

The Cognitive Foundation
of Empirical Social
Sciences Research

A Story of Research Companionship

Karl H. Müller | Niko Toš

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Tabel of Contents

Foreword	7
About the Book	11
Acknowledgements	29
Part I – New Cognitive Foundations and Enviroments for Survey Research	31
1 Towards New Cognitive Foundations for Survey Research	33
2 New Cognitive Environments for Survey Research in the Age of Science II	53
Part II – Methodological Aspects; Morphological Access to Comparative Analysis	75
3 The Third Road for Comparative Research: Morphological Designs	77
4 Towards New Frontiers in Comparative Survey Research	111
Part III – The Concept of RISC in the Development of Modern Societies	155
5 The RISC-Program: An Experiment in Trans-Disciplinary Knowledge	157
6 RISC-Processes and Societal Coevolution: Towards a Common Framework	173

7	Micro-foundations of Risk Societies in Slovenia and Europe I: Basic Concepts and New Inequality Scales	223
8	Micro-foundations of Risk Societies in Slovenia and Europe II – Towards High Theory	253
Part IV – Empirical Analysis and Examples		271
9	Living Conditions, Socio-Economic Risks, Inequality and Health. Establishing New Theoretical Foundations and Closer Empirical Linkages	273
10	The Organization of Modern Societies: Core-Periphery or Vertically Stratified?	303
11	Trust in Institutions of the System – European Comparisons – and Slovenia	325
12	Comparative Analysis of Religiosity – in Slovenia and Central and Eastern European Countries	373
Bibliography		405
Authors		427
First Publications		445
Index		447

Foreword

The book *The Cognitive Foundation of Empirical Social Science Research – Research Companionships* is an exceptionally rich and insightful work that addresses multiple dimensions of sociological inquiry, analysis, and critical reflection. Written by Karl H. Müller and Niko Toš—both renowned for their expertise and international research achievements—it makes a significant contribution to the contemporary development of sociology. By integrating theoretical reflection with empirical research and concrete examples, the book offers valuable insights into the complexity of modern society for a broad readership that includes scholars, students and practitioners.

In the introduction, the authors reflect on their long-standing research collaboration and emphasize the importance of critical thinking in the social sciences and the continual search for innovative methodological approaches. After having first met in the late 1980s in international research groups focused on values, Müller and Toš began to collaborate in the early 1990s and continued their partnership for decades. Over the years, they developed a shared critical perspective on established social science practices and a commitment to exploring new methodological pathways for advancing sociological research.

Research Companionships compiles a selection of texts written between the late 1990s and early 2010s. These writings reflect the authors' evolving research perspectives and shared insights over time. All contributions were previously published in respected academic journals or as chapters in books and monographs. The essays address pressing social processes and highlight key theoretical, epistemological, and methodological issues, particularly from the vantage point of comparative research on modern societal development. Central to the volume is the concept of RISC (Rare Incidents, Strong Consequences), which the authors explore in depth as a key lens for understanding transformative events in contemporary social life. Several thematic empirical studies are also included, offering diverse perspectives on key sociological challenges.

The book is structured in four parts, each devoted to a distinct thematic and methodological area of sociological research. The selection of articles and essays—produced over more than two decades—offers a window into the development and diversity of contemporary sociological thought.

The first part, “New Cognitive Environments for Social Survey Research,” addresses the challenges researchers face in adapting methodologies (both quantitative and qualitative) to complex cognitive and technological contexts. It includes the discussions “Towards New Cognitive Foundations for Survey Research” and “New Cognitive Environments for Survey Research in the Era of Science 2.0.” By exploring the intersection of cognitive processes and research methods, these texts offer new perspectives on how we study and understand social complexity, in turn laying the groundwork for understanding the key concepts, methodological approaches, and theoretical backgrounds of modern sociology.

The second part, “Methodological Aspects: Morphological Approaches to Comparative Analysis,” focuses on comparative research designs and morphological methods in contemporary sociological research. It includes the essays “The Third Way to Comparative Research: Morphological Design” and “Towards New Frontiers in Comparative Survey Research,” which provide a critical overview of methodological innovations and their practical applications in comparative studies.

The third part, “The RISC Concept in the Development of Modern Societies and as a Direction in Social Science Research,” explores the theoretical and empirical implications held by the RISC framework—Rare Incidents, Strong Consequences—for analyzing modern societies. Three essays—“The RISC Program: An Experiment in Transdisciplinary Knowledge Production at the University of Ljubljana,” “Microfoundations of Risk Societies in Slovenia and Europe: Towards a High Theory,” and “Basic Concepts and New Scales of Inequality”—examine how low-probability, high-impact events reshape institutions, risk perception, and inequality in European contexts.

The fourth part, “Empirical Analyses and Illustrations,” presents comparative and nationally focused empirical studies on themes such as living conditions, inequality, trust, religiosity, and institutional legitimacy. By analyzing diverse social processes from multiple perspectives, the authors illuminate societal intricacies and encourage reflection on sociology’s role today. This chapter provides a deep exploration of modern society’s complexities and the challenges in sociological research. It includes the following discussions: “Living Conditions, Socio-Economic Risks, Inequality, and Health: Establishing New Theoretical Foundations and Stronger Empirical Links,” “The Organization of Modern Societies: Core-Periphery or Vertical Stratification?,” “Trust in System Institutions in Slovenia and Eastern European Countries,” and “Com-

parative Analysis of Religiosity in Slovenia and Central and Eastern European Countries.” These contributions offer both theoretical framing and empirical depth, opening new avenues for sociological reflection.

Taken together, *Research Companionships* represents a significant contribution to contemporary sociology. The authors—internationally respected figures in the field—provide critical, wide-ranging, and methodologically grounded insights. The volume spans fundamental sociological concepts and current social problems, including migration, globalization, the environmental crisis, and social justice. Through clear argumentation and empirically grounded case studies, the book supports both newcomers to the field and experienced scholars in navigating the complexity of modern social life. In so doing, it also raises important ethical and epistemological questions about the limitations and responsibilities of sociological research.

In conclusion, *Research Companionships* is essential reading for anyone interested in the contemporary developments and future paths of sociology and the social sciences more broadly. By weaving conceptual innovation, methodological critique, and empirical inquiry together, Müller and Toš offer a model of collaborative scholarship that deepens our understanding of social transformation and strengthens the cognitive foundations of empirical social research.

Ljubljana, December 30, 2024

Slavko Splichal

About the Book

A Story of Research Companionship

Karl H. Müller and Niko Toš

In the preface, Slavko Splichal¹ writes that the authors of the book *The Cognitive Foundation of Empirical Social Sciences Research*, as internationally active sociologists, began meeting in international research groups on values in the late 1980s. At the turn of the 1990s, we connected and began collaborating on research that continued up until recently. And that is true. Our long-term cooperation was not aimless; over time, it developed into a program that we defined in the book's subtitle as "research companionship"—a shared direction in our investigations and analyses, always within narrower or broader collegial circles, focusing on key societal issues while critically evaluating social science research practices and seeking new methodological solutions.

Throughout, our work took place in the domain of intercultural, international, and comparative empirical research, serving as a substitute for the experimentation found in the natural sciences. In the last quarter-century, it was especially focused on the extraordinary "space" of problem-oriented, epistemological, and methodological development represented by the European Social Survey (ESS) between 2000 and 2025.

Our collaboration unfolded in several smaller joint projects and consultations, and most visibly through co-authored publications and articles. We also tackled broader thematic discussions as editors of books with invited contributors of monographic chapters, or as co-authors of books. We encouraged colleagues—our "research companions"—to join in the analysis and writing or supported them simply with the publication of their monographs.

The concept of "research companionship" refers to an open-ended program that consistently included broader or narrower networks of sociologists and

¹ All the individuals listed are authors or co-authors of contributions in the books or of the books themselves (1–10) presented in this text. Their research areas, academic roles, and achievements are briefly described in the appendix "Research Companions" at the end of the book.

was closely tied to most of our book projects, as seen in the following section of this essay.

We present ten selected books that emerged within the framework of this program—five were co-authored by us (5, 6, 7, 8, 10)², three were jointly conceived and edited (1, 2, 3), one resulting from a symposium on Modern RISC Societies and edited by a broader editorial team (4) and, finally, books written by colleagues that we encouraged to engage in analysis and writing, reviewed their work, and supported their publication (7, 8).

Among these, book (9) stands out as it exemplifies—via the experience of one of us—the breadth and parallel nature of the networks of companions that served as the foundation for intercultural, international comparative research.

Below, we present the ten books in chronological order. For each, we include a summary taken from its preface, written either by invited reviewers or the authors themselves. The names of the monograph authors are also listed, illustrating the scope of the research companionship network we built in over three decades of collaboration and friendship.³

(1) Toš / Müller, eds.: Political Faces of Slovenia, Political Orientations and Values at the End of the Century (Edition Echoraum / Wien, 2005)

As noted by J. Potočnik in the preface: “The authors of the book you are about to read have embarked upon a demanding and complex intellectual project. Their aim is to present to the European reader the main characteristics of Slovenia’s political developments in the past couple of decades, its specificities and the underlying reasons for the path towards independence and European integration. The celebration of the first anniversary of Slovenia’s membership of the Union is a good occasion to effectively reflect on this and to draw some conclusions. In many aspects, Slovenia occupied a special position in Europe within the last couple of decades.”

“I welcome this book as a particular proof of vitality of Slovenia’s political and economic arrangements which enable the country to successfully take part in the development of the European Union. The comprehensive assessment of

2 The numerical labels correspond to the books presented in the following section.

3 Most of the listed authors come from, or are affiliated with, our research environments (Wisdom, Vienna; Public Opinion and Mass Communication Research Centre, Faculty of Social Sciences, University of Ljubljana).

the past development of Slovenia, the comparative nature of the study and the wide variety of the subjects analysed (social, gender, environmental, religious etc.) which goes beyond pure analysis of the political system, give a fascinating overview of the Slovenian institutional “laboratory” as the authors call it. In this sense, I am convinced that the book will find the interest of both policy makers and political scientists not just in Slovenia but also across Europe. There is always something new to learn and there is plenty of it in this book” (Potočnik 2005).

To this, we, the authors, added:

“Working together across national boundaries and across different languages requires a coordinated effort by a large number of persons. In our case, the volume has been the first in a hopefully long series of books under the common heading of complexity, design, and society. Moreover, it was the first book in which we tested our new layout as well as our new publishing and graphic programs.”

The book comprises 16 chapters written by researchers from our research groups in Vienna and Ljubljana. A total of 17 co-authors contributed to the writing of these chapters, mostly from the Ljubljana group—as well as from the Vienna team.⁴

(2) Toš / Müller, eds.: Three Roads to Comparative Research: Analytical, Visual and Morphological (Edition Echoraum / Wien, 2009)

In the preface, Ivan Svetlik writes: “In the course of the next two years the European Union with its member states will open its borders for free and unrestricted movement of employees across all EU countries. The new era of a European labour market will generate a new wave of challenges for nationally oriented labour market policies, for the national institutional arrangements of social partnership and cooperatist regimes and for employment and labour market policies at the European level. Somewhat surprisingly, the new era of European labour markets implies dramatic changes for the social sciences across Europe too, which, so far, have followed national agendas as well.

⁴ The listed authors/co-authors (with the number of contributions in parentheses) include: K. H. Müller (3), Günth Nemeth, and Dieter Ringler—all affiliated with Wisdom, Vienna; V. Miheljak (2), Brina Malnar (2), Ivan Bernik (3), Niko Toš (5), Janez Štebe, Slavko Kurdija, Mitja Hafner-Fink, Tomaž Volf, Matej Kovačič, and Samo Uhan—professors and researchers at the Public Opinion and Mass Communication Research Centre, Faculty of Social Sciences, University of Ljubljana (FSS UL).

For European labour market policies, the primary challenges lie in adequate coping with the multiplicity of levels and in intelligent designs for European and national activities. More specifically, the next years and decades will bring the formation of European employment programs, the implementation of common European minimal standards, the harmonization of unemployment systems and a quick transfer of national best practice policies in the field of labour market policies to other European areas.”

“Coming from the social sciences myself, it is quite remarkable that only in recent decades the social sciences have faced and taken up the dual challenges of becoming European and, equally important, becoming global at the same time. The global challenges are manifold and highly complex and will not be discussed further in the present context.”

“But the European challenges turn out to be highly complex and diversified, too. One of these challenges lies, for example, in the current information systems for employment and professional qualifications which, so far, were clearly restricted by their national boundaries and which were developed for decades and even centuries within national confines.”

“Europe turns out to be one of the deep social science problems, too, because it leads to a re-thinking of what constitutes professions, qualifications and what can be used as a frame of reference for comparisons. Likewise, comparative research on the different levels of regional, national and supranational trajectories of employment systems and of labour markets becomes another highly intriguing issue which will require a large number of new approaches as well.

Seen from this perspective I highly welcome the edition of this new book because it shows some of the traditional and some of the new ways how to deal with the process of Europeanization in the area of labour markets and employment systems. Moreover, the three roads to comparative research, which were used in this volume, offer a variety of comparative results and patterns for Central and Eastern Europe.

I hope that this book contributes to an improved understanding of the complexities of the European project and to a widening of our current approaches in comparative research. Finally, amidst the current turmoil in the financial markets and in industrial production, I hope that this volume will be used not only by social scientists but by policy makers as well in order to keep them aware of the difficult paths and of the enormous challenges ahead (Svetlik 2009).

Nineteen authors from six European research centers contributed to the writing of fifteen chapters of the monograph.⁵

(3) Toš / Müller, eds.: Primerjalno družboslovje. Metodološki in vsebinski vidiki / Comparative Social Science. Methodological and Substantive Aspects (Dokumenti SJM, Fakulteta za družbene vede, UL / Ljubljana, 2010)

“Much could be written about international social science; some has been, and much more will be. But over the years the capacity to compare nations has been improved, one of the results of many people learning a lot of little things. The question is whether that capacity will be well used. At the moment the potential considerably exceeds the product”.

This thought was expressed by Henry Teune (Teune 1990) at the symposium on the state and perspectives of comparative social science research in 1989⁶ in Ljubljana:

“And at least since Durkheim, it is undisputed that the comparative method is inherent to sociology, that it is its cognitive foundation, and therefore it is possible to write about comparative social research, much has already been written and much more will be. During this time, international comparative research has expanded significantly, new knowledge and experiences have been gained, many new comparative projects have been conceived and carried out; new comparative longitudinal programs have been developed, which include many nations and cultures; extensive social science data, files, and archives have been created ... And the question arises whether all the possibilities have been exploited, since it seems that they still far exceed the results of the analyses. Since this thought comes from a social scientist who, in the 1960s, laid the foundations for modern international comparative research, his warning and guidance are especially valuable.

Slovenian empirical social science has also made a big step—actually two, with an intermediate pause—into the realm of international comparative research from the mid-1960s to the present. In the first This step, from the mid-1960s to the early 1970s, when Slovenian (also Yugoslav) sociology professionally and

5 The following are the names of the authors and co-authors of the individual chapters: Karl H. Müller (3), Niko Toš (3).

6 The conference took place in the framework of the ISS, the Research Council, and the Faculty of Social Sciences, UL. The conference initiators were Zdravko Mlinar, Slavko Splichal, and Niko Toš, in connection with the idea of establishing the International Sociological Institute in Ljubljana and Paris.

institutionally developed and strengthened, when it seemed that political conditions were favorable, and when Yugoslavia, with its system-specific characteristics, attracted the interest of American and European sociology, this was reflected in its opening up to the international space. A series of international projects involving Yugoslavia were initiated—and Slovenian sociologists played an important role in this (Mlinar, 2006). In the early 1970s, there was a setback.

Political constraints did not only affect comparative research but social science research as a whole. The re-opening of conditions for research coincided with the deepening of the social crisis and the disintegration of the system in the 1980s. Slovenian sociologists made efforts to re-enter the international research space in the second half of the 1980s, and in the early 1990s, after the country's independence⁷, this largely happened. We joined all the major infra-structural social science empirical research programs that were created at the end of the 1970s in international social science and were already in full swing in the 1980s. These include: the European (EVS, 1991) and World (WVS, 1991) Value Surveys, the International Social Survey Program (ISSP, 1990), the Comparative Study of Electoral Systems (CSES, 1993); we participated in the design of the European Social Survey (ESS, 2000). With this, we expanded and deepened the possibilities for international comparative research and the inclusion of Slovenia (as a reference unit) into the realm of international comparative analysis, and this is what this book discusses" (Toš 2009).

In writing the 16 chapters, which represent the work, researchers associated with Wisdom, Vienna, and the Center for Public Opinion Research at FDV, Ljubljana, participated, with the exception of Karl H. Müller.⁸

(4) Kajfež-Bogataj / Müller / Svetlik / Toš, eds.: Modern RISC-Societies. Towards a New Paradigm for Societal Evolution (Edition Echoraum / Wien, 2010)

The foreword signed by the editors of the book describes how:

"This book has been the outcome of trying something new and innovative in the field of inter- and trans-disciplinary research on societal issues, past,

7 And sociological research during this period, especially public opinion surveys, confirmed the independence aspirations of the Slovenian population. For more on this, see: Toš, N., Klinar, P., Markič, B., Roter, Z., Mlinar, Z., and Rus, V. (1995): *The Maturing of Slovenian Self-Awareness*; SJM Documents, CJMMK, Faculty of Social Sciences, Ljubljana.

8 The authors/co-authors of the 16 chapters in the book are: Karl H. Müller (3), Niko Toš (5), Zdravko Mlinar, Slavko Splichal (2), Brina Malnar (2), Slavko Kurdija (2), Mitja Hafner-Fink, Veljko Rus, Janez Štebe

present and future. Like in most innovative attempts in this area, one should be reminded of three important features of innovation processes in general.

First, Michael Vance stresses the peculiar fact that innovation processes should not be seen as radical departures, but in an intimately close relationship with their old environments.

“Innovation is the creation of the new or the re-arranging of the old in a new way”.

Consequently, the new RISC-framework takes large quantities of building blocks from traditional research across the natural or social sciences areas but provides a re-arrangement or, alternatively, a recombinative and integrative design for these many diverse and isolated components.

Second, Sir Francis Bacon [1561–1626], in his “Essay on Innovations,” provides another important hint on innovation processes, namely the imperfect nature of the early stages of innovations which applies quite naturally to the emerging RISC-framework as well.

“As the births of living creatures, at first, are ill-shapen: so are all innovations, which are the births of time”.

With respect to the future path of RISC-research, Woody Allen gives a consolatory assessment even for the case of failed innovations.

“If you’re not failing every now and again, it’s a sign you’re not doing anything very innovative”.

In this sense, the general new outlooks and perspectives on the evolution of RISC-societies, even in the case of their unsuccessful diffusion, remain an honest attempt to address urgent societal problems in a genuinely new way.

It should be emphasised that the present book in its final design fits very well into the overall context of the book series with its emphasis on complexity research or on new research designs, new methodologies or, as an essential element, new perspectives on the evolution of societies.

We sincerely hope that the results of this book enable researchers in the field to widen their current perspectives on societal evolution significantly and to open up new ways for an inter- and trans-disciplinary research of contemporary societies with exciting and innovative results”.

- (5) **Müller / Toš: Towards a New Kind of Social Sciences (Edition Echoraum / Wien, 2012); The Slovenian translation of the book Müller / Toš: Naproti novim oblikam družboslovja (Dokumenti SJM, Fakulteta za družbene vede UL, Ljubljana 2020).**

We, the authors wrote in the preface: “This volume is the result of a large research project which runs under the name EECO-LAB⁹ and has its main focus on the European Social Survey (ESS) and on generating the data for the ESS.”

“The volume compiles a series of jointly produced articles on ESS-data, on survey methodology and on the interpretation of survey data. Three general themes can be specified which lie at the heart of this book.

The first major theme which provides also the necessary background focuses on an ongoing phase transition in the overall science landscapes from a traditional configuration under the name of Science I to an emergent ensemble under the heading of Science II. This transition from Science I to Science II becomes the central issue of Part I.

The second major theme discusses the impact of the transition from Science I to Science II for empirical social research, especially for survey research. Traditional empirical survey research was built very much along the line of Science I-assumptions and conditions. The new configuration of Science II poses very serious and significant threats to survey research both with respect to the underlying survey methodology as well as to the organisation of surveys and the analysis of survey data. Part II discusses the consequences of Science II for the survey methodology and Part III points to new possibilities in the area of survey constructions and of data analysis.

The third major theme introduces the notion of RISC-societies (Rare Incidents, Strong Consequences) as a general evolutionary framework for societal analyses. The final grand theme centres on the overall organisation of RISC-societies in two different aspects or dimensions. The first issue lies in the specification of basic societal structures for contemporary RISC societies.

Here, the crucial question lies in the structuration of full-time employment in contemporary RISC-societies. Does full-time employment corresponds with a stable core-periphery organisation or with a strongly vertical organisation where full-time employment is strongly vertically stratified and other forms of

9 EECO-LAB: Eastern European Co-operation on Labour, funded by Austrian Federal Ministry of Labour.

employment or even unemployment follow the distinctions within full-time employment. The second aspect or dimension focuses on societal inequality and in its impact on health conditions.

These three major issues seem even at second glance sufficiently interesting, diversified and relevant to be analysed in a special volume.”

“It should be emphasised that the present book in its final design fits very well into the overall context of the echoraum-book series with its emphasis on complexity research or on new research designs, new methodologies or, as an essential element, on new information designs. It is hoped that the rather unconventional ways for survey research will meet the interest of social scientists across Europe who search for novel ways and methods in survey research and analysis. It is worthwhile to contemplate an old quotation from enlightenment times, namely from Denis Diderot.

“There are things I can’t force. I must adjust. There are times when the greatest change needed is a change in my viewpoint”.

We sincerely hope that the chapters and articles presented in this volume exhibit some of the changes we have taken over the last years. Moreover, we wish that the cognitive changes indicated in this volume enable researchers in their fields to widen their current tool-box significantly and to open up new ways for social research with exciting and innovative results.”

(6) Malnar¹⁰ / Müller: Surveys and Reflexivity. A Second-Order Analysis of the European Social Survey, ESS (Edition Echoraum / Wien, 2015)

The book signed by K.H. Müller and B. Malnar was created within the same “companion program” and serves as more evidence that our research collaboration was open and continuously directed to the central substantive, epistemological, and methodological aspects and dilemmas related to the orientation, implementation, and evaluation of the results of fundamental social science (infrastructural) programs, particularly the ESS. Throughout, we have attracted and included researchers, encouraging them to deepen their analyses of complex phenomena, problems, and methodological aspects.

10 Malnar, Brina.

The fact that the Survey and Reflexivity focused on the ESS in its treatment of Second Order Analysis only confirms that this research, which closely connected us, was of exceptional importance. Even in its conceptualization, it was clear that we were developing a key European empirical social science infrastructure.

It is appropriate to refer to the foreword by Max Kaase, one of the intellectual fathers of the ESS, who, in the foreword for “Surveys and Reflexivity”: Some Thoughts, wrote:

“In writing about the ESS, inevitably my first thought goes to Roger Jowell who passed away (2011). With Roger, institutionally the ESS has lost its spiritus rector in the development from the 1999 “Blueprint for the ESS” to the whole process of implementation. In the contemporary rational world the saying goes that there is nobody who cannot be replaced if necessary, but there are reasons to doubt that this is always true“. Work on developing the ESS started in 1995 with a decision by the Standing Committee for the Social Sciences (SCSS) of the European Science Foundation (ESF) to accept my proposal to set up an “Expert Group” studying the feasibility of the ESS idea. This idea had originated from my experience with the comparative “Beliefs in Government”¹¹ project which I had directed jointly with Kenneth Newton between 1988 and 1995. Funding of the Expert Group was to come through contributions by interested national research councils, following the then extant a la carte mode of funding research through ESF.

The group produced a written report in 1996 and proposed to the SCSS to vigorously pursue the ESS concept by developing a detailed document (blueprint) for the steps envisaged to bring the ESS to life. The expert group report was accepted by the members of the SCSS who followed its recommendations and particularly emphasised the need for such a blueprint to be first discussed and accepted at a later point in time by the SCSS to be finally presented for approval to the ESF General Assembly. This was effected in 2000 and so set the stage for what over the years has become the ESS. Looking back from the contemporary situation of the ESS after having been transformed, in November 2013, into a European Research Infrastructure Consortium (ERIC)

11 The research collaboration between N. Toš and K.H. Müller dates back to the second half of the 1980s while completing the Belief in Government project. In 1999, the Slovenian translation of the final book by M. Kaase/K. Newton and N. Toš was published: *Zaupanje v vlado* (Trust in Government)—with an extensive chapter on *Zaupanje Slovencev v demokratični sistem* (Trust of Slovenians in the Democratic System), by the Liberal Academy and the Scientific Library of FSS, UL, Ljubljana.

under the auspices of the European Commission, it is hard to believe what all involved in this complicated process have been jointly able to achieve.

But time has gone by, and I now strongly believe that the ESS needs expansion and innovations in order to remain what wanted it to be: a top-notch multi-dimensional infrastructure for the social sciences.

In this context I find the book edited by Brina Malnar and Karl H. Müller of particular relevance. Karl H. Müller was involved in the ESS from its early stages, first as a member of the Steering Committee and, later, as the national ESS-coordinator for Austria, as in Cyprus, he gave a fascinating lecture on three grand challenges for the ESS which is now published in this volume. Brina Malnar, from the University of Ljubljana over the last couple of years has invested a lot of effort in analysing the annual record of publications using ESS data. As one would expect, from 2002/2003 on when the measurement started with 18 entries, this number has now substantially increased and for the year 2014 alone 381 publications were found which worked with data sets from the ESS. This achievement is even more remarkable considering that the share of peer-reviewed journal articles has increased from 24,1 % in 2004 to 56,1% in 2012. Publications thus are a benchmark which the ESS ERIC has to observe closely in the future and this, incidentally, provides already a strong argument in favor of continuing to collect the information of which and how many publications are based on ESS data.

But the book “Surveys and Reflexivity” adds three important points which go well beyond collecting information on ESS-publications.

First, survey research and the scientific environment in which it flourishes are in permanent flux and have undergone significant transformations in recent years. These scientific changes and transitions are summarised in Part I of the book which not only deals with three grand challenges for the ESS, but in a more general vein also addresses great transformations for the science system as a whole.

Second, the results of investigating ESS publications have been placed in a new and wider context of second-order survey research which is presented in a systematic way in Part II of this book. Thus, the collection of ESS- publications, though significant and important, is not the only research task in this domain. Second-order survey studies as a new field offer a multiplicity of innovative perspectives which will be a challenging task in its own right to be pursued in the future.

Third, this book provides also a blueprint or a strategy to broaden the ESS ERIC substantive and methodological research approach. Part III of the book describes such additional ESS-components which reside on different science levels and which are focused on specific research objectives and tasks. In the final chapter, the overview of reflexive research designs which offer additional options for survey research as well very fittingly concludes the book.

“Surveys and Reflexivity” presents many suggestions which should be discussed not only within the ESS-community, but also within and among European social science research infrastructures and presents even challenges for survey research in general. Obviously, definite answers on the feasibility and on the potential financial support necessary for installing all the activities which are proposed by Karl H. Müller and Brina Malnar will not easily be come by. But this type of input and new perspectives for advancing the ESS are needed in order to keep the ESS in its leading role as a provider of research infrastructure support as well as of high quality research for the European social science community and beyond”.

(7) Hafner-Fink / Kurdija / Uhan: Social Research: from Paradigmatic Divide to Pragmatic Eclecticism (Edition Echoraum / Wien, 2017)

The book was written by Mitja Hafner-Fink, Slavko Kurdija, and Samo Uhan.

It was created in the framework of the “research companionship” program. In the introduction, the authors write:

“In the book, we link certain aspects of social research stemming from conflicting paradigmatic standpoints: on one hand, we consider issues of survey research as a typical representative of the quantitative approach based on positivism and, on the other, the problem of grounded theory as a paradigmatic reference of the qualitative approach. Today, when various approaches to the integration (combination) of methods from different paradigmatic positions are increasingly being applied in social research, this should not be seen as unusual. However, if we add that all of the books authors are primarily ‘involved’ in, at least at first glance, what is paradigmatically the most typical quantitative research, namely, in social surveys, this slightly changes the assessment. We proceed from our own experience in researching public opinion and from international comparative social surveys conducted by the Public Opinion and Mass Communication Research Centre (POMCRC) at the Faculty of Social Sciences of the University of Ljubljana.

We believe that for any successful social survey placed in the positivist tradition, certain principles of the interpretive approach and constructivism should also be taken considered. The survey situation is essentially a 'social event', mainly based on the communication between the researcher and the respondent. This social event' (the whole context of the survey interview) no doubt has an important role in how respondents form answers to survey questions. Therefore, the image of society we present with the data collected in the survey is partly also a result of this 'social event'. The outcome of exploring people's attitudes and opinions with a survey is therefore not merely a 'neutral' image of the actual situation in society, but we can say it is also a 'construct' of this situation (cf. Krippendorff, 2005). If we consider the thesis on the social construction of reality (see Berger & Luckmann, 1988), then we can say that the phenomenon we reveal through opinion polls would not have existed without this survey. By doing so, we have certainly moved to an area which, at the time of the paradigmatic split, almost exclusively fits on the qualitative side and within the framework of constructivism.

If, accordingly, quantitative researchers pursue the quality of survey data as their key (methodological) goal and accept the thesis of constructing social reality, then, of course, they cannot avoid questions they are unable to answer simply by 'juggling' numbers or statistical calculations. They should also take the principles of the 'opposite' side into account, namely the interpretative paradigm and constructivism, and specifically a qualitative research strategy based on them. Thus, in developing and testing the survey questionnaire – the measurement instrument of the most typical quantitative social science research – researchers often use cognitive interviews, which are a typical qualitative method (cf. Willis, 2015). When accepting the thesis on the survey situation as a factor in the construction of social reality, it is also not surprising that researchers are dealing with the problem of the context of the survey situation, along with the broader social and cultural circumstances of conducting the survey...".

"As mentioned at the start, one trend in contemporary social science research is to combine qualitative and quantitative approaches (methods). This is also a reflection of the complexity of the research problems that social scientists are addressing. Let us consider just a few aspects of such complexity: a) multi-level research (micro - macro); b) research problems often require an interdisciplinary approach; and c) applied research often involves other actors in addition to researchers. We can say that, even during a period of the greatest paradigmatic divisions, for purely pragmatic reasons researchers in practice of-

ten ‘forget’ about these divisions and use qualitative and quantitative methods within the same research. In this context, international comparative research is especially interesting, where the ‘qualitative-quantitative’ divide was particularly present, and at the same time, due to the complexity of comparative research problems the need to overcome this division has emerged (cf. Ragin 1987). International comparative research is a typical example of combining different research levels – especially when considering the following: data are often collected at the micro level (for example, through a social survey of individuals), while research conclusions are presented at the macro level (e.g. at the level of nations or countries). The complexity of cross-national comparisons (particularly when comparing complex macro-social units) is thus a key argument for combining methods or even synthesising qualitative and quantitative approaches in the comparative research context (cf. Ragin 1987; Rihoux & Ragin, 2009).

(8) Ule¹² / Malnar / Kurdija: Health and Medicine in Transition (Edition Echoraum / Wien, 2017)

The analyses were conducted and written by Mirjana Ule, Brina Malnar, and Slavko Kurdija. The monograph updates research in the field of the sociology of health and healthcare—a field first entered by Slovenian empirical social science with the Attitudes toward Health and Healthcare survey in 1982¹³. This was later continued in the framework of the “research companionship” program during the 1990s¹⁴ and further developed through thematic modules and blocks on health and healthcare within international comparative programs like the ISSP and ESS.

In the introduction to the book, the authors write:

“Modern medicine is one of the biggest achievements of the 20th century, among the strongest life-influencing factors in contemporary societies and a main reason that people are living longer and more active lives. It is also one of the largest industries and a source of many ethical controversies such as the question of patients’ autonomy and integrity, the issues of unequal access, overmedication and similar. In today’s societies, the discourse of science and

12 Mirjana Ule.

13 Toš, N., Malnar, B. (Eds.). (2002). *Social Aspects of Health. Documents of the Slovenian Public Opinion (SJM)*, Faculty of Social Sciences, University of Ljubljana.

14 K.H. Müller, G. Nemeth, and N. Toš (2002). *Living Conditions, Socio-Economic Risks, Inequality, and Health – New Theoretical Foundations and Major Empirical Connections*.

expert knowledge lies at the heart of the dominant ideology and, as social scientists have pointed out, this is from where modern medicine draws its power. Being science-based, medicine is also believed to be close to the interests and values of the dominant social classes (i.e. knowledge classes), which tend to offer it generous support by subscribing to its ideology of healthy living and using its products and services. However, analysts have also observed a growing disagreement between medicine and the ruling neoliberal capitalist system in Western societies. On one hand, modern medicine in general and doctors in particular have benefited enormously from the health insurance system and other welfare state programmes, as well as from the emergence of a mass market of health products. On the other, the work of medical professionals has become more and more controlled by actors in the public and private arena, such as governments and private companies. The pressures seem to be increasing from both sides. There is also a tendency in Western countries to rationalise health care, which is another development undermining the authority of modern medicine. In such an economic and political context, managers, economists and advertisers are competing with medical professionals for the role of the dominant experts who will define the optimal criteria for medical practice.

In this way, the boundaries of medical knowledge are increasingly being set by politics and capital, and not by the inherent logic of the medical profession and science, a process which may ultimately undermine medical knowledge itself (Coburn and Willis, 2000). The view that the power of medical professionals is based on the rarity and elitist nature of medical expertise rests on the assumption that, apart from some marginal parts, medical practice cannot be routinised and reproduced. What can be reproduced are technical procedures inherent to the medical practice, but not the knowledge, skills and experiences of doctors, it is assumed. In other words, the proportion of medical expertise that does not render itself easily to reproduction and routinisation will determine how much exclusivist power modern medicine still possess. As of late, some experts have observed that the development of the field of medicine is going in the direction of a greater possibility of routinisation and even concluded that medicine is being proletarianised. The more technical medical practice becomes, the more its exclusiveness and prestige are reduced (Coburn and Willis, 2000).

It therefore seems that in the 21st century the growing influence of medicine observed in the last 100 years or so is being counterbalanced by various forms of its social dependence. As already noted, the big supervisor of the

population's health practices is increasingly becoming supervised itself, particularly by governments, as well as health and social insurance systems. All of these players are becoming ever more involved in the financial aspects of health care, a process which brings about closer monitoring of medical professionals' work. In many respects, medicine seem to be losing its previously held position of an autonomous, self-sufficient system of health care, and its undisputed authority to draw the line between illness and normalcy. However, the fact that medicine has been pushed into a more dependent and less autonomous position precisely in the era of the sweeping *médicalisation* of modern societies is quite ironic. Nevertheless, we should not lose sight of the fact that modern medicine still exercises an extremely strong influence over society. This influence is further empowered by structural factors such as the spread of chronic illness due to demographic shifts in Western societies, particularly longevity and the ageing of populations. Further, new approaches to healing promote the view that all of us are continuously at a health risk. Another source of its social visibility and presence in the public discourse are biomedical innovations and genetic technologies that generate new ethical dilemmas, visions and utopias about new forms of society.¹⁵

(9) Malnar / Müller, eds. (2017): Societal Enlightenment in Turbulent Times. A Festschrift for Niko Toš (Edition Echoraum / Wien, 2017)

Edited by K.H. Müller and B. Malnar, this book was created in honor of the recent anniversary (1934–2014) of Niko Toš. The authors of the 14 contributions are European and American “research companions”, distinguished social scientists, and personal friends with whom Niko Toš had strong ties and collaborated collegially for several decades.

The contributions are divided into three parts.

In Part I: Others on Social Research and Social Science Research Infrastructures. Slovenian and International Perspectives, the contributions include:

15 In addition to books (7) and (8), the “companionship” program can be credited with the following publications:

- Toš / Mihelj, eds. (2002): *Slovenia Between Continuity and Change, 1990–1997*; published by Wissenschaftszentrum Berlin für Sozialwissenschaften; Sigma Verlag, Berlin;
- Pavlin / Deželan / Svetlik, eds. (2013): *Challenges of Citizenship in Higher Education*; Edition Echoraum, Vienna;
- Ule / Šribar / Umek-Venturini, eds. (2015): *Gendering Science: Slovenian Survey in the EU Paradigm*; Edition Echoraum, Vienna.

(1) A Tribute to Prof Emeritus Dr Niko Toš written by Ivan Svetlik; (2) Social Research in Austria from its Early Days to the Late 1970s, Anton Amann; (3) On Austrian Social Science Research Infrastructures, Anton Amann / Karl H. Müller; (4) Research Infrastructures in the Social Sciences. Generic View and a Concrete Example, Peter Farago (5) Institutional Environments and Organisational Performance in Basic Biomedical Science, R.J. Hollingsworth / E.J. Hollingsworth/ D.M. Gear; (6) The ESS as a ‘European Success Story’, Max Kaase; (7) Prolegomena to a Comparative Second-Order Analysis of the World Values Survey, Hans-Dieter Klingemann (8) Informing Academic and Policy Communities: The Case of the European Social Survey, Brina Malnar | Milan Šinko; (9) Vision and Mission: The Dynamics of Social Research Data Infrastructure, Ekkehard Mochmann; (10) European Social Sciences and its Research Infrastructure: 10 Years On, John H. Smit; The Case of Slovenian Social Science Data Infrastructure – ADP (Archive of Social Science Data), Janez Štebe / Sonja Bezjak; and (12) My Long and Robust Relationship with Niko Toš, Paul M. Zulehner.

Part 2: Scientific Cultivations in Face of Turbulent Times

(13) Niko Toš and the Unfolding of Science Domains: Cultivating Diversity or Coherence? Karl H. Müller.

Part 3: Achievements and Milestones of Niko Toš

(14) Niko Toš, Pioneer for the Social Science and for Social Science Research Infrastructures in Slovenia, Tine Hribar Zdravko Mlinar / Veljko Rus.

* * *

And here we are with the book (10) Müller / Toš, **The Cognitive Foundation of Empirical Social Sciences Research** (Scientific Library, Faculty of Social Sciences, University Ljubljana, 2025), undoubtedly the final book in our long-standing research partnership, both between us and within the intertwined sociological network, featuring a large group of sociologists, as shown in book projects 1 to 9.

In the Foreword, Slavko Splichal describes at some length how we conceived this book. We have nothing to add to that, nor to subtract. We can only say that this is just one of many later and parallel research Companionships – in the most recent period, in the time that is running out. However, for both of us, it is the most important.

And this time that is running out is primarily the social, planetary time. The disintegration of ruling systems, the decay of fundamental arrangements and values in relations between blocs, regions, states, cultures.... with the endless expansion of disparities, discrimination, genocidal wars, this dystopian state of world societies defined by the concentrated power of capital demands a return to the foundations. It calls for a struggle for a new social order, for ethical foundations in reordering relations between societies and the planet, for their survival; it demands a struggle for new anthropological foundations in the arrangement of world societies, states, and relations between groups and the individuals within them. And we did not write about all of this in this book. Is this a call for a cognitive effort, a call for the rebellion of social scientists, sociologists?!

Vienna / Kamnik, December 30, 2024

Acknowledgements

The story of research companionship may indeed be, as our friend Max Kaase argues, a “success story,” not just about our critical reflections, analyses, and writings on the substantive, methodological, and cognitive-theoretical aspects of empirical social science research. When this, for example, is developed in Germany as “Empirische Sozialforschung,” it almost becomes an independent social science discipline with its own topics and methodology. It is about a research partnership, about the connected, inclusive research activity of a large number of social scientists and other professionals, for wide networks of collaborators, and in this account, the traces of this collaboration are recorded in books 1 to 10.

Thanks for this are due to everyone mentioned in this account, the authors and co-authors—and many unnamed individuals. Special thanks are also due to all the researchers and collaborators in our research environments in Ljubljana and Vienna—and much wider. Thank you to everyone! We are also grateful to all the colleagues who with their critical commitment, care, precision, persistence, expertise, and support enabled the publication of the books, scientific articles, and many others described in this “story of research companionship.”

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Vienna / Kamnik, December 30, 2024

Karl H. Müller / Niko Toš

Part I

**New Cognitive
Foundations and
Enviroments for Survey
Research**

1 Towards New Cognitive Foundations for Survey Research

In this chapter we will focus on the rapidly widening cognitive-science landscapes and their potential impact for fresh perspectives on survey research. More ambitiously, the article wants to explore new foundations for survey research which are based on current advances within the broad domains of the cognitive sciences. In essence, the article wants to establish four major claims. First, over the last decades survey research has reached its point of perfection and, given the quality standards of European data collections like the European Social Survey (ESS), can be improved further only marginally. Second, survey research in its current form is characterized by various forms of incompleteness which, however, cannot be re-solved within the contemporary boundaries of survey research. Third, the expanding field of the cognitive sciences should be considered as the most relevant background knowledge for survey research in all its aspects, starting from the design of questionnaires to the actual fieldwork-procedures and to the analysis of survey data. Fourth, shifting to a cognitive science background should have a highly significant aspect of re-shaping survey research and for alternative paths for survey designs which, so far, have hardly been explored.

* * *

This chapter wants to draw the reader's attention to new theory structures and models in the cognitive sciences¹ which, so far, were considered to lie outside the domain of contemporary survey research. However, the subsequent sections attempt to show that the cognitive sciences, broadly understood, should constitute the relevant theoretical background knowledge for survey research. Such a shift from the current folk psychology-traditions to the cognitive sciences should exert a considerable influence in re-shaping survey methodologies, survey analyses and, equally important, the theory constructions for survey-based

1 On current summaries of the neuro-cognitive architectures of these different faculties, see Gazzaniga, Bizzi and Black, 2004 or Calvert, Spence and Stein, 2004. Within the cognitive neuro-science arena, one finds meanwhile numerous sub-fields and disciplinary niches specializing on a particular senso-motoric, emotional or cognitive faculty. For a diverse set of literature, see Calvin, 1996, Calvin and Bickerton, 2000, Campbell, 1984, Damasio, 1994, 2003, Deacon, 1997, Edelman, 1987, 1990, 1992 or 2007, Hofstadter, 1982, Hofstadter and Dennett, 1982, Hofstadter 1985, 1995 or 1997, Holland, 1995, Lakoff and Nunez, 2000, Minsky, 1990, Norretanders, 1997, Pinker, 1997, Plotkin, 1997, Pollock, 1989, Ratey, 2001, Roth, 1999 or Sternberg and Wagner, 1994.

research. Adapting and accommodating to this new background knowledge, survey research, in our assessment, should and will leave behind its established core routines and its standard procedures as special cases, very much as Newtonian physics has become a special niche within contemporary physics.

The Tipping Point for Survey Research

At the outset, a few general remarks will be undertaken on the current status of survey research. For the moment it seems that survey based research has become the most frequently used publication mode across the social sciences. The following table, compiled by Willem E. Saris and Irmtraud N. Gallhofer², shows a remarkable increase of survey-based research in wide segments of the social sciences, including, surprisingly, social psychology and economics as well.

Table 1.1: The Rise of Survey Research from 1950 to 1995

	Economics	Sociology	Political Science	Social Psychology	Public Opinion
	(39.4%)	(59.6%)	(28.9%)	(48.7%)	(95.0%)
1949/50	5.7%	24.1%	2.6%	22.0%	43.0%
1964/65	32.9%	54.8%	19.4%	14.6%	55.7%
1979/80	28.7%	55.8%	35.4%	21.0%	90.6%
1994/95	42.3%	69.7%	41.9%	49.9%	90.3%

Table 1 suggests that survey research is on a continuous victory march. However, it will be argued that survey research, despite its continued successes at the level of data production in the social sciences, has reached its tipping point already. Survey research, so the argument goes, will be challenged more and more especially on cognitive grounds, but also for epistemological and wider societal reasons. The next section will point to four fundamental forms of incompleteness in survey research which, in combination, significantly reduce the development capacities for survey research in its conventional form in the future.³

² See the summaries by Saris and Gallhofer, 2007:2p.

³ It belongs to the well-known results of innovation research that old technologies are usually replaced at the height of their efficiency and their relative strength. Thus, analog cameras have been substituted by digital ones at the height of their performance-levels. On this point, see especially Utterbeck, 1989, 1996 or von Foerster, 2003: 284.

The Fundamental Incompleteness of Survey Research in at Least Four Dimensions

Initially, an argument will be provided that a phase transition in the overall science landscapes is currently under way which has been labeled as the transition from Science I to Science II. Science I was the dominant form of science from the beginning of modern science in the 16th century up to 1900/1950. Science II, consequently, emerged over the last decades and will turn out to be the new hegemonial regime, although Science II will not replace Science I completely. In a variety of domains and applications Science I-models and methods will still be used⁴. In view of the overall changes from Science I to Science II four significant deficiencies of survey research become apparent which, in combination, lead to the verdict of a fundamental incompleteness of current survey designs.

The first incompleteness is fundamental in nature and comes from the reliance on internal assessments and internal descriptions only.⁵ Under the flag of Science I it was both necessary and sufficient for survey research to have a single internal descriptive account of a respondent as the basis for subsequent analyses. This single account was considered as necessary and sufficient for two different domains, namely for the internal preferences, goals, attitudes, evaluations, etc. of a respondent as reported by the respondent and for the actions and interactions of a respondent as a manifestation of these underlying preferences, goals, attitudes, evaluations, etc. This focus on individual respondents was supported by the view of individuals as carriers of stable internal preferences, goals, attitudes, evaluations which, due to their inscriptions in long-term memory, can be measured directly, albeit with a certain amount of measurement errors.

The second incompleteness of survey research stems from the restricted code in which survey items are presented. Currently a single survey item should be composed of an introduction, a motivation part, information regarding the content, instruction of the respondent, interviewer instruction, requests for answers and of answers with categories or response scales (Saris and Gallhofer, 2007: 121). However, the mode of fixed responses as well as asymmet-

4 On the distinction between Science I and Science II, see especially Hollingsworth and Müller, 2008 and on a wider discussion of this separation see Boyer, 2008; Mayntz, 2008; Nowotny, 2008 or Sornette, 2008.

5 Here, the terms external description on the one hand and internal description on the other hand are to be used in the following way. External descriptions comprise any description by a competent observer of the overt manifestations and of the results of cognitive operations by an observable actor. In contrast, internal descriptions are tied to the self-description and self-evaluation of a competent actor alone.

ric question and answer interactions become more and more marginalized in contemporary life worlds.

The third form of incompleteness has to do with the interactions between respondents and researchers which happen in a highly restricted and only in a media-mediated manner. Currently, no information mechanisms link the side of survey researchers with the respondents and no recursive interactions between researchers and respondents occur. Surveys are usually restricted to a single measurement affair only.

The fourth fundamental incompleteness of survey research is due to the absence of survey researchers from survey research. This does by no means mean that survey researchers should report on their profile of responses in the survey they have constructed. Rather, the emphasis lies on a detailed documentation of a survey in terms of its targets as seen by a single researcher or a research group, its actual composition, its selection procedures that led to the final version, its relations, similarities and dissimilarities to existing surveys and, above all, the intended novelty and the »cash value« (Wilfried Sellars) of producing a new survey data set.

Towards New Typologies for Survey Measurement Processes

Due to the fundamental incompleteness of survey research it is worth asking what types of measurements are performed within survey settings. It is interesting to note that in the formative years of survey and attitude research social scientists like Richard T. LaPiere have shown beyond reasonable doubt, but also with no lasting success, that survey research is faced with a deadly threat because attitudes and actions are separated by an unbridgeable gap. LaPiere's assessment from the year 1934 seems as valid and as controversial now as it was then.

The questionnaire is cheap, easy and mechanical. The study of human behavior is time-consuming, intellectually fatiguing and depends for its success on the ability of the investigator ... Yet it would seem far more worthwhile to make a shrewd guess regarding that which is essential than to accurately measure that which is likely to prove quite irrelevant. (La Piere, 1934: 237)

Following this counter-tradition to the dominant forms of comparative survey research Peter Converse's article on the nature of belief systems in mass publics in 1964 marks another hallmark in approaching survey measurements and survey data in a radically different way. His article on non-attitudes can be seen as another important reference point for an alternative view of the

survey measurement processes. According to Converse, attitudes measured in normal survey research qualify as non-attitudes only and as such they are highly volatile and subject to frequent changes.

Subsequently, the issue of non-attitudes provoked a new account on the part of conventional survey research which emphasized the »real« measurement of »real« attitudes in surveys, but allowed for varying degrees of measurement errors. Thus, non-attitudes quickly changed into true attitudes again, albeit in a slightly blurred and fuzzy version.

Thus, it seems worthwhile to go deeper into the issue of measurement processes and of measurement types not only in survey research⁶, but across different scientific domains. Table 2 presents an elementary division of measurement types for measurements across the natural and the social worlds. Here, two measurement dimensions are used, the first one on the repeatability of measurements (exhaustive/repetitive) and the second one on the degree of observer dependency.

- Exhaustive measurements lose, due to the measurement process, the possibility of a renewed measurement whereas repetitive measurements can be performed over and over again.
- Similarly, strong observer dependency means that the measurement process itself produces or generates the quantity to be measured whereas in weak observer-dependent contexts the quantities to be measured could be measured, in principle, before or after the actual measurement process as well.

Normally, the first measurement type in Table 2 is linked to the realms of quantum physics, where measurements are both exhaustive and strongly observer-dependent (e.g., Zeilinger, 2005), and the fourth type to the macro worlds across nature and society. Following the conventional wisdom (e.g., Hand, 2004 or Henshaw, 2006), measurements and observations in survey domains, if properly designed and conducted, can be treated like measurements of velocities, length, temperature or distances in the macro-natural arenas. In short, measurements in survey research, if adequately adjusted for measurement errors, correspond to type IV (Saris and Gallhofer, 2007).⁷

6 On measurements in survey Andrews, 1984; Blalock, 1968 or 1990; Edwards and Bagozzi, 2000; Esposito and Rothgeb, 1997; Hox, 1997; Krosnick and Abelson, 1991; Lass, Saris and Kaase, 1997; Lord and Novick, 1968; Miethe, 1985 or Sniderman and Theriault, 2004.

7 Measurement type II is reserved for those cases where the measurement process destroys the conditions of the possibilities for renewed measurements. For example, measuring the breaking point for materials makes a renewed measurement impossible. Measurement type III applies whenever the measurement process creates a measurable quantity via the measurement process itself. Like in the case of a roulette, a croupier as a strong observer produces a sequence of numbers from 0 to 36 in a just in time-manner.

Table 1.2: Types of Measurement

	Strong Observer-Dependency	Weak Observer-Dependency
Exhaustive	Measurement Type I	Measurement Type II
Repetitive	Measurement Type III	Measurement Type IV

In sharp contrast to an established consensus on survey measurements, it will be argued subsequently that measurements in survey contexts, as performed according to the rules and guidelines of empirical social research⁸, fall under the first measurement type and not under the fourth type.

With respect to the dimension exhaustive/repetitive, asking a survey question once destroys the possibility for asking it again immediately afterwards. Asking the same item two, three or more times in a row creates a new context for respondents. Likewise, asking the same survey questions in a repeated manner meets definite barriers and constraints on the side of respondents.⁹ Thus, along the first dimension measurements in survey research are in no way similar to consecutive and repeated measurements for physical macro-objects and their properties like velocity or temperature.

For the dimension of weak/strong observer dependencies two broad alternatives are feasible in survey interactions. According to the conventional wisdom in survey research, responses are based on stable assessments which are well embedded in the cognitive-behavioral repertoire and inside the neuro-cognitive organization of respondents. Thus, Jon A. Krosnick, Charles M. Judd and Bernd Wittenbrink adhere to the storehouse or file drawer image of attitudes and see a

great theoretical and practical value ... to hypothesize that a single attitude exists in a person's mind: the net evaluation associated with the object.
(Krosnick, Judd and Wittenbrink, 2006: 26)

In this conventional view, survey measurements are founded on respondents' introspective reports of their stable long-term attitudes and beliefs which are well-stored in the long-term memory of respondents. On this account, survey

8 See, for example, the handbook of survey methodology by de Leeuw/Hox/Dillman, 2008.

9 Respondents could be asked, however, if they are willing to participate in a weekly or even in a daily survey. But such a demand must be stated clearly in advance and must be fully accepted by respondents. Again, in a daily questionnaire it will become exceedingly difficult to ask the same question twice. Additionally, daily surveys will be accepted by respondents only if they deal with daily changing processes. This condition is usually fulfilled in the field of consumption, media utilization within the last 24 hours or in the area of social contacts. But it should become exceedingly difficult to ask respondents on their trust in institutions in daily intervals.

measurements can be subject to measurement errors which, however, can be corrected and adjusted.

In the alternative perspective, survey responses are created just in time within the context of a survey itself, without prior fixed quantities or specific values in the cognitive repertoire and organization of respondents. Rather, due to the fixed menu of admissible survey responses, respondents can be assumed to match this unusual format with their ordinary language routines and, albeit in a spontaneous manner, with some of their past experiences. In this perspective, survey responses are creative reactions on unusual requests which in most instances are produced and delivered in a spontaneous manner.

By necessity, the second alternative in conjunction with the exhaustive character of survey measurements, leads to the first measurement type in Table 2. It will become the main task in the next sections to build up additional support from the cognitive sciences to justify the assumption that survey responses are exhaustive in nature and are the results of strong observer dependencies.

Consequently, the next sections will introduce two basic models from the field of the cognitive neuro-sciences, the first one a meanwhile classical model for non-trivial systems and the second one a cognitive model for learning under the name of genetic algorithms¹⁰. Both models, in combination, provide new insights into the central actors in survey research, namely into the cognitive states of respondents.

Survey Respondents as Non-Trivial Actors

In the discussion of different measurement types one could already see that proponents of conventional measurement theory refer to the internal cognitive organization of respondents, although this reference is usually made in an ad-hoc manner.

As a first step, a very general model will be introduced which points to a central feature of respondents which, however, is constantly neglected in survey measurement theory. In a series of publications¹¹ Heinz von Foerster uses the distinction between trivial and non-trivial ensembles. For him, this separation was vital in order to be able to differentiate between trivial physical systems on the one hand and non-trivial biological systems on the other hand. Thus,

10 On genetic algorithms, see, for example, Goldberg, 1989; Holland, 1986; Holland et al., 1989; Holland, 1989; Koza, 1992; Michalewicz, 1992; Mitchell, 1996 or Rawlins, 1991.

11 See, for example, Foerster, 1984, 1993 or 2003.

Heinz von Foerster's two models should be relevant both for the study of human actors and for models of learning or other cognitive abilities as well. In general, these two models or machines exhibit the following characteristics.

0.1 Trivial machines: (i) synthetically determined; (ii) independent of the past; (iii) analytically determinable; (iv) predictable.

02. Non-trivial machines: (i) synthetically un-determined; (ii) dependent on the past; (iii) analytically non-determinable; (iv) unpredictable (Foerster, 1993: 74 pp.)

Trivial machines like input-output machines can be determined from their input and output data only. The basic distinction between trivial and non-trivial systems lies in the internal organization and structures of the latter.

Non-trivial machines have 'inner' states. In each operation, this inner state changes, so that when the next operation takes place, the previous operation is not repeated, but rather another operation can take place. (Foerster, 1993: 76)

Due to their state-determination, non-trivial systems with even a small number of input and output activities and inner states, move beyond the realm of synthetic or analytic determination.

03. Let n be the number of inputs and outputs ..., then the number N_T of passible trivial machines, and the number N_{NT} of non-trivial machines is: $N_T(n) = n^n$, $N_{NT}(n) = n^{nz}$, where z signifies the number of internal states of the NT machine, but z cannot be greater than the number of possible trivial machines, so that $z_{\max} = n^n$ (Foerster, 1993: 77)¹²

The relevance of the distinction between trivial and non-trivial systems for survey research should be obvious. If one assumes that respondents in surveys are state-determined non-trivial actors, then the identification problem of internal states becomes of utmost importance. Conventional measurement theory operates, however, on a model of trivial actors where the problem of internal states can be safely neglected. Obviously, the conventional measurement theory for surveys has been operationalized for trivial systems, but not for non-trivial systems. To conclude, Table 3 highlights the differences between trivial and non-trivial models for respondents.

12 As a simple example, a trivial machine with $n = 4$, the result is $NT(4) = 4^4 = 256$ However $NNT(4) = 4^4z$ with $Z = 4^4$ which, after some calculations, becomes 22048 or approximately 10620.

Table 1.3: Trivial and Non-Trivial Models of Survey Respondents¹³

Trivial Models	Non-Trivial Models
Models	
Input/Function/Output	Functors (Operators)
Independent Variable/Function/	Operating on Functions
Dependent Variable	State-Determined Systems
Cause/Law/Effect	with Non-Linear Dynamics
Stimulus/Nervous System/Response	(Discontinuous, Qualitative
Goal/System/Action	Changes, Chaotic
Environment/Organism/Behavior	Behavior, etc.)
Motivation/Character/Actions, etc.	
Model Characteristics	
Predictable	Unpredictable
Independent of Pre-History	History-Dependent
Synthetically determined	Synthetically un-determined
Functions Identifiable	Functions not identifiable
Analytically computable	Analytically not computable
Value of functions effectively	Value of functions not
computable)	effectively computable)
Reductionist	Relational, systemic

GA-Systems as Cognitive Models of Survey Interactions

In this section a brief sketch of new groups of cognitive models from the domain of evolutionary computation¹⁴ will be introduced because they provide the necessary ingredients for modeling the cognitive competencies and the social interactions inherent in the questioning and answering of surveys.

Using genetic algorithms (GA) as a specific framework, it will be assumed that both an interviewer and a respondent in a survey are organized as GA-ensembles. In the context of survey interactions, a GA-system is situated in an environment that produces a flow of verbal inputs for the GA-system which enter into the domain of internal processing. In turn, a GA-system generates verbal outputs for its environment which, once again, lead to a new round of verbal inputs for the GA-system.

The basic ingredients of a GA-system have been captured in Figure 1. Internally, a GA-system consists of an internal message list, a set of encoded classi-

13 The subsequent differentiations in Table 3 have been put forward essentially by Heinz von Foerster, like in Foerster, 1984: 8ff.

14 Evolutionary computation is an emerging field with different areas like genetic programming, genetic algorithms, evolutionary strategies or evolutionary programming. For an overview, see de Jong, 2006.

fiers $\{C_1, C_2, \dots, C_n\}$ as if then rules and an output interface which generates a flow of verbal responses for the environment.

John Holland, one of the inventors of GA-systems, provides the following short summary of the GA's processing cycle.

The basic execution cycle of this system proceeds as follows:

1. Place all messages from the input interface on the current message list.
2. Compare all messages on the current message list to all conditions of all classifiers and record all matches.
3. For each set of matches satisfying the condition part of some classifier, post the message specified by its action part to a new message list.
4. Replace the current message list with the new message list.
5. Process the message list through the output interface to produce the system's current output.
6. Return to step 1. (Holland *et al.*, 1989: 106)

A GA-system is basically a rule system and is equipped with three types of rules. Empirical rules are composed of different sets like categorical rules (If type T_1 has property P_1 , then also P_2), associative rules (If type T_1 has property P_1 , then activate category C_1), predictive rules (If type T_1 meets type T_2 , T_1 will produce Action A^1) or diachronic rules (If Event E_1 occurs, then react with Action $_1$).

The second class of rules consists of inferential rules which are based on inductive generalization procedures like specialization rules, unusualness rules, law of large number heuristics or regulation schemes. The primary function of inferential rules is to produce better empirical rules. (Holland *et al.*, 1989: 43)

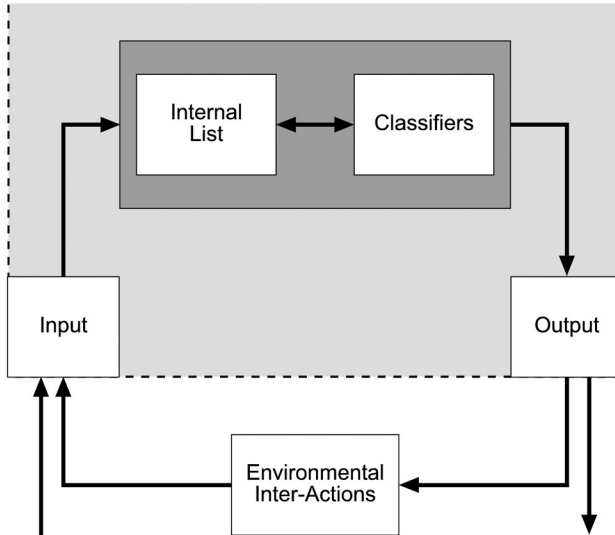
Finally, a set of unchangeable and in-built operative rules can be seen as the innate hardware of any GA-system:

Operating principles are neither learnable nor teachable. They are innate system manipulation procedures ... These include the procedures for calling up the relevant empirical rules for representing the environment; the bidding system by which such rules compete to construct the current representation of reality ... Other operating principles invoke some of the procedures of knowledge alteration ... (Ibid: 46)

The cognitive processing within a GA is based on a bidding process in which one of the GA-rules gets activated and executed. Given an internally encoded input from the environment, a suitable or viable GA-response is selected among a group of different available alternatives. This selection process is de-

pendent on the strength of each of the classifiers which, in turn, is a function of their previous strength and their specificity, a drift towards higher internal complexity or a volatility of outputs.

Figure 1.1: A Scheme for a Ga-Classifier System



Aside from the bidding process, a classifier system develops, in evolutionary time, a higher degree of internal complexity by a cross-over process and by the production of new classifiers as a recombination of previously successful ones.

The cognitive organization of a GA-system exhibits several remarkable properties which are necessary for their overall flexibility and for their absorption of environmental complexities like a potential multiplicity of internal rules for a given input, blatant overall inconsistency or an emphasis of specific over general rules.

This short overview of GA-systems should be sufficient to use GA-architectures for the interactions in survey contexts.

Towards a Logic of Over-Learned and Under-Learned Responses

Drawing on the two cognitive models of learning actors, a distinction will be introduced which should prove useful for the interpretation of the data generated under the auspices of conventional survey designs. This basic dis-

inction is frequently used in memory research¹⁵ and, at least partially, in the research on embedded cognition¹⁶. Here, a separation can be made between over-learned and under-learned contexts. In memory research, the terms over-learned and under-learned refer essentially to the duration and to the frequency of learning processes or to the all or none character of learning.¹⁷ In embedded cognition, an over-learned or an under-learned context is characterized by the stability or the instability of action sequences. In over-learned contexts one finds either identical, sequentially fixed or constant actions irrespective of varying contexts or different pre-histories. In over-learned configurations, a single fixed operation or a fixed series of operations is required, expected and, in the case of violations, sometimes even sanctioned. In under-learned contexts, one usually finds varying, un-stable, context-dependent and fluid actions which are genuinely innovative, are created on the spot and are highly volatile, depending on the degree of openness in a particular situation.

Turning to a special instance of over-learned and under-learned contexts, namely to responses, the following basic distinctions can be made.

An over-learned response is triggered by a question, a command and the like and is characterized by a fixed word, a number, a sentence, a sequence of numbers or a short narrative which essentially remain unchanged in the short run and which change only under exceptional circumstances in the long run.¹⁸ Typical examples for over-learned responses include the name of a person, her or his date of birth, a person's education level, or the employment status. Over-learned responses can be differentiated into general and specific responses. The former contain numerous instances which belong to the cognitive repertoire of minimally competent persons like one's first name, the latter are dependent on the knowledge and performance levels of a concrete individual.¹⁹

In contrast, under-learned responses are highly volatile even in the very short run, they are subject to frequent changes in short time intervals and they are sensitive both to contexts and to pre-histories. They, too, like the specific over-learned responses, depend on the cognitive organization and repertoire

15 On over-learned and under-learned facts in memory research, see, e.g., Bower, 1977 or Taylor, 2004.

16 See, for example, Underwood, 1996.

17 See, for example, Glass/Lian, 2008.

18 It should be mentioned that the production of over-learned responses has been characteristic of traditional education systems.

19 A specialist on World War II and an expert on ants-research, for example, will share very large sets of general over-learned responses but will differ significantly with respect to their specific over-learned responses.

of individuals. Another rather obvious feature of under-learned responses is that they are easily forgotten within a very short period of time. Table 4 offers several basic distinctions between under-learned and over-learned responses.²⁰

Table 1.4: An Overview of Over-Learned and Under-Learned Responses

Over-Learned Responses	Under-Learned Responses
Single Solution	Multiple Solutions Possible
Stable, Fixed	Highly Volatile, Unstable
Trivial	Non-Trivial
Repetitive	Creative
Key Input Only	Highly Selective of Inputs
Encoded in Long-Term Memory	Short-Term Memory only
Constant Reproduction across Time	Just in Time Productions
Context-Independent	Context-Sensitive
Path-Independent	Path-Dependent
State-Independent	State-Dependent
Global Consistency	Global Inconsistency
Observation Errors	Only Trivial Observational Errors
Identifiable	Possible

A final important distinction between over-learned and under-learned responses refers to the notion of observation and measurement errors. In over-learned responses measurement errors can be identified and, equally important, corrected. This correction can be accomplished due to the possibility for repeated measurements and due to the stable and fixed solutions in over-learned contexts. In fact, over-learned responses correspond to the fourth measurement type in Table 2. In sharp contrast, under-learned responses cannot be subject to measurement errors since an under-learned response misses an essential component, namely the reference values or the so-called true values. In under-learned responses one is confronted with a series of creative state-, input-, context- and history-dependent just in time responses where each of these responses, in the absence of neuro-physiological data from the cognitive neuro-sciences, must be treated as a »true value« under a set of specific, but highly varying circumstances.

20 The distinction between over-learned and under-learned responses has been introduced, quite obviously, also with respect to surveys and survey questioning. From the dichotomy in Table 4 a survey is usually a mixture between over-learned and under-learned responses. The former are highly concentrated in the socio-demographic section of a survey with questions on age, gender, occupation and the like whereas the latter are distributed over most of the remaining parts of surveys, especially over all the so-called attitudinal or evaluational segments.

With the distinction of overlearned and underlearned responses, it will be assumed hypothetically that the survey interactions between respondents and interviewers take place as a dialogue between two GA-systems.

Here, the part of the interviewer will not be analyzed in greater length although this side could produce interesting new results, too. The center of the investigation is occupied with the GA-respondents, their cognitive architectures and the characteristic features of the interaction processes.²¹

As a starting point, it is fair to assume that for GA-organized respondents many of the survey questions, especially the ones related to attitudes or evaluations, will belong to the under-learned category. The available inputs in terms of questions, the restricted options for answers, the quantitative scales, etc. are not matched directly by the internal rule repertoire which could correspond to these specific inputs directly. Thus, answers to survey questions like trust in various institutions, life satisfaction in its various aspects, to name some prominent examples, require a creative response by a GA-respondent and qualify, thus, as under-learned. Turning to the GA-respondent side only, the following characteristic features of the interaction process can be specified.

One of the most important elements of the GA-based interactions lies in the sheer multiplicity of available responses by GA-respondents. The GA-organization allows a permanent recombination of new rules and, equally important, the co-existence of older and newer rules. The GA-organization acts rather graceful and very seldom removes older rules from its rule-set. This special feature of a multiplicity of answers has been noted by survey researchers as well. As pointed out especially by John R. Zaller (1992), respondents in surveys have a much richer repertoire of different responses at their disposal. Consequently, Zaller's response axiom states that

Individuals answer survey questions by averaging across the considerations that are immediately salient or accessible to them (Zaller, 1992: 49)

What becomes of particular relevance here is that the high number of available responses is directly related to the under-learned situation and to the unusual requests for answering which require a creative response. In GA-language, due to the under-learned situation of a specific survey-question, a multiplicity

21 It goes without saying that a GA-architecture in its current form is under-critical and under-complex in view of the complex cognitive tasks inherent in survey responses. Thus, the present outline should be seen as a counter-factual sketch which is focused on GA-systems and which brings to light several characteristic features of the cognitive organization of respondents where the underlying GA-architecture can offer heuristic guidelines and a weak explanatory support.

of rules become activated since none of the available rule matches the input of a survey question.

The multiplicity of responses can be shown whenever a survey question does not require a selection of a single option, but asks for assessments of each of the options sequentially. Take, for example, the question of different images of society which has been used in the Austrian Social Survey in 1993. Here, respondents were asked to which of the following four general views or images of society they could agree: to a meritocratic-conservative (a), to a »Marxist« (b), to a corporatist (c) or to a social relations-oriented view (d). As it turned out, even the contradictory pair of images, namely (a) and (b), was clearly treated in a non-contradictory manner. Only 54 % of the respondents opted for one of the consistent options (a+/b-, a-/b+) and 46 % agreed to inconsistent options. With respect to all four images of society, the largest single group agreed to all four images, followed by an agreement to three different images.

Second, this multiplicity of alternatives covers only the bright side of the coin. There is a dark side to this coin, too, because this multiplicity of alternatives contradicts an implicit assumption of survey designs and especially of survey designers. Usually, survey questionnaires are developed on the tacit assumption that respondents possess a consistent belief-system which can be captured through the items and dimensions of a multi-thematic survey. Wilson and Hodges (1992) describe this hidden assumption as the mental file view where respondents possess a well-ordered mental drawer, consisting of mental files on issues like legalized abortion, migration or trust in the police. Whenever a survey question is asked, they look for the appropriate file and report its content.

However, one of the most obvious characteristics of a GA-system lies in the global as well as in the local inconsistency of its rules which differ only in their relative strength. Surveys very seldom are designed to exhibit underlying inconsistencies in the attitude and belief system of respondents. The GA-architecture is structured in a way that the usual consistency relations do not apply. 80 % of the respondents may be optimistic about their long-term future or about the future of the society as a whole. Any interpretation which would indicate that $100 - 80 = 20$ % of the population are quite concerned about the future would be extremely misleading. Normally, roughly 80 % of the respondents will reply as well that they were very much concerned and worried with respect to the state of the environment and the sustainability of the mode of economic production and distribution. Global and local inconsistency is

an essential element of a GA-architecture and this feature is reflected strongly in survey responses, too.

Apart from the global inconsistency of the GA-architecture, the third general characteristic deals with the logic of under-learned responses which does not comply with classical logic. Assume, in line with two valued logic, the availability of conceptual pairs like true/false, confirmed/rejected, allow/forbid, etc. As Hippler and Schwarz (1986), for example, demonstrated the conceptual pairs allow/forbid and not forbid/not allow are treated in surveys not as equivalent, but quite distinctively since allow and forbid are consistently seen as stronger statements than not allowing and not forbidding. Moreover, Hippler and Schwarz provide an un-intended support for the distinction between under-learned and over-learned responses because this observed asymmetry only holds for respondents with weakly developed attitudes (under-learned), not for persons with very strong attitudes (over-learned).

Another logical feature of under-learned responses is that the usual transitivity relations $a > b, b > c \rightarrow a > c$ do not hold.²²

Furthermore, another seemingly illogical feature can be observed in the relation of generality and rule strength. One of the tacit assumptions especially in value-related survey research lies in the importance of general values as an essential determinant for preferences or specific routines. However, the GA-architecture reveals an interesting inversion between rule strength and generality. In brief, the most general rules turn out to be the weakest ones, the most specific rules, due to their context specificity, usually become the strongest ones.

Fourth, an underlying GA-architecture points to the important role of path dependencies, context effects and to the sensitivity to small input variations in survey-interactions. This special part has been studied in survey research extensively under labels like response effects, question order effects and the like.²³ The important point to be emphasized from a GA-perspective, however, lies in the simultaneity of a large variety of contexts, of a sensitivity to small input variations and of different pre-histories which cannot be isolated or de-composed in an un-ambiguous matter. Contexts may vary with interviewers and with specific events during a survey interaction, the wording

²² For a wonderful article on the topology of nervous nets and the non-transitivity of values, see McCulloch, 1980.

²³ See, for example, Bradburn and Mason, 1964; Cronbach, 1946; Krosnick and Alwin, 1987; Martin, 1964 or Schwarz and Hippler, 1991.

of questions and, more importantly, the subsequent interpretation may vary with the pre-history of survey respondents prior to a survey interaction, etc. The simultaneity of these variations cannot be controlled sequentially which, in turn, raises another insurmountable problem for any comprehensive theory of measurement errors.

Aside from a multiplicity of potential replies, the overall inconsistency of these multiple alternatives, the non-classical logic underlying survey responses and context or history effects, volatility becomes a fifth essential feature of GA-based survey interactions. From a GA-based perspective, this volatility is composed of four different components. Initially, the volatility is partly due to the probabilistic bidding process which constitutes a necessary component of variation. Another part of the volatility comes from the necessity of producing creative responses which, by itself, must be considered as a non-trivial and inherently instable process. Additionally, the bidding process is, due to varying contexts of survey interactions, highly complex which, once again, adds to the volatility of responses. Finally, a fourth important aspect with respect to the volatility of under-learned responses lies in the scales which are available in many survey questions. When confronted with a scale between 0 and ten for example, respondents in under-learned situations usually are indifferent with respect to a broad range of values which adds another element in the overall volatility of responses.²⁴

Numerous examples have been generated which point to the instability and the variation in responses. John R. Zaller gives an illuminating example in terms of changes in wordings.

A record instance of the effect of changes in question wording may be a New York Times poll in 1983 which found that public support for a 'freeze' on nuclear weapon production varied between 18 and 83 percent, depending on how the issue was framed. (Zaller, 1992: 29)

A particular striking example comes from the German Welfare Survey 1984 in which one of the most central questions, namely overall life satisfaction, was, by mistake, asked twice in an identical fashion. The correlation between both responses was only 0.60.²⁵

24 While this indifference range may vary between respondents, it can be assumed that each respondent is indifferent with respect to at least two values on such a scale.

25 See for more details Glatzer, 1984.

Sixth, a highly fascinating feature in the creative nature of under-learned survey responses reveals itself by focusing on GA-architectures. Usually, the input side in survey interactions consists of a series of verbal items which, in conjunction, should be taken into account by a GA-system. But in a GA-architecture, it cannot be taken for granted that the entire input has been used in the process of producing an answer.

Thus, one is suddenly confronted with the possibility that other forms of understanding outside the intended domain of survey researchers were operative in generating a specific answer. For obvious reasons, the term »un-intended consequences« of a survey question points to the possibility that respondents did not reply to an intended question, but to a different one which was composed of selective elements of the original one.

Take, for example, a seemingly straightforward question like a self-assessment of one's overall position in society and a measurement method, using a scale from 1 to 10.²⁶ More than 80 % of the unskilled workers positioned themselves above the societal average (6 and higher), in contrast to roughly 57 % of the skilled workers. In GA-language it seems very likely that many respondents in the unskilled group produced an answer with respect to their subjective overall position from 0 to 10, and not to the intended societal positions from 0 to 10.

Another feature of unintended effects comes into play whenever under-learned items like work satisfaction, using a scale from 0 to 10, are asked in various, seemingly different dimensions. As has been shown in another publication²⁷, the answers to different dimensions of work satisfaction tended to be quite similar across Europe, despite very heterogeneous working and living conditions. In GA-language, the seemingly different dimension of work satisfaction became subject to a default operation which, among other results, would have produced very similar outcomes, had the list of dimensions been longer than the existing one.

The feature of defaults is of critical importance for a new perspective on comparative analyses because these defaults offer empirical support for similarity relations between non-identical questions within identical larger domains like work satisfaction.

26 This example comes from the Austrian Social Survey 1993 and is discussed at length in Müller, 1998.

27 See Reautschnig, 2009 and Müller and Reautschnig, 2010.

The seventh feature of under-learned survey responses leads outside the GA-domain proper and to the domain of long-term and short-term memory. Under-learned responses, due to their under-learned nature, do not enter into long-term memory and are, thus, quickly erased from the memory screen in a very short period of time.²⁸ Within survey settings, twenty to thirty minutes are sufficient for having completely forgotten a specific under-learned response to a survey question.

These seven GA-based features conclude the presentation of the new cognitive background theory for survey interactions.

Towards New Designs for Comparative Survey Research in the Age of Science II

In our judgement, the next years and decades will experience a fundamental change in the core approaches to identify attitudes²⁹, to determine subjective as well as objective living conditions or to capture individual life styles. The paths for comparative survey research of the 20th century and its trajectories in the 21st century will be situated in significantly different cognitive territories. It would require several separate articles to present the consequences of the new cognitive foundations for survey research in more detail. But we would like to indicate the general direction for such a reconfiguration of survey methodologies. This re-shaping requires, above all, recursive research designs where the step S_{t+1} operates on the results of step S_t . In this way, research designs should move towards cognitive equilibrium areas or attractors. Table 5 shows that a small number of research designs are already available which can be qualified as recursive.

28 Following Saris and Gallhofer, 2007: 220, twenty minutes within a conventional survey interview are sufficient for practically forgetting an under-learned response to a survey question.

29 On classical approaches to attitudes, see, e.g., Ajzen, 1989; Ajzen and Fishbein, 1980; Eagly and Chaiken, 1993 or Fishbein and Ajzen, 1975.

Table 1.5: Recursive Designs in Social Science Research

Methods	Applications	Similarity Relations	
		Recursive Operations	Eigenforms
Circular Questioning ³⁰	Social or Cognitive Perspectives	Recursive, towards a Homogenization of Perspectives	Stable Social or Cognitive Group View
Delphi-Methods ³¹	Scenarios, Cognitive Assessments	Recursive, towards Consensus Formation	Group-Consensus
Generative Social Sciences ³²	Rule-based Dynamics	Recursive, toward Stable Configurations	Equilibrium, Limit Cycles, Strange Attractors, etc.
Meta-Analysis ³³	Results of Empirical Research	Recursive, towards Robust Knowledge	Robust Results of Empirical Tests
Triangulation ³⁴	Utilization of Different Research Methods	Recursive, towards Robust Knowledge	Stable Results

It will become the major task for subsequent publications to present an overview of new recursive designs in survey research which, moreover, correspond to the new cognitive foundations, outlined in the present article.

30 On circular questioning see, for example, Pfeffer, 2001.

31 Delphi-Methods have been introduced already in the 1950s. See, for example, Rescher, 1998.

32 Generative social science has become a generic term for rule and actor based designs. For a summary, see Epstein, 2006.

33 Meta-Analysis has become a common procedure in the eighties and nineties of the 20th century in areas like clinical research and psychology. For a summary, see, for example, Hunter and Schmidt, 2004.

34 Triangulation has become popular quite recently as a design to integrate a heterogeneous set of research methods across the quantitative and the qualitative spectrum. See, for example, Punch, 1998:242–246.

2 New Cognitive Environments for Survey Research in the Age of Science II

This chapter deals with a rapid change which is currently sweeping through the science landscapes and discusses the far-reaching implications of this structural break for the social sciences and for survey research in particular. More specifically, this article will make three central claims. First, the science system as a whole is presently undergoing a significant phase transition which can be summarized as a shift from Science I to Science II. Second, due to these large-scale changes, new cognitive environments are gradually emerging as the background knowledge of survey research which will exert a profound impact on its future practices. Third, these new cognitive environments will lead to new actor models and to new bridges between survey research and the cognitive neurosciences on the one hand and biomedical research on the other hand.

* * *

Let's start from a bird's eye view on scientific landscapes and on their evolution in the very long run. From this macroscientific perspective of the *très longue durée* it can be observed that a deep structural change is currently taking place which affects the disciplinary matrices (Kuhn, 1973, 1977) as well as the cognitive cooperation potentials of practically all major disciplines across the natural, social and technical sciences.¹ Quite naturally, such a comprehensive phase transition should exert a deep impact on the social sciences and on their boundaries or links with neighbouring or seemingly distant academic fields. In particular, the relevant background knowledge for the social sciences in general or for special areas like survey research in particular should be changing significantly. In the subsequent sections of this article some of the implications of this ongoing metamorphosis in the science landscapes for the area of survey research will be outlined in greater detail. As its central claim, the article suggests that the current changes in the background knowledge of survey research should have a strong influence in reshaping and reinventing survey research significantly.

1 On this phase transition from Science I to Science II across different dimensions of the science landscape, see especially Hollingsworth and Müller, 2008 as well as Hollingsworth et al., 2008 or 2010.

From Science I to Science II

Within the last decades, the science system as a whole has entered a phase of radical transformations from an old regime, called Science I, to a new regime under the name of Science II.² This general change will lead to profound changes in the theoretical and epistemological background knowledge for the social sciences in general and for survey research in particular.³

Table 1 captures some of the important shifts from the traditional cognitive organizations of science which were characteristic of the scientific method from the 16th and 17th centuries onward to its new rules of operation and to the new model and theory structures which emerged rapidly since the 1950s.

Table 2.1: Main Distinctions between Science I and Science II

Dimensions	Science I	Science II
Leading Fields of Science	Classical Physics	Evolutionary Biology and the Sciences of Complexity
Theoretical Goals	General, Universal Laws	Pattern Formation and Pattern Recognition
Theoretical Perspectives	Axiomatic, Reductionistic	Nested and Embedded Processes
Leading Metaphors	Clocks	Clouds
Core Philosophers	Rene Descartes (Cogito)	Ludwig Wittgenstein (Cogitamus)
Epistemology	Observer Excluded	Observer Included
Ontology	Dualism (<i>res cogitans/res extensa</i>)	Monism, Self–Organization Processes
Generative Mechanisms	Trivial Mechanisms	Non–Trivial Mechanisms
Forecasting Capabilities	High	Low
Complexity	Low	High
Perspectives on Change	Linear, Equilibrium	Non–Linear, far from Equilibrium
Distributions	Emphasis on Mild Distributions	Emphasis on Wild Distributions
Potential for Inter-Disciplinary Research	Low	High
Cognitive Distances between the Social Sciences and the Lea–ding Field of Science	High	Medium/Small

2 For a similar distinction between Mode I and Mode II see, for example, Gibbons et al., 1994, Nowotny et al., 2001 or Nowotny, 1999 and 2005.

3 On a wider discussion of the ongoing transformations from Science I to Science II, see especially Boyer, 2008, Mayntz, 2008, Nowotny, 2008 or Sornette, 2008. While Mode I and Mode II refer more to the organizational changes in science, the differentiation between Science I and Science II is more focused on the theoretical dynamics of the overall science landscapes.

Significant Changes in the Background Knowledge for Survey Research in the Age of Science II

- Before entering into content issues, the concept of a background knowledge (BK) for a scientific discipline SDi must be introduced in a clear and accessible manner. In a general way, the theoretical, epistemological and methodological background knowledge for a scientific discipline SDi is composed of building blocks from three different domains.
- The first class of background knowledge elements (BK^I) for a scientific discipline SDi or field of analysis is based on those disciplines that can be assumed to constitute or form the basis of SDi. With respect to the social sciences or the particular field of survey research, the cognitive neurosciences (CNS) can be seen as the constitutive background knowledge area for the social sciences or, more specifically, for survey research. Here, the model and theory structures of CNS, its prevalent epistemologies and its dominant methodologies are all included in the BK^I group for the social sciences or for survey research.
- The second set of BK building blocks (BK^{II}) comes from the leading field (LDt) at a given time t, the theory structures of LDt, its dominant epistemologies and its general methodologies. Thus, the lifesciences and their mode of operations⁴ constitute the second BK^{II} group for the social sciences or for survey research.
- The third and final group of background knowledge building blocks (BK^{III}) is transdisciplinary in nature and applies to all scientific disciplines, including the leading discipline as well. Paradigmatically, the third BK-group is composed of a semantic network with universal categories like space, time, matter, energy or information, of a system of constants across the natural and social worlds, of basic logical and numerical calculi and of general rules for scientific operations across all relevant scientific disciplines.

In the days of Science I with theoretical physics as the leading scientific field, the search for universal laws or a reductionist view of theory structures with theoretical physics as its basis were typical elements of the theoretical background knowledge for the social sciences in general or for survey research in particular. Likewise, epistemological or methodological rules, associated with theoretical physics like objectivity, scientific realism or the covering law mod-

⁴ On characteristic differences between the operation rules in high energy physics and molecular biology, see especially KnorrCetina, 1999.

el of explanations became characteristic building blocks for the background-knowledge of the social sciences.

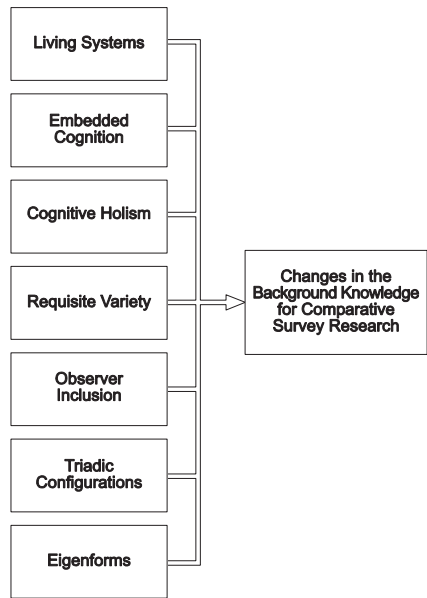
Currently, we live amidst the diffusion of Science II, with the life sciences as the leading field and with its corresponding epistemologies or methodologies. In the context of Science II the theoretical, epistemological and methodological backgroundknowledge for scientific disciplines outside the leading field of the life sciences is undergoing significant changes, too. In a single catchphrase, the transitions in background knowledge can be summarized as a shift from a vertically grounding background knowledge to a horizontally embedding one or, in line with Table 1, from a hierarchically structured background knowledge to a heterarchical one (Müller, 2011).

At this point, the article will be focused on those changes in the background knowledge which are of particular relevance for survey research. In a nutshell, at least seven building blocks can be identified both from the area of the life sciences (BK^{II}) and from the embedding domains of the neurocognitive sciences (BK^I) which should exert a strong influence on the future forms of models, methods and instrument constructions in survey research. As will be shown later on in more detail, the new background knowledge should have sustainable effects on internal, nontrivial actor models which should replace the current trivial versions, on more complex external actor models and their interactions with their environments as well as on the links between survey research and the biomedical sciences. Table 2 as well as Figure 1 summarize those changes in background knowledge that should exert a significant impact on survey research.

Table 2.2: *Changes in the Theoretical, Epistemological and Methodological Background Knowledge of Science I and Science II*

Domains of Back-ground Knowledge	Science I [Theoretical Physics as Leading Discipline (LD)]	Science II [Life Sciences as LD]
Objects of Investigation	Objects Simple Action Schemes	Living Systems Embedded Cognition
	Cognitive Isolationism Single Account Sufficient	Cognitive Holism Requisite Variety Necessary
Subjects of Investigation	Observer Exclusion	Observer Inclusion
Interactions (between Subjects and Objects)	Sequential, Linear Equilibrium Dyadic, Asymmetric Forms	Recursive, Non-Linear Eigenforms Triadic, Symmetric Configurations

Figure 2.1: The Emerging Epistemological, Methodological and Theoretical Science II Background for Survey Research



As can be seen both from Figure 1 and from Table 2, the main differences between the old and the new background knowledge cover the entire domain of analyses, namely the subjects of investigation, the objects of analysis and, finally, the interaction modes between subjects and objects of analysis. All three domains differ strongly between Science I and Science II. In short, Science II has become a science of living systems for living systems in which the subjects of analysis, being living systems themselves, are an indispensable and inclusive part of an investigation. The objects of analysis, namely living systems, turn out to be far more complex than the physical objects within Science I. Finally, the interactions between subjects and objects are organized, as will be shown later, in a closed triadic as well as recursive manner.

The methodological and theoretical elements of the new background knowledge emerge predominantly from the embedding area for the social sciences, namely from the cognitive neurosciences whereas the new epistemological components come from a diverse group of frameworks which are particularly focused on the specificities of living systems like the approaches by Robert Rosen (2005) and Walter M. Elsasser (1998), radical constructivism or, as

especially relevant subsets of radical constructivism,⁵ secondorder cybernetics (esp. Foerster, 2003) and the autopoietic approach (Maturana, 1985a; Maturana and Varela, 1987). These and similar perspectives are especially relevant for shaping the core epistemologies of Science II research.⁶ From both sides, the theoreticalmethodological and the epistemological one, the conventional wisdom of survey research is not only questioned in its core aspects and in its central designs (see, for example, Palombo, 1999; Ryckman, 2000), but survey research is also very much encouraged to change its traditional perspectives in order to become compatible with the new Science II landscapes.

Seven new Components in the Background Knowledge for Survey Research in the Age of Science II

Following Figure 1 and Table 2, the first distinctive feature between the background knowledge BK^{III} of Science I and Science II lies in the units of analysis and has been captured by the dichotomy of objects (Science I) and living systems (Science II). As it turns out, living systems, as the main actors on the stage of Science II, are structured and organized in a significantly different way than the physical objects in the phase of Science I. Living systems can be characterized by attributes like autonomy, internal statedetermination, multilevel organization, learning and the like. The most important differences to the objects under Science I lie, however, in the relations between a researcher and her or his domain of investigation. Under Science I, objects and researchers were situated in different ontological domains whereas under Science II, the researcher heror himself is a living system, too, and can be described with categories like autonomy, internal statedetermination, multilevel organization, learning and the like. This point has farreaching implications, some of which will be dealt with under the notion of observer inclusion (See, once again, Figure 1).

Aside from an analytical distinction in terms of living actors, a second new element in the theoretical background knowledge BK^{III} for survey research is related to the description of the environments of living systems which should be conceptualized in a significantly different way, too. In Science I, physical objects could be studied as embedded in a physical environment and with di-

5 On radical constructivism in general, see Watzlawick, 1981, Watzlawick and Krieg, 1991 or Schmidt, 1987 which paved the way for radical constructivism as a wider research tradition.

6 Secondorder cybernetics has been developed explicitly by Heinz von Foerster as a science of living systems for living systems. See especially Foerster, 2003, Müller and Müller, 2007 and Müller, 2008.

rectly observable interactions between objects and their surroundings. Under Science II, cognitive models and methodologies must follow more and more along the pathways of embedded or situated cognition (see esp. Adams and Aizawa, 2008; Bodenhausen and Lambert, 2003; Gibbs, 2005; Noe, 2009 or Robbins and Aydede, 2008). This road towards embedded or situated cognition is so important because it puts special emphasis on the distributed nature of cognition, on thinking environments and why, following a wellknown reversion by Humberto R. Maturana, the mind is not the head (Maturana, 1985).

In situated cognition, a brain needs not only a sensomotoric active organism, but also a responsive environment for its own internal cognitive operations. In this view, the environment becomes the necessary coevolving counterpart for individual actions and interactions. Table 3 exhibits some of the characteristic differences between the two forms of environments in Science I and in Science II.

Cognitive holism becomes the third new component of the background knowledge BK^{III} for survey research, but will be introduced in more detail in the next section because the building block of cognitive holism offers a new bridge from the cognitive neurosciences to the inner side of actor models.

Table 2.3: *The Changing Roles of Environments between Science I and Science II*

Environments in Science I	Environments in Science II
Weak Boundaries	Strong Boundaries
Direct Crossings	Indirect Crossings
Cause – Effect	Triadic Relations
Direct Environmental Effects	Boundary Transformations, Indirect Effects
External Dynamics	Internal Dynamics
Adaptation Internal	Complexity Drifts

The fourth point of departure between the old and the new background knowledge BK^{III} moves away from the descriptive requirements for living systems and their environments or from the theoretical requirement of a holistic organization of cognitive theories. Instead, the fourth point emphasizes the importance of a requisite descriptive and data variety. Under Science II, the focus shifts away from descriptions and measurements at a single level to more general configurations and, above all, to different levels of descriptive and data variety. The study of living systems requires a multiplicity of data sources which cover the entire range of measurements, ranging from the cellular and

neural level, to highlevel brain measurements, up to the levels of internal or external verbal accounts or the observations of acting and interacting persons and transactional data in the case of human societies. All these different levels, measurement types and data formats are needed in order to reach a fuller understanding of living systems in their contexts or environments.

The most important challenge with respect to the requisite variety of measurements and observations will be to bridge the currently deep gap between behavioral observations and the level of the brain scans and neural measurements. But Science II, in contrast to Science I, will generate a rich flow of neural and brain data not only on different types of thought processes, but on daily routines and practices as well. For comparative survey research, this new stage of a requisite descriptive data variety will bring about a dense stream of neural patterns and data for the different stages in survey interactions, which should allow tackling classical issues and controversies like the one on nonattitudes or underlearned responses in a fresh manner.

Fifth, aside from the requisite descriptive variety, another epistemological point of considerable relevance for Science II research in general lies in the inclusion of observers or, alternatively, of researchers in their research. Focused on survey research in particular, research designs will change more and more from an exclusive to an inclusive mode, with social researchers as an indispensable element in it.

In the world of Science I, mass, space and energy were the fundamental building blocks for a science of objects. Warren McCulloch was probably the first to note the peculiarity that breakthroughs in physics require the invention of surprising regularities or theorems of great abstraction which, however, are not included in the conceptual machinery for physical objects.

Let us now compel our physicist to account for himself as a part of the physical world. In all fairness, he must stick to his own rules and show in terms of mass, energy, space and time how it comes about that he creates theoretical physics. (McCulloch, 1988, 73)

Thus, in Science II one is, by necessity, confronted with a more inclusive task. Following, once again, McCulloch, a physicist

must then become a neurophysiologist ..., but in so doing he will be compelled to answer whether theoretical physics is something which he can discuss in terms of neurophysiology ... To answer 'no' is to remain a physicist undefiled. To answer 'yes' is to become a metaphysician. (Ibid.)

In other words, Science II is the era of living systems, being researched by living systems. This new configuration brings the observer or the researcher as a necessary component back into her or his research domain. Thus, Science II becomes to a remarkable extent a selfreferential and selfinclusive form of science.

Sixth, another element of the new background knowledge BK^{III} for survey research lies in the closed organization of relations into which living systems, the observing scientist included, can and should enter. In Science II, the new minimal configuration for the study of living or learning systems by living systems is not a dyadic relation between subject and object which has been characteristic of the conventional scientific method, but is built in a triadic fashion, with the observing scientific researcher as one node, the domains under observation as another node and with a final node linking and closing these two nodes to a triadic ensemble. In short, Science II research designs are to be built in their minimal form not with one, not with two, but with three components.⁷

Science II, in contrast to Science I, will be characterized more and more by designs and by operations in configurations of a closed triadic nature which includes the observing researcher R, the domain under observation which is usually composed of observing living systems or, alternatively, of participant observers PO. Additionally, R and PO are closed by an intermediate element such as rule systems or theories about the neural organization of PO and R which acts as a generative mechanism GM between R and PO.

Characteristically, the types of relations in triadic configurations change from causal relations to generative relations. Figure 2 as well as Table 4 highlight the significant differences between the causal forms of Science I and the generative configurations of Science II.

7 See also the paper from 1976 by Francisco J. Varela, where he moves beyond the usual dualistic suspects of observer/observed, subject/object, describer/described, operator/operand and the like (Varela, 1976).

Figure 2.2: Triadic and Generatively Closed Research Designs

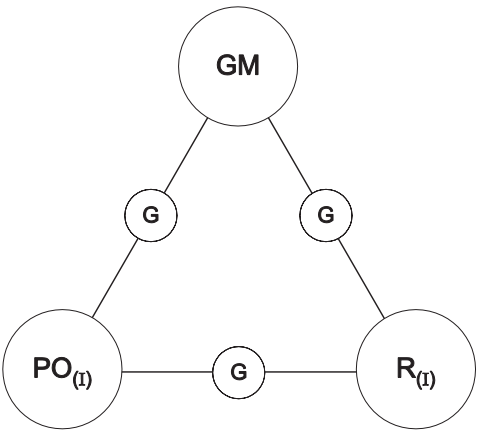


Table 2.4: Causal and Generative Relations

Causal ($A \rightarrow B$)	Generative [$PO(A, B), LS, GM$]*
Asymmetrical in time	Symmetrical in time
Separation into cause and effect	No causes and effects
Cause is necessary, sufficient or both	Mutual dependence
Observers excluded	Observers included
Non-recursive	Recursive
Openness	Closure
Generalizations	Necessary Eigenforms

*A, B: Events. PO: Observer. GM: Generative Mechanism. LS: Living Systems as Field of Research.

Seventh, Table 4 already included the notion of necessary Eigenforms, inherent in triadic and generative configurations. Thus, the seventh ingredient of the new background knowledge BK^{III} emphasizes the production of Eigenforms. This implies that the recursive interactions between researchers and their living fields of investigation, if properly organized in a triadic fashion, lead to new stabilities or, to use an expression by Heinz von Foerster, to Eigenforms. Eigenforms become one of the central goals of research processes within Science II.⁸

8 Among the many variants of a theorem on the necessary emergence of Eigenforms, see, for example, Francisco Varela and Joseph Goguen's version 1979.

The remaining sections of this article will build three broad bridges from survey research to the core domains of Science II in general and to the cognitive neurosciences and to the area of biomedical and health research in particular. These three bridges should offer fresh incentives for pursuing and intensifying new ways of survey research both for generating data and for analyzing them.

Bridges from the Cognitive Neurosciences to new Complex Internal Actor Models for Survey Research

Following the new focus on living systems and the notion of embedded cognition, one of the basic differences between the old and the new background knowledge lies in the complex nature of cognitive processes of living systems. The study of cognition under Science II departs more and more from the pathways of conventional folkpsychology or from typical Science I traditions like behaviorism.

One of the challenging general heuristic rules for the study of cognitive processes called cognitive holism, was already included in Figure 1 and was propagated strongly as early as in 1969 by Heinz von Foerster (Foerster, 2003).

According to this rule, it is possible, in principle, to isolate conceptually certain components in the stream of cognitive processes, for instance the faculty to perceive, the faculty to remember,⁹ the faculty to infer or many other sensocognitive as well as cognitivemotoric faculties. However, one should not expect that these conceptual separations between perception, memory or inference find a 1:1 correspondence in the neural organization of actors. In its generalized form, the principle of cognitive holism can be formulated in the following way:

If one wishes to isolate these faculties functionally or locally, one is doomed to fail. Consequently, if the mechanisms that are responsible for any of these faculties are to be discovered, then the totality of cognitive processes must be considered ... (Foerster and Müller, 2003, 29f.)¹⁰

9 In principle, it would be possible to differentiate between a large number of these faculties, like the faculty to infer, the faculty to learn, the faculty to evaluate, the faculty to communicate or the faculty to move, to name just a few more additional faculties.

10 Aside from the functional and the local theses, one could put forward two additional theses, one on genetic holism and one on epistemological holism as well. For more details, see Foerster and Müller, 2003.

The inseparability of these faculties can be shown by a reduction *ad absurdum*. It can be demonstrated that the assumption of independent faculties in isolation leads to absurd consequences. In particular, it can be demonstrated that, if one of these faculties mentioned above is omitted, the entire system is devoid of cognition.

Phrased differently, actor models with one of the above faculties like actor models with memory only turn out strikingly incomplete because a variety of additional internal faculties are required in order to account for the capacity to memorize. Thus, cognitive holism poses a very big challenge for the development of new internal actor models. But once actor models that correspond to the principle of cognitive holism are available, a new bridge is opened up between survey research in general and between the interactions of respondents and interviewers in particular. As has already been demonstrated (Müller and Toš, 2009), these new interaction models, based, for example, on genetic algorithms, can offer profound new insights on the nature of survey questions and on several fallacies which result from a traditional folkpsychology view on domains like values or selfevaluations.

In particular, fully developed internal actor models could lead to a new typology of survey questions which is based on the cognitive production type of survey responses. In order to separate survey items into various groups, a new dimension can be introduced that refers to two different types of cognitive response productions, which have been labeled as overlearned and underlearned responses (Müller and Toš, 2009). Overlearned responses can be considered as relatively stable, constant and insensitive to different contexts or prehistories of actors. Underlearned responses are, by necessity, creative, highly volatile, instable and sensitive to contexts or prehistories. This distinction varies from one person to the other and it always involves the cognitive organization of actors as a whole. Table 5 offers some further hints on the differences between these two types of responses. Probably the most important element of this distinction between overlearned and underlearned responses lies in the fact that underlearned responses are quickly forgotten and play no relevant role in the overall cognitive organization of actors.

In the spirit of cognitive holism, overlearned responses can be considered as a permanent and stable component of the overall cognitive repertoire of actors and underlearned responses as justintime reactions to a particular communicative interaction. Underlearned responses become a typical byproduct of a communicative interaction and bear no or very little relevance for recurrent practices or for other relevant preferences of actors.

Table 2.5: Over-Learned and Under-Learned Responses in Surveys

Dimensions	Over-Learned Responses	Under-Learned Responses
Response	Single Response	Multiple Responses Possible
Response across Time	Stable across Time	Highly Volatile, Unstable
Inputs	No Sensitivity to Question Inputs	Highly Selective/Sensitive of Question Inputs
Memory	Long-Term Memory	Short-Term Memory
Production	Recall	Just in Time Productions
Type of Task	Non-Creative	Creative
Context	Context-Free	Context-Sensitive
Path-Dependency	Path-Independent	Path-Dependent
State-Dependency	State-Independent	State-Dependent
Consistency	Global Consistency	Global, Local Inconsistencies
Errors by Respondents	Errors by Respondents Possible	No Error by Respondents Possible
Bias	No Biases	Multiple Biases
Complexity	Trivial Configuration	Non-Trivial Configuration

One can introduce a second dimension with respect to different forms of observation, which becomes relevant for survey items. Along this second dimension, survey items can be differentiated between externally observable domains like recurrent practices which can be observed in principle by third parties and internal domains like assessments which rely pre-dominantly on the respondents’ answers alone. Survey items with externally observable domains can be validated with the help of other observational data whereas items with only internal domains offer no links to observable practices and routines of actors.

It becomes highly interesting to arrange these two domains of cognitive response production and the two different types of observational domains. Table 6 presents such a matrix with four different groups of survey items.

Table 2.6: A 2 x 2 Matrix of Survey-Items

	Externally Observable Domains (Recurrent Practices, KnowledgeItems, etc.)	Internal Domains (Assessments, Attitudes, Fictional Stories, etc.)
OverLearned Responses	Group I	Group II
UnderLearned Responses	Group III	Group IV

Due to the differentiations in Table 6, the interpretation of thesefour groups of survey items should and must differ radically from one another.

-
- Group I items can be interpreted at face value and can be compared and checked with other external data as well with respect to measurement errors or biases. Items on the daily time from home to work, on information activities, on the voting behaviour or on knowledge items fall under the first category. Unfortunately however, Group I items are not the most common ones in surveys and are rather restricted to the sociodemographic section of surveys only.
 - Group II items, due to an internal cognitive production process only, cannot be linked with comparable external data sets, but may have similar data in the past or from other regions. Group II items are also strongly connected with the longterm cognitive repertoire of actors, which manifests itself in these stable and contextindependent responses. Most importantly, several additional items are usually needed to determine a Group II membership of a particular item, otherwise a Group II item becomes unidentifiable. While specific preferences or assessments might qualify as a Group II item, Group II items cannot be interpreted in terms of recurrent practices but must be understood as stable fixedpoints in the cognitive domain of actors only.
 - Group III items are composed of externally observable survey questions which contain an unusual component like a particular scaling device. For example, asking for daily TV consumption in terms of minutes requires a creative reaction and, thus, an underlearned response. Usually, Group II items are characterized by weak links to recurrent practices, although additional external information on TV consumption patterns for various TV-networks would be needed for any substantial interpretation. For Group III items, additional external information is necessarily required in order to transform the weak links to recurrent practices into stronger ties.
 - At first sight, Group IV items look similar to the other three groups although these items are fundamentally different from the rest of the groups. Responses to these items are produced just in time, are forgotten almost instantly and, moreover, highly volatile and unstable within respondents. Trust in national or European institutions on a ten point scale can be considered as a paradigmatic example for a Group IV item. In terms of interpretation, Group IV responses offer no hints on recurrent practices and need, additionally, a large amount of similar crossregional and intertemporal data in order to identify a relevant *explanandum* at all. Persistent differences across and within countries on the trust in institutions item, for example, makes it worthwhile to search for relevant external data on recurrent practices which are relevant for trust issues. In a strong sense, Group IV items by themselves are void of interpretative content.

This short typology of survey items, based on a holistic cognitive actor model, makes three very clear points on the current distances between survey items and recurrent societal practices.

- First, relatively few survey items, namely Group I items only, allow a direct interpretation in terms of recurrent societal practices. Moreover, Group I items can be analysed further with respect to significant differences in terms of class or stratification, gender differences or age groups.
- Second, Group II and Group III items require a substantial amount of additional internal and especially external data in order to become interpretable at all. In combination with large external or internal data, these items can be interpreted at least in terms of weak ties to recurrent practices or the cognitive organization of respondents.
- Third, Group IV items need an enormous amount of additional internal as well as external data in order to close the gap to observable recurrent societal routines at least in a weak sense.

The upshot of the typology of survey responses lies in the observation that only a few items in traditional surveys can be interpreted directly with the help of statistical analyses. The majority of survey items, especially Group IV items, need a large amount of additional external as well as internal data in order to be interpretable at all. However, surveys are usually interpreted as if they were composed of Group I items only. In other words, by relying on surveys and the established forms of interpretation, a researcher positions her or himself in relatively large distances to recurrent societal practices which, after all, were the target domain for surveys in the first place.

Bridges from the Cognitive Neurosciences to new External Actor Models

The second bridge is situated in the domain of actor-environment coupling and crosses the great divide between survey research and the fields of the cognitive neurosciences (Gazzaniga et al., 2004). The second bridge is built with the help of a well-known principle in the cognitive neurosciences which has been labeled as the principle of undifferentiated encodings (PUE). PUE was postulated already by Johannes P. Müller in 1826 and has been put forward in recent decades again and again by Heinz von Foerster (e.g., Foerster, 2003) or Ernst von Glasersfeld (Glasersfeld, 1997). In order to describe PUE at greater length, it can be divided into three parts.

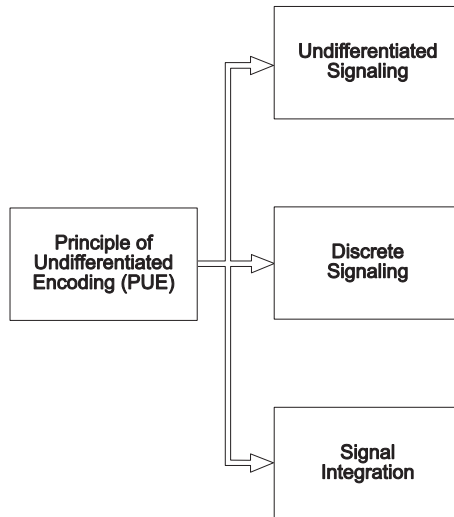
- Undifferentiated Signaling: The first part concerns the sensory border between actors and their environments and asserts that only undifferentiated

quantities at different levels of intensities, but not qualitatively differentiated signals, cross the border between the external and the internal worlds of actors. Thus, sensory inputs enter as undifferentiated quantities and not as differentiated qualities.

The response of a nerve cell does not encode the physical nature of the agents that caused its response. Encoded is only 'how much' ..., but not 'what' (von Foerster, 2003, 215).

- Discrete Signaling: The second PUEpart stresses the fact that the quantities are not encoded in a continuous fashion, but in a discrete manner.
- Signal Integration: Finally, the third PUElement emphasizes the necessity for an overall integration of sensory inputs into an overall pattern or result.

Figure 2.3: The Elements of the Principle of Undifferentiated Encoding(PUE)



At first sight there are no family resemblances in view which could lead from the principle of undifferentiated encoding within the cognitive neurosciences to conventional survey research. Upon second thought however, the following methodological links can be identified which help to cross the distance between PUE in the cognitive neuroscience domains on the one hand and survey research on the other hand.

Due to PUE and the emphasis on undifferentiated signaling, a strong support can be offered for the functional equivalence of different dimensions within an identical broader survey domain. Surveys, by necessity, are capable

of selecting only a small fraction of the daily routines and of their impact on the preferences and evaluations of individuals. Likewise, surveys are capable of identifying individual coping capacities in a highly selective manner, too. Thus, a single survey offers a highly selective minimal model of situated cognition (Robbins and Aydede, 2008; PiatelliPalmarini, 1994; Pohl, 2004) which covers a small fraction of the overall stream of routines and of the cognitive evaluation patterns of actors.

PUE could and should open new bridges especially for a secondary analysis of seemingly incomparable datasets which are characterized by different dimensions within an identical common domain. Here, PUE can be used to treat different dimensions within a commonly shared domain as equivalent. With discrete signaling one can build a discrete quantitative scale for qualitatively different inputs. And signal integration can be transformed into a special algorithm for all the aggregation of selected survey dimensions.

Table 7 offers an example for two common survey domains in Survey A and Survey B¹¹ with different dimensions for each of the two common domains.

Both surveys offer a functionally equivalent account of the overall neurocognitive pattern of undifferentiated encodings, discrete signaling and the signal integration between the cognitiveneural organization of actors and their socioeconomic environments.

Table 2.7: PUE-Equivalent Item Batteries in Survey A and Survey B

Survey	A Survey B
Common Domain I: Working Conditions	
Allowed to be flexible in working hours	Allowed to decide how daily work is organized
Allowed to influence job environment	Allowed to influence decisions about work direction
Allowed to change work tasks	Get a similar or better job with another employer
Start own business	Satisfaction with the way things are handled at workplace
Common Domain II: Resources	
Household's total net income, all sources	Highest level of education
Borrow money to make ends meet, difficult or easy	Feeling about household's income nowadays
Life satisfaction	Happiness
Father's highest level of education	Mother's highest level of education

11 Survey A and Survey B both use different items form the European Social Survey (ESS). This procedure was taken in order to demonstrate the comparability between these different dimensions within a common domain. For more details, see Müller et al., 2010.

Due to the rich availability of different dimensions within a set of common domains, one could produce new, but identically generated group formations which can be used for comparative analysis, despite significant differences in the underlying dimensions. Due to PUE, these constructs can be considered as equivalent in terms of their overall neurocognitive repercussions and implications. Thus, through the PUEbridge a large number of new designs for secondary analyses should be opened up because one can use different dimensions in surveys that share a set of common domains and aggregate them in an identical manner (see Bischof et al., 2009).

New Bridges from Survey Research to the Biomedical Sciences

The third new bridge leads from designs for survey analysis to the areas of biomedical and health research. Through this bridge one can move from various domains of vertical socioeconomic dimensions, from socioeconomic inequalities as well as the selfreported health status to a deeper language level and to a homogeneous vocabulary of stressors and of neuroimmunological processes.

Initially, it is useful to start with a taxonomy of different types of stressors which can be found within the relevant body of literature (see, for example, Cooper, 1996; Horwitz and Scheid, 1999, or Sarafino, 2002). Here, one is confronted with a heterogeneous set, comprised of sensory stressors (strong light, noise, sensory deprivation, etc.), blockstressors (preventing essential routines like eating, sleeping, social contacts, etc.), achievement stressors (tests, examinations, worktasks, but also monotony at work, etc.), social stressors (large crowd of people, loneliness, isolation, etc.), environmental stressors (noise, pollution, toxic materials, etc.), decisionbased stressors (goal conflicts, quick decisions, but also lack of decisionmaking, etc.) or futurebased stressors (fear, anxiety of the future, etc.).

Seemingly, the heterogeneity of stressors is accompanied by a heterogeneity of stress reactions which vary in time (minutes, hours, days, weeks ...), in intensity or in emotions, associated with each stress reaction. Nevertheless, common to all these stress reactions is an attempt to reduce the discrepancy between the effects of stressors and internal target values. Moreover, all stress reactions involve the activation of the hypothalamuspituitaryadrenal axis and produce comparatively high quantities of endocrine hormones, particularly corticosteroids, with cortisol as the most important one, and catecholamines. Likewise, all physiological reactions to stress manifest themselves in a broad range of measurable changes like a higher production of stress hormones,

higher degrees of blood pressure, heart rate, respiration rate, galvanic skin responses or, in larger amounts, of free fat acids.

The general pattern of stress responses possesses at least two main connections to the domain of sickness and ailments, namely through their direct effects on the cardiovascular system on the one hand, and through their immediate impact on the immune system on the other hand.

With the short background on stressresearch, it appears plausible to create a bridge from survey research to special classes of stressors like social, environmental, futurebased or decisionbased stressors. In order to move along this bridge, one needs a special subset of survey dimensions which are linked to societal inequality. In particular, the lower segments of dimensions like degree of education, income, but also working conditions, work autonomy or environmental constraints like pollution or traffic noise can be seen as external determinants of societal inequalities. From this perspective, the following subsetrelation can be put forward:

Lower Segments S^L of Dimensions of Societal Inequalities $\subset$ Stressors

It is quite obvious that this subsetrelationship needs a very detailed justification which cannot be provided within the framework of the present article. However, five main arguments can be given, however, which should offer some plausibility for a subset relation between S^L , the lowest decile, lowest quarter up to the lower third in the different dimensions of societal inequalities and stressors.

- First, S^L -positions, which can be specified in a wide array of living and working conditions, are characterized, *inter alia*, by their relative permanence. Thus, many of the S^L -parts of socioeconomic inequality dimensions like low, insufficient or deteriorating incomes or low degrees of qualifications are to be classified as longlasting or, like in the case of low qualifications, as (nearly) permanent. Thus, being positioned in the S^L -parts normally acts as a continuous stressor and not as a single, rare or isolated occurrence.
- Second, there exists a remarkable symmetry between the language of societal inequality, in particular the focus on the lower parts of a distribution on the one hand and the physiological stress language on the other hand. In both cases, no equivalences can be found for the upper side of the inequality dimensions. Feeling unsafe in the public sphere does have a corollary in terms of stressors. But feeling very safe in the public domain does not constitute an alternative source for stressors. Likewise, a noisy

environment at the workplace or at home implies at the same time an environmental stressor whereas a quiet atmosphere at work or at home cannot be associated with a different group of stressors. Thus, the lower segments of the distribution of inequality dimensions can be linked to stressors, whereas upper segments in the distribution imply, by and large, the absence of stressors.

- Third, the distributiondependent specification for thresholds for the S^L -parts provides additional support for the subset relationship between the S^L -areas of dimensions of societal inequality and stressors. Since the majority of the population is, by definitional necessity, above the S^L -threshold, individual actors, falling in a specific S^L -part, perceive themselves usually relatively deprived. Thus, the available literature on the importance of relative deprivation (Olson and Hafer, 1996 or Walker and Pettigrew, 1984) can be added as further evidence for the proposed S^L -partstress linkages.
- Fourth, while stress reactions vary in length, intensity and emotional involvement, the basic physiological reaction patterns are unspecific with respect to the sources of stress. In other words, one does not find a “bad boss-stress reaction”, confined to a specific region in the neuro-immune system in contrast to a “loud noisestress reaction”, affecting other parts of the neuroimmune system. Thus, a multidimensional array of essential living conditions across the contexts or settings of actors and across their cognitiveemotional organization can be interpreted as a summary of all relevant potential stressors whose scope and degree of completeness is limited by the restrictions inherent in conventional survey research only.
- Fifth, stressors and stress reaction are clearly not invariant to the actual number of stressors since stress reactions are functionally related, probably in a complex and nonlinear manner, to the overall number of stressors. This, in turn, provides additional support why a survey analysis should focus on the aggregation of dimensions because these aggregate values should be interpretable in terms of a net value for the overall number of socioeconomic stressors.

In this way, a third bridge can be built which leads from survey research to biomedical and health research and back and which should lead to a much deeper understanding of the complex interactions between daily routines at the workplace or at home and on patterns of health conditions.

Further Outlooks

At this point, the question arises whether these three bridges from the neuro-cognitive sciences to survey research should be viewed as artificial constructs

with zero consequences, as a happy coincidence or as a preliminary set of successful examples with many more to come. Towards the end of this article two strong arguments can be put forward that one should be able to identify many more recombinations across survey research, the neurocognitive sciences and the life sciences in the future. These two basic arguments do not even depend on the secular changes from Science I to Science II, but refer to the underlying technological support systems and environments.

- First, in a sharp contrast to the laboratories for most parts of the 20th century, one can observe a revolution in cyberresearch infrastructures which started only in the last two decades and which will provide, *inter alia*, a huge potential for dataintegration and model recombinations across practically all scientific disciplines. The cyberresearch infrastructures, which are currently built across various fields of science are, in principle, accessible from every point of the scientific landscapes. Thus, a massive integrative support system is currently in construction which, even in the case of a chronic underutilization, provides a permanent incentive to explore new and interior transdisciplinary ways of data or theory integration.
- Second, one can also see an upward trajectory of the information and communication technologies (ICT) from its low levels of numerical operations to considerably higher levels of complex task integrations. Along this path the ICTsegment produces recombinant and increasingly intelligent machines that move along the drift of cognitive holism, which has been described in the fourth section of this article. As a consequence, a rich class of machinebased, but cognitiveholistic actor models, which can also be used as reference points for survey research, will be developed in the near future.

And with this brief technological outlook, the current article on the impact of new building blocks in the background knowledge for survey research can and will be concluded.

Part II

**Methodological Aspects;
Morphological Access to
Comparative Analysis**

3 The Third Road for Comparative Research: Morphological Designs

This chapter presents the outlines for a new road to comparative research which could become of special relevance for large quantities of unused data outside the current data bases for comparative analyses. These datasets have been produced and analyzed within a single region only and, so far, were of no use for comparative research due to the absence of functionally identical datasets in other regions or countries. Subsequently, these surveys which have been designed and assembled for the purpose of analyzing a single population only will be characterized as atomic survey-datasets¹. Essentially, atomic survey datasets are, due to the missing links to similar survey datasets in other areas, lost for comparative research. At this point, the morphological approach sets in, tries to create bridges between these different atomic survey datasets and attempts to bring them into the arena of comparative research. With a common class of data transformations which can be labelled as formation and as aggregation, the morphological approach generates a set of morphological constructs {MCi} which, despite the heterogeneity of the underlying atomic survey datasets, can be used for comparative analyses. Towards the end of this article, several different designs within the third road to comparative research will be described in greater detail. But the main thrust of this paper lies in a high-risk test of the morphological approach in order to establish its viability for comparative research.

The Traditional Limits for Comparative Research

So far, atomic survey datasets, i.e., directly incomparable micro-data between regions, were thought to be the strongest argument for the generation of comparable cross-regional survey programs like the European Social Survey (ESS), Eurobarometer or the World Value Survey. Usually, comparative research has reached its insurmountable limits if confronted with different questions from different surveys in different countries. As an example, take the following two questions from Table 1.

1 Consequently, molecular datasets could be introduced as chains composed of identically generated datasets across regions like in the case of international survey programs (SHARE, ISSP, European Value Surveys, etc.). Moreover, in the subsequent article the emphasis lies on atomic survey datasets. *Mutatis mutandis*, the same arguments and strategies could be used for panel datasets as well.

Table 3.1: Two Different Questions from Different Surveys in two Different Countries

Question Q_i from Survey A in country C_1 [$Q_i(A, C_1)$]:	Start one's own business
Question Q_j from Survey B in country C_2 [$Q_j(B, C_2)$]:	Satisfaction with the way things are handled at workplace

Consequently, molecular datasets could be introduced as chains composed of identically generated datasets across regions like in the case of international survey programs (SHARE, ISSP, European Value Surveys, etc.). Moreover, in the subsequent article the emphasis lies on atomic survey datasets. Mutatis mutandis, the same arguments and strategies could be used for panel datasets as well.

Normally, the outcomes for $Q_i(A, C_1)$ cannot be compared with the results for $Q_j(B, C_2)$. Assume, that for $Q_i(A, C_1)$ two thirds of the female population, in contrast to only one third of the male group, have big difficulties in starting one's own business whereas three quarters of the female group are rather satisfied with their workplace, compared with only 50% of the male respondents. Any inference from $Q_i(A, C_1)$ in country C_1 with respect to the potential results for $Q_j(B, C_2)$ – and *vice versa* – would be ill-founded and, due to the absence of directly comparable data, would constitute a wild speculation without any empirical foundations.

At this point, the morphological approach begins with its operations in creating links or bridges. But quite obviously, the morphological approach is not a magical procedure which can be used for any kind of heterogeneous datasets irrespective of the degree of data incomparability. After all, data on media consumption in country C_1 will provide no comparative clues on the health status of the population in country C_2 .

Thus, the morphological approach rests itself on two assumptions which, *a fortiori*, are needed for the traditional ways of comparative research, too.

The first assumption is one of at least second-best or *satisficing* practices and requires that the atomic surveys which have been conducted, fulfil the usual quality requirements for surveys in a sufficiently professional manner. In other words, the atomic survey datasets used for morphological analyses should be free of serious deficits, biases and errors with respect to sampling, interviewer accuracy, etc.

The second assumption is content-oriented and requires a small number of shared domains between the selected atomic surveys. These shared domains are to be understood in a very general way and are fulfilled in all those instanc-

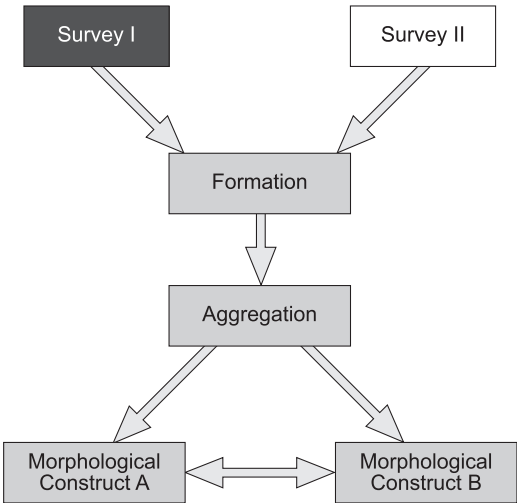
es where a uniform classification scheme CS can be built for each of the selected atomic surveys. What is needed, thus, for the morphological approach, are different atomic surveys on two, three or more shared domains like health, political attitudes or working conditions and the like.

Violating even these two conditions simply means abstaining from any type of comparative data-analysis, morphological, traditional or otherwise.

The Basic Steps in the Morphological Approach

Figure 1 presents an overview for the third road to comparative research. The morphological approach starts with two or more different atomic surveys A, B ... in different regional units like cities or countries. Here, the variables, items and scales between the surveys A, B are usually heterogeneous, except for socio-demographic variables like age, gender or household size. Heterogeneity between surveys means that survey-questions are focused on different dimensions within a broader domain, that questions are phrased in significantly different ways within the same dimension and that the scales used for these questions differ substantially, too. Under normal circumstances, comparative research has come to an end in cases of strong survey heterogeneity².

Figure 3.1: Morphological Designs



2 To repeat, once more, the morphological approach, as any other alternative, must come to an insurmountable barrier, once a survey on eating habits in country C₁ is to be compared with a different survey on professional training in country C₂.

However, the morphological approach starts with a set of atomic surveys A, B and creates a sub-set of shared domains which can be described in a homogeneous fashion by a single classification scheme CS. This classification scheme with a small list of shared domains like aging, housing, quality of life and the like forms the basis for the morphological approach. Following Figure 1, the essential steps in the morphological approach are called formation and aggregation.

Formation means a dual selection process.

- The first selection is made with respect to a number of elementary forms which have been assembled in Figure 2.
- The second selection concerns the number of dimensions used, given that the selection of elementary forms has been accomplished. Figure 3 highlights the distribution of forms with four dimension in each of the common domains.

More specifically, the formation process involves, first, the specification of a classification scheme CS for a group of atomic survey data sets. This classification scheme CS leads to a specific number N of homogeneous themes or

Figure 3.2: Elementary Forms of Shared Domains between Atomic Survey Data Sets

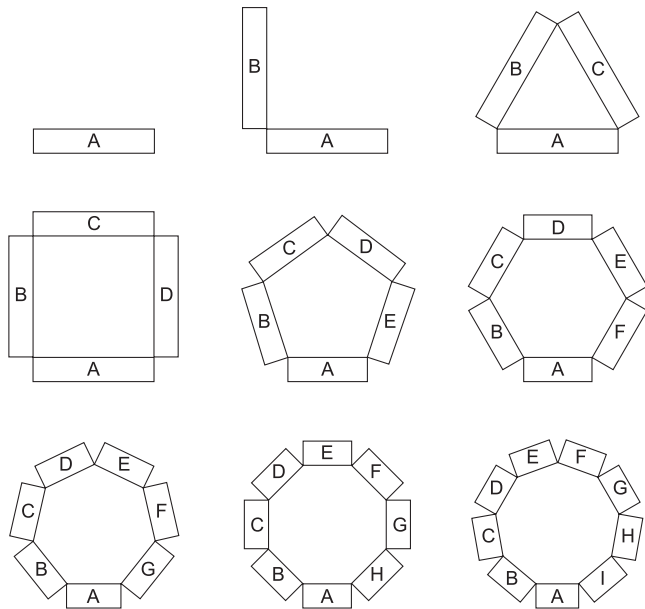
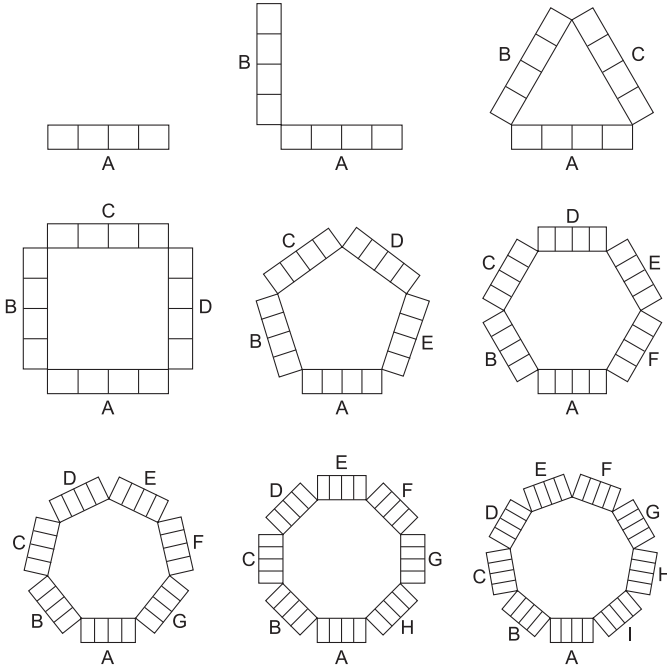


Figure 3.3: Elementary Forms F_i with $i = 1, 2, 3 \dots, 9$ Shared Domains and Four Dimensions



domains which are shared by all atomic survey data-sets under consideration. Usually, a CS for atomic data sets includes broad domains (e.g., social capital, partnership and family, etc.) which have been covered by a number of different questions or item-batteries in each of the atomic surveys.

The specification of a number of shared domains leads to the selection of a corresponding elementary form. Elementary forms F_i ($i = 1, 2, 3 \dots$) are based on the combination of unit rectangles where each unit rectangle represents a single shared domain between atomic survey data sets. These unit rectangles can be combined to elementary geometric constructs like triangles, squares, pentagons, hexagons, heptagons and the like. Figure 2 summarizes these elementary geometric forms F_i from a single area up to a configuration of a nonagon with nine broad common domains among a set of atomic surveys. Obviously, the next step consists in the selection of a common number of variables or dimensions $F_{i,d}$ ($d = 1, 2, 3, \dots$) which are needed for the subsequent creation of morphological constructs. Normally, several variables or dimensions are available for each of these shared domains. Depending on the

selected atomic surveys the usual number of dimensions will be three, four or five and, probably seldom, higher. Numbers beyond seven or eight depend on the availability of suitable survey questions and lower numbers lead to difficulties for the morphological approach itself or to the purpose of comparative research altogether. Figure 3 demonstrates the variety of elementary forms $F_{i,4}$ ($i = 1, 2, \dots, 9$) with four dimensions and similar diagrams could be produced for three, five or more dimensions as well.

In terms of data operations, formation means a data transformation from an atomic survey dataset with different scales to a sub-data set with a specific number of shared domains, a specific number of dimensions for each of these domains, and, most importantly, homogeneous scales across all dimensions and domains.

Following Diagram 1, the next step in the morphological approach, after formation, is called aggregation which is directed towards a morphological construct MC_i for each of the atomic data sets. These morphological constructs become, then, the basis for comparative investigations. Thus, based on a morphological construct for each atomic survey data set under consideration, the comparative analysis can be focused on the structure of the morphological constructs $MC^{A,B}$... and, due to the availability of an identical set of variables for all atomic surveys, on the socio-demographic profiles of this morphological construct.

In terms of data operations, aggregation is focused, first, on the integration of dimensions and domains and, second, on the creation of a horizontal or vertical stratification of the sub-dataset which, then, forms the basis for comparative analyses.

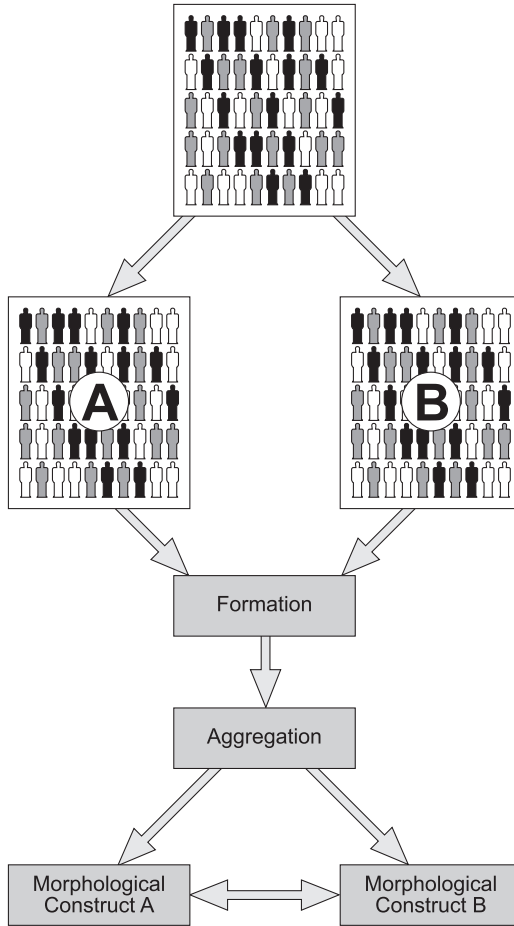
Due to the necessary selection and construction of forms inherent in this approach the terms morphology and morphological approach have become the main classifiers for the third road to comparative research.

Subsequently, a test design and a preliminary demonstration of the viability of the third road to comparative research will be laid out in greater detail.

A Test-Design for the Morphological Approach

Within the present context, a test-design will be constructed which should help to demonstrate the usability and the relative robustness of the morphological approach. Following Figure 4, a single national survey will be selected and split into two different groups of questions A and B. It must be empha-

Figure 3.4: A Test-Design for the Morphological Approach



sized that the split is not one in populations as in split ballot designs, but a split in survey questions. The rationale for focusing on a single survey only is rather straightforward: By concentrating on a single population, by using two different subsets of questions from one survey and by performing the morphological approach with an identical population one can easily compare the two resulting stratifications with respect to their population composition. In this way, two groups of results could be obtained.

- If the population is grouped in high numbers into the same categories by the formation and aggregation operations, despite two different sets of sur-

vey questions, then the morphological approach seems to be a viable path to follow and the title of Part III – the third road to comparative research – can be justified.

- However, if the population is stratified across the two morphological constructs, following the necessary formation and aggregation operations, in a random manner, then the morphological approach should be abandoned altogether. (See, once again, Figure 4)

Turning to the test design in more detail, the starting point lies in the construction of a classification scheme CS which divides the survey into a small set of broad domains or general themes.

As usual, a zero hypothesis H_0 can be put forward which asserts the non-viability and the erroneous nature of the entire morphological approach.

H_0 : The morphological constructs used for comparative analyses cannot be compared with each other in any meaningful way. The morphological data-constructs used for comparisons are, due to the absence of directly comparable data, artificial and spurious and lead to ill-founded results.

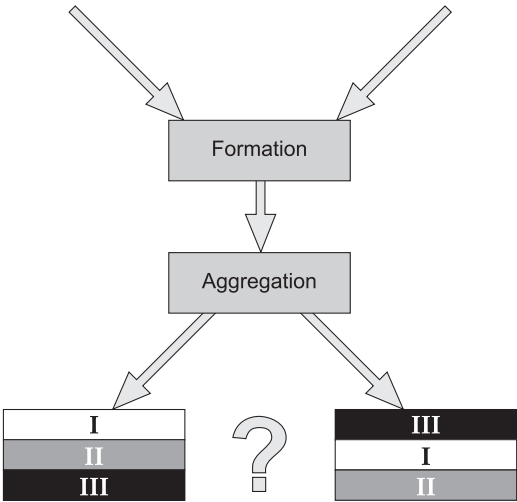
In order to refute H_0 , the validity and the reliability of the morphological constructs MC must be shown in the following manner.

H_A : The morphological constructs used for comparative analyses can be compared with each other in many meaningful ways. The morphological data-constructs used for comparisons are, due to the absence of directly comparable data, both valid and reliable and comparisons lead to empirically well-founded results.

A perfect support of the H_0 -hypothesis would consist in a series of comparisons between MC^A and MC^B in which each single categorization is misplaced. This configuration is shown in Figure 5 where one and the same population has been categorized in three levels (low, medium, high). Due to the fact, that a single data set has been used, it can be determined how much the two constructs MC^A and MC^B differ from each other. As Figure 5 demonstrates this categorization has been undertaken in an entirely different way for the two morphological constructs MC^A and MC^B .

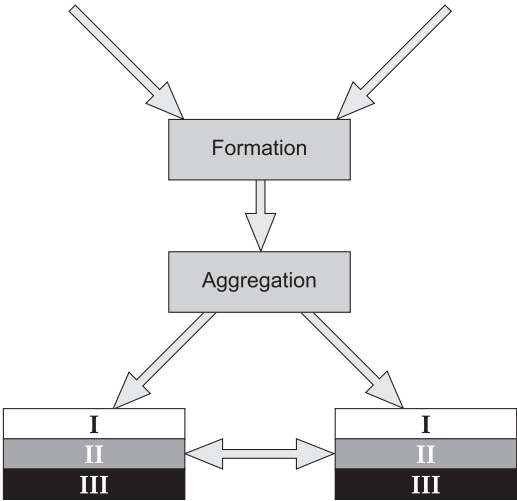
Actually, not a single individual in MC^A is placed at the same level in MC^B . In the worst case of Figure 5, zero percent of the population have been categorized in an identical manner through the two morphological constructs MC^A and MC^B .

Figure 3.5: A Perfect Failure for the Morphological Approach



Contrary, the perfect support for H_A and for the morphological approach is depicted in Figure 6 where the two morphological constructs MC^A and MC^B produce an identical categorization for the entire population P . Here, all respondents within the morphological construct MC^A can be found at the identical levels in the morphological construct MC^B . In the case of identical categorizations for an entire survey sample on the basis of two different sets

Figure 3.6: An Optimal Result in Favor of the Morphological Design



of questions, one would have produced extremely strong empirical evidence for the construct validity of the morphological approach. In the next section, the numerical demarcations will be specified in greater detail which, quite obviously, must be situated somewhere between 0 (perfect misspecification) to 1 (perfect correspondence)

Finally, given that this approach produces valid and reliable categorizations for two different sets of questions within a single dataset, one can safely infer that this approach works also in the case of two different surveys with different sets of questions across different populations. And this inductive inference can be made, due to the present test-design with a single population, free of any ecological fallacies.

Setting up the Test

Using the Austrian data for the ESS as test dataset, a classification scheme CS with three broad domains has been specified. For each of these domains four variables or dimensions were available.³ The classification scheme CS was composed of

- Social capital (trust in institutions, general trust)
- Working conditions
- Central actor-resources (income, education, life satisfaction, etc.)

Table 2 summarizes the two different groups of questions from the Austrian ESS questionnaire which were used for a differentiation into two different sub-surveys, namely into Survey A and into Survey B. The underlying elementary form $F_{3,4}$ is represented by the right element in the first row of Figure 3 which consists of three shared domains with four dimensions each.

The procedures with a classification scheme CS and different dimensions are neither particularly spectacular nor is it clear how a new road to comparative research can be based on these elementary forms or dimensions, specified so far. But until now, only the first step in the morphological procedure, the formation step, has been performed. What is still missing is the second step which has been qualified as aggregation procedure.

3 For the test design any multiple thematic survey like, for example, the Austria Social Survey, conducted in 1986, 1993 and 2003, could have been chosen. The reason for selecting the European Social Survey was motivated by the fact that the ESS, due to its availability for twenty or so European countries, allows an identical replication of the morphological approach for the Austrian ESS data for the entire dataset as well.

Here, a common aggregation procedure for two elementary forms produces two morphological constructs MC^A and MC^B which, then, become the basis for comparative analyses between population A and population B. To obtain the morphological constructs MC^A and MC^B , the following aggregation steps have to be undertaken.

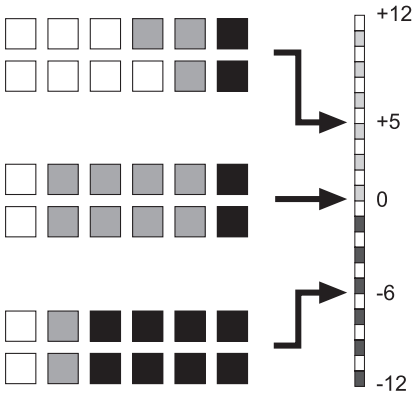
First, each of the twelve dimensions in both data sets must be divided into three segments, S^U , S^M and S^L . The criterion for separation is distribution-dependent where S^U occupies the upper third of the distribution, S^M the middle range and S^L the lower third of the distribution. Thus, single dimensions like flexibility in working hours or the feeling about the household's income may exhibit a distribution with a single peak, two peaks or several peaks. Independent of the shape of the distribution, the upper third of the distribution is classified as S^U , the middle third as S^M and the lower third as S^L .

Second, a data transformation of the actual values in the dataset into the domain of -1, 0 and +1 must be performed. The transformation rules are straightforward: S^U equals 1, $S^M = 0$ and S^L becomes -1.

Third, at this point each respondent in the data set is characterized by a string of varying numbers of -1, 0 and +1. Consequently, an aggregation procedure is needed which generates a single number for each respondent in the dataset.

Figure 8 exemplifies the corresponding aggregation procedure for the twelve dimensions. From Figure 8 one can see that the total number of S^L or the

Figure 3.8: A Transformation of the Data for Three Respondents with Twelve Dimensions into a Vertical Inequality Scale from -12 to +12



SU: White Squares; SM: Gray Squares; SL: Black Squares

number of domains with a value of -1 are subtracted from the total number of S^U or the number of domains with a value of +1. Thus, a respondent with seven S^U -segments and two S^L -areas receives the overall value of 5 or a respondent with two S^U areas and eight S^L domains ends up with a value of -6.

Fourth, a new scale can be constructed which, due to the twelve dimensions selected for the data sets A and B, ranges from -12 to +12. +12 corresponds to a homogeneous distribution of +1 only and -12 marks the opposite sequence of a string of -1 only. Thus, each respondent, due to the selection of twelve dimensions, is located at one of the discrete points in the scale between -12 and +12.

Fifth, the resulting distribution, due to these data transformations, must be a normal distribution with $\mu = 0$ and $\sigma = 1$. This distribution is separated, once again, into three layers, namely into G^U , G^M and G^L . G^U comprises the upper third of the population, G^M the middle layer and G^L the lower third of the population distribution.

Sixth, the separation of the two populations A and B into three layers G^{AU} , G^{AM} and G^{AL} and G^{BU} , G^{BM} and G^{BL} leads to the morphological constructs MC^A and MC^B .

Seventh, the two morphological constructs MC^A and MC^B can then be compared with respect to their socio-demographic composition like gender and age distribution or other socio-demographic categories which are usually available in an identical fashion across surveys.

In this way, two morphological constructs MC^A and MC^B have been generated which are based on sub-surveys from the ESS and, due to the overall test design, on the same survey population.

The Test-Results for the Morphological Approach

The final step in establishing the morphological approach as a viable new path for comparative research consists in a comparison between the two morphological constructs MC^A and MC^B . Since the ESS has been split into two sets of questions with an identical population for each ESS-sub-class the crucial criterion lies, quite obviously, in the retention rate r for the groups G^U , G^M and G^L . The retention rate r measures the number of identically classified instances in the survey population P and focuses on the similarities or dissimilarities in the composition of G^{AU} , G^{AM} and G^{AL} on the one hand and of G^{BU} , G^{BM} and G^{BL} on the other hand.

Three a priori generalizations on the viability of the morphological procedure can be formulated right away.

- First, the higher the retention rate between the two group stratifications of the morphological constructs MC^A and MC^B , the higher the construct validity of MC^A and MC^B and, thus, of the morphological approach.
- Second, the higher the number of successful test instances with split surveys and single populations, the higher the reliability of the morphological procedure.
- Third, the higher the construct validity and the reliability, the more the morphological approach can be applied to instances with two, three or more different surveys either across time or across regional units.

The retention rate r can be formally introduced as

$$r = \frac{(\sum n_i)}{(\sum n_i + \sum n_k)}$$

where the expression in the numerator sums up the common instances between survey A and B and the denominator is composed of the sum of common elements plus the sum of misclassified respondents.⁴ The expected value for the retention rate r for a purely random classification method of an initial configuration of three groups $[g_1, g_2, g_3]$ into a new schema with three groups $[g_1, g_2, g_3]$ is, quite obviously $r = 1/3$.⁵

A priori, the following assessments can be undertaken with respect to the retention rate r from a value close to 0 up to a value very close to 1.

A value of $r \approx 0$ like in Diagram 5 would exhibit an endemic misclassification of the morphological procedure altogether. In this case, the morphological procedure offers an unintended side-effect. Due to the non-random nature of a complete misspecification additional considerations could be devoted to the problem whether a configuration with a highly significant negative result could be transformed into one with highly significant positive results. A value well below $r < 0.33$ would indicate a misclassification bias of the morphological approach altogether. Since the expected value for a purely random classification procedure lies at $r = 0.33$, it can be safely assumed that a significantly

4 A retention rate can be calculated in two ways, namely first with the population of Survey A as origin and the population of Survey B as successor and, second, with population B as origin and A as successor.

5 Given a configuration of three groups g_1, g_2, g_3 , one has a total of nine possibilities with three rank preserving specifications $[g_1|g_1, g_2|g_2, g_3|g_3]$ and six possible misspecifications.

lower value for the retention rate r implies a systematic bias inherent in the morphological constructions.

Values of $r > 0.33$ but below $r \leq 0.50$ would show that the morphological approach performs slightly better than a pure random classification but is of no use for comparative research since the failure rate is sufficiently large and the margin of errors is simply too wide.

The most interesting and relevant domain of the retention rate lies in the range $0.50 \leq r < 1$. Here, the morphological approach operates in a highly significant manner well beyond a pure random classification procedure. Moreover, the retention rate is sufficiently high to be qualified as pattern preserving. Pattern preservation can be defined as a data transformation $D \rightarrow D^*$ which keeps general data patterns like a rising or a falling trend, clusters or characteristic relations largely intact so that D^* exemplifies these patterns, albeit with some variations, as well. Especially interesting are retention rates near or above 0.67 because this would show that the morphological approach produces very powerful classification preserving results.

The value of $r = 1$ or r sufficiently close to 1 would show that both morphological constructs, despite their different underlying dimensions and data-bases, yield the same results. In this case, the morphological approach would operate almost in a purely magical way because it would generate, despite an underlying heterogeneity, (almost) perfect homogeneity.

Before going into the issues of construct validity, reliability and retention rates, Table 3 presents a summary of the correlations between each pair of the dimensions used for Survey A and Survey B. This overview is useful because it demonstrates that the constitutive pairs of dimensions from Survey A and from Survey B are not correlated in a uniformly high manner. On the one hand, each of the three groups contains at least a pair of rather weakly correlated dimensions. Second, the correlations for the three groups themselves, specified as average correlation for all four pairs, differ significantly as well. The pairwise correlations in the domain of trust in institutions and in people turn out to be the highest (0.54) and they fall considerably in the area of working conditions (0.38).

Turning now to the decision problem of accepting H_0 or H_A , the following procedures and rules can be established.

With respect to the construct validity, two extreme cases can be distinguished. Assume a single dataset divided into two sub-sets A and B with n ($n=1,2,\dots$,

Table 3.3: Correlations between the Dimensions in Survey A and in Survey B (ESS)*

Survey A/Survey B (ESS)	
Domain I: Trust in Institutions and in People	
Trust in country's parliament / Trust in the legal system	0.56
Trust in the police / Trust in politicians	0.43
Most people can be trusted or you can't be too careful / Most people try to take advantage of you	0.58
Making mind up about political issues Politicians in general care what people like me think	0.60
Average Correlation for Domain I	0.54
Domain II: Working Conditions	
Allowed to be flexible in working hours / Allowed to decide how daily work is organized	0.56
Allowed to influence job environment / Allowed to influence decisions about work direction	0.62
Allowed to change work tasks / Get a similar or better job with another employer	0.24
Start own business / Satisfaction with the way things are handled at workplace	0.09
Average Correlation for Domain II	0.38
Domain III: General Resources	
Household's total net income, all sources / Highest level of education	0.17
Borrow money to make ends meet, difficult or easy / Feeling about household's income nowadays	0.41
Life Satisfaction / Happiness	0.68
Average Correlation for Domain III	0.49
Average Correlation across Domains	0.47

*: The correlations have been calculated for the entire eSS-data set in round 1 and not for the Austrian data.

N) common domains and m ($m=1,2,\dots, M$) indicators or dimensions for each of the domains respectively where $n_{A,B}$ domains $\times$ $m_{A,B}$ dimensions are used as the empirical basis for comparisons. Assume, furthermore, a morphological formation and aggregation procedure that leads to two final morphological constructs MC^A and MC^B which separates the population of A and B in $o_{A,B}$ ($o=2,3,\dots, O$) categories each. Then, H_0 can be rejected if two independent tests on construct validity and reliability are passed.

Construct validity can be assumed in the case of $0.50 \leq r < 1$ simply because the retention rate lies within a domain far away from a random classification. Perfect construct validity occurs in the case of $r \approx 1$.

Turning to the reliability of the morphological approach, it can be assumed that the reliability increases inductively with the number of successful test applications. In the present context, reliability will be taken into account only in a weak way by applying the morphological test design for ESS data from Austria and for the entire ESS country group.

Table 4 offers a first overview on the results of the morphological procedures and on the overall retention rates. The retention rates have been calculated

both for the Austrian data set of the ESS as well as for the entire ESS-data set across all countries. In this way, the calculations both for a single country as well as for the entire set of ESS-countries should demonstrate that these retention rates are not the result of particularly happy circumstances within a single country, but demonstrate a general feature of the entire ESS-data set. Moreover, using ESS-data for Austria as well as for the entire group of ESS-countries provides at least a weak hint on the reliability of the morphological approach.

Table 3.4: Retention Rates for Survey A and Survey B (ESS) (in %)

Retention Rates	Austria		Europe	
	A/B	B/A	A/B	B/A
Retention Rate for Domain I (Social Capital)				
Lower Group	57.5	65.3	70.6	66.2
Middle Group	39.8	44.1	46.0	46.7
Upper Group	74.8	59.3	64.5	68.3
Retention Rate for Domain II (Working Conditions)				
Lower Group	66.3	71.4	66.6	66.5
Middle Group	65.4	55.3	63.0	58.1
Upper Group	55.0	67.5	57.1	65.6
Retention Rate for Domain III (General Resources)				
Lower Group	59.3	42.2	80.2	41.0
Middle Group	48.0	47.6	47.8	33.9
Upper Group	54.2	67.0	33.2	86.0
Overall Retention Rate across Domains				
Lower Group	54.3	72.8	76.6	68.0
Middle Group	48.3	34.3	53.3	36.3
Upper Group	69.4	71.7	59.5	87.4
Average Retention Rate across Domains	57.3	59.6	63.1	63.9

The most important result from Table 4 lies in the fact that the retention rates lie well in the critical and pattern-preserving range of $0.50 \leq r < 1$. As a rule of thumb, the retention rates come close to the value of $r \approx 0.67$ which means, essentially, that approximately two thirds of the population have been classified in a rank-preserving way.

A second essential outcome lies in the overall consistency of retention rates for a single broad domain or across the three shared domains. This result is particularly encouraging because it demonstrates the applicability of the morphological approach already for elementary forms of the variety $F_{1,4}, F_{1,5}, F_{1,6}, \dots$.

Finally, the third result points to the consistency between a single national survey and a large group of national surveys which offers at least a weak support for the reliability of the morphological approach.

In sum, with retention rates well around $r \approx 0.67$ and, thus, a relatively high construct validity plus an a priori reliability of the morphological procedure due to the similarity between the Austrian and the European retention rates, H_0 can be safely rejected and H_A accepted. These results are highly encouraging for the overall viability of the morphological approach and for using morphological constructs as units of comparisons in the case of atomic data sets.

Moreover, using atomic surveys and splitting them into sub-atomic parts with identical populations should become the indispensable testing ground for exploring and eliminating potential weaknesses in the morphological construction processes. In principle, exploring the test-design with single populations should lead to two forms of potential cognitive gains.

On the one hand, this testing ground of split surveys and identical populations for each sub-survey should contribute, in the long run, to the development of positive and negative heuristic rules for the formation and aggregation procedures of the morphological approach. For example, the third common domain for the ESS with its focus on general resources turned out to be the one with the comparatively lowest retention rates. Looking more closely on the selected dimensions and on the construction process, it was rather difficult to split the two education variables into three equal segments. Although the ESS did not offer another pair of dimensions in the shared domain of general resources, it becomes possible to identify the weak components in the formation and aggregation process. Thus, there is a positive learning curve inherent in the morphological approach which has not been unfolded and which stays currently almost in its initial configuration.

On the other hand, performing the morphological approach for a single dataset should produce a lot of new explicit and implicit knowledge with respect to superfluous and redundant survey questions. High retention rates for two subsets of questions within a single survey implies that one of the subsets can be replaced by an entirely new domain and by a new set of questions and dimensions altogether.

Different Trajectories within the Third Road of Comparative Research

Having established, in principle, the overall viability of the morphological approach, one can specify a large number of different designs within the

morphological framework. Specific research interests and research questions require different morphological constructs as well as different forms of comparative analyses morphological style.

At the outset, the morphological approach is capable to cope with a large variety of formal structures in terms of the underlying composition and of spatio-temporal levels.

On the one hand, the morphological approach can be applied to different populations, be they composed of persons, households, enterprises, cities, nations and the like.⁶ In compositional terms, this framework is not restricted to specific elements like persons alone, but can be used for different segments of contemporary societies as well like non-government organizations, research institutes, internet communities, etc. as well.

On the other hand, this approach can be used for different spatio-temporal levels as well, ranging, spatially, from neighborhoods to cities, regions, countries, supra-national regions up to the global level and temporarily from daily variations, monthly changes, yearly developments up to the slow transformations of the *longue durée*.

Different Morphological Constructs

Morphological constructs can be built in two different ways, namely, like it has been done in the test-deign, in a vertical way or in a horizontal manner. The selection of vertical or horizontal constructs depends, on the one hand, on the overall research question as well as on the goal of a comparative analysis and, on the other hand, on the available classification scheme CS and on the dimensions selected for the morphological construct. In some applications it might turn out that vertical (horizontal) constructs should be specified, but no appropriate CS with a small number of vertical (horizontal) dimensions can be found within the available surveys.

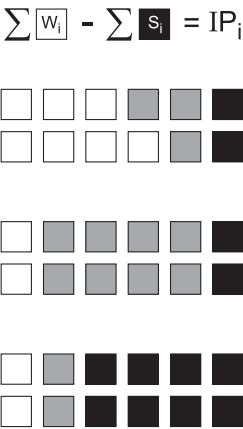
Vertical Constructs

Morphological constructs as vertical formations reflect, very generally, underlying distributions of socio-economic inequality. For vertical constructs, classification schemes should cover essential domains of societal inequalities and

⁶ It must be stressed that the morphological approach has been applied already to different sets of actors like firms, scientific institutes, state agencies and the like. As an example of a morphological analysis for scientific institutes, see Müller et al., 2002.

dimensions should be chosen in a way that their lower ends can be interpreted in one of the following ways: as socio-economic risks, as being in a highly under-privileged position, as very disadvantageous, as very marginalized and the like⁷. Here, the lower and higher ends of the various dimensions must constitute an inequality relation. For example, the dichotomy of very high socio-economic risks and very high socio-economic life chances can be viewed as one of the possible interpretations for the two end points of the scale.

Figure 3.9: A Data-Transformation for Three Survey Respondents with Twelve Dimensions into the Domain of -1, 0 and +1



White Squares: Life Chances; Gray Squares: Medium; Black Squares: Risks POS_i; Position of respondent i; LC: Life chances of i; R: Socio-economic risks of i

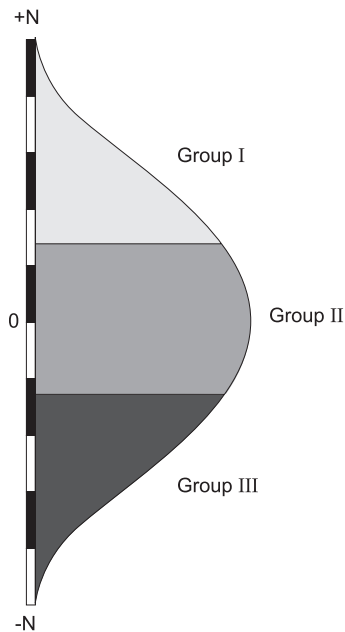
In general, the road with vertical morphological constructs should be selected whenever the research interest is directed towards societal inequalities and towards vertical stratifications. Looking at Table 2, for instance, many, if not all, of the dimensions bear strong relations with societal inequality. For instance, income, level of education, but also different forms of autonomy at the workplace can be seen as important aspects of societal inequality. Similarly, a high level of trust in institutions or in one’s social environment can be viewed as an individual resource whereas low levels of trust exclude a person from many routines and practices and can be viewed as a lack of social capital. Due to the

7 Likewise, the upper ends should be interpreted in a number of different ways, too, like socio-economic life chances, very over-privileged, very advantageous, very central and the like

selection of dimensions in Table 2 with clear relations to societal inequality, the road with vertical morphological constructs has been chosen.

More specifically, the vertical formation procedure consists, first, in a data transformation for each of the selected dimensions from the existing variety of different scales and values to a single scale only. In principle, different options are available like a continuous scale between 0 and 1 or various discrete linear scales. The question of scaling will be discussed in greater detail in section 6.1.3.

Figure 3.10: The Vertical Morphological Aggregation Procedure

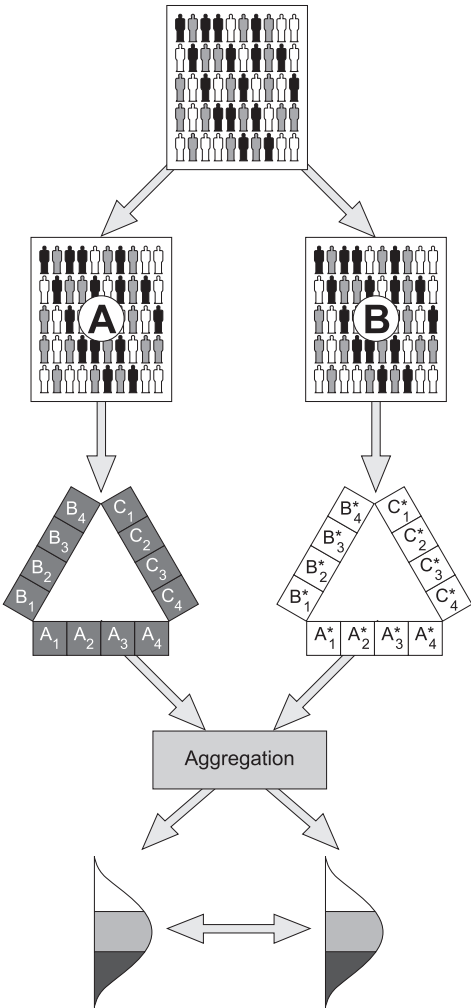


In the test-design, a particularly useful transformation has been employed which was based on the underlying distribution in each of the dimensions and which consisted in a transformation of the distribution of a single variable or dimension into the domain of -1 , 0 and $+1$. Here, a single dimension like the “health status” on a scale from 0 to 10 was transformed into the $[-1, 0, +1]$ -scale in the following distribution-dependent way. The lower third of the distribution S^L received the value -1 , the upper third S^U the value $+1$ and the middle segment SM the value 0 . Likewise, income, measured in income groups or levels of education, measured in years, were be transformed in the

same way. The lower third of the distribution received the value -1, the upper third is encoded as +1 and the medium segment gets, once again, the value 0. Figure 9 demonstrates, once again, a possible distribution for three survey respondents, based on a classification scheme CS with a total of three shared domains and four dimensions each.

Due to the overall aggregation and to the summation of socio-economic life chances minus the number of socio-economic risk position each individual received a single value in the domain of $-N$ to $+N$ where N stands for the

Figure 3.11: Two Vertically Distributed Morphological Constructs A and B

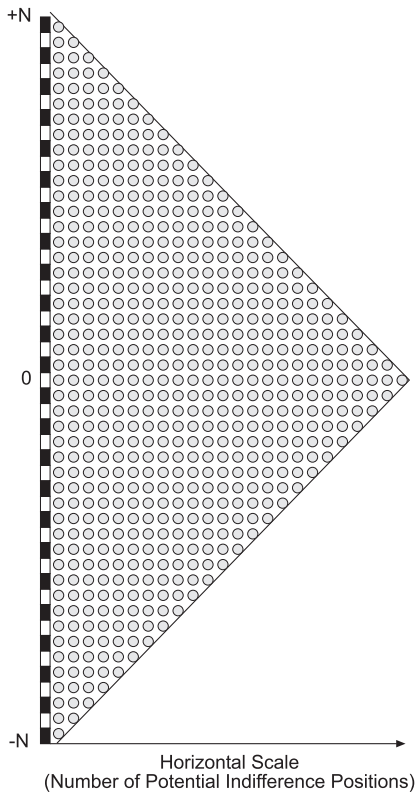


total number of dimensions. For example, in the test example, each respondent could be characterized by a single value in the domain from -12 to $+12$. Due to the aggregation process, the overall outcome is a normal distribution which can be separated, once again, in three groups, namely into G^U , an upper group, G^M , a medium group and G^L , a lower group. (See also Figure 10)

In terms of comparative analysis with two atomic surveys, the minimal instance for a morphological design with vertical dimensions and scales consists of two morphological constructs MCA and MCB which serve as units of comparative analysis. (See also Figure 11)

Additionally, this type of aggregation offers an interesting way for horizontal stratifications especially around the values of -1 , 9 and $+1$, as can be seen from Figure 12.

Figure 12: Searching for Different Horizontal Configurations within a Vertical Morphological Construct



Horizontally, the value 0 can be reached by twelve medium positions or by six risk-positions and six positions of socio-economic life chances. Again, empirical analyses have shown very interesting discrepancies between groups with a high number of medium positions versus groups with a relatively large number of positions of risks and life chances simultaneously.⁸

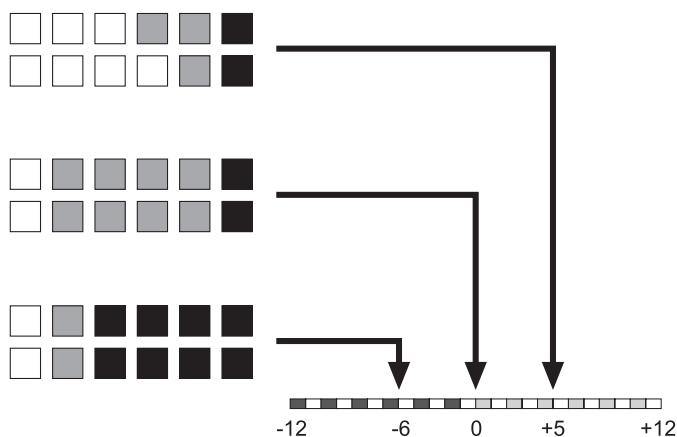
Finally, the morphological constructs can serve as units for comparative analysis in a number of ways. The morphological constructs MCi can be compared with respect to their gender distribution in each of the groups, to their age distribution, to their qualification levels, etc. In principle, the entire set of socio-demographic dimensions available across surveys can be used for comparative investigations.

In this sense, a powerful link can be created between atomic datasets which, so far, lay outside the domain of comparative research.

Horizontal Constructs

Morphological constructs can be built as horizontal configurations, too. Horizontal constructs correspond to different life-styles⁹ or to different forms of life

Figure 3.13: A Transformation of Three Data-Sets with Twelve Dimensions into a Horizontal Life-Style Scale from -12 to +12

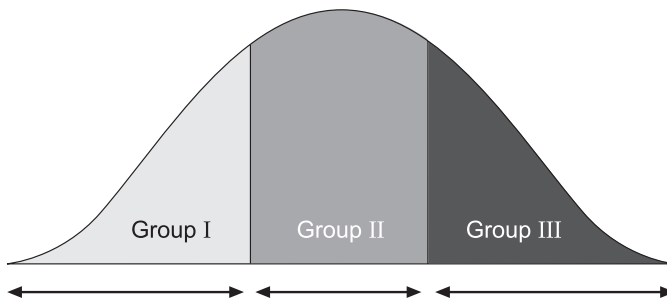


8 For more details, see Müller/Link, 1997.

9 For an overview of life-style approaches, see Dangschat/Blasius 1994, Otte, 2004, Richter, 2005, Rössel, 2005 or Schwenk, 1996.

(Ludwig Wittgenstein) which should not be interpreted as societal inequality but as horizontal stratifications. Take, for example, a classification scheme CS which consists of leisure activities, cultural and artistic preferences and of consumption styles. Moreover, the selected dimensions consist of the frequency of visiting a theater or an exhibition of contemporary art or the importance of contemporary design in the purchase of consumer durables, etc. Here, the lower and the upper end-points of the selected dimensions could be interpreted in a number of different ways like traditional versus innovative, simple versus complex, etc. In contrast to the vertical constructs with a homogeneous interpretation in terms of societal inequality, horizontal constructs and horizontal stratifications are much more heterogeneous and one has to be very explicit with respect to the classification scheme CS and the interpretation for the selected dimensions. Figure 13 and Figure 14 exhibit the aggregation process using horizontal constructs.

Figure 3.14: A Normally Distributed Aggregated Morphological Construct on Socio-Economic Life-Styles



Quite obviously, horizontal constructs and horizontal group stratifications become the new units of comparative analysis where major comparative issues lie, once again, in the socio-demographic group composition of MCA and MCB.

Non-Linear Scales

So far, the underlying scales were linear and discrete. But Table 5 shows that a wide variety of scales could be used for the formation and aggregation procedures.

Table 3.5: *Different Types of Scales in the Morphological Approach*

	Linear	Non-Linear
Discrete	Type I	Type II
Continuous	Type III	Type IV

Overall life satisfaction, for example, if measured on a scale between zero and ten exhibits only a small number of respondents with values of five and smaller and, once again, a very small number in the highest category of ten. It is questionable whether the distance between 9 and 10 is the same as between, say, 6 and 7 or 0 and 1. Here, non-linear forms of scaling of Type II could be used as a substitute. In other instances, logarithmic scales could turn out as a useful way for scaling, especially in cases where the dimensions are scaled according to large quantities like the amount of household income, square meters for housing, or years spent in of education, etc.

Non-linear scales could give rise to wild vertical or horizontal constructs as well where the separations for different groups are not made on the basis of the overall population distribution, but on the scale-values, with very few instances in the upper range, a relatively small amount of cases in the middle range and the great majority in the lower group.

In this way, a wide variety of procedures – vertical, horizontal, different types of scales – become available for obtaining the morphological constructs MCi.

Designs for Morphological Comparisons

Morphological constructs, if produced in a homogeneous and consistent manner for a number of different atomic surveys, become the new units of comparative analysis. Most importantly, a large number of different research designs can be created on the basis of morphological constructs as the subsequent explorations will demonstrate.

Comparisons for a Single Unit across Time

The first morphological design builds comparisons across time within a single region, using a set of different surveys $\{S_{i,t}\}$ where t lies in the interval from t_0 , the initial period, to t_k , the final period.. This design is particularly useful for the creation of time series on vertical formations like risk groups or on horizontal strata like different life style groups. This design is particularly relevant where only a small number of identical surveys is available within a

single region and the available survey replications are many years apart from one another. Here, a number of alternative surveys for each of the missing years could be selected which could fill at least partially the gaps between the missing years.

The design for a single unit across time requires the usual steps in the morphological approach, namely the specification of an appropriate set of common or shared domains, the formation of dimensions and their aggregation along vertical or horizontal scales. In this way, time-series on the development of socio-economic risk groups, for example, can be created and can be analyzed in depth with respect to their changing socio-demographic composition, etc. Moreover, these time series can be compared with time series which result from a focus on the available identical surveys only and which use linear extrapolations for the missing years.

Comparisons for Multiple Units for a Single Point in Time

The second morphological research design creates comparisons with a larger number of spatial units, be it cities, regions or countries, for a single point in time. Here, different surveys with a significant number of shared or common domains are to be selected, first, and a classification scheme CS must be constructed. Then, the different formation and aggregation steps have to be performed, dependent on the overall comparative research interest, on the classification scheme CS and on the interpretation of the selected dimensions. This instance is of particular interest in the case of cities and of sub-national regions which over the last years have accumulated a large number of atomic surveys which have been designed with very little consideration of comparative research interests. Here, the morphological approach offers a valuable instrument to link these atomic surveys and to create new units of comparison, either in vertical or in horizontal forms.

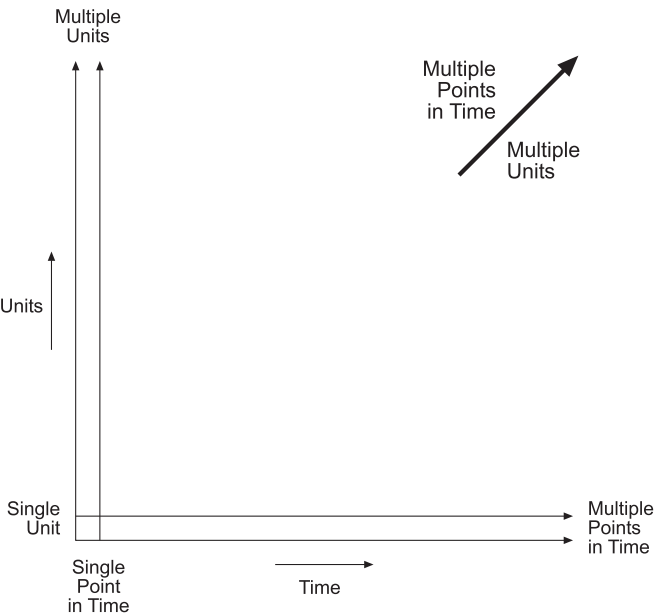
Comparisons for Multiple Units across Multiple Points in Time

Finally, the third morphological research design is aimed towards comparisons with an increasing number of spatial units and time points. This approach is the most demanding one and requires a large number of atomic surveys and a careful specification of a common classification scheme CS. However, the potential gains of this design, once it has been successfully implemented, are unusually high since it leads to comparisons of, say, socio-economic risk groups across a number of spatial units and across time.

Figure 15 summarizes the different research designs within the morphological perspective. Figure 15 can be easily divided into four quadrants which correspond to different designs laid out so far.

The first quadrant in the lower left area is occupied, essentially, by the test design of the morphological approach where one operates with a single unit, with identical populations and with a single point in time. The second quadrant in the lower right side is occupied by the design with single spatial units and multiple points of time. The third quadrant in the upper left side is reserved for the design with multiple units and a single point in time. Finally, the upper right hand quadrant uses multiple units with multiple points in time.

Figure 3.15: The N x T Scope for Morphological Comparisons



Bridges from the Morphological Approach to Areas outside the Social Sciences

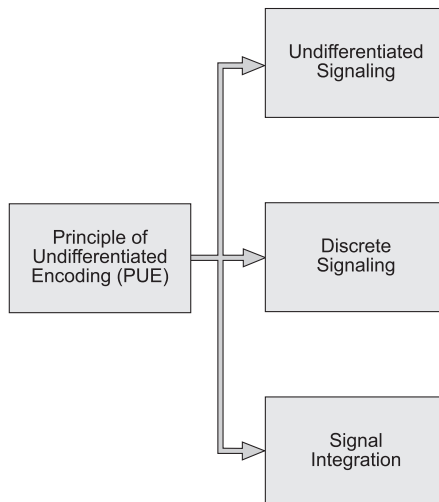
The concluding section will build two broad bridges from the morphological approach to domains outside empirical social research and even outside the social sciences, namely to the cognitive neuro- sciences on the one hand and to the area of bio-medical and health research on the other hand. These two

bridges provide additional cognitive support for the morphological approach and should offer new incentives for pursuing and intensifying this type of morphological analysis.

The Bridge to the Cognitive Neuro-Sciences

The first bridge crosses the great divide between the morphological approach in social research and the fields of the cognitive neuro-sciences. With the first bridge, more cognitive support can be offered for the assumed equivalence of morphological constructs despite their different underlying dimensions. The first bridge is built with the help of a well-known principle in the cognitive neuro-sciences which has been labeled as the principle of undifferentiated encodings (PUE). PUE has been postulated already by Johannes P. Müller in 1826 and has been put forward in recent decades again and again by Heinz von Foerster (*e.g.*, Foerster, 2002, Foerster/Glasersfeld, 1999) or Ernst von Glasersfeld (Glasersfeld, 1997). In order to describe PUE at greater length, it can be divided into three parts.

Figure 3.16: The Elements of the Principle of Undifferentiated Encoding (PUE)



- Undifferentiated Signaling: The first part concerns the sensory border between actors and their environments and asserts that only undifferentiated quantities at different levels of intensities, but not qualitatively differentiated signals cross the border between the external and the internal worlds

of actors. Thus, sensory inputs enter as undifferentiated quantities and not in differentiated qualities.

The response of a nerve cell does not encode the physical nature of the agents that caused its response. Encoded is only 'how much' ..., but not 'what'. (von Foerster, 2002:215)

- Discrete Signaling: The second PUE-part stresses the fact that the quantities are not encoded in a continuous fashion, but in a discrete manner.
- Signal Integration: Finally, the third PUE-element emphasizes the necessity for an overall integration of sensory inputs into an overall pattern or result.

At first sight there are no family resemblances in sight which could lead from the principle of undifferentiated encoding within the cognitive neurosciences to the morphological approach. Upon second thought however, the following methodological links can be identified which help to cross the distance between PUE in the cognitive neuro-science domains on the one side and the morphological approach in empirical social research on the other side.

Due to PUE and the emphasis on undifferentiated signaling a strong support can be offered for the functional equivalence of different dimensions within an identical broader domain. Surveys, by necessity, are capable of selecting only a small fraction of the daily routines and of their impact on the preferences and evaluations of individuals. Likewise, surveys are capable of identifying individual coping capacities in a highly selective manner, too. Thus, a single survey offers a highly selective minimal model of the overall stream of routines and of the cognitive evaluations of actors.

At this point, it is important to note that the two procedures in the morphological approach, namely formation and aggregation, correspond with PUE in all its three aspects. Undifferentiated encoding is used by treating different dimensions within a common shared domain as equivalent. Discrete signaling is accounted for by building a discrete quantitative scale for qualitatively different inputs. Signal integration occurs in the morphological approach by using a special algorithm for all the aggregation of selected survey dimensions.

Thus, a single morphological construct MC^A can be interpreted as a minimal model which fulfills the PUE-requirements. Due to the practical infinity of potential dimensions within a set of common domains, a morphological construct MC^B , using different dimensions, leads to a minimal PUE-compliant model as well. Due to PUE, both morphological constructs can be consid-

ered as equivalent in terms of their overall neuro-cognitive repercussions and implications. Both morphological constructs offer a functionally equivalent account of the overall neuro-cognitive pattern of undifferentiated encodings, discrete signaling and the signal integration between the cognitive-neural organization of actors and their socio-economic environments.

The Bridge to Bio-Medical Research

The second bridge leads from the vertically oriented side of the morphological approach to bio-medical and health research. Here, one can find a common deep-level language through which the domains of vertical socio-economic dimensions, inequalities as well as health can be expressed in a homogeneous vocabulary of stressors and of neuro-immunological processes.

Initially, it is useful to start with a taxonomy of different types of stressors which can be found within the relevant body of literature¹⁰. Here, one is confronted with a heterogeneous set, comprised of sensory stressors (strong light, noise, sensory deprivation, etc.), block-stressors (preventing essential routines like eating, sleeping, social contacts, etc.), achievement stressors (tests, examinations, work-tasks, but also monotony at work, etc.), social stressors (large crowd of people, loneliness, isolation, etc.), environmental stressors (noise, pollution, toxic materials, etc.), decision-based stressors (goal conflicts, quick decisions, but also lack of decision-making, etc.) or future-based stressors (fear, anxiety of the future, etc.)

Seemingly, the heterogeneity of stressors is accompanied by a heterogeneity of stress reactions which vary in time (minutes, hours, days, weeks ...), in intensity or in emotions, associated with each stress reaction. Nevertheless, common to all these stress reactions is an attempt to reduce the discrepancy between the effects of stressors and internal target values. Moreover, all stress reactions involve the activation of the hypothalamus-pituitary-adrenal axis and produce comparatively high quantities of endocrine hormones, particularly corticosteroids, with cortisol as the most important one, and catecholamines. Likewise, all physiological reactions to stress manifest themselves in a broad range of measurable changes like a higher production of stress hormones, higher degrees of blood pressure, heart rate, respiration rate, galvanic skin responses or in larger amounts of free fat acids.

10 See on this point see Cooper, 1996, Horwitz/Scheid, 1999, or Sarafino, 2002.

The general pattern of stress responses possesses at least two main connections to the domain of sickness and ailments, namely through their direct effects on the cardiovascular system on the one hand and through their immediate impact on the immune system on the other hand.

With the short background on stress-research, it appears plausible to create a bridge from societal inequalities to special classes of stressors like social, environmental, future-based or decision-based stressors. Here, the following subset-relation can be put forward:

Lower Segments S^L of Dimensions of Societal Inequalities $\subset$ Stressors It is quite obvious that this subset-relationship needs a very detailed justification which cannot be provided within the framework of the present article. Five main arguments can be given, however, which should offer some plausibility for a sub-set relation between S^L , the lowest one third in the different dimensions of societal inequalities and stressors.

- First, S^L -positions, which can be specified in a wide array of living and working conditions, are characterized, *inter alia*, by their relative permanence. Thus, many of the S^L -parts of socio-economic inequality dimensions like low, insufficient or deteriorating incomes or low degrees of qualifications are to be classified as long-lasting or, like in the case of low qualifications, as (nearly) permanent. Thus, being positioned in the S^L -parts normally acts as a continuous stressor and not as a single, rare or isolated occurrence.
- Second, there exists a remarkable asymmetry between the language of societal inequality, in particular the distinction between socioeconomic risks and life chances on the one hand and the physiological stress language on the other hand. While socio-economic risks and life chances have been introduced symmetrically, no symmetry can be identified for the stress domains. Feeling unsafe in the public sphere (socio-economic risk/stressor) does not have a life chance corollary in terms of stressors. Feeling safe in the public domain does not constitute an alternative source for stressors. Likewise, a noisy environment at the workplace or at home implies an essential socioeconomic risk and at the same time an environmental stressor whereas a quiet atmosphere at work or at home cannot be associated with a different group of stressors. Thus, socio-economic risks can be linked to stressors, socio-economic life-chances imply, by and large, the absence of stressors.
- Third, the distribution-dependent specification for thresholds for the S^L -parts provides additional support for the subset relationship between the

S^L-areas of dimensions of societal inequality and stressors. Since the majority of the population is, by definitional necessity, above the S^L-threshold, individual actors, falling in a specific S^L-part, perceive themselves usually relatively deprived. Thus, the available literature on the importance of relative deprivation¹¹ can be added as further evidence for the proposed S^L-part-stress linkages.

- Fourth, while stress reactions vary in length, intensity and emotional involvement, the basic physiological reaction patterns are unspecific with respect to the sources of stress. In other words, one does not find a “bad boss-stress reaction”, confined to a specific region in the neuro-immune system in contrast to a “loud noise-stress reaction”, affecting other parts of the neuro-immune system. Thus, a multidimensional array of essential living conditions across the contexts or settings of actors and across their cognitive-emotional organization can be interpreted as a summary of all relevant potential stressors whose scope and degree of completeness is limited by the restrictions inherent in conventional survey research only.
- Fifth, stressors and stress reaction are clearly not invariant to the actual number of stressors since stress reactions are functionally related, probably in a complex and non-linear manner, to the overall number of stressors. This, in turn, provides additional support why the morphological aggregation procedure should be interpretable in terms of a net value for the overall number of socio-economic stressors.

In this way, a second bridge has been built which leads from the morphological approach to biomedical and health research and back. And this, in turn, leads to the question whether these two bridges from empirical social research to the life science, broadly conceived, can be viewed as a happy coincidence or whether one can identify more general reasons for the family resemblance between a new road for comparative research and the cognitive neurosciences or bio-medical research. This question, *inter alia*, stands in the center of the next article.

11 On this literature, see more recently Walker/Pettigrew 1984 or Olson/Hafer 1996.

4 Towards New Frontiers in Comparative Survey Research

The chapter will turn its focus on the widening horizons and on the emerging cognitive landscapes for new ways and directions in comparative survey research¹. Moreover, these new territories and frontiers for comparative survey research will add more cognitive weight to the procedures and rules of the morphological approach which was presented in the previous chapter. This article will start with some general remarks on the increasing pressures for comparative survey research and will continue with a basic phase transition in the cognitive organization of science, namely the transition from Science I to Science II.

The subsequent parts of this article deal with the repercussions and consequences of this phase transition for the social sciences in general and for comparative survey research in particular. Thus, the reader's attention will be drawn to a new organization and to new structures in the theoretical background knowledge for comparative survey research which should exert a considerable influence in re-shaping survey methodologies and comparative survey research altogether. Adapting and accommodating to this new background knowledge, comparative survey research, in our assessment, should and will create, on the one hand, new survey designs compatible with the emerging background knowledge and will leave behind its established core routines and its standard procedures as special cases, very much as Newtonian physics has become a special terrain within contemporary physics. In our judgement, the next years and decades will experience a fundamental change in the core approaches to identify attitudes, to determine subjective as well as objective living conditions or to explore individual life styles. The paths for comparative survey research of the 20th century and its trajectories in the 21st century will be situated in significantly different cognitive territories.

1 The term comparative survey research comprises three main components, namely data production through surveys, analysis of a single survey data set and comparative analysis of survey data. In the subsequent article, the term survey research is related to the production process of survey data, survey analysis is used for the statistical operations with single survey data and comparative survey analysis refers to the analytical operations with survey data for at least two different populations.

The Rise and Decline of Traditional Comparative Survey Research

At the outset, a few general reflections will be undertaken on the ambiguous status of comparative survey research both in science and in society. On the one hand, survey based research has become the most frequently used publication mode across the social sciences². The following table has been assembled by Saris/Gaulhofer 2007:2p. and it shows a remarkable increase of survey-based research in a wide variety of the social sciences, including, surprisingly, social psychology and economics as well.

Table 4.1: The Rise of Survey Research

	Economics	Sociology	Political Science	Social Psychology	Public Opinion
	(39.4%)	(59.6%)	(28.9%)	(48.7%)	(95.0%)
1949/50	5.7%	24.1%	2.6%	22.0%	43.0%
1964/65	32.9%	54.8%	19.4%	14.6%	55.7%
1979/80	28.7%	55.8%	35.4%	21.0%	90.6%
1994/95	42.3%	69.7%	41.9%	49.9%	90.3%

On the other hand, comparative survey research has been questioned in recent decades on cognitive, epistemological and social grounds by at least three important components inherent in the processes and operations of comparative survey research itself, namely by social researchers, by the respondents of surveys and, at least in an indirect manner, by the underlying information and communication technologies. Currently, these three elements, in combination, gain in cognitive impact and could significantly reduce the capacities and the potentials for comparative survey research in its conventional form in the future. It might well be that comparative survey research has reached its maximum diffusion level and, despite its high level of achievements and sophistication, is already entering a phase of relative decline.³

New Alternatives for Data Production and the Issue of Survey Measurements

Within the field of empirical approaches towards the social worlds, comparative survey research has been pressured by two developments within the social

² See the summaries by Saris/Gaulhofer, 2007:2p.

³ It belongs to the well-known results of innovation research that old technologies are usually replaced at the height of their efficiency and their relative strength. Thus, analogue cameras have been substituted by digital ones at the height of their performance and xx Utterbeck 1989, 1996.

sciences themselves, the first being the diffusion of new forms of so-called qualitative research and the second focusing on the still unresolved question of survey measurements.

Turning to the first process, the last decades have witnessed a wave of new approaches for exploring the social worlds under the heading of qualitative social research⁴. Leaving aside the problem of the relative merits of quantitative or qualitative designs and methods, the new domains of qualitative social research offer also a new way of interacting with individuals or social groups. By and large, these new qualitative approaches for data generation and data analysis view their respondents in an entirely different way to the procedures of standardized surveys. Qualitative interactions and methods try to maintain an open and flexible access to respondents, stress their autonomy and want to bring to surface not only specific episodes and perspectives by individuals or social groups, but more general narrative structures or styles of narration as well. In a significant number of instances, qualitative and quantitative research produce incoherent or even contradictory results, which, in turn, call for more complex ways of combination and integration like the so-called method of triangulation.

Aside from a new wave of qualitative research, the quantitative data themselves which are generated in traditional survey research have been a constant focus of discussion and interpretation. Peter Converse's article on the nature of belief systems in mass publics (19xx) can be used as an important reference point in question. According to Converse, attitudes measured in normal survey research qualify as non-attitudes only and as such they are highly volatile and subject to frequent changes. Subsequently, the issue of non-attitudes provoked an alternative on the part of conventional survey research which emphasized the measurement of "real" attitudes, but allowed for varying degrees of measurement errors.

Thus, it seems worthwhile to go deeper into the issue of measurement processes and of measurement types not only in survey research, but across different scientific domains. Table 2 presents an elementary division of measurement types for measurements across the natural and the social worlds. Here, two measurement dimensions are used, the first one on the repeatability of measurements (exhaustive/repetitive) and the second one on the degree of observer dependency.

4 On the widening and deepening field of qualitative research, see Flick/Kardorff/Steinke, 2005, Helfferich, 2005 or Lamnek, 2005.

- Exhaustive measurements lose, due to the measurement process, the possibility of a renewed measurement whereas repetitive measurements can be performed over and over again.
- Similarly, strong observer dependency means that the measurement process itself produces or generates the quantity to be measured whereas in weak observer-dependent contexts the quantities to be measured could be measured, in principle, before or after the actual measurement process as well.

Normally, the first measurement type in Table 1 is linked to the realms of quantum physics, where measurements are both exhaustive and strongly observer-dependent (e.g., Zeilinger, 2005), and the fourth type to the macro worlds across nature and society. Following the conventional wisdom (e.g., Hand, 2004 or Henshaw, 2006), measurements and observations in survey domains, if properly designed and conducted, can be treated like measurements of velocities, length, temperature or distances in the macro-natural arenas. In short, measurements in survey research, if adequately adjusted for measurement errors, correspond to type IV (Saris/Gallhofer, 2007).⁵

Table 4.2: Types of Measurement

	Strong Observer-Dependency	Weak Observer-Dependency
Exhaustive	Measurement Type I	Measurement Type II
Repetitive	Measurement Type III	Measurement Type IV

In sharp contrast to an established consensus on survey measurements, it will be argued here that measurements in survey contexts, as performed according to the rules and guidelines of empirical social research⁶, fall under the first measurement type and not under the fourth type.

With respect to the dimension exhaustive/repetitive, asking a survey question once destroys the possibility for asking it again immediately afterwards. Asking the same item two, three or more times in a row creates a new context for respondents. Likewise, asking the same survey questions in a repeated man-

⁵ Measurement type II is reserved for those cases where the measurement process destroys the conditions of the possibilities for renewed measurements. For example, measuring the breaking point for materials makes a renewed measurement impossible. Measurement type III applies whenever the measurement process creates a measurable quantity via the measurement process itself. Like in the case of a roulette, a croupier as a strong observer produces a sequence of numbers from 0 to 36 in a just in time-manner.

⁶ See, for example, the handbook of survey methodology by de Leeuw/Hox/Dillman, 2008.

ner meets definite barriers and constraints on the side of respondents.⁷ Thus, along the first dimension measurements in survey research are in no way similar to consecutive and repeated measurements for physical macro-objects and their properties like velocity or temperature.

For the dimension of weak/strong observer dependencies two broad alternatives are feasible in survey interactions. According to the conventional wisdom in survey research, responses are based on stable assessments which are well embedded in the cognitive-behavioral repertoire and inside the neuro-cognitive organization of respondents. Thus, Jon A. Krosnick, Charles M. Judd and Bernd Wittenbrink adhere to the storehouse or file drawer image of attitudes and see

great theoretical and practical value ... to hypothesize that a single attitude exists in a person's mind: the net evaluation associated with the object.
(Krosnick, Judd/ Wittenbrink 2006:26)

In this traditional view, survey measurements are founded on respondents' introspective reports of their stable long-term attitudes and beliefs which are well-stored in the long-term memory of respondents. On this account, survey measurements can be subject to measurement errors which, however, can be corrected and adjusted.

In the alternative perspective, survey responses are created just in time within the context of a survey itself, without prior fixed quantities or specific values in the cognitive repertoire and organization of respondents. Rather, due to the fixed menu of admissible survey responses, respondents can be assumed to match this unusual format with their ordinary language routines and their past experiences. In this perspective, survey responses are creative reactions on unusual requests which in most instances are produced and delivered in a spontaneous manner.

By necessity, the second alternative in conjunction with the exhaustive character of survey measurements, leads to the first measurement type in Table 2. It will become the main task in the next sections to build up additional support from the cognitive sciences and from elements in the background knowledge

7 Respondents could be asked, however, if they are willing to participate in a weekly or even in a daily survey. But such a demand must be stated clearly in advance and must be fully accepted by respondents. And again, in a daily questionnaire it will become exceedingly difficult to ask the same question twice. Additionally, daily surveys will be accepted by respondents only if they deal with daily changing responses. This condition is usually fulfilled in the field of consumption, media utilization within the last 24 hours or in the area of social contacts. But it should become exceedingly difficult to ask respondents on their trust in institutions in daily intervals.

of comparative survey research to justify the assumption that survey responses are exhaustive in nature and are the results of strong observer dependencies.

The Increasingly Strange Social Form of Survey Questioning

Aside from the scientific domain itself, survey research has come under implicit attack by the respondents of surveys, too, on two major fronts.

First, in the course of societal differentiations and individualization processes, it becomes more and more difficult to include special groups in a representative survey sample. For example, migrant persons with severe language problems in their new environments, younger and highly mobile persons, very old persons living in retirement homes, these are just three societal groups which are usually included only marginally in a survey data set.

Second, respondents turn out to be less and less willing to follow the ordinary procedures of a survey interview. Response rates for telephone or face to face surveys are declining continuously and respondents tend to defect especially in the case of telephone interviews.⁸

It seems worthwhile to investigate this issue of a growing survey apathy or, alternatively, of survey irrelevance in closer detail. The method for this in-depth analysis can be qualified as a variant of an ordinary language investigation and seeks to establish implicit or explicit rules, structures and constraints in the language game called survey questioning.

In general, survey interactions, whether by telephone or face to face⁹, belong to a large class of question and answer-interactions which have found their way into different societal domains or systems and play their indispensable and non-substitutable roles.

A very broad division separates question and answer interactions into a continuum of symmetric and asymmetric instances.

- Symmetric interactions come close to Jürgen Habermas' ideal speech situation¹⁰ where each participant has an equal chance of asking and of answering and where role reversals are a necessary part of the symmetry arrangement.

8 In terms of quality control, telephone interviews are considered to have the lowest values for reliability or validity. See, for example, Saris/Gaulhofer 2007.

9 In the subsequent discussion, self-administered surveys are not being considered since they do not involve other actors outside the respondent her- or himself.

10 See, for example, Habermas, 1981 and 1984.

- In asymmetric interactions the roles of the questioning part is usually fixed and no role reversals are allowed. Additionally, one observes a clear power asymmetry between the actors responsible for the questioning from the persons undertaking the answering parts¹¹. Here, all important strategic moves are reserved for the questioning part and the responding part has to adapt to these requirements.

Symmetric questioning and answer routines have been part of the conversations in civil society contexts and have become deeply embedded in virtual worlds where forums, chats and other forms of on-line discussions use this open and equally accessible format. Moreover, new forms of opinion expression on a wide variety of issues and topics like blogs diffuse rapidly within the cyber-sphere. Here as well, symmetric forms of expressing one's opinion and reacting to it have become the dominant mode. Moreover, blogs can be linked to each other, leading to new virtual communities and the like. Typical contexts for asymmetric and power loaded question and answer-interactions can be found, *inter alia*, in national legal systems, in national systems of security, in national education systems or in the national systems of tertiary education and of professional learning¹². The recurrent use of the word national is not used accidentally because these question-answer interactions emerged in the course of the state building processes in the domain of an observing and of a caring state (Abraham de Swan). In Western societies these asymmetric interaction forms were built on earlier models of control in military or in religious contexts.

Turning to these asymmetric question and answer interactions more closely, it becomes noteworthy that aside from their power asymmetry they usually operate under special constraints, especially under a constraint of subjective truth or truthfulness.

Turning to the question and answer interactions in surveys it goes (almost) without saying that they belong to the asymmetric cluster. Survey questioning and answering allows for no role reversals and operates, as its *differentia specifica*, with a very restricted number of options for answering. Thus, survey interactions are characterized by a practical necessity to select a specific

11 With respect to power, Max Weber's definition of power can be used as a useful reference point. See Weber 1980.

12 National systems of broad domains like education, security, innovation or health comprise, from a cross-national perspective, a heterogeneous set of ensembles with a multiplicity of different actors and with characteristic forms of bindings or bondings between actors. For a theoretical summary, see Hollingsworth/Müller/Hollingsworth 2002.

pre-defined answer from a menu of admissible answers.¹³ Moreover, the small number of admissible answers is rather uncommon to most survey respondents since they are required to use numbers and scales or different degrees of agreement or disagreement. Survey interactions operate on a weak constraint of truth in the sense of honesty, truthfulness or accuracy since these features simply are expected to be fulfilled within survey interactions. Surveys usually are free of legal or criminal sanctions except for exceptional instances of fraud on part of the interviewers.¹⁴

In recent years, the ways of expressing opinions has increased substantially in the Western world, especially following the revolution in information and communication technologies (ICT). Currently, the virtual web-communities with unrestricted forms of expressions and the potential for freely formed self-expressions abound. Thus, from the cognitive horizons of respondents, survey interactions become more and more outdated and, from the repertoire of everyday expressions, rather marginalized.

Economic Pressures and Technological Advances

A third element which currently weakens comparative survey research comes from the fields of the already mentioned ICT-technologies and their economic repercussions. In particular, the rapid diffusion of a new wave of information and communication technologies (ICT)¹⁵ brought about a dual effect. On the one hand, the new ICT-technologies lowered the entrance barriers for new firms in the field of market and opinion research. On the other hand, the new ICT-technologies do not only offer new modes for the production of survey data, they also provide solutions for alternative ways of organizing surveys.

The first point is easy to describe. Through advances in ICT-technologies, the costs for setting up small and medium-sized telephone labs has decreased dramatically. More specifically, rapidly decreasing hardware costs for laptops or PCs, computer aided software for surveys plus statistical software packages and, finally, decreasing telephone costs or the emergence of call-centers have led to a situation where new firms with small amounts of funds can easily enter into the field of market and opinion research. Moreover, due to the

13 In this respect, surveys are similar to multiple choice tests which operate on the basis of a pre-given set of opinions plus the necessity to choose one of them.

14 A national census can be an exception to this condition which, at least in some countries, have criminal sanctions both for interviewers and respondents.

15 More systematically, see Müller 2008xx.

increased competition, the prices for conducting surveys are declining rapidly as well. This, in turn, led to a considerable widening of surveys outside the classical fields of market research or the social sciences themselves. Currently, both print and audiovisual media use surveys for elections and for opinions on widely debated political issues extensively.

The characteristic constraints of these technological advances and economic developments are not widely discussed. Usually, survey research operates under increasingly strong economic constraints and limitations. Within these new configurations, the critical element in surveys becomes time. Thus, surveys normally are generated under critical time constraints since interviewers are not full-time employed and their income usually depends on the number of successful interviews. Thus, the survey interactions become more and more reduced and individuals who cannot be contacted immediately are replaced by the next available person in the sample. In this way, the quality of survey data decreases substantially and it comes as no surprise that the data quality of telephone interviews is 'considered as the lowest among all possible modes'.¹⁶ Turning to the second point, these new information and communication technologies enable and support a new mode for survey research, namely online or e-surveys. Here, the degree of autonomy of respondents is increased substantially because they are

These new technological advances allow, on the one hand, better and better simulations of face to face questionnaires, with voices talking to respondents, with virtual cards and with

This new technological potential increases, on the other hand, the development of new types of online-surveys which, for example, follow the path of deliberative surveys. Here, respondents receive to each question a substantial amount of background information which can be used prior to answering a single survey item.

To sum up, the measurement processes in surveys are undertaken currently under heavy economic and that is under strong time constraints. Additionally, the measurement process through telephones is organized in a way that leaves very little room for reflective answering and for more symmetric forms of interactions, reducing, thus, the data qualities of surveys considerably. Additionally, new modes of online-surveys widen the possibilities of survey re-

16 For a summary on the issue of modes and data quality, see Saris/Gallhofer 2007.

search well beyond the conventional designs and open up a new and rapidly expanding trajectory of non-standard survey research.

A Phase Transition from Science I to Science II

The most dramatic change for comparative survey research in the years ahead, however, is cognitive in nature. Within the last decades, the science system as a whole has entered a phase of radical transformation from an old regime, called Science I, to a new regime under the name of Science II.¹⁷ Table 3 captures some of the important shifts from the traditional cognitive organizations of science to its new theory structures.

Table 4.3: Main Distinctions between Science I and Science II

Dimensions	Science I	Science II
Leading Fields of Science	Classical Physics	Evolutionary Biology and the Sciences of Complexity
Theoretical Goals	General, Universal Laws	Pattern Formation and Pattern Recognition
Theoretical Perspectives	Axiomatic, Reductives	Nested and Embedded Processes
Leading Metaphors	Clocks	Clouds
Core Philosophers	Rene Descartes (Cogito)	Ludwig Wittgenstein (Cogitamus)
Epistemology	Observer Excluded	Observer Included
Ontology	Dualism (res cogitans/res extensa)	Monism, Self-Organization Capacities
Generative Mechanisms	Trivial Mechanisms	Non-Trivial Mechanisms
Forecasting Capabilities	High	Low
Complexity	Low	High
Perspectives on Change	Linear, Equilibrium	Non-Linear, far from Equilibrium
Distributions	Emphasis on Mild Distributions	Emphasis on Wild Distributions
Potential for Inter-Disciplinary Research	Low	High
Cognitive Distances be-tween the Social Sciences and the Leading Field of Science	High	Medium/Small

17 Science I was the dominant form of science from the beginning of modern science I the 16th century up to 1900/1950. Science II, consequently, emerged over the last decades and will turn out to be the new hegemonial regime, although Science II will not replace Science I completely. In a variety of domains and applications Science I-models and methods will be still being used. On this distinction between Science I and Science II, see especially Hollingsworth/Müller, 2008 and on a wider discussion of this separation see Boyer, 2008, Mayntz, 2008, Nowotny, 2008 or Sornette, 2008.

Before presenting some of the relevant changes in the theoretical background knowledge in greater detail, a short parable will be offered which captures these current changes in a metaphorical way. The subsequent parable takes place in the context of airplanes and airplane cockpits. According to this parable, each scientific discipline operates in a plane of its own and, as a consequence, one finds two big fleets operating, one for the natural sciences and one for the social sciences¹⁸.

In the traditional airplane cockpits, a social or a natural scientist as data pilot or data navigator had a large number of instruments at her or his disposal which, if constructed properly, provided accurate measurements of the states of their planes. The data pilots or data navigators were not responsible for the steering of the plane. Their task was to record and analyze their data and to send their findings to a control center which was in control of the steering process. Best practices in social research, for example, consisted, then, in an intelligent reading and in a fruitful synthesis of these various instruments which produced, in the end, a reliable and a stable picture of the overall flight dynamics.

The trivial cockpit designs and the trivial rules to operate with them worked exceedingly well for several hundred years. For a short period it seemed that especially the airplanes under the flag of nature could be navigated and controlled nearly perfectly. The other larger and smaller planes from the social sciences operated, though less successfully, with the same standards and procedures as the airplanes under the flag of nature.

Quite suddenly and unexpectedly however, the core parts of the cockpit designs and instruments for the large fleet of the natural sciences were overthrown nearly completely and substituted with new designs, new instruments and new operation techniques. These new environments, although only partially recognized and acknowledged at that time, differed radically from the old settings and could be characterized, in general, as non-trivial.

Rather rapidly, these alternative settings found their ways in more and more airplanes. But the replacement process was undertaken in a slightly confusing manner because the traditional cockpits and instruments were kept in place and the new instruments and devices which replaced the old instruments and operation techniques in most of their important aspects were placed and dis-

18 It should be added that a large number of airplanes were available at that time, both for the natural and for the social sciences. It can be assumed that each scientific discipline, even the smallest ones, had its own carrier. Thus, the airplanes of the social sciences or of the natural sciences consisted of a very large fleet of airplanes, respectively.

tributed all over the plane. In fact, these new settings eliminated the central role of the cockpit itself because data navigators were required to interact with their flight objects, be it passengers, animals or plants in order to be able to continue with their operations.

In the new types of planes data navigators were confronted with a collection of non-trivial instruments which appeared to operate at least partially at random. Moreover, the airplanes turned out to be self-organizing ones and exhibited all characteristics of highly complex self-organizing ensembles which led to a complete re-thinking of control and steering issues under the heading of “illusion of control”¹⁹.

For a long time the data navigators, being trained in trivial cockpit designs and trivial cockpit techniques, were quite unaware that they became embedded more and more in non-trivial settings. Especially the airplanes which constituted the fleet called society experienced a period of severe crises. Using their traditional trivial techniques and restricting data navigators to their traditional cockpits and instruments led to massive failures and highly misleading estimations. Most notably, even dramatic changes in the direction of the planes escaped the attention of societal data navigators who stuck to their old ways of analyses and handling.

Only very slowly and in small jumps the societal data navigators shifted to the new modes of operation and to the new forms of interactions with their passengers or their non-trivial instruments. And only step by step they were able to adapt to the modes of operation of a self-organizing plane. Especially for societal data navigators, it turned out to be a long and an extremely challenging process to learn the characteristic modes of operation in and with these new non-trivial environments.

This short parable makes one aware that the current foundations of empirical social research have started a transformation process which also affects the theoretical and epistemological background knowledge for the social sciences in general and for comparative social research in particular²⁰.

19 On the topic of “illusion of control”, see Handbook or Piatelli-Palmarini, 1994 or Pohl, 2004.

20 On the background knowledge relevant for Science I see Hollingsworth/Müller, 2008 or Hollingsworth/Müller/Hollingsworth/Gear, 2008.

Significant Changes in the Background Knowledge for Comparative Survey Research in the Age of Science II

Before entering into content issues, the concept of background knowledge (BK) for a scientific discipline Di must be introduced in a clear and accessible manner. In a general way, the theoretical, epistemological and methodological background knowledge for a scientific discipline Di is directly related to the leading field or to the core scientific discipline (LDt) at a given time t , to the theory structures of LDt, to its dominant epistemologies and to its general methodology. In the days of Science I with theoretical physics as leading scientific field for example, the search for universal laws or a reductionist view of theory structures with physics as its basis were typical elements of the theoretical background knowledge for the social sciences in general or for comparative survey research in particular. Likewise, epistemological or methodological rules, associated with theoretical physics like objectivity, scientific realism or the covering law model of explanations became characteristic building blocks for the social sciences, too.²¹ Currently, we live amidst the diffusion of Science II, with the life sciences as leading field and with epistemologies and ontologies which as the science of living systems by living systems as the leading field

In the context of Science II the theoretical, epistemological and methodological background knowledge for scientific disciplines outside the leading field of the life sciences undergoes significant changes. In a non-metaphorical way, at least seven building blocks can be identified which are characteristic for a science of living systems by living systems and which, therefore, become characteristic for the emerging theoretical, epistemological and methodological background knowledge in Science II. Clearly, these new building blocks will exert a considerable cognitive pressure on the research designs from the era of Science I and should lead to new research designs for comparative survey research as well.

Table 4 as well as Figure 1 summarize those changes in background knowledge that will be of particular relevance for comparative survey research. As can be seen both from Figure 1 and from Table 4, the main differences between the old and the new background knowledge cover the entire domain of analyses, namely the subjects of investigation, the objects of analysis and,

21 It should be added that throughout the 19th and the 20th century one finds a very broad literature and a constant discussion that the standards and theory structures of theoretical physics cannot and should not be used within the social sciences. See, above all, the separations and distinctions between so-called nomothetic and idiographic sciences (Acham, 1974) or, as a particularly relevant point of debate, the so-called 'Positivismusstreit' (Adorno et al. 1978)

finally, the interaction modes between subject and object of analysis. All three domains differ strongly between Science I and Science II. In short, Science II has become a science of living systems for living systems in which the subjects of analysis, being living systems themselves, are an indispensable and inclusive part of an investigation, the objects of analysis, namely living systems, turn out to be far more complex than the physical objects within Science I and, finally, the interactions between subjects and objects are organized in a closed triadic as well as recursive manner.

These epistemological, methodological and theoretical background knowledge elements emerge from the leading field of Science II, namely from the cognitive life sciences, broadly conceived as well as from radical constructivism or, alternatively, from second-order cybernetics²² which can be considered as one of the core epistemologies for Science II-research.²³ From both sides the conventional wisdom of comparative social research is not only questioned in its core aspects and in its central designs²⁴, but comparative social research is very much also encouraged to change its traditional perspectives in order to become compatible with the new Science II landscapes.²⁵

Table 4.4: Changes in the Theoretical, Epistemological and Methodological Background Knowledge of Science I and Science II

Domains of Background Knowledge	Science I [Theoretical Physics als Leading Discipline (LD)]	Science II [Life Sciences as LD]
Objects of Investigation	Trivial Actors Trivial Action Schemes	Non Trivial Actors Embedded Cognition
	Cognitive Isolationism	Cognitive Holism
	Single Account	Requisite Variety
	Sufficient	Necessary
Subjects of Investigation	Observer Exclusion	Observer-Inclusion
Interactions (between Subjects and Objects)	Sequential, Linear Equilibrium	Recursive, Non-Linear Eigenforms
	Dyadic, Asymmetric Forms	Triadic, Symmetric Configurations

22 On radical constructivism, see, as summaries Watzlawick, 1981, Watzlawick/Krieg, 1991, Schmidt, 1987 or Glasersfeld, 1997.

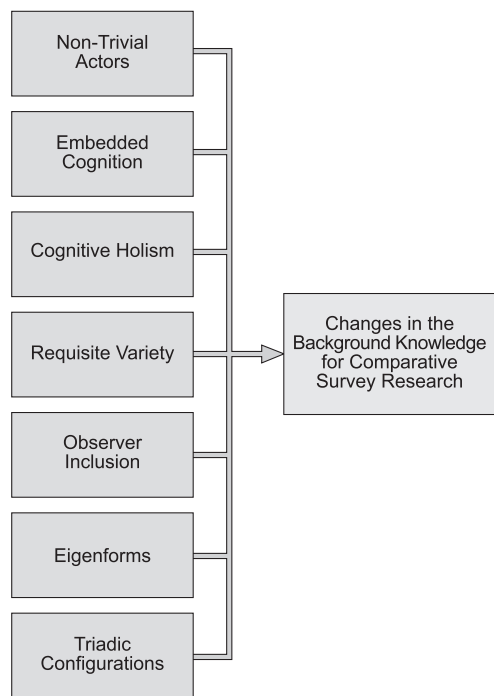
23 Second-order cybernetics has been developed explicitly by Heinz von Foerster as a science of living systems for living systems. On Heinz von Foerster and his work at the Biological Computer Laboratory, see especially Foerster, 2003, Müller/Müller, 2007 and Müller, 2008.

24 For interesting overviews and approaches, see Palombo, 1999, Ryckman, 2000.

25 The morphological approach in the previous chapter can be seen as a typical example for a new design which corresponds rather well with the new theoretical background knowledge of Science II.

Following Figure 1 and Table 4, the first distinctive feature between Science I and Science II lies in the units of analysis and has been captured by the dichotomy of objects (Science I) and living systems (Science II). As it turns out, living systems as the main actors on the stage of Science II are structured and organized in a significantly different way than the physical objects in the phase of Science I. Put briefly, living systems can and should best be described in a non-trivial mode whereas objects can and should be conceptualized in a trivial mode. Table 5 exhibits some of the characteristic differences between these two modes of descriptions.²⁶

Figure 1: The Emerging Epistemological, Methodological and Theoretical Science II-Background for Comparative Social Research



Aside from an analytical requirement in terms of non-trivial descriptions of living actors, a second new element in the theoretical background knowledge

26 It should be added that the trivial and the non-trivial mode of description are universal modes respectively which can be used for living systems and objects alike. Thus, one is confronted with two types of errors, namely using a trivial description mode for nontrivial ensembles (trivialization error) or a non-trivial mode for trivial configurations (spiritualization error).

is related to the description of the environments of non-trivial actors which should be conceptualized in a significantly different way, too. In Science I, physical objects could be studied as embedded in a physical environment and with trivial interactions between objects and their surroundings. Under Science II, cognitive models and methodologies will follow more and more along the pathways of embedded or situated cognition.²⁷ This road towards embedded or situated cognition is so important because it puts special emphasis on the distributed nature of cognition, on thinking environments and why, following a well-known reversion by Humberto R. Maturana, the brain is not in the head.

Table 4.5: The Changing Roles of Environments between Science I and Science II

Environments in Science I	Environments in Science II
Weak Boundaries	Strong Boundaries
Direct Crossings	Indirect Crossings
Cause – Effect	Triadic Relations
Direct Environmental Effects	Boundary Transformations, Indirect Effects
External Dynamics	Internal Dynamics
Adaptation	Internal Complexity Drifts

In situated cognition, a brain needs not only a senso-motoric organism, but also an environment for its own internal cognitive operations. In this view, the environment becomes the necessary co-evolving counterpart for individual actions and interactions.

Following the distinctions between descriptions for trivial and non-trivial actors or trivial and non-trivial environments, the third point of separation between the old and the new background knowledge is focused on the complex nature of cognitive processes itself. The study of cognition under Science II departs more and more from the pathways of conventional folk-psychology or from typical Science-I traditions like behaviorism. One of the challenging general heuristic rules for the study of cognitive processes is called cognitive holism and has been propagated strongly already in 1969 by Heinz von Foerster (Foerster, 2003).

According to this rule, it is possible, in principle, to isolate conceptually certain components in the stream of cognitive processes, for instance the faculty

²⁷ On embedded cognition see especially Adams/Aizawa, 2008, Bodenhausen/Lambert, 2003, Gibbs, 2005, Noe, 2009 or Robbins, 2008.

to perceive, the faculty to remember²⁸, the faculty to infer or many other senso-cognitive as well as cognitive-motoric faculties.²⁹ However, one should not expect that these conceptual separations between perception, memory or inference finds a 1:1 correspondence in the neural organization of actors. In its generalized form this principle can be formulated in the following way:

If one wishes to isolate these faculties functionally or locally, one is doomed to fail. Consequently, if the mechanisms that are responsible for any of these faculties are to be discovered, then the totality of cognitive processes must be considered ... (von Foerster/Müller 2003:29f.)³⁰

The inseparability of these faculties can be shown by a reduction ad absurdum. It can be demonstrated that the assumption of independent faculties in isolation leads to absurd consequences. In particular, it can be demonstrated that, if one of these seven faculties mentioned above is omitted, the entire system is devoid of cognition. In greater detail this proof runs as follows:

- (i) Omit perception: the system is incapable of representing internally environmental regularities.
- (ii) Omit memory: the system has only throughput.
- (iii) Omit prediction, i.e. the faculty of drawing inferences: perception generates to sensation or memory to recording.
- (iv) Omit learning: the system is bound to a fixed *modus operandi*.
- (v) Omit evaluation: the system is incapable of selecting.
- (vi) Omit communication:
- (vii) Omit movement: the system is incapable of acting.

28 In principle, it would be possible to differentiate between a large number of these faculties like the faculty to infer, the faculty to learn, the faculty to evaluate, the faculty to communicate or the faculty to move, to name just a few more additional faculties.

29 On current summaries of the neuro-cognitive architectures of these different faculties, see Gazzaniga, 2004 or Calvert/Spence/Stein, 2004. Within the cognitive neuro-science arena, one finds meanwhile numerous sub-fields and disciplinary niches specializing on a particular senso-motoric, emotional or cognitive faculty. For a diverse set of literature, see 1998 Calvin, 1996, Calvin/Bickerton, 2000, Campbell, 1984, Damasio, 1994/1999, Deacon, 1997, Holland, 1995, Hofstadter, 1982, Hofstadter/Dennett, 1982, Hofstadter 1985/1995/1997, Lakoff/Nunez, 2000, Minsky, 1990, Norretanders, 1997, Pinker, 1997, Plotkin, 1997, Pollock, 1989, Ratey, 2001, Roth, 1999 or Sternberg/Wagner, 1994.

30 Aside from the functional and the local theses, one could put forward two additional theses, one on genetic holism and one on epistemological holism:

Genetic Thesis: If one wishes to isolate these faculties genetically, one is doomed to fail. Consequently, if the genetic mechanisms that are responsible for any of these faculties are to be discovered, then the totality of genetic processes must be considered ...

Epistemological Thesis: If one wishes to describe these faculties in an external, observer-independent stance, one is doomed to fail. Consequently, if the mechanisms that are responsible for any of these faculties are to be discovered, the mode of description has to change into an internal, observer-including stance.

The fourth point of departure between the old and the new background knowledge moves away from the descriptive requirements for living systems and their environments or from the theoretical requirement of a holistic organization of cognitive theories. Instead, the fourth point emphasizes the importance of a requisite descriptive variety. Under Science II, the focus shifts away from single accounts to more general configurations and, above all, to a higher level of descriptive variety.

Fifth, aside from the requisite descriptive variety, another epistemological point of considerable relevance for Science II-research in general lies in the inclusion of observers or, alternatively, researchers in their research. Focused on social research in particular, research designs will change more and more from an exclusive into an inclusive mode, with social researchers as an indispensable element in it.

In the world of Science I, mass, space and energy were the fundamental building blocks for a science of objects. Warren McCulloch was probably the first to note the peculiarity that breakthroughs in physics require the invention of surprising regularities or theorems of great abstraction which, however, are not included in physics proper. Thus, in Science II one is, by necessity, confronted with a more inclusive task. Following McCulloch,

let us now compel our physicist to account for himself as a part of the physical world. In all fairness, he must stick to his own rules and show in terms of mass, energy, space and time how it comes about that he creates theoretical physics. He must then become a neurophysiologist ... (McCulloch 1988:73)

In other words, Science II becomes to a remarkable extent a self-referential and self-inclusive form of science.

Sixth, observers qua researchers and their field of investigation can use a new type of recursive language which, if properly used, leads to Eigenforms as the new forms of stability within Science II..

Eigenvalues and stability only recursively.

Nevertheless, the recursive language of Eigenforms exhibits a series of general and highly interesting properties which can be listed in a short summary.

Eigenforms in numerical domains are discrete (even if the domain of the primary argument obs_0 is continuous). Moreover, Eigenforms represent equilibria, and, depending upon the chosen domain of the primary argument, these

equilibria may be fixed points, functional equilibria, operational equilibria, behavioural equilibria, structural equilibria, etc. Furthermore, Eigenforms, emerge in a generative relationship, the one implying the other, and vice versa. These Eigenforms, because of their self-generating nature, imply topological closure or circularity and topological closure produces Eigenforms.³¹ Additionally, in an atomical social context each observer's experience of her or his own senso-motoric coordination can be referred to by a symbol of this experience like "object" or "thing" which, at the same time, "may be taken as a token for the externality of communal space" (Foerster 2003:267) The recursive language of Eigenforms can be extended easily to a molecular social context and to a configuration with two observing systems. The topology of closure can be applied to the entire spectrum of observable operations, from an atomic context with a single actor, from a two-actor configuration to many actor-ensembles as well as to self-referential configurations.

Finally, Eigenforms are not dependent on infinite recursions, as has been suggested by Heinz von Foerster.

The construction of eigenforms in the sense of Heinz's model can be done without the idealized excursion to infinity ... via a device invented by Church and Curry in the 1930s that is commonly called the 'lambda calculus'. (Kauffman 2005:131)

Seventh, the final element of the new background knowledge for comparative survey research lies in the closed organization of relations into which living systems, the observing scientist included, can and should enter. In Science II, the new minimal configuration for living or learning systems is not a dyadic relation between subject and object which has been characteristic of the conventional scientific method, but is built in a triadic fashion, with the observing scientific researcher as one node, the domains under observations as another node and with a final node linking and closing these two nodes to a triadic ensemble. In short, Science II-research designs are to be built in their minimal form not with one, not with two but with three components.³²

31 This result, that there emerge Eigen-values, is the only thing we can rely on. It rests upon a theorem. Among the many variants and paraphrases of this astonishing theorem I've picked Francisco Varela and Joseph Goguen's version (1979), for I believe I see an affinity here with sociological vocabulary. "In every operationally closed system there arise Eigen behaviors." (Closure Theorem) (Foerster 2003:316)

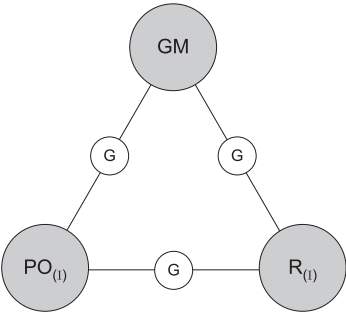
32 See also the paper from 1976a by Francisco J. Varela where he starts from the usual dualistic suspects like observer/observed, subject/object, describer/described, operator/operand and the like and continues: It is very obvious, however, that these poles are not effectively opposed but rather moments of a larger whole which sits in a meta-level with respect to both terms. (Varela 1976a:65)

Table 4.6: Recursive Designs in Social Research

Methods	Applications	Similarity Relations	
		Recursive Operations	Eigen Values
Circular Questioning ³²	Social or Cognitive Perspectives	Recursive, towards a Homogenization of Perspectives	Stable Social or Cognitive Group View*
Delphi-Methods ³³	Scenarios, Cognitive Assessments	Recursive, towards Consensus Formation	Group-Consensus*
Generative Social Sciences ³⁴	Rule-based Dynamics	Recursive, towards Stable Configurations	Equilibrium, Limit Cycles, Strange Attractors, etc.
Meta-Analysis ³⁵	Results of Empirical Research	Recursive, towards Robust Knowledge	Robust Results of Empirical Tests*
Triangulation ³⁶	Utilization of Different Research Methods	Recursive, towards Robust Knowledge	Stable Results*

With respect to research designs, a triadic configuration requires a living system conceptualizes a minimal triadic relationship by linking a human observing system with a specific language L and a minimal societal context S.

Figure 4.2: Triadic and Generatively Closed Research Designs



Thus, an observed system changes into a triadic configuration of observers, language, and society.

33 On circular questioning see, for example, Pfeffer, 2001.
34 Delphi-Methods have been introduced already in the 1950s. See, for example, Rescher, 1998.
35 Generative social science has become a generic term for rule and actor based designs. For a summary, see Epstein, 2006.
36 Meta-Analysis has become a common procedure in the eighties and nineties of the 20th century in areas like clinical research and psychology. For a summary, see, for example, Hunter and Schmidt, 2004.
37 Triangulation has become popular quite recently as a design to integrate a heterogeneous set of research methods across the quantitative and the qualitative spectrum. See, for example, Punch, 1998:242 – 246.

Table 4.7: Causal and Generative Relations

Causal (A *B)	Generative [(A, B), O, GM]
Asymmetrical in time	Symmetrical in time
Separation into cause and effect	No causes and effects
Cause is necessary, sufficient or both	Mutual dependence
Observers excluded	Observers included
Non-recursive	Recursive
Openness	Closure
Generalizations	Necessary Eigenforms

Science II, in contrast to Science I, will be characterized more and more by designing and operating in configurations of a closed triadic nature which includes the observing scientist, the domain under observation which may be composed of observing living systems as well and an inter-mediate and closing element like rule systems or theories about the neural organization of observer and observed. In Science II, the scientific observer in all her or his operations is in and not out and becomes a necessary part of the investigation from the very beginning to the very end.

The Fourfold Roots of a Fundamental Incompleteness of Survey Research in the Age of Science II

In sum, these new elements in the theoretical background knowledge for comparative survey research should lead, by and by, to the recognition of a series of four significant deficiencies which, in combination, lead to the verdict of a fundamental incompleteness of traditional survey designs.

The first incompleteness stems from the restricted code in which survey items are to be presented. Currently a single survey item is to be composed of an introduction, a motivation part, information regarding the content, instruction of the respondent, interviewer instruction, requests for answers and of answers with categories or response scales (Saris/Gaulhofer 2007:121). As has been shown in the first section of this article, the mode of fixed responses as well as asymmetric question and answer interactions have become more and more marginalized in contemporary life worlds. From this perspective, fixed categories and response scales should be at least accompanied by additional responses which are open and narrative in nature. These narratives, in turn, can be coded and produce, thus, an important supplementary body of data from a single respondent. In section 7.1 another way of supplementary data is shown with the help of visual productions which are generated by the respondents

themselves. Again, these visual forms exhibit a large number of implicit measures that can be brought to surface.

The second incompleteness is fundamental in nature and comes from the reliance of internal assessments and internal descriptions only. Here, the terms external description on the one hand and internal description on the other hand are to be used in the following way. External descriptions comprise any description by a competent observer of the overt manifestations and of the results of cognitive operations by an observable actor. In contrast, internal descriptions are tied to the self-description and self-evaluation of a competent actor alone. In a more detailed manner these two modes can be specified in the following way.

The internal behavior description BD-IN of an actor A is based on a complex set of relations Ω between the internal states S_A , the inputs I_A , the overall context C_A and the previous history H_A :

$$\text{BD-IN}^A : \Omega_A [S_A, I_A, C_A, H_A]$$

The external behavior description BD-EX for an actor A by an observer O turns out to be far more complicated because it is based on a set of complex relations Ω between the internal states S_O of the observer, the inputs $I_{A,O}$ of the actor (as perceived by the observer) and of the observer, the overall context $C_{A,O}$ for the actor (as perceived by the observer) and of the observer and, finally, the previous history $H_{A,O}$ both of the actor (as perceived by the observer) and of the observer:

$$\text{BD-EX}^{A,O} : \Omega_{A,O} [S_O, I_{A,O}, C_{A,O}, H_{A,O}]$$

Turning more specifically to the context of survey research, an internal description comprises a set of responses by an actor A to the questions and items of given survey Si.

$$S_i\text{D-IN}^A : \Omega_A [S_A, I_A, C_A, H_A]$$

where S_A, I_A, C_A, H_A constitute the relevant components which enter into the overall evaluation.

Likewise, an external survey-based description $S_i\text{D}^{A,O}$ comes about through a more complex configuration, namely via

$$S_i\text{D-EX}^{A,O} : \Omega_{A,O} [S_O, I_{A,O}, C_{A,O}, H_{A,O}]$$

In comparative survey research under the flag of Science I it was necessary and sufficient to have a single internal descriptive account BD-IN of a respondent

as the basis for subsequent analyses. This single account was considered as necessary and sufficient for two different domains, namely for the internal preferences, goals, attitudes, evaluations, etc. of an actor as reported by an actor and for the actions and interactions of an actor as a manifestation of these underlying preferences, goals, attitudes, evaluations, etc. This focus on individual respondents was supported by the view of individuals as carriers of stable internal preferences, goals, attitudes, evaluations which, due to their inscriptions in long-term memory, can be measured directly, albeit with a certain amount of measurement errors. In conventional survey research with the background knowledge of Science I one simply is justified to assume that, for example, the significant differences in working conditions between Scandinavia and Eastern Europe which have been shown in Part II of this book reflect different work settings which are viewed rather favorably in Scandinavia and quite unpleasantly in Eastern Europe.

In the formative years of survey and attitude research Richard T. La Piere has shown beyond reasonable doubt that one attitudes and actions are separated by an unbridgeable gap. In the context of a change from Science I to Science II his assessment from 1934 is as valid now as it was then.

The questionnaire is cheap, easy and mechanical. The study of human behavior is time-consuming, intellectually fatiguing and depends for its success on the ability of the investigator ... Yet it would seem far more worth while to make a shrewd guess regarding that which is essential than to accurately measure that which is likely to prove quite irrelevant. (La Piere 1934:237)

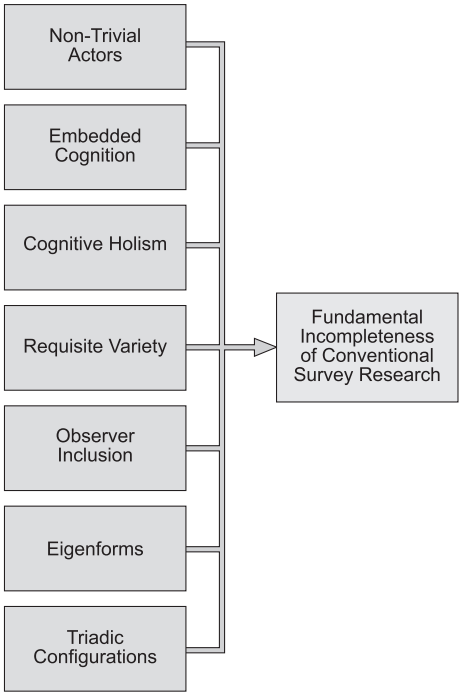
External observations can be supplemented in a wide variety of ways. Including relevant macro-data. A particularly interesting way of adding external observations example additional element on the level of external behavior descriptions. The necessity for external observations can be strengthened by the fact that even more complex survey inputs like vignettes does not help to bridge the gap between the traditional survey contexts and actual behaviors.³⁸ Another way to external health surveys and medical tests. A different path which has not been explored yet lies in the inclusion of another respondent R_2 who, in a mode of circular questioning, could be asked about the most likely answers of R_1 . The third fundamental incompleteness is linked with the absence of survey researchers from survey research. This does by no means

38 It should be added that vignette surveys try to provide a more complex input pattern. Nevertheless, also vignette surveys exhibit striking discrepancies to observations of actual behaviors. See, for example, Groß/Börensens, 2009.

mean that survey researchers should report on their profile of responses in the survey they have constructed. Rather, the emphasis lies on a detailed documentation of a survey in terms of its targets as seen by a single researcher or a research group, its actual composition, its selection procedures that led to the final version, its relations, similarities and dissimilarities to existing surveys and, above all, the intended novelty and the “cash value” (Wilfried Sellars) of producing a new survey data set.

One could easily think of a special survey for surveys which contains both open and closed questions and which gives an in-depth view of all the domains mentioned above³⁹. Moreover, such a survey of surveys could produce a whole new group of relevant meta-data which are currently missing⁴⁰. The

Figure 4.3: The New Background Knowledge and the Fundamental Incompleteness of Comparative Survey Research



39 In fact, such a survey of surveys could be organized as an online-survey with a large amount of additional information and links.

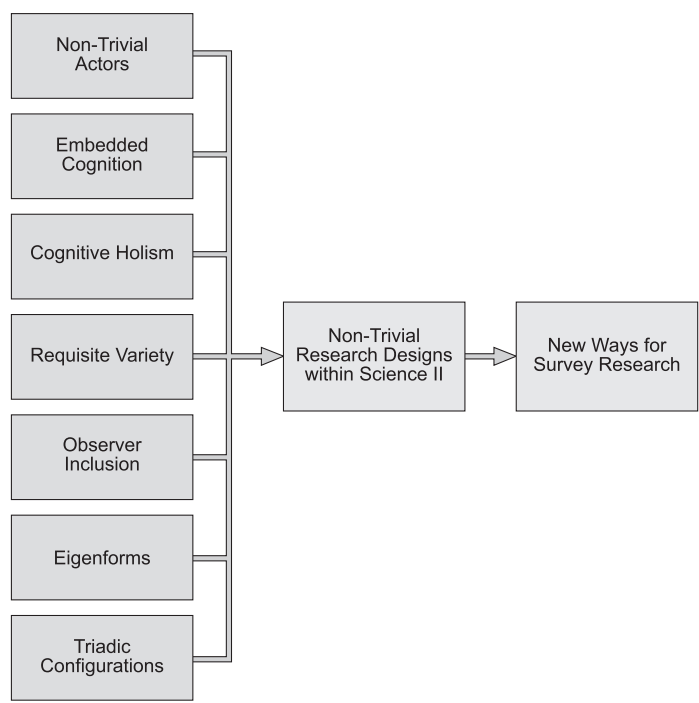
40 For this form of documentation, one can refer to the European Social Survey which for the time being qualifies as a best practice example and which has produced a large amount of materials on survey construction, on methodology or on general specifications. However, there is still a long way from the current list of documents to the final step of an in-depth meta-data documentation on the side of survey researchers.

important point here is that the inclusion of survey researchers, their expectations and their intentions, can be used for an empirically guided self-reflexive research on survey research.

The fourth and final incompleteness leads to the interactions between respondents and researchers which happen currently in a highly restricted and almost random manner. In terms of triadic configurations, no generative mechanism links currently the side of survey researchers with the respondents, no recursive interactions occur and, thus, no drift towards Eigen-values can emerge.

Figure 3 summarizes, once again, the emerging building blocks of a new background knowledge in its impact on comparative survey research in its traditional designs.

Figure 4.4: *The Opening Cognitive Landscapes for New Types of Surveys*



Towards New Designs for Comparative Survey Research in the Age of Science II

Given the epistemological, methodological and theoretical sketch on significant components of Science II background knowledge for social comparative

research in the previous chapters, it can be expected that research designs for comparative research will undergo significant changes as well in order to correspond to these new background components.

The most important shift with respect to research designs can be captured with a well-known distinction within radical constructivism, namely the separation between trivial and non trivial configurations, be they machines, mechanisms, actors or research designs.

Table 4.8: Trivial and non-Trivial Research Designs

Trivial Research-Designs („Hard Sciences“)	Non-Trivial Research-Designs („Soft Sciences“) ⁴²
Models	
Input/Function/Output	Functors (Operators)
Independent Variable/Function	Operating on Functions
Dependent Variable	State-Determined Systems
Cause/Law/Effect	with Non-Linear Dynamics
Stimulus/Nervous System/Response	(Discontinuous, Qualitative
Goal/System/Action	Changes, Chaotic
Environment/Organism/Behavior	Behavior, etc.)
Motivation/Character/Actions, etc.	
Model Characteristics	
Predictable	Unpredictable
Independent of Pre-History	History-Dependent
Synthetically determined	Synthetically un-determined
(Functions Identifiable)	(Functions not identifiable)
Analytically computable	Analytically not computable
(Value of functions effectively computable)	(Value of functions not effectively computable)
Reductionist	Relational, systemic
Methodology	
First-order Designs	Second-order Designs
Observer-independent	Observer-dependent
Hetero-referential	Self-referential
Organization	
Single Researchers	Teams, Groups
It-Based	Bit-Based

The distinction between trivial research designs (Science I) and nontrivial designs (Science II) affects a large number of research dimensions simultaneous-

41 The subsequent differentiations in Table 5 have been put forward essentially by Heinz von Foerster, like in Foerster 1984:8ff.

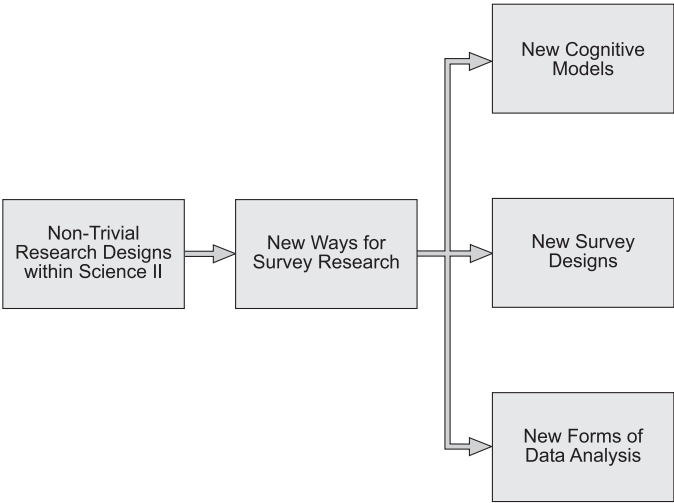
42 Hard sciences and soft sciences can be differentiated in the following way. Hard sciences deal with relatively easy or soft problems, whereas soft sciences are concerned with hard problems.

ly. Non-trivial designs and their main distinctions to trivial machine or design configurations can be summarized via Table 8.

In the old days of Science I, the natural or the social sciences operated in a cognitive setting which could be characterized as a trivial research environment, relying on trivial models, mechanisms and methods and on trivial research designs.⁴³

The final sections in this article will present three groups of new perspectives and designs in the domain of comparative survey research. The first group will consist of suitable cognitive models, the second one on new survey research designs and the third one on novel methods of comparative data analysis. All three groups correspond to the new epistemological and theoretical background knowledge with its focus on non-trivial actors, embedded complex cognitive models, observer-inclusion and the like. Figure 5 presents an overview of the structure of the final sections in this article.

Figure 4.5: *New Cognitive Models, Novel Survey Designs and Innovative Methods for Complex Social Micro-Research*



43 For reasons of simplicity, the entire science landscape is divided into two major areas, called the natural and the social sciences. The latter comprised the social sciences in the conventional sense and the humanities.

Towards New Cognitive Models: Building a Logic of Over-Learned and Under-Learned Responses

What follows from here on is a short overview of suitable cognitive models for survey research, of new survey designs and, finally, of new ways for data analysis in accordance with the emerging background knowledge of Science II. In the domain of cognitive theories for survey research, trivial action schemes like behaviorism were the classical cognitive theory background within a Science I environment which, at least partially, lent cognitive support to the operations of opinion and survey research from the 1920s and 1930s onwards. In this formative period, attitudes and questionnaire-designs for identifying attitudes gradually occupied the center of the analytical stage, culminating in Gordon W. Allport's "The concept of attitude is probably the most distinctive and indispensable concept in contemporary American social psychology" (Allport 1937:3) in 1937.

Within the emerging Science II-regime, the diffusion of life sciences in general and of the cognitive sciences in particular has produced a broad range of new cognitive models and experimental settings which provide a novel theory and modeling background for a deeper understanding of the cognitive interactions and of the cognitive performances in survey research.

A Phenomenology of Under-learned and Over-learned Responses

Initially, a distinction will be introduced which should prove useful for the interpretation of the data generated under the auspices of traditional survey designs. This basic distinction is frequently used in memory research⁴⁴ and, at least partially, in the research of embedded cognition. Here, a separation has been made between over-learned and under-learned situations. In memory research, the terms over-learned and under-learned refer essentially to the duration and to the frequency of learning and memorizing processes. In embedded cognition, an over-learned or an under-learned situation is characterized by the stability or the instability of action sequences. In over learned situations one finds either identical, sequentially fixed or constant actions irrespective of varying contexts or different pre-histories. Thus, in over-learned configurations, a single fixed operation or a fixed series of operations is required, expected and, in the case of violations, sometimes even sanctioned. In under-learned situations, one usually finds varying, unstable context-dependent

44 On over-learned and under-learned facts in memory research, see, e.g., Bower, 1977.

and fluid actions which are genuinely innovative, are created on the spot and are highly volatile, depending on the degree of openness in a particular situation.

Turning to a special instance of over-learned and under-learned situations, namely to over-learned and under-learned responses, the following basic distinctions can be made.

An over-learned response is triggered by a question and is characterized by a fixed word, a number, a sentence, a sequence of numbers or a short narrative which essentially remain unchanged in the short run and which change only under exceptional circumstances in the long run.⁴⁵ Typical examples for overlearned responses include the name of a person, her or his date of birth, a person's education level, or the employment status. Over-learned responses can be differentiated between general and specific responses. The former contain numerous instances which belong to the cognitive repertoire of minimally competent persons like one's first name, the latter are dependent on the knowledge and performance levels of a concrete individual.⁴⁶

In contrast, under-learned responses are highly volatile even in the very short run, they are subject to frequent changes in the short run, too and they are sensitive both to contexts and to pre-histories. They, too, like the specific over-learned responses, depend on the cognitive organization and repertoire of individuals. Another rather obvious feature of under-learned responses is that they are easily forgotten within a very short period of time. Table 9 offers several basic distinctions between under-learned and over-learned responses.

A final important distinction between over-learned and under-learned responses refers to the notion of observation errors. In over-learned responses measurement errors can be identified and, equally important, corrected. This correction can be accomplished due to the possibility for repeated measurements and due to the stable and fixed solutions in overlearned contexts. In fact, over-learned responses correspond to the fourth measurement type in Table 2. In sharp contrast, under-learned responses cannot be subject to measurement errors since an under-learned response misses an essential component, namely the reference values or the so-called true values. In under-learned responses one is confronted with a series of creative state-, input-, context-and

45 It should be mentioned that the production of over-learned responses has been characteristic of traditional education systems.

46 A specialist on World War II and an expert on maritime research, for example, will share very large sets of general as well as specific over-learned responses.

history-dependent just in time responses where each of these responses, in the absence of neuro-physiological data from the cognitive neuro-sciences, must be treated as a “true value” under a set of specific, but highly varying circumstances.

The distinction between over-learned and under-learned responses has been introduced, quite obviously, also with respect to surveys and survey questioning. From the dichotomy in Table 9 a survey is usually a mixture between over-learned and under-learned responses. The former are highly concentrated in the socio-demographic section of a survey with questions on age, gender, occupation and the like whereas the latter are distributed over most of the remaining parts of surveys, especially over all the so-called attitudinal or evaluational segments. Nevertheless, despite the under-learned nature of most survey responses, survey measurement theory operates on the basis of randomly distorted over-learned responses and on the dichotomy between true values and measurement errors.

Table 4.9: Over-Learned Responses Under-Learned Responses

Over-Learned Responses	Under-Learned Responses
Single Solution	Multiple Solutions Possible
Stable, Fixed	Highly Volatile, Unstable
Trivial	Non-Trivial
Repetitive	Creative
Key Input Only	Highly Selective of Inputs
Encoded in Long-Term Memory	Short-Term Memory only
Constant Reproduction across Time	Just in Time Productions
Context-Independent	Context-Sensitive
Path-Independent	Path-Dependent
State-Independent	State-Dependent
Global Consistency	Global Inconsistency
Observation Errors Identifiable	Only Trivial Observational Errors Possible

GA-Systems as Cognitive Models of Survey Interactions

In this section a brief sketch of new groups of cognitive models will be outlined which should help to grasp the intricacies of the social interactions and of the cognitive competencies needed in survey contexts. These new models belong, by and large, to the domain of evolutionary computation⁴⁷ and they

⁴⁷ Evolutionary computation is an emerging field with different areas like genetic programming, genetic algorithms, evolutionary strategies or evolutionary programming. For an overview, see de Jong, 2006.

provide the necessary ingredients for modeling the cognitive competencies and the social interactions inherent in the questioning and answering of surveys.

Using genetic algorithms (GA)⁴⁸ as a specific framework, it will be assumed that both an interviewer and a respondent in a survey are organized as GA-ensembles. In the context of survey interactions, a GA-system is situated in an environment that produces a flow of verbal inputs for the GA-system which enter into the domain of internal processing. In turn, a GA-system generates verbal outputs for its environment which, once again, lead to a new round of verbal inputs for the GA-system.

The basic ingredients of a GA-system have been captured in Figure 6. Internally, a GA-system consists of an internal message list, a set of encoded classifiers $\{C_1, C_2, \dots, C_n\}$ as if $\rightarrow$ then rules and an output interface which generates a flow of verbal responses for the environment.

John Holland, one of the inventors of GA-systems, provides the following short summary of the GA's processing cycle.

The basic execution cycle of this system proceeds as follows:

- 1) Place all messages from the input interface on the current message list.
- 2) Compare all messages on the current message list to all conditions of all classifiers and record all matches.
- 3) For each set of matches satisfying the condition part of some classifier, post the message specified by its action part to a new message list.
- 4) Replace the current message list with the new message list.
- 5) Process the message list through the output interface to produce the system's current output.
- 6) Return to step 1. (Holland et al., 1989:106)

A GA-system is basically a rule system and is equipped with three types of rules. Empirical rules are composed of different sets like categorical rules (If species S_1 has property P_1 , then also P_2), associative rules (If species S_1 has property P_1 , then activate category C_1), predictive rules (If species S_1 meets species S_2 , S_1 will produce Action A_1) or diachronic rules (If Event E_1 occurs, then react with Action₁).

48 On generic algorithms, see, for example, Davis, 1990, Holland, 1986, Holland et al., 1989, Holland, 1989, Koza, 1992, Michalewicz, 1992, Rawlins, 1991 or Mitchell/Forrest/ Holland, 1992.

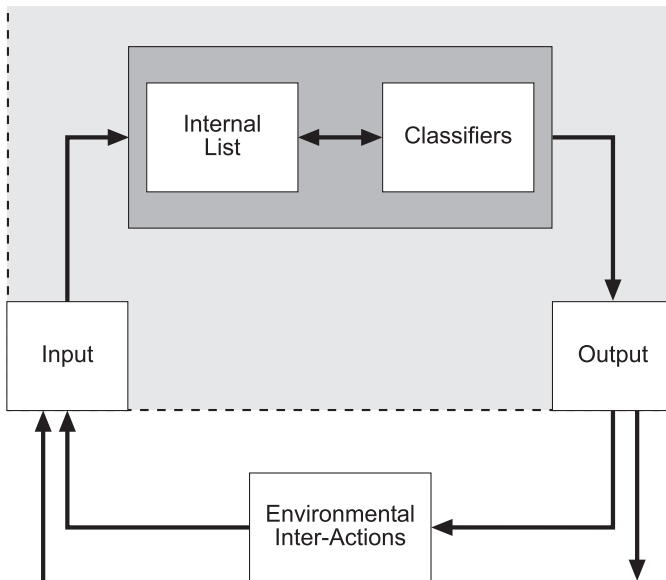
The second class of rules consists of inferential rules which are based on inductive generalization procedures like specialization rules, unusualness rules, law of large number heuristics or regulation schemes.

The primary function of inferential rules is to produce better empirical rules. (Holland et al., 1989:43)

Finally, a set of unchangeable and in-built operative rules can be seen as the innate hardware of any GA-system:

Operating principles are neither learnable nor teachable. They are innate system manipulation procedures ... These include the procedures for calling up the relevant empirical rules for representing the environment; the bidding system by which such rules compete to construct the current representation of reality ... Other operating principles invoke some of the procedures of knowledge alteration ... (Ibid:46)

Figure 4.6: A Scheme for a GA-Classifer System



The cognitive processing within a GA is based on a bidding process in which one of the GA-rules gets activated and executed.

... In basic classifier systems the mechanism for activating rules is very simple: all matched rules are activated. For classifier systems with learning

mechanisms it is desirable to make activation dependent on additional parameters. These include the strength of a classifier, which is a measure of its past success, and support, which is a measure of likely relevance to the current situation. (Holland et al. 1989:105f.)

Following the above quotation the core of the classifier system lies in a bidding process where, given an internally encoded input from the environment, a suitable or viable GA-response is selected among a group of different available alternatives. This selection process is dependent on the strength of each of the classifiers which, in turn, is a function of their previous strength and their specificity.

Aside from the bidding process, a classifier system develops, in evolutionary time, a higher degree of internal complexity by a cross-over process and by the production of new classifiers as a recombination of previously successful ones.

The cognitive organization of a GA-system exhibits several remarkable properties which are necessary for their overall flexibility and for their absorption of environmental complexities.

- An essential feature of evolving classifier systems lies in the multiplicity of available rules for any given input. Since fixed responses or defaults are to be considered as the exceptional cases only, a GA-system possesses a large potential repertoire of rules for any given input.
- Associated with the heterogeneity of the GA-rule-composition, a classifier system is blatantly inconsistent from a logical point of view since contradictory rules are maintained within the rule corpus and conflicting rules become part of a bidding process.
- The strong GA-inconsistency allows, however, for a high degree of flexibility and scope. Inconsistent rules may co-evolve in separate niches of a GA-system's interaction with its environment.
- GA-systems, due to the recombination of rules, are characterized by a drift towards increasing their internal complexity. In other words, a GA-system is building up ever higher internal complexity levels in order to interact with their environments. The environments, in turn, are subject to the same complexity drift which becomes, then the basis for a permanent struggle for higher complexity.
- Another characteristic feature of a classifier system lies in the volatility of its outputs which is due internally to the probabilistic bidding processes and eternally to varying contexts.

- Fixed and stable outputs, e.g., over-learned actions in general or over-learned responses in particular, can emerge in GA-systems, but they should be considered as special cases which become defaults due to regular successes in the past.
- The distinction in over-learned and under-learned responses can be given a more precise meaning within a GA-context. Over-learned responses are executed regularly independent of contexts or prehistories and result in a specific, pre-given response. Under-learned responses, in turn, are reserved for those situations where the inputs and the available internal rule repertoire do not match completely and a creative GA-response is required.
- Additionally, an interesting inversion can be observed between the generality of rules and their strengths. Unlike a system of axioms where theorems can be deduced from a small set of general strong principles, general rules in the GA-architecture are usually weak and remain inactive in specific contexts. Usually, narrow, but context specific rules usually dominate over general rules.

In general, it appears that individuating information ... has substantial power to override default assumptions based on category membership. (Holland et al. 1989:219)

This short overview of GA-systems should be sufficient to use GA-architectures for the interactions in survey contexts.

Towards New Cognitive Foundations for Survey Research

In this section it will be assumed hypothetically that the survey interactions between respondents and interviewers take place as a dialogue between two GA-systems. Here, the part of the interviewer will not be analyzed in greater length although this side could produce interesting new results, too. The center of the investigation is occupied with the GA-respondents, their cognitive architectures and the characteristic features of the interaction processes.⁴⁹

Using, once again, the distinction between over-learned and under-learned responses, it is fair to assume that for GA-organized respondents many of the survey questions, especially the ones related to attitudes or evaluations,

⁴⁹ It goes without saying that a GA-architecture in its current form is under-critical and under-complex in view of the complex cognitive tasks inherent in survey responses. Thus, the present outline should be seen as a counter-factual sketch which is focused on GA-systems and which brings to light several characteristic features of the cognitive organization of respondents where the underlying GA-architecture can offer heuristic guidelines and a weak explanatory support.

will belong to the under-learned category. The available inputs in terms of questions, the restricted options for answers, the quantitative scales, etc. are not matched directly by the internal rule repertoire which could correspond to these specific inputs directly. Thus, answers to survey questions like trust in various institutions, life satisfaction in its various aspects, to name some prominent examples, require a creative response by a GA-respondent and qualify, thus, as under-learned.

Turning to the GA-respondent side only, the following characteristic features of the interaction process can be specified.

One of the most important element of the GA-based interactions lies in the sheer multiplicity of available responses by GA-respondents. The GA-organization allows a permanent recombination of new rules and, equally important, the co-existence of older and newer rules. The GA-organization acts rather graceful and very seldom removes older rules from its rule-set. This special feature of a multiplicity of answers has been noted by survey researchers as well. As pointed out especially by John R. Zaller (1992), respondents in surveys have a much richer repertoire of different responses at their disposal. Consequently, Zaller's response axiom states that

Individuals answer survey questions by averaging across the considerations that are immediately salient or accessible to them (Zaller 1992:49)

What becomes of particular relevance here is that the high number of available responses is directly related to the under-learned situation and to the unusual requests for answering which require a creative response. In GA-language, due to the under-learned situation of a specific survey-question, a multiplicity of rules become activated since none of the available rule matches the input of a survey question.

The multiplicity of responses can be shown whenever a survey question does not require a selection of a single option, but asks for assessments of each of the options sequentially. Take, for example, the question of different images of society which has been used in the Austrian Social Survey in 1993. Here, respondents were asked to which of the following four general views or images of society they could agree: to a meritocratic-conservative (a), to a "Marxist" (b), to a corporatist (c) or to a social relations-oriented view (d). As it turned out, even the contradictory pair of images, namely (a) and (b), was clearly treated in a non-contradictory manner. Only 54% of the respondents opted for one of the consistent options (a+/b-, a-/b+) and 46% agreed to inconsis-

ent options. With respect to all four images of society, the largest single group agreed to all four images, followed by an agreement to three different images.

Second, this multiplicity of alternatives covers only the bright side of the coin. There is a dark side to this coin, too, because this multiplicity of alternatives contradicts an implicit assumption of survey designs and especially of survey designers. Usually, survey questionnaires are developed on the tacit assumption that respondents possess a consistent belief-system which can be captured through the items and dimensions of a multi-thematic survey. Wilson and Hodges (1992) describe this hidden assumption as the mental file view where respondents possess a well-ordered mental drawer, consisting of mental files on issues like legalized abortion, migration or trust in the police. Whenever a survey question is asked, they look for the appropriate file and report its content.

However, one of the most obvious characteristics of a GA-system lies in the global as well as in the local inconsistency of its rules which differ only in their relative strength. The GA-architecture

allows all rules to be treated as hypotheses, more or less confirmed, thereby stepping around difficult global consistency requirements. (Holland 1989:488)

Surveys very seldom are designed to exhibit underlying inconsistencies in the attitude and belief system of respondents. The GA-architecture is structured in a way that the usual consistency relations do not apply. 80% of the respondents may be optimistic about their long-term future or about the future of the society as a whole. Any interpretation which would indicate that $100 - 80 = 20\%$ of the population are quite concerned about the future would be extremely misleading. Normally, roughly 80% of the respondents will reply as well that they were very much concerned and worried with respect to the state of the environment and the sustainability of the mode of economic production and distribution. Global and local inconsistency is an essential element of a GA-architectures and this feature is reflected strongly in survey responses, too.

Apart from the global inconsistency of the GA-architecture, the third general characteristic deals with the logic of under-learned responses which does not comply with classical logic. Assume, in line with two valued logic, the availability of conceptual pairs like true/false, confirmed/rejected, allow/forbid, etc. As Hippler and Schwarz (1986), for example, demonstrated the conceptual pairs allow/forbid and not forbid/not allow are treated in surveys not as equiv-

alent, but quite distinctively since allow and forbid are treated consistently as stronger statements than not allowing and not forbidding. Moreover, Hippler and Schwarz provide an un-intended support for the distinction between under-learned and over-learned responses because this observed asymmetry between only holds for respondents with weakly developed attitudes (under-learned), not for persons with very strong attitudes (over-learned). Another feature of under-learned responses is that the usual transitivity relations $a > b, b > c \rightarrow a > c$ do not hold.⁵⁰

Furthermore, a tacit assumption especially in value-related survey research lies in the importance of general values as a determinant for preferences or specific routines. However, the GA-architecture reveals an interesting inversion between rule strength and generality. In brief, the most general rules turn out to be the weakest ones, the most specific rules, due to their context specificity, usually become the strongest ones.

Fourth, an underlying GA-architecture points to the important role of path dependencies, context effects and to the sensitivity to small input variations in survey-interactions. This special part has been studied in survey research extensively under labels like response effects, question order effects and the like.⁵¹ The important point to be emphasized from a GA-perspective, however, lies in the simultaneity of a large variety of contexts, of a sensitivity to small input variations and of different pre-histories which cannot be isolated or de-composed in an un-ambiguous matter. Contexts may vary with interviewers and with specific events during a survey interaction, the wording of questions and, more importantly, the subsequent interpretation may vary with the pre-history of survey respondents prior to a survey interaction, etc. The simultaneity of these variations cannot be controlled sequentially which, in turn, raises insurmountable problems for any comprehensive theory of measurement errors.

Aside from a multiplicity of potential replies, the overall inconsistency of these multiple alternatives, the non-classical logic underlying survey responses and context or history effects, volatility becomes a fifth essential feature of GA-based survey interactions. From a GA-based perspective, this volatility is composed of four different components. Initially, the volatility is partly due to the probabilistic bidding process which constitutes a necessary component of

50 For a wonderful article on the topology of nervous nets and the non-transitivity of values, see McCulloch 1980.

51 See, for example, Bradburn/Mason, 1964, Cronbach, 1946, Krosnick/Alwin, 1987, Martin, 1964 or Schwarz/Hippler, 1991.

variation. Another part of the volatility comes from the necessity of producing creative responses which, by itself, must be considered as a nontrivial and inherently instable process. Additionally, the bidding process is, due to varying contexts of survey interactions, highly complex which, once again, adds to the volatility of responses. Finally, a fourth important aspect with respect to the volatility of under-learned responses lies in the scales which are available in many survey questions. When confronted with a scale between 0 and ten for example, respondents in under-learned situations usually are indifferent with respect to a broad range of values which adds another element in the overall volatility of responses.⁵²

Numerous examples have been generated which point to the instability and the variation in responses. John R. Zaller gives an illuminating example in terms of changes in wordings.

A record instance of the effect of changes in question wording may be a New York Times poll in 1983 which found that public support for a 'freeze' on nuclear weapon production varied between 18 and 83 percent, depending on how the issue was framed. (Zaller 1992:29)

A particular striking example comes from the German Welfare Survey 1984 in which one of the most central questions, namely overall life satisfaction was, by mistake, was asked twice in an identical fashion. The correlation between both responses was only 0.60.

Sixth, a highly fascinating feature in the creative nature of under-learned survey responses reveals itself by focusing on GA-architectures. Usually, the input side in survey interactions consists of a series of verbal items which, in conjunction, should be taken into account by a GA-system. But in a GA-architecture, it cannot be taken for granted that the entire input has been used in the process of producing an answer.

Thus, one is suddenly confronted with the possibility that other forms of understanding outside the intended domain of survey researchers were operative in generating a specific answer. For obvious reasons, the term "unintended consequences" of a survey question points to the possibility that respondents did not reply to an intended question, but to a different one which was composed of selective elements of the original one.

52 While this indifference range may vary between respondents, it can be assumed that each respondent is indifferent with respect to at least two values on such a scale.

Take, for example, a seemingly straightforward question like a self-assessment of one's overall position in society and a measurement method, using a scale from 1 to 10.⁵³ More than 80% of the unskilled workers positioned themselves above the societal average (6 and higher), in contrast to roughly 57% of the skilled workers. In GA-language it seems very likely that many respondents in the unskilled group produced an answer with respect to their subjective overall position from 0 to 10, and not to the intended societal positions from 0 to 10.

Another feature of unintended effects comes into play whenever under-learned items like work satisfaction and a scale from 0 to 10 are asked in various, seemingly different dimensions. As has been shown in Part II of this book, the answers to different dimensions of work satisfaction tended to be quite similar across Europe, despite very heterogeneous working and living conditions. In GA-language, the seemingly different dimension of work satisfaction became subject to a default operation which, among other results, would have produced very similar outcomes, had the list of dimensions been longer than the existing one.

The feature of defaults is of critical importance for the morphological approach because these defaults offer empirical support for the similarity relations, essential for the morphological approach, between seemingly different dimensions.

The seventh feature of under-learned survey responses leads outside the GA-domain proper and to the domain of long-term and short-term memory. Under-learned responses, due to their under-learned nature, do not enter into long-term memory and are, thus, quickly erased from the memory screen in a very short period of time. Within survey settings, twenty to thirty minutes are sufficient for having completely forgotten a specific under-learned response to a survey question.⁵⁴

These seven GA-based features conclude the section on a new cognitive background theory for survey interactions. As a final remark, a short quotation will be presented which, once again, points to the intricacies and the complexities in producing survey responses. In a meanwhile classical description Daniel C. Dennett provides us with an interesting sketch of the bidding pro-

53 This example comes from the Austrian Social Survey 1993 and is discussed at length in Müller, 1998.

54 Following Saris/Gaulhofer, 2007:220, twenty minutes within a conventional survey interview are sufficient for practically forgetting an under-learned response to a survey question.

cess inherent in spoken language. Dennett uses a pandemonium of demons which starts to operate internally and, finally, produces a spoken phrase. Here, Dennett's description will be slightly adapted to survey responses. The pandemonium of demons will, after a person has been asked a survey question, start to operate internally and will result in a winner of the bidding process which, then, gets executed.

Let's consider a survey question like "How satisfied are you with your life?" and ... a pandemonium of word-demons ... First we go into vocal noisemaking mode

Beeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeep

... The internal 'noise' excites various demons in us who begin trying to modulate the horn in all sorts of random ways by interfering with its stream. The result is gibberish, but at least it's English gibberish (in English speakers)

Yabba-dabba-doo-fiddledy-dee-tiddly-pom-fi-fi-fo-fum ...

But before any of this embarrassing stuff actually hits the outside world, further demons, sensitive to patterns in the chaos, start shaping it up into words, phrases, clichés

And so, how about that? baseball, don't you know, in point of fact, strawberries, happenstance, okay? That's the ticket. Well, then ...

which incites demons to make further serendipitous discoveries, augmented by opportunistic shaping, yielding longer bits of more acceptable verbage, until finally a whole sentence emerges:

I'm going to knock your teeth down your throat!

Fortunately, however, this gets aside, unspoken, since at the same time (in parallel) other candidates have been brewing and are now in the offering, including a few obvious losers, such as

You big meany!

and

Read any good books lately?

and a winner by default, which gets spoken:

[I don't understand this question!]

*... We can suppose that all of this happens in swift generations of 'wasteful' parallel processing, with hordes of anonymous demons and their hopeful constructions never seeing the light of the day ... (Dennett 1991:237p.)*⁵⁵

Towards New Forms of Survey Designs and Data Analysis

Towards the end of this article a few general remarks should open up new directions and new frontiers for survey designs as well as for novel forms in the analyses of survey data.

Introducing Visual Surveys

In recent years, new survey designs were proposed under the name of deliberative polling⁵⁶ which, by adding additional information and background materials, attempt to move the under-learned responses towards the overlearned group. These designs organize surveys as a learning process but run into an interesting trade-off between high representativeness/low deliberation and low representativeness/high deliberation.

With respect to new survey designs, one of the core differences between Science I and Science II was the dichotomy between general and universal laws on the one hand and pattern recognition and pattern formation on the other hand. A new survey design which is based on this distinction moves the verbal responses from categories and numbers to the domain of pattern recognition and pattern production.

In essence, these surveys are composed of two types of outputs. The first group consists of a series of patterns where the task of respondents lies in the selection of a single, most appropriate pattern. The second group is composed of visual tasks which end up in a specific pattern, generated by a respondent. (For an overview, see Müller, 2004)

Two examples should be sufficient to demonstrate this type of visual survey. The first example deals with a pattern recognition task and is exemplified by Figure 7. Here, one sees a collection of visual patterns which represent one's life course so far. The task of respondents is twofold. Either they select one of the pre-given patterns or they produce a new one.

⁵⁵ The sentence in brackets has been implemented by us, in the original version the final sentence is: 'Your feet are too big!'

⁵⁶ On deliberative polling, see, e.g., Liuskin/Fishkin/Jowell, 2002 or Sturgis/Roberts/Allum, 2005.

Figure 4.7: Measurement Method as Pattern Recognition

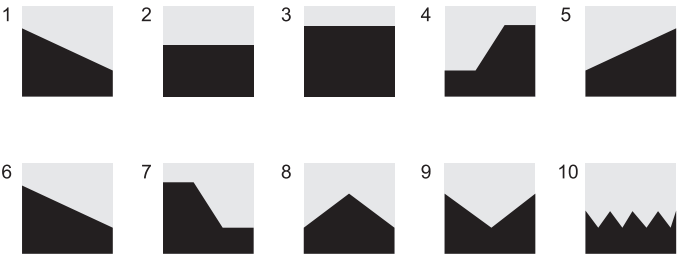
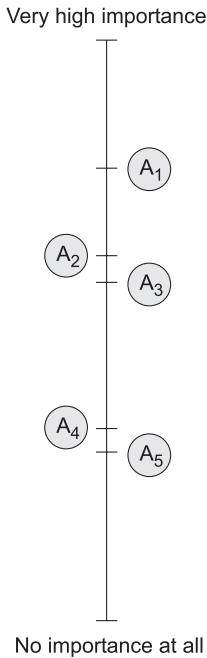


Figure 8, in turn, shifts to an elementary form of pattern production where respondents are asked to evaluate five different domains and rate their overall importance for them. In sharp contrast to the sequential mode of questioning in traditional surveys, this pattern producing task generates a configuration where each new alternative A2, A3, A4 and A5 is placed within a self-specified context of an already existing reference point (A1). A self-generated configuration like the one in 7, while under-learned, too, provides an abundance of

Figure 4.8: Measurement Method as Pattern Formation



structural and also of quantitative information on the relative strength of each of the five alternatives

According to our experience with a small number of visual surveys so far, shifting from verbal responses to pattern formation and pattern recognition could and should become a new way for survey designs. In our assessment, visual or pattern-based surveys could capture the complexities of the cognitive architectures of respondents in a much better way than the Science I-based measurement methods with their restricted scales and pre-arranged verbal responses.

Towards New Forms of Survey Data Analysis

New cognitive models like the ones on over-learned and under-learned responses, GA-based architectures and new survey designs, for example the visual designs introduced above, should lead, finally, to new ways of data analysis, too.

Referring back to the start of Chapter 14, one of the challenges for comparative research is to bring in datasets which, so far, remained outside the domain of comparative analysis. For example, directly incomparable data between regions or countries were thought to be the strongest argument for the generation of comparable cross-regional or cross-country data-sets. Thus, what is currently urgently needed are the outlines for a new road to comparative research which could become of special relevance for large quantities of unused data outside the current data bases for comparative analyses. These datasets (round and round ... and round)

Part III

**The Concept of RISC
in the Development
of Modern Societies**

5 The RISC-Program: An Experiment in Trans-Disciplinary Knowledge Production at the University of Ljubljana

The last fifty years of the 20th century as well as the first decade of the new millennium have experienced a rapid and profound re-configuration of the science system as a whole. After a brief summary of these secular changes and phase transitions the article will present an overview of the organization and the outputs of a small research program at the University of Ljubljana which, from 2007 to 2009, ran under the name of RISC (Rare Incidents, Strong Consequences). The rationale for the focus on rare events was that, on the one hand, these rare events constitute a very important problem cluster for contemporary societies and that, on the other hand, rare events, due to their widespread occurrences in societal and natural systems, can serve as a paradigmatic example for a new type of trans-disciplinary knowledge production. Moreover, rare events belong to the class of complex scientific problems which share a number of characteristic features.¹ For instance, rare events with big societal impacts are in most instances difficult or impossible to predict in terms of the time of their appearance as well as of their magnitude. They appear suddenly as a consequence of much longer term development processes. Additionally, these rare events question the conventional wisdom on the close linkages between explanation, prediction and control.² Although nearly impossible to predict and very difficult to explain even *ex post*,³ these rare events can be controlled, nevertheless, in ways beyond traditional scientific explanations or predictions.

Secular Phase Transitions in Science

Before entering into a detailed description of rare events a general background topic is to be discussed which became an important reference point in the organization of the RISC-program, namely a significant change in the overall science landscape. At the outset two major phase transition in the overall sci-

1 On complex problems and their characteristic features, see, *e.g.*, Anderson, Arrow and Pines', 1988, Stein, 1989, Casti, 1994, Coveney and Highfield, 1995, Cowan, Pines and Meltzer, 1999, Holland, 1995, Kauffman, 1995 or Rescher, 1998.

2 On the conventional wisdom of the strong ties between prediction, control and explanation, see, for example, Casti, 1989, Popper, 1965 and 1972 or Suppe, 1977.

3 See, for example, the very revealing article on *ex post* explanations of financial crises by Peter Strukelj in this volume.

entific landscapes will be laid out, albeit in a very brief manner. Currently, the cognitive and organizational landscapes of science are experiencing a secular shift which can be characterized in its epistemological, ontological, theoretical and organizational dimensions as a transition from Science I to Science II⁴ and in its knowledge organization as a change from Mode I to Mode II.⁵

Science I corresponds to the organization of science from its initial modern phase in the 16th century to the 1940s and 1950s approximately. Science I is the long-term period of majestic clockworks, culminating at an early stage with the “*Principia Mathematica*” of Sir Isaac Newton in 1687. In contrast, Science II operates with blind watchmakers [Richard Dawkins] or, to use another metaphor from Karl R. Popper, works in a configuration of clouds.⁶

The transition from Science I to Science II should not be seen as replacements or substitutions of old homogeneous forms with new ones, but as a transition in terms of hegemony. The first phase from the long 16th century up to the period between 1900 and 1950 is characterized by the dominance of Science I and contained only a few elements of Science II, whereas the second phase from the 1950s onwards can be described as the peaceful co-existence between a dominant area of Science II and a substantial cluster, which remains structured and organized in Science I.

Table 1 highlights some of the major shifts from Science I to Science II, which, once again, should be understood as an exchange between center and periphery. Following Table 1 more specifically, the following distinctions can be introduced between Science I and Science II.⁷

With respect to theory construction, general and universal laws, while at the core of Science I, move to the periphery of Science II, while pattern formation or pattern recognition, formerly marginally embedded in the domains of Science I, move to center stage of Science II. The leading discipline for Science I is theoretical physics whereas the core areas of Science II are the life sciences, broadly conceived. Science II addresses a large number of common problems, common metaphors, common methods as well as common models

4 See especially Hollingsworth and Müller, 2008, Hollingsworth, Müller and Hollingsworth, 2008 or Hollingsworth, Müller, Hollingsworth and Gear, 2008 and in this volume.

5 On the transition from Mode I to Mode II, see especially Gibbons *et al.* 1994 or Nowotny, Scott and Gibbons, 2001, and Nowotny, 2005.

6 One could make the point that Science I and Science II correspond, at least partially, to the two epistemic cultures, identified by Knorr-Cetina, 1999, namely the closed culture of high-energy particle physics [Science I] and the open trial and error type of micro-biology [Science II].

7 For more background materials, see also Price, 1963 or Rescher, 1982.

and mechanisms which can be identified across a wide variety of disciplines in the natural and in the social sciences. This common domain comprises issues like evolutionary dynamics, structural changes, multi-level organization or morphological issues. George Cowan identified a large set of problems which, contrary to the age of Science I, require the co-operative efforts of scientists across the Great Divides of natural, technical and medical sciences on the one hand and of the social sciences and humanities on the other hand.

Table 5.1: Basic Differences between Science I and Science II

Dimensions	Science I	Science II
Leading Fields of Science	Classical Physics	Evolutionary Biology and the Sciences of Complexity
Theoretical Goals	General, Universal Laws	Pattern Formation and Pattern Recognition
Theory Structures	Axiomatic, Reductionistic	Nested, in Multiple Levels Simultaneously
Research-Programs Heuristic Rules	Closed Deductive Induction	Open, Recombinative Critical Phenomena, Qualitative Change
Units of Method Forecasting Capacities Levels of Complexity Ontology Epistemology	Causal Relations High Low Dualism Observer- Exclusion ("Objectivity")	Generative Relations Low High Monism Observer-Inclusion
Re-entries (Self-Reference) Dynamics	Re-Entries Excluded Linear Dynamics, Equilibrium	Re-Entries Possible Non-linear, far from Equilibrium
Types of Distribution	Normal Distributions, Mild Distributions	Power-Law Distributions, Wild Distributions
Potential for Interdisciplinary Research	Low	High
Cognitive Distances between Natural and Social Sciences	High	Low
Leading Metaphors	Clocks	Clouds

Theoretical neurophysics; the modeling of evolution, including the evolution of behavior; strategies to troublesome states of minds and associated higher brain functions; nonlinear systems dynamics, pattern recognition and human thought; fundamental physics, astronomy, and mathematics; archaeology, archaeometry, and forces leading to extinction of flourishing cultures; an integrated approach to information science; (or) the heterogeneity of genetic inventories of individuals [Cowan, 1988:236].

It is interesting to note that the Austrian cybernetician and pioneer in the cognitive sciences, Heinz von Foerster, addressed the issue of the declining hegemony of Science I already in the 1970s and 1980 which, in his assessment, was about to crumble and fade away.⁸ For Heinz von Foerster, the classical scientific method was characterized by three general rules which can be found in Table 1, too. First, Science I adhered to the rule of objectivity—“the properties of the observer shall not enter the description of his observations” [Foerster, 2003:285]. This rule effectively eliminated selfish designs from the landscapes of Science I. The second rule was described as the rule of induction or of conservation of rules—“rules observed in the past shall apply to the future” [Foerster, 2003:203] and led to the general inability and insensitivity for structural or qualitative changes. Finally, the third general rule was classified as the rule of causality or, alternatively, of necessary and sufficient causes and was characterized by Heinz von Foerster with a sufficiently necessary amount of romantic irony: “Almost everything in the universe shall be irrelevant” [*Ibid.*]. Resting on these three pillars, Heinz von Foerster concluded that the traditional scientific method is “counter-productive in contemplating any evolutionary process, be it the growing up of an individual, or a society in transition” [*Ibid.*:204].

Aside from the cognitive phase transition in the theoretical science landscapes, profound changes are occurring simultaneously in the domain of knowledge organization. Here, a phase transition is under way which leads from the traditional modes of knowledge organization along disciplinary boundaries, labeled as Mode I, to a new and trans-disciplinary form of organization under the name of Mode II.⁹ It must be stressed that the phases of Mode I and Mode II do not coincide with the two periods for Science I and Science II since Mode II emerges only in the course of the 1980s and 1990s and Mode I does not start prior to the massive “disciplinification” of the sciences during the second half of the 19th century. Nevertheless, both phase transitions should be viewed as complementary,¹⁰ the first one in the cognitive domains of theory structures and leading epistemologies, the second one in the arena of scientific organizations and forms of intra-scientific or science-society co-operations. Table 2 highlights the major differences for both forms of knowledge organization.

8 For more details, see Müller, 2007 and 2008 or Müller and Müller, 2007.

9 On these secular shifts, see Gibbons *et al.*, 1994, Nowotny *et al.*, 2000, Nowotny, 1999 and 2005.

10 On the important notion of complementarity, see especially French and Kennedy, 1985, Rozenal, 1967 or Söderqvist, 2003.

According to Table 2, a substantial shift in knowledge organization is breaking its way. One of the changes, which is common to both phase transitions is the significant increase in inter- and transdisciplinary co-operations [Mode II] and a significantly increased number of theory—as well as mechanism-, methods- and model-linkages across scientific fields and disciplines [Science II].

Table 5.2: Two Types of Organizing Knowledge Production

Dimensions	Mode I	Mode II
Knowledge Organization	Separation between context of discovery and application Separation of basic- science and applied science Focus on disciplinary matrices	Basic discoveries in the context of applications Entanglement between applied and basic science Focus on trans-disciplinary problems, patterns, metaphors
Organizational Units	Homogeneous researchteams in stable spatial locations Long-term orientation	Heterogeneous Researchteams; Distributed across space Limited periods, temporary configurations
Quality Control	Peer review, Internal	Wider set of criteria, including extra-scientific elements like societal acceptance, etc.
Extra-Scientific-Domains	Irrelevant	Societal responsibilities and the need for societal consensus formation

The capacity to cooperate with experts from other fields, to come to see the world and its problems in a complementary way and to emphasize with different presuppositions, involves the capacity to assume multiple cognitive and societal identities ... Biologists working in environmental science, computer scientists in the analysis of gene sequences and mathematicians in ecological modeling can equally gain reputation on both their native and new grounds [Gibbons et al. 1994:149].

As can be seen in Table 1.1, one of the main distinctions between Science I and Science II lies in the two dimensions of potential for inter-disciplinary cooperation on the one hand and the distances between the natural and the social sciences on the other hand. Both dimensions change substantially between Science I and Science II. In short, Science II becomes a period with a high potential of inter-disciplinary co-operation and a phase with relatively small distances between the natural and the social sciences, due to a growing stock of common models, methods, mechanisms and metaphors which can be

used across various disciplinary fields and due to the change in leading fields from theoretical physics to the life sciences.

The RISC-Program as an Experiment within Science II and Mode II

The RISC-program at the University of Ljubljana was characterized by a common focus on processes which exhibit a characteristic distribution between a small number of very big events with major effects and repercussions and a very large number of events with very small or marginal effects only. Therefore, the acronym RISC—Rare Incidents, Strong Consequences—has been chosen which, additionally, has the advantage of sounding strikingly similar to the concept of risk. Furthermore, well-established compounds like risk-society, risk-assessments, risk-insurances, etc. can be complemented with the corresponding RISC-notions. RISC-processes can be found in many fields of research and clearly transcend the boundaries of academic disciplines or the big divide between the natural and the social sciences. But it was not only the ubiquity of RISC-processes in geology, finance, migration research or linguistic which was so fascinating to study. The long-term aims of the research program on RISC-processes were

- to find common models, methods and mechanism across the various RISC-applications and, in doing this, establish a strong trans-disciplinary line of co-operations at the University of Ljubljana
- to search for a common framework of societal evolution which would be able to integrate the various disciplinary and trans-disciplinary RISC-work
- to provide the infrastructure for bringing together a number of international experts having experiences in dealing with RISC-processes and enable a reflection and exchange of experiences
- to become an internationally recognized focus for policy making activities in the RISC-arena by identifying major policy issues to be dealt with, possible future research on RISC-related hazards and disasters and new policy approaches.

As can be seen from the long-term goals and perspectives, the research program wanted to give, on the one hand, new impulses for trans-disciplinary studies in the social, physical, biological and technical sciences at the University of Ljubljana and, on the other hand, to work on a common theory framework for the evolution of modern societies, past, present and future.¹¹

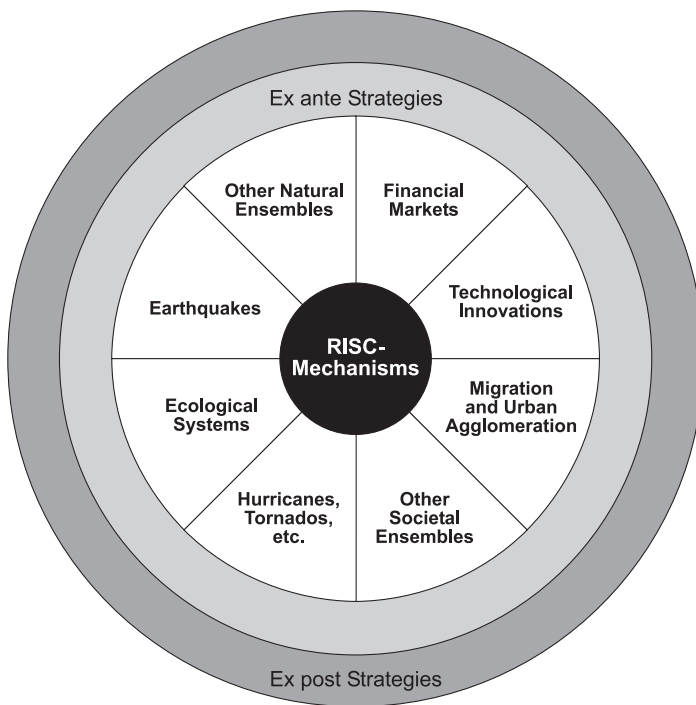
11 For more background materials on the comparative advantages of this type of transdisciplinary organization, see especially Hollingsworth and Hollingsworth, 2000 or Hollingsworth, 2004.

The Profile of the RISC-Program

Following an international workshop at the University of Ljubljana on May 25 and 26, 2007 with an overview of RISC-processes the research program for the period from 2007 to 2009 was concentrated on institutionalizing a RISC-based agenda that was capable of advancing the state of global RISC-research.

The work areas of a new co-ordinating unit or hub have been laid out already in a programmatic paper, underlying the Ljubljana Workshop¹² and are to be recapitulated briefly. All the activities of the new hub fell into three broad cognitive domains [see Figure 1].

Figure 5.1: The Overall RISC-Research Program



With respect to the theoretical core, it was already noted in the Mission Statement¹³ of the new research program that models, methods and mechanisms which generate or account for RISC-processes and a general evolutionary

¹² See Hollingsworth/Müller/Svetlik and Toš, 2007.

¹³ See Hollingsworth/Müller/Svetlik/Toš, 2007, especially page 5.

framework which is able to integrate the various RISC-processes, lie at the core of the RISC-program.¹⁴

Different applications across different academic fields and disciplines constituted the second group of cognitive tasks. Since RISC-processes can be found in the natural as well as in the social sciences they can be studied in diverse academic fields like economics, sociology, historiography, information sciences, medical research, earth sciences, biology or the environmental sciences.

Finally, the third area in Figure 1 covered the overall implications of RISC-processes for the sustainability of contemporary societies. Within the research program policies and plans were developed to cope with large scale disasters or negative effects before they occur, in an effort to prepare societies (ex ante policies). Moreover, attention was given to efforts to sustain a high level of quality of life even in the face of disasters and, consequently, plans and policy suggestions to safeguard societies from disasters (ex post policies).

With respect to the organization of the hub it was envisioned that the overall number of personnel should be very small and limited to the following group of persons.

- First, a high-ranking hub coordinator from the University of Ljubljana was chosen who was well embedded in the communication processes between the different faculties of the University of Ljubljana. This person was responsible to guarantee the annual budget through contributions from the faculties. Professor Ivan Svetlik as vice rector of the University of Ljubljana stepped in to take over this central position. After his move to become Minister of Labour, Family and Social Affairs on November 21, 2008, Professor Lučka Kajfež Bogataj became his successor.
- Second, an external scientific advisor was needed as scientific hub coordinator, who should enable contacts to international networks dealing with RISC- issues. Working part-time, the advisor was expected to focus his activities on the development of the RISC-program. Here, Karl H. Müller from WISDOM in Vienna was invited to take this coordinating position.

14 For relevant literature of the RISC-core see, for example, Bak, 1996, Ball, 2004, Barabási, 2002, Beinhocker, 2006, Haken, 1982 and 1983, Jackson, 2006, Jantsch, 1972, Jensen, 1998, Mandelbrot, 2004, Newman, Barabási and Watts, 2006, Sornette, 2002 and 2006, Thom, 1989, Watts, 2003. For the general background, see especially Zipf, 1949.

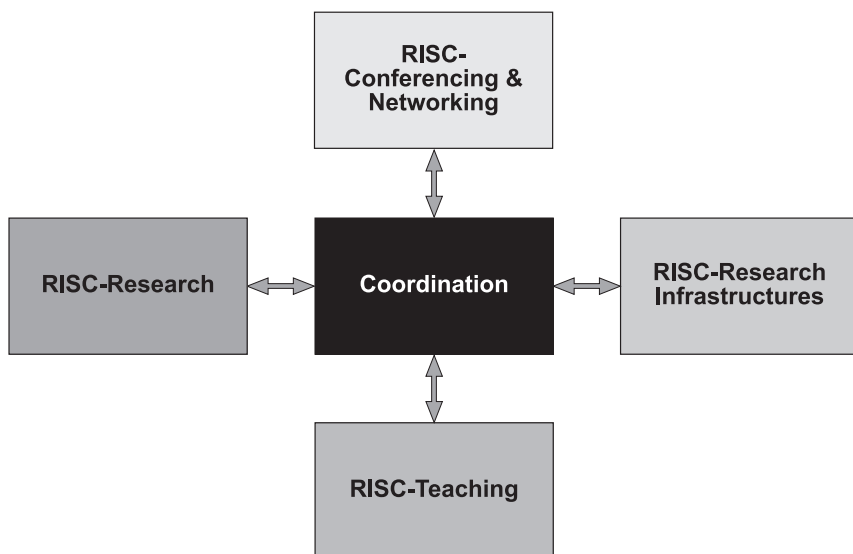
- A group of experts at the University of Ljubljana have been selected who acted as a Faculty Advisory Board and who had the important task of disseminating the RISC-program to their faculties.
- Another group of local researchers were to be mobilized who should become the key actors for RISC-research. Ideally, these persons were assumed to be teachers and researchers from the University of Ljubljana, who already dealt with various aspects of RISC-issues or who might have interest to do so in the future. Their immediate interest should be focused on bringing their students into the emerging RISC-activities and on the development of new research and teaching programs. They were considered as essential for the mobilisation of internal financial resources at the University of Ljubljana.
- An administrative and technical support was provided for the two coordinators. This included a part time employee, office, and infrastructure for meetings, workshops and conferences on RISC-processes, other services etc. From October 2007 onwards, Anja Polajnar helped to coordinate all the planned activities, to prepare materials, to manage the web site, to make travelling and accommodation arrangements, to handle reimbursements etc. From October 2008 until summer 2009, Manca Poglajen fulfilled this role.
- An International Scientific Advisory Committee was set up, composed of several highly regarded foreign and Slovenian experts. The committee should monitor and advise the RISC-program. It assisted in implementing the vision for the new research program, energized the local participants and advised about sources of funding. The members were encouraged also to contribute to the program through lectures or individual advice. The international members from abroad were Professor Didier Sornette from the ETH Zürich, Professor Robert Boyer (Ecole des Hautes Etudes en Sciences Sociales and Centre Pour la Recherche Economique et ses Applications, Paris), Professor Henry Abarbanel (Professor of Physics and Research Physicist (Scripps Institution of Oceanography), University of California San Diego, Director of the Institute for Nonlinear Science at the University of California) and Professor J. Rogers Hollingsworth, from the University of Wisconsin, Madison as speaker of the board. From the University of Ljubljana, Professor Lučka Kajfež Bogataj and Professor Anuska Ferligoj participated in the Scientific Advisory Board.
- The RISC-program was placed in the framework of integrated activities of the University of Ljubljana. Organizationally it was situated in IRI (Institute for Innovation and Development).

This concludes the presentation of the organizational format of the RISC-program.

Main Groups of RISC-Activities

As already indicated, the RISC-unit was operating in a large number of areas like organizing talks, lectures, small workshops, or preparing a summer school, applying for research projects or counselling political bodies both nationally and internationally on appropriate policies for RISC-processes. As an overview the RISC-program wanted to operate, aside from the coordination activities, in four broad areas which can also be seen in Figure 2.

Figure 5.2: The Organization of the RISC-Program 2007–2009



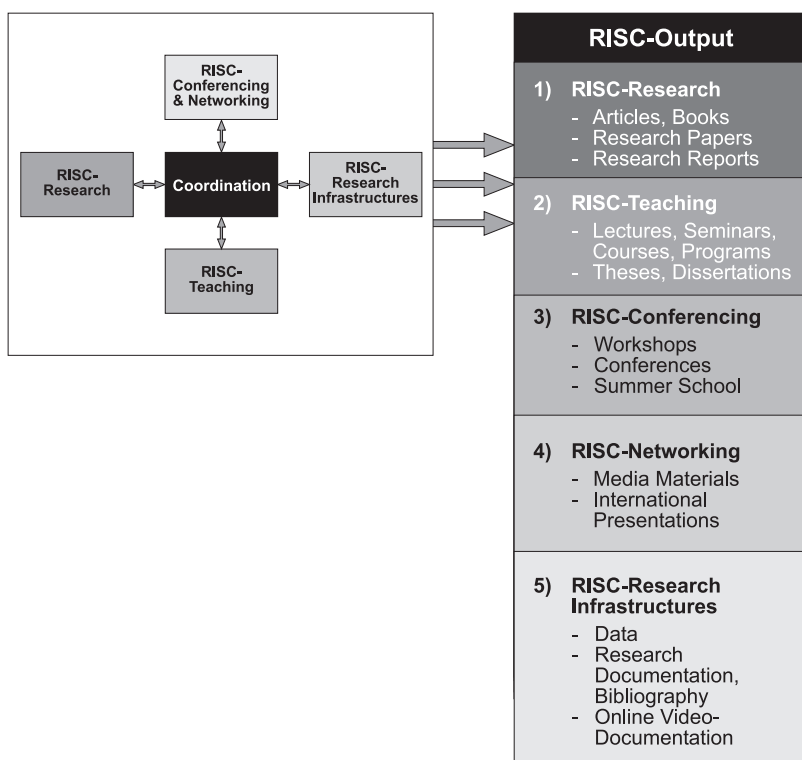
In terms of outputs of the RISC-program, one expected to obtain substantial results in five groups of RISC-activities during the period from 2007 to 2009 which can also be found in Figure 3.

RISC-Research and Publications

One of the core tasks of the RISC-program was the building of research communities at the University of Ljubljana across the social, physical, biological and technical sciences. These RISC-research communities were to conduct

RISC-research and enhance the local expertise in this field. Leaders of faculties, research groups or centres and existing post graduate study programs were invited to take part in the initiative. The expected effect was to increase the horizontal and trans- disciplinary integration of the University of Ljubljana. Applying for grants on RISC-research at the national and the international level as well as conducting research projects was to become the most prominent type of activity.¹⁵ Moreover, it was expected that a well structured research profile should emerge as a result of the two years activities.

Figure 5.3: The Main Tasks of the RISC-Program



Thus, by the end of the first period there should be a small number of research reports, resulting from national or internationally organized RISC-projects. Additionally, the RISC-program coordinators were to produce a number of

¹⁵ A total of seven research applications have been made to national and international funding bodies (ARSS, ESF, Norwegian Foundation) in the course of the two years. However, the outcome was only marginal and no important research project was approved.

articles and towards the end of 2009 also a book on RISC-processes. Aside from that, the RISC-program invited members of the University of Ljubljana to publish relevant articles or overviews under the new RISC-umbrella. For this purpose, a new series, entitled RISC-Research Series, was founded in January 2008.¹⁶

Risk-Teaching

The RISC-coordinators organized a series of lectures, seminars and courses by national and international experts as well as small workshops on different aspects of RISC-research on a regular basis. This main purpose of these activities was to explore the possibilities for further research and teaching activities and to mobilize national and international RISC-research experts. By far the most important activity during the two year period was a regular series of talks and workshops that were organized in intervals of approximately four weeks. Speakers in this series included Henry Abarbanel, Patrick Doreian, Günter Haag, J. Rogers Hollingsworth, Lučka Kajfež Bogataj, Adrian Lucas and Didier Sornette. These mainly international experts on RISC-processes were expected to interact with different faculty members or students for a short period of three to four days. The intended format was a lecture to the interested students and staff, one or more informal discussion-rounds and workshops in different institutes as well as informal meetings with students and faculty members. A second type of event consisted of small workshops for one or two days. For these workshops, several additional RISC-experts outside the University of Ljubljana were invited as well. The main emphasis of these workshops was concentrated on one of the following topics:

- on modeling and model-related problems of RISC-processes
- on a specific RISC-application domain like financial crises, environmental hazards, etc.
- on RISC-relevant research on hazards, disasters and policy-implications.

Additionally, the hub was working on establishing a summer school on RISC-research. It was envisioned to create this summer school in a two stage process, the first stage as part of an already existing summer school and the second and final stage as an independent annual summer school on different aspects of RISC-research.¹⁷

¹⁶ Currently, nine research reports have been produced in the RISC-series.

¹⁷ As a role model one can refer to the Santa Fe Summer Schools in the late eighties and nineties. See, for example, Stein 1989.

Moreover, the RISC-program attempted to mobilize local resources at the University of Ljubljana to support RISC-research by theses and dissertations across various disciplines and faculties. Graduate and post-graduate students were invited to take part in a RISC-award and three students with relevant RISC-topics have been selected.

Finally, the RISC-unit produced two general outlines towards a graduate and a postgraduate RISC-program as joint degree study programs in cooperation between the University of Ljubljana and other institutions. The postgraduate RISC-program was conceptualized for persons already engaged in research professionally who want to add a special qualification and who want to become RISC-specialists. Both programs were designed to provide special competencies in:

- models and generative mechanisms for RISC-processes across a wide variety of areas
- applying models, methods and data for RISC-analyses
- hazards and disaster prevention
- conducting transdisciplinary RISC-projects.

Finally, one was also contemplating the idea of involving third countries' universities in order to apply to the Erasmus Mundus scheme.

Risk-Networking and Conferencing

One of the important targets of the RISC-program was the organization of knowledge-transfers on RISC-processes to other universities in Europe on the one hand and to the media on the other hand.

With respect to the networking within the university domain, the major target was the diffusion of the RISC-program as a role model for trans-disciplinary research within an university and for a new type of social science or, alternatively, for a new form of addressing serious societal problems. For this purpose, several meetings have been arranged with the European University Association and the design of the RISC-program was presented in several international conferences like the World University Forum.

In the area of media mobilization, the aim was to use national and international media as a carrier to inform the wider public on RISC-issues and on strategies and policies to minimize the impact of rare events. Additionally, counselling local, national or international journalists on appropriate policy measures for taming RISC-related consequences became an integral task of the RISC-media activities.

RISC-Research-Infrastructures

Following Figure 3, research infrastructures were the fifth and final group of RISC-relevant outputs. Several of the RISC-research applications were focused on the issue of data and data management for RISC-research. Unfortunately, none of these applications turned out to be successful. As a consequence, the RISC-related research infrastructures were only marginally developed in the course of the two years.

In terms of infrastructure, in January 2008 a web-page on the RISC-program became available which included also the TRASD-homepage, set up for the kick-off meeting in May 2007. The RISC-homepage provided an in-depth documentation of on-going activities and served at least two main important tasks, aside from being a vital communication tool both inside and outside the University of Ljubljana.

- First, all the lectures and seminars were recorded and could be accessed through the RISC-homepage.
- Second, the homepage offered the research papers of the RISC-series for downloads and provided essential information on relevant literature on RISC-processes.

At this point, this short summary of five different types of activities under the RISC-umbrella has come to its end.

Shortcomings

As it turned out, the RISC-program did not succeed to pass a critical threshold and, to use a terminology from Walt W. Rostow, to launch a “take off” which would have moved it into a stage of “self-sustained growth.” A final project application as a nationally funded center of excellence did not succeed. In our view, three main reasons, the first one cognitive in nature, the second and the third one organizational, can be identified for the failure of the program. Probably the most important reason for the failure of the program was the inability to mobilize RISC-related research capacities at the University of Ljubljana. On various occasions a general interest was expressed with respect to risk-related issues, but no or marginal interests could be recorded for RISC-issues. One can offer several empirical instances for the claim that no manifest RISC-related research interests emerged in the course of the last two years.

- All in all, there was a total of seven international lectures by specialists in RISC-modeling, most of them physicists, but the overall impact of these lectures in terms of contacts, networking or projects was close to zero.
- The 1st University Workshop showed an interesting risk-related program with presentations on risk-perceptions, floods, droughts, etc. Nevertheless, with the exception of a single presentation from the Jožef Stefan-Institute, not a single RISC-related lecture was presented during the workshop.
- The RISC-award produced a number of interesting risk-related submissions. However, the only RISC-centered submission on co-citation networks was given a low evaluation by the members of the Faculty Board whereas risk-related topics were very favorably assessed.
- The current RISC-volume has very valuable contributions from the University of Ljubljana but all these contributions are situated either in the area of risk-prevention, damage-control or in the area of the methodology of inter- and transdisciplinary research.
- Additionally, not a single long-term research program at the University of Ljubljana has added RISC-related topics into its menu of research goals. In essence, the long-term research programs remained essentially within their discipline-specific boundaries and RISC-issues were not part of any of these programs.
- Finally, the RISC-series was mainly produced by external persons outside the University of Ljubljana. Out of a total of nine papers so far one finds only two Ljubljana papers in the series, one by Lučka Kajfež Bogataj on climate change and one by Peter Strukelj on the weaknesses of economic explanations of the current crisis. Both contributions are very interesting on risk-related or methodological grounds, but do not belong to the core field of RISC-modeling or empirical RISC-research.

In a crucial sense, the RISC-program maintained itself on the semantic ambiguity between RISC as a study of rare events and risk as an inter-disciplinary research field associated with disasters, hazards or accidents. Due to the large research capacities of the University of Ljubljana in the fields of risk-research, the RISC-program was apparently conceived as a subset or as a pure variation of a risk-related program.

A second decisive element of weakness came about when the RISC-program was initialized. In the beginning, the first programmatic RISC-papers were focused on establishing a RISC-research institute at the University of Ljubljana. Due to funding difficulties, Ivan Svetlik made a very interesting move and the RISC-program became an internally generated activity where several

faculties of the University of Ljubljana were to provide a seed money for a period of two years. What remained relatively vague, at this point, were medium and long-term targets and success criteria. With Ivan Svetlik and his strong position as vice-rector these pending issues could be kept implicit or vaguely defined. There was a general understanding that the RISC-program should have, on the one hand, international lectures, workshops or publications, and should generate, on the other hand, new inter-disciplinary research projects for the University of Ljubljana. Aside from this general understanding, no explicit targets have been fixed and, especially important, no procedures have been discussed for the case that these general goals cannot be reached through the available instruments of lectures, workshops, publications.

The third component for the failure of the RISC-program emerged after the transition from Ivan Svetlik to the Slovenian Ministry of Labour, Family, and Social Affairs. At this point, the targets of the RISC-program as well as the function and the task distribution of all relevant actors should have been made explicit to and for all relevant participants. This should have included the role of and the financial incentives for the new RISC-coordinator of the University of Ljubljana, the role and the requirements of the Faculty Board and, finally, the role of the external scientific advisor. As a consequence, the weak governance structure became even weaker and the overall goals of the program became even less clear and diverse.

Future Outlooks

The present volume offers a first overview not only on the potential of RISC-research, but also on the potential of RISC-research as a new form for the study of contemporary societies. The subsequent article on the dimensions and the long-term evolution of global RISC-societies can serve as an evaluation instance whether the scope of the RISC-program was intrinsically too small and theoretically too restricted or whether the analysis of RISC-societies could and should become a new recombinant societal science to address important societal issues in a broader, more inter- and trans-disciplinary and, equally important, more interventionist manner.

6 RISC-Processes and Societal Coevolution: Towards a Common Framework

One of the persistently puzzling issues for contemporary theories of societal evolution or coevolution¹ concerns the engines or, alternatively, the (f)actors for societal changes. To be sure, the literature is full of potential candidates for generative mechanisms² of societal coevolution like, to mention a few, functional differentiations into specific societal sub-domains or systems,³ knowledge as a new wealth generating factor of production,⁴ configurational and structuration dynamics,⁵ great ideas,⁶ the Schumpeterian entrepreneurs pursuing their recombinations of factors of production or innovations for short,⁷ forces of production, revolutionizing both economic sub-structures and societal super-structures,⁸ a technologically driven transition from low and medium risk production to high risk production processes with substantial ramification for individual life-courses,⁹ urbanization,¹⁰ a small set of crucial variables relevant for long-term sustainability¹¹ or a permanent interplay

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- 1 Societal evolution at the regional, national or global levels is almost by necessity coevolutionary in nature. Societies at the regional or national levels are horizontally embedded in an environment of coevolving regional or national societies and the societies at the global levels interact with their global environments in a coevolutionary manner, too. Thus, in the context of this article, the terms societal evolution and societal coevolution are used in a strictly equivalent fashion. See also Durham, 1991, Lewontin/Oyama, 2000, Oyama, 2000 or Thompson, 1994.
 - 2 Subsequently, the concepts of generative mechanisms or, alternatively, of generative engines will be used for the following minimal configuration, namely for a process P as a sequence of events and for an ensemble EN which can be attributed with the production of this sequence of events P. The ensemble EN could be a system, a network or any other complex configuration like a system of systems, a network of networks, a system of systems and networks, etc. Typically, generative mechanisms or engines involve a dual level configuration between a set of micro-actors A^{mi} who are dynamically inter-linked with one another and who through their aggregated micro-dynamics produce or generate the macro-process P^{MA} .
 - 3 See, e.g., Parsons, 1951, 1964 and 1994 or Luhmann, 1984 and 1997.
 - 4 Along the knowledge line, see Bell, 1979a and 1979b, Drucker, 1993, Nelson, 1996 or Thurow, 1996, 1999 and 2005.
 - 5 See especially Giddens, 1984, 1991, 2000 and 2009.
 - 6 As a recent example, see Ogle, 2008.
 - 7 On the Schumpeter system, see, for example, Arthur, 2009, Schumpeter, 1934, 1952, 1961, 1975, 1991, or Weidlich/Haag, 1983.
 - 8 Under this category fall all Marxist approaches that use the distinction between an economic production ensemble and a collection of societal systems which are strongly influenced by the economic production ensemble and which, in turn, have a limited capacity to influence or control this production ensemble.
 - 9 See, for example, Beck, 1986, 1997, 1998a, 1998b, 2000, 2002 or 2007.
 - 10 On urbanization see, for example, Florida, 2002 or 2005.
 - 11 See, especially, Diamond, 2005, with his five driving forces of environmental damages, climate changes, hostile neighbors, loss of trading partners, inappropriate reactions to change.

between systemic differentiations and life world developments.¹² So far, the problem of rare events remained outside the mainstream discussions on the driving (f)actors for societal development, growth or coevolution.¹³ Thus, the next steps will introduce the notion of RISC-processes (Rare Incidents, Strong Consequences) within an evolutionary theory landscape and build up a set of crucial components for an evolutionary RISC-based approach to societal unfoldings, differentiations and complexifications.

RISC-Processes as the Missing Links in the Theories of Societal Coevolution

Formally, a RISC-process is characterized by a specific distribution and an underlying distribution function where a very large number of minor or marginal events is accompanied by a very small number of very large-scale events. RISC-processes occur within societies as well as in their environment. Societal or internal RISC-processes comprise areas like the global finance system with rare occurrences of severe global crises in 1893, 1929, 1987 and 2008 or the current global information and communication networks with a very large number of marginal and local network defects and rare incidents of major failures with widespread and disastrous consequences. Natural RISC-processes in the environment of societies can be found, for example, in earthquakes with very rare instances of earthquakes with deep impact and catastrophic consequences and a very large number of very weak quakes.

In the words of Didier Sornette, RISC-processes exhibit a wild distribution and can be qualified, thus, as wild processes. In contrast, the bell shaped normal distribution can be described as a mild distribution and the underlying processes, consequently, as mild ones.

What is the probability that someone has twice your height? Essentially zero! The height, weight and many other variables are distributed with 'mild' probability distribution functions with a well-defined typical value and relatively small variations around it. What is the probability that someone has twice your wealth? The answer of course depends somewhat on your wealth but in general there is a non-vanishing fraction of the pop-

12 Of course, Jürgen Habermas is the most relevant source of reference in this area as can be seen from Habermas, 1968, 1981 or 1984.

13 On the current scope of disaster research, see, e.g., Felgentreff/Glade, 2008, Quarantelli, 1998 or Rodriguez/Quarantelli/Dynes, 2007.

ulation twice, ten times, or even one hundred times wealthier as you are.
[Sornette, 2006:104]

Figure 6.1: Two Distributions of a RISC-Process

1a Linear Scale



1b Dual Logarithmic Scales

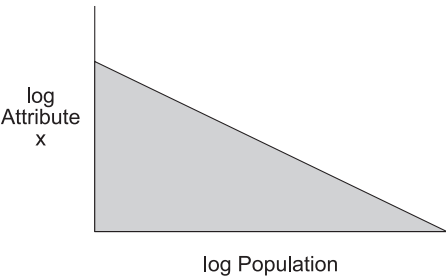


Table 1 offers a short overview on the ubiquity of RISC-processes with respect to natural or social domains and with respect to different scientific disciplines involved.

Table 6.1: RISC-Processes Across Different Scientific Disciplines

RISC-Process/ Scientific Discipline	Distribution-Characteristics Rare Incidents, Strong Consequences	Very Frequent Incidents, Weak Consequences
Natural Science Domains		
Sandpiles/ Physics	very small number of very big avalanches	very large number of very small avalanches
Earthquakes/ Earth sciences	very small number of earthquakes with very strong effects	very large number of earthquakes with very small effects
Solar flares/ Astronomy	very small number of very strong outbursts	very large number of small outbursts

Continuing Table 6.1

RISC-Process/ Scientific Discipline	Distribution-Characteristics Rare Incidents, Strong Consequences	Very Frequent Incidents, Weak Consequences
Tornados, hurricanes, taifuns, etc. Meteorology	very small number of very devastating tornados, hurricanes, taifuns, etc.	very large number of atmospheric turbulences
Forest fires/ Environmental sciences	very small number of fires with very large scale consequences	very large number of fires with very local effects
Viruses and epidemics/ Medical Research	very small number of new viruses with very large- scale effects	very large number of new viruses with no or marginal effects
Ecological systems/ Environmental sciences	very small number of breakdowns with very large-scale effects	very large number of vanished species with no or marginal effects
The brain/ Neurocognitive sciences	very small number of neurons with a very high number of links	very large number of neurons with a very low number of connections
Social Science Fields		
Language/ Linguistics	very small number of words with a very large number of occurrences (in books, plays, etc.)	very large number of words with a very small number of occurrences (in books, plays, etc.)
Scientific quotations/ Science studies	very small number of articles, quoted with very high frequency or very high impact	large number of articles with no quotations or zero-impact
Scientific breakthroughs/ Science studies	very small number of institutes with a very large number of scientific breakthroughs	very large number of institutes with no scientific breakthroughs
Innovations/ Sciencetechnology-society	very small number of innovations with far- reaching effects and very strong repercussions	very large number of innovations with near-zero effects or re-percussions
Financial markets/ Finance	very small number of crashes with very strong effects	very large number of fluctuations with very small consequences
Wealth and income/ Economics	very small number of very high income or wealth	very large number of persons or households with small or medium income
Power grid/ Energy sciences	very small number of accidents/ failures with very widespread consequences	very large number of minor accidents/failures with no or marginal effects
Migration and settlement/ Sociology, demography	very small number of very large cities within a nation	very large number of small settlements

Another interesting aspect of the overall RISC-framework lies in the micro-operators or actors and in their relevant operations which constitute or produce a RISC-process. As can be seen from Table 2, operators and operations comprise very heterogeneous sets, ranging from simple operators like a grain of sand to complex ones like firms, organizations or scientific institutes and from simple operations like dropping/falling down to very complex ones

like doing research work, publishing or quoting articles. It is important to note that the focus on operators and operations does not assume a reference model of behaviour/action or a set of maximization or minimization rules. Operators and operations can be specified freely and can include trivial and non-trivial operation schemes.¹⁴

Table 6.2: Selected Examples for Micro-Operators, Micro-Operations and Mechanisms in the Production of RISC-Processes

RISC-Building Blocks			
	RISC-Micro-Operators	RISC-Micro-Operations	RISC-Mechanism
Natural Science Domains			
Sandpiles	a single grain of sand	dropping down (on a specific spot)	a non-random growth mechanism
earthquakes	a tectonic plate	movements and inter-Actions	dynamic plate mechanism
Forest Fires	a tree, bush, etc.	inflaming, interactions with neighbouring trees or bushes, etc.	local diffusion mechanism
Viruses and epidemics	a single virus	replication, movement, interactions, mutation	epidemiological diffusion mechanism
ecological systems	a species	reproduction, interactions, mutations	eco-network-mechanism
Cognitive systems	a neuron	signaling	neural propagation mechanism
Language	a competent language user	bindings of language elements	societal network mechanism
Scientific quotations	a single scientist	quoting articles	science network mechanism
Scientific breakthroughs	a scientific institute	solving new research problems	science network mechanism
Innovations	a firm or an organization	changing the production processes	economic network mechanism
Financial markets	a single trader	selling and buying, innovating products or processes	economic network mechanism
Income and wealth	a single individual or household	income from employment or self-employment	economic network mechanism
Migration and settlement	a single individual or household	moving to a new place, spatial attractivity differences	societal network mechanism

14 On situated or embedded cognition, see, for example, Adams/Aizawa, 2010, Augoustinos/ Walker, 2001, Fiske/Taylor, 1991, Noe, 2006 or Pfeifer/Bongard, 2007.

From Tables 1 and 2 it becomes clear that RISC-processes can be characterized as self-organizing since all the examples in Tables 1 or 2 have no units for effective steering and control. No malevolent or benevolent controller or demon is in sight for arranging, following Table 2, the succession of sand avalanches, the order of magnitude of earthquakes, the severity of forest fires, the power of hurricanes or tornados, the diffusion degree of epidemics, the severity in the breakdown of ecological systems, the ordering of neural waves, the frequency order of words, the frequency distribution of scientific quotations, the orchestration of scientific breakthroughs across institutes, the rank-size distribution of firms or, finally, the severity of financial crises.

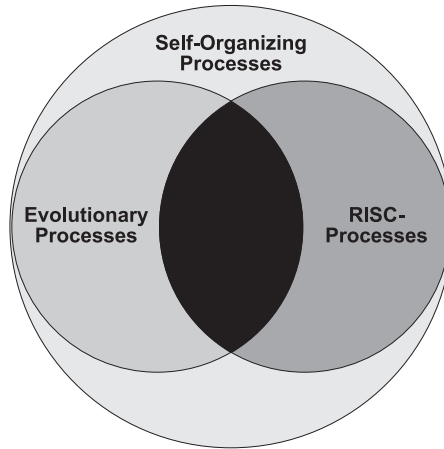
In other words, RISC-processes are mostly generated through the characteristic micro-operations of their micro-operators although one can identify control units in many of the examples in Table 2 where these control units remain well embedded and couched in an overall self-organization ensemble.

Furthermore, while all RISC-processes can be classified as self-organizing, the relations between RISC-processes, self-organization and evolution are complex and can be captured with the help of Figure 2. While all evolutionary processes can be characterized as self-organizing, the converse relation does not hold since not all self-organization processes should be qualified, at the same time, as evolutionary ones. As an example, take the case of the dynamics of tectonic plates and the issue of earthquakes which, for obvious reasons, is to be qualified as a non-evolutionary self-organizing process. Similarly, all RISC-processes turn out to be self-organizing ones, but the reverse side does not hold either since not all self-organization processes are distributed in a RISC-like fashion. As an empirical example, take the size distribution in a species which is normally and, thus, mildly distributed. Finally, not all RISC-processes are to be qualified as evolutionary ones and not all evolutionary processes exhibit a RISC-distribution. Thus, Figure 2 summarizes the intricate relations between RISC-processes, evolution and self-organization. Additionally, RISC-processes are produced by generative mechanisms which can be divided into two broad clusters, namely into non-evolutionary and evolutionary mechanisms. In terms of demarcation criteria, an evolutionary mechanism requires an endogenous proliferation of novelty as well as a dualism in the micro-constitution of evolutionary actors. In biology, this dualism has a well-defined meaning,¹⁵ since the observable properties, structures and processes of an organism as micro-actor belong to its phenotype and the se-

15 On this point, see, for example, Feldman 1988:43 and Maynard-Smith, 1974, 1982b or 1989.

quence of nucleotides, forming the DNA of an organism are qualified as its genotype.¹⁶

Figure 6.2: The Relations between RISC-Processes, Evolutionary Processes and Self-Organization Processes



Moreover, the evolution of evolution in general exhibits a very illuminating RISC-characteristic as well because innovations or mutations in the history of life exhibit only a very small number of very profound changes and transitions and a very large number of marginal or minimal changes. The following table, compiled by John Maynard Smith and Eörs Szathmáry [1996:5], offers an overview on the very small number of big evolutionary jumps.

Moreover, it must be added that these innovative jumps and transitions were accompanied by a widening of the evolutionary landscape and not by a complete substitution, something which can be captured in Figure 3.

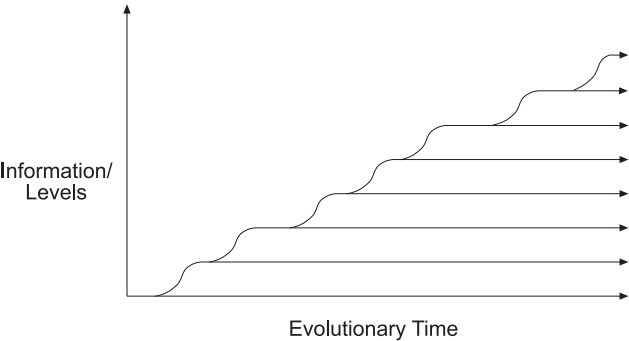
Focusing on the generative mechanisms and models of RISC-processes, the relations between RISC-processes and generative mechanisms are intricate and can best be described as a dual one:many-relationship. For each RISC-process one usually finds a non-empty set of generative mechanisms and models which can be used for empirical analysis. Likewise, each generative mechanism or model can be utilized in several different contexts and, thus, for a variety of different RISC-processes.

¹⁶ Due to this separation of domains, an interesting point could be made that any evolutionary theory from its very outset is coevolutionary in nature. On this point, see especially Margulis, 1981, 1993 or 1998.

Table 6.3: Very Large Scale Transitions in Evolutionary Time

Previous State Transition	Phase	New State
Replicating molecules	→	populations of molecules in compartments
Unlinked replicators	→	chromosomes
RNA as gene and enzyme	→	DNA and protein (genetic code)
Prokaryotes	→	eukaryotes
Asexual clones	→	sexual populations
Protists	→	animals, plants and fungi (cell differentiation)
Solitary individuals	→	colonies
Primate societies	→	Human societies (language)

Figure 6.3: The Pattern of Evolutionary Unfoldings

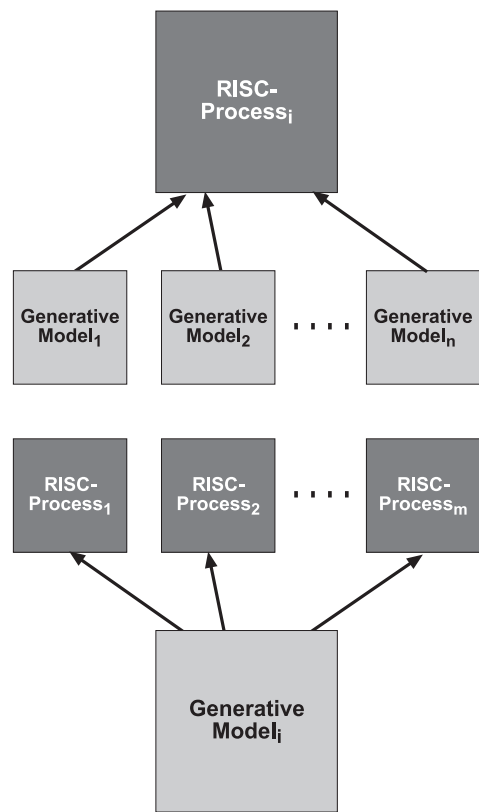


At the current point it must be posed as an open question whether the different generative mechanisms and models will converge to one or a small number of second-order mechanisms and models generating mechanisms and models. Thus, Figure 5 leaves it open whether the model cluster at the deep-structure will consist of one, two or several independent clusters of generating mechanisms of generating mechanisms.

At this point it could be interesting to continue with a short discussion on the differences and similarities between the concept of RISC-processes and the focus on rare events with large-scale societal consequences on the one hand with the meanwhile well-recognized notion of risk-societies¹⁷ on the other hand.

17 As *locus classicus*, see Beck, 1986.

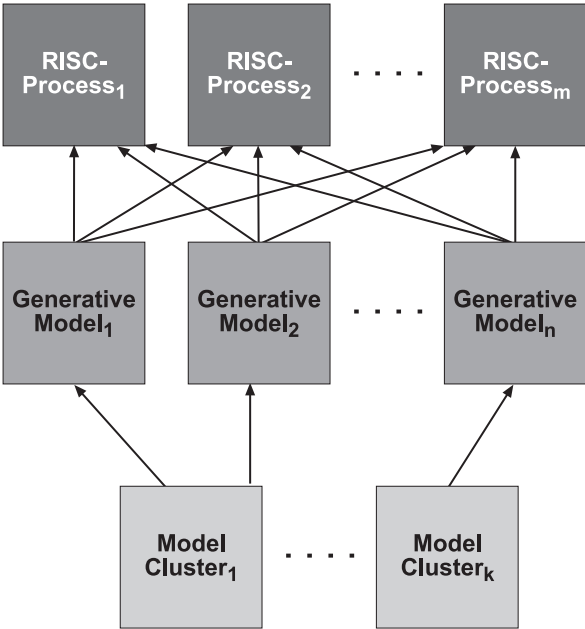
Figure 6.4: The One-Many Relationships between RISC-Processes and Generative Mechanisms



At the outset, RISC-societies, *i.e.*, societies with an ensemble of internal and external RISC-mechanisms and processes, differ from post-modern risk-societies in a fundamental manner, since risk-societies, following Ulrich Beck and others,¹⁸ emerged as the latest phase of capitalist development only whereas RISC-societies and their evolution can be traced throughout the entire history of human societies. Figure 6 and Table 4 offer some guidelines on the special relations between contemporary risk-societies and RISC-societies.

18 On risks and risk-research, aside from Ulrich Beck's risk-society, see also Adams, 1995, Banse, 1996, Bernstein 1996, Bonß, 1995, Caplan, 2000, Dembo and Freeman, 1998, Douglas, 1992, Dowd, 2005, Fischhoff et al., 1981, Gardner, 2008, Graham and Wiener, 1995, Pidgeron, Kasperson and Paul Slovic, 2003, Reason, 1994, Slovic, 2000 or Wisner et al. 1994.

Figure 6.5: The Convergence Towards Small Clusters of RISC-Mechanisms



Due to the profound dissimilarities between RISC-societies and their risky counterparts it seems worthwhile to continue this article with a long-term historical perspective which should shed new light on the intricate relations between rare events and societal evolution.

Figure 6.6: The Relations between Risk-Societies and RISC-Processes

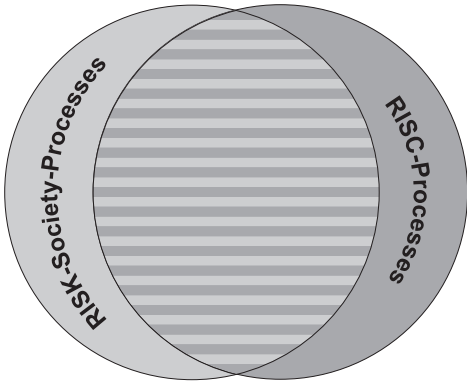


Table 6.4: Shared Domains and Differences between Risk-Societies and RISC-Processes

Shared Domains	RISC-Processes Independent of Risk-Societies	Aspects of Risk-Societies without RISC-Processes
Production processes and large-scale Innovations; Relations between pro-duction processes and the environment; Size distribution of firms; Income and wealth distribution; Financial markets; Migration and settlements, etc.	solar flares sandpiles tectonic formations brain mechanisms word-frequency distributions; scientific quotations complex networks (pre-ferential attachments), etc.	processes of the individualization of life Courses; drifts towards scientific self-reflexivity, etc. individualization of risks from Systemic domains to private households, individuals, etc.

The Three Very Long-Term Stages in the Evolution of RISC-Societies

As stated already, rare events with far-reaching societal consequences have been part and parcel of the evolution of modern societies from its earliest stages onwards. So far, the history of rare events has been considered as exogenous and as residing outside the driving (f)actors or the generative mechanisms for societal complexifications and differentiations. Earthquakes, like forest fires, floods, droughts, famines or epidemics were seen as short and catastrophic episodes beyond the scope of endogenous socio-economic development and growth patterns. In sharp contrast, it is suggested here that rare events play a genuinely endogenous role. Moreover, the history of RISC-societies can be separated into three distinct stages where Stage I comprises, by and large, all human societies prior to the irreversible capitalist expansion in the 16th century, Stage II consists of the evolution of a package of societal RISC-mechanisms and processes and their global diffusion in the half millennium between the 1450s to the 1950s and Stage III is breaking its way from the 1950s onward as new forms of couplings and interplays between societal and natural RISC-processes emerge. Table 5 presents an overview of the three stages of RISC-societies.

Table 6.5: Three Historical Stages in the Diffusion of RISC-Processes

Time	Distribution of RISC-Processes
Stage I [prior to 1450] Societies under the dominance of natural RISC-processes	A large class of RISC-processes in the environment of societies A relatively small class of RISC-processes in the sphere of economic production and knowledge generation

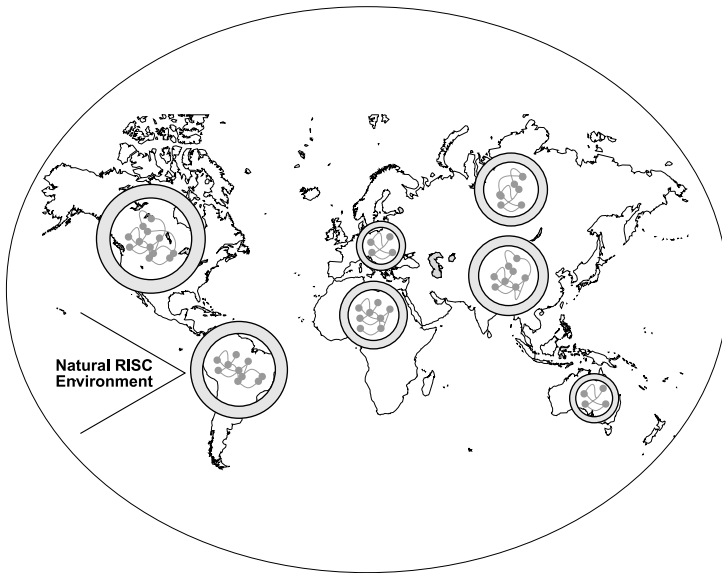
Continuing Table 6.5

Time	Distribution of RISC-Processes
Stage II [1450–1950] Societies under the dominance of societal RISC-processes	Aside from the RISC-ensembles already in operation during the periods prior to 1450: 1) A collection of RISC-processes in the spheres of economic production (2) A set of RISC-processes in the domain of knowledge generation (3) Secondary, tertiary, n-ary RISC-processes as a consequence of (1) and (2) (4) The self-organization of the interlinked RISC-ensembles from and across (1) to (3)
Stage III [after 1950] Societies under the dominance of couplings between natural (external) and societal (internal) RISC-processes	The growing interdependencies and interconnections between natural and societal RISC-processes

The RISC-World before 1450

The RISC-worlds prior to 1450 were relatively small, with a world population of approximately 50 million persons around 1000 B.C. to roughly 400 million people around 1450. For centuries, the world population remained stable, with the exception of the period from 600 to 300 B.C. and around the decades of the year 1000. One of the most striking features prior to the long 16th century lies in the near absence of RISC-mechanisms inside the economic or knowledge production spheres of societies.

According to the stylized Figure 7, the socio-economic worlds prior to 1450 were composed of a large number of societal islands, separated by no man's land or the seas between them and embedded in natural environments which were self-organized in a large class of external RISC-processes. In essence, during the very long first RISC-stage, the regionally separated states, empires or other societal ensembles of varying degrees of organizational complexity and embedded in different natural settings were affected and threatened by natural RISC-processes in the form of earthquakes, fires, famines, droughts, floods, epidemics, etc. Societal RISC-processes played a dominant role in the field of languages, and were possibly involved in migration patterns within empires, in selected cases of societal wealth distribution, etc. Inventions, innovations and new technologies, although deeply engrained into the societal fabric, were

Figure 6.7: Globally Distributed Societal Ensembles Prior to 1450

not organized in a permanent and continuous way and remained largely outside the scope of societal RISC-processes.

Following Karl Polanyi [1978, 1979], these different isolated and globally distributed societal ensembles can be classified as reciprocal or as re-distributive. Re-distributive formations exhibit a higher degree of organizational complexity, are clearly dominated by the political system and are, therefore, regionally confined up to the level of empires. These more complex re-distributive societal formations are characterized by the dominance of agricultural production and by a small and limited number of trades, by a rigid stratification system where the economic production processes mainly in agriculture reflect this stratification system. Capitalist engines, as they will be introduced in the next section, were only present to a sub-critical degree. This state of independent reciprocal and re-distributive worlds has been captured, aside from Figure 7, also by Table 6 which exhibit a small number of empires and societal ensembles, all embedded in a natural environment and subject to the influence of natural RISC-processes.

The second noteworthy feature in the first RISC-stage lies in the absence of RISC-processes in the domain of knowledge production. Analogous to Polanyi's scheme, societal knowledge-bases prior to 1450 can be characterized either as distributed or as centralized. Centralized knowledge bases were dom-

inated by special knowledge preserving groups usually also associated with a dominant religion and empirical knowledge remained, using a term from Michael Polanyi, largely implicit. [See also Table 7]

Table 6.6: *Societal Ensembles Prior to 1450*

Societal Ensembles	
Reciprocal Formations	Redistributive Formations
Societies under the dominance of personal exchanges	Societies under the dominance of the political System

Quite obviously, rare events like strong earthquakes, catastrophic eruptions of volcanoes, long-enduring famines, wide-spread epidemics left a deep imprint in the collective memory of societies and it would be a fascinating research task, to link these rare events prior to 1450 to traditional knowledge systems, especially to religious and magic practices which should safeguard these societal ensembles from the occurrence of these rare events.

Table 6.7: *Knowledge Production Systems prior to 1450*

Varieties of Knowledge Productions	
Distributed Knowledge Bases	Centralized Knowledge Bases
Knowledge bases hared among the members of a societal ensemble	Knowledge bases under the dominance of a knowledge preserving group

Two Great RISC-Transformations and Their Global Diffusion 1450–1950

At a surface-level it is widely recognized, following Immanuel Wallerstein,¹⁹ Fernand Braudel,²⁰ and others,²¹ that the five centuries between 1450 and 1950 experienced a gradual integration of reciprocal as well as re-distributive societal formations into a relatively small global production system which

19 On Immanuel Wallerstein's world systems perspective, see especially Wallerstein, 1974, 1979, 1980, 1984 or 1989.

20 With respect to Fernand Braudel, see especially his three volume compilation on *Civilization and Capitalism* with a time span from the 15th to the 18th century in Braudel, 1979, 1982 and 1986.

21 From Karl Marx, 1964 to Max Weber, 1949, 1951 or 1978 one finds a wide-spread consensus on the uniqueness of the capitalist transformation. Relatively seldom, however, one finds an emphasis of a dual movement in economy and science. [Müller, 1999] To view both production processes within the economic sphere and within science under a homogeneous RISC-perspective constitutes a novel feature of the present approach.

was composed, initially, of a core region in the north-western parts of Europe (France, England, The Netherlands), of semiperipheral areas (Spain, Portugal, Eastern Europe, the Italian peninsula, etc.) and of small bands of peripheral regions along the coasts of Africa, of Latin America or the East Indies. This global production system was fueled by a capitalist engine and was bound or linked together during its first centuries by a more and more differentiated system of trade relations. This global production system had placed itself outside the realm of effective political controls through regional political systems in Europe like the one in Spain, in France, in the Netherlands or in England. Subsequently specific development patterns emerged in each of the three global regions, reaching from differences in world trade-relations to significantly different roles and control capacities of national governments or to different compositions with respect to socioeconomic groups or classes.

- Core regions were characterized by an advanced economic production system and by a powerful state apparatus which shielded, supported and stimulated the national system of production both internally and externally.
- Semiperipheral areas occupied an intermediary position both in the sphere of production and, especially important, in trade relations.
- Peripheral domains were specializing in the role of agricultural producers and providers of raw materials. The state apparatus was comparatively weak and acted in a core-oriented manner. Likewise, trade relations with the center were highly asymmetrical.

Over the centuries, one can observe the gradual emergence of global instruments like the gold-standard for coordinating and balancing the evolving world economic system. By 1930, towards the end of Stage II, weak global institutions and organizations like the League of Nations emerged which attempted to fulfill essential co-ordinating functions, too.

Thus, the First Great Transformation can be characterized as the world-historic turn towards an economic RISC-mechanism as network of networks of self-organizing and globally distributed markets. Following Karl Polanyi, the societal consequences were twofold. On the one hand, “the economy is no longer embedded in social relations, but the social relations are embedded into the economic system” [Polanyi 1978:88].²² On the other hand, during the half millennium between 1450 and 1950 all hitherto external societal

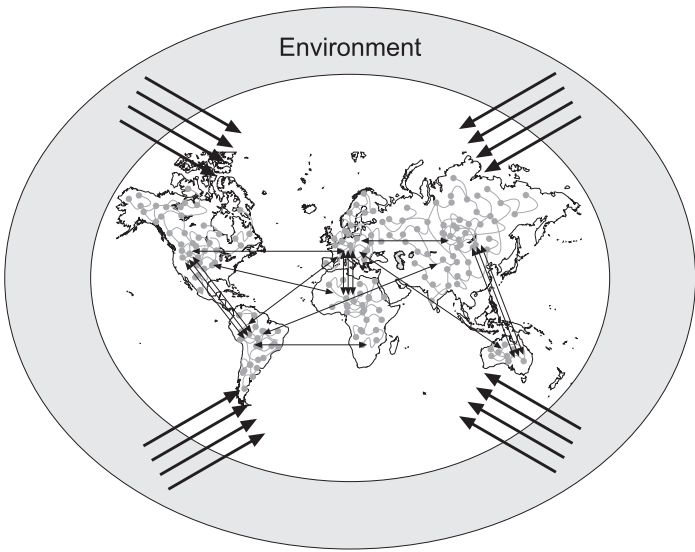
22 Translation by Karl H. Müller from Polanyi, 1978.

formations were gradually integrated into this expanding network of networks which had conquered every continent and every country within the five continents. As a consequence, reciprocal and redistributive societal formations became market or, alternatively, capitalist formations. [See also Table 8]

Table 6.8: The Great Transformation I: Local Reciprocal or Redistributive Formations Become Integrated in a Single Global RISC-Mechanism

The First Great Transformation: Economic RISC-Production			
Reciprocal Formations	Redistributive Formations	→ →	Capitalist Formations
Societies under dominance of personal exchanges	Societies under dominance of the political system	→ → → →	Societies under dominance of markets

Figure 6.8: The Irreversible Expansion of the Capitalist Engine



The second Great Transformation is much less recognized and occurred in the domain of knowledge production. The half millennium between 1450 and 1950 saw a gradual integration of traditional forms of knowledge production and of societal knowledge bases which could be characterized either as distributed or as centralized knowledge bases. Thus, between 1450 and 1950 a globally distributed science-driven knowledge base emerged [See also Table

9]. Between 1450 and 1950, a global differentiation can be observed which brought about a separation into three distinct regional types of knowledge bases with respect to the (re) production and to the accessibilities of knowledge: central, semi-peripheral and peripheral knowledge-bases, all of them, of course, science-driven.

- Core knowledge bases turn out to be highly distribution-oriented, setting the standards of the state of the art within specific fields of inquiry elsewhere, too. Judged from an intellectual balance of international exchanges, the core knowledge base is diffusion driven, exhibiting a global diffusion potential but being highly selective, in turn, with respect to knowledge bases and contributions from other regions. In terms of operationalizations and measurements for the present time, SCI-groups (science citation indicators) must exhibit a clearly asymmetrical pattern in which articles from core knowledge producing regions quote mainly other core region publications while, in turn, they are being quoted throughout the semiperipheral or peripheral knowledge bases.
- For semiperipheral knowledge bases, a genuine mixture between core features and peripheral features can be recorded, since semiperipheral knowledge bases show areas of high global competence with a correspondingly high diffusion potential as well as research fields with predominantly reception-centered features only.
- Peripheral knowledge bases are mainly reception driven, exemplifying a high reception potential but being only marginally reproduced and recombined in other regions. Once again seen from an intellectual balance of international exchanges, the peripheral knowledge base is characterized by a local diffusion potential only, although it is able, albeit with a certain time lag, to reproduce the state of the art-standards set in core or semiperipheral knowledge bases. Again, peripheral knowledge production is highly asymmetrical in terms of SCI-values, exhibiting comparatively low impact values for other regions of the world.

The most surprising feature of Table 9 lies in the fact that the essential spatio-temporal differentiations for the evolving economic RISC-mechanism can be applied to the evolving RISC-mechanism for knowledge production as well. Although some important differences prevail, the deep similarity in the evolutionary development patterns of knowledge bases and economic production formations remains unaffected. Thus, it is not only possible and heuristically fruitful, to differentiate between core, semiperipheral and peripheral knowledge bases, but it is also rewarding from a cognitive point of view, to

Table 6.9: The Great Transformation II: Distributed or Centralized Knowledge Bases Become Integrated in a Single Global Knowledge Base

The Second Great Transformation: Knowledge Production			
Distributed Knowledge Bases	Centralized Knowledge Bases	→ → →	Science-Centered Knowledge Bases
Knowledge bases shared among the members of a societal ensemble	Knowledge bases under the dominance of a knowledge preserving group	→ → → →	Knowledge bases under the dominance of an open mode of knowledge production (modern science)

study the coevolution of economic and knowledge production throughout the five centuries of Stage II.

The scientific production, like the evolving capitalist mechanism, have always carried with them a strong tendency toward globalization, although globalization is to be understood in the spatio-temporal contexts of the evolving world-economy only.²³ Thus, despite the seemingly global discourses between scientific centers throughout the 18th century in Paris, London, Edinburgh, Berlin, the American East Coast or St. Petersburg, many external territories and their knowledge traditions, especially in Africa, have not only been excluded, but also de-qualified and mis-understood in a very profound manner.²⁴

The Third Stage of RISC-Societies after 1950

The decades between 1900 and 1950 have seen the emergence of three major shifts which justify to categorize the period after 1950 as the third stage in the very long-term evolution of RISC-societies. These three new components will be outlined in greater detail in the fifth section of this article. At this point, the three basic stages of RISC-societies as well as the two Great Transformations in economic and in knowledge production have been introduced. In the next section both transformations will be discussed in greater detail from a RISC-point of view.

The Two Great Transformations as Complex Network Mechanisms

The present section deals with the incorporation of RISC-processes into the metabolisms of economic production and into the forms of global knowledge

²³ On this point, see especially Merton, 1985.

²⁴ See, for example, Raynal and Diderot, 1988, Hegel, 1956.

production of the 17th, 18th, 19th or 20th century. Within this section, four strong claims will be developed and supported with historical evidence.

First, it will be argued that both for the sphere of economic production as well as for the domain of knowledge proliferation two self-organizing mechanisms or, alternatively, two self-similar network structures and dynamics can be specified which account for the spectacular growth in the area of economic and knowledge production.

Second, the embedding of a capitalist and a science RISC-mechanism and their self-organized evolution has led to a swarm of interlinked RISC-processes in the economic and scientific spheres as well as in societal arenas.

As a third thesis, the capitalist RISC-mechanism in its long-term unfoldings has generated and continues to generate a series of infra-structural networks which, over the last decades, became organized more and more as complex networks. Finally, from the 18th century onward, the capitalist and the science mechanism started to operate in a synchronous and, thus, coevolutionary manner.

At the outset, Table 10 summarizes basic operations for the capitalist RISC-mechanism and the swarm of RISC-processes, associated with this capitalist engine. Of course, the term RISC-mechanism does not stand here for a hidden mechanical construct in the centre of production processes, but for a basic set of network structures and a for a growth dynamics of this network.²⁵

Table 6.10: *The Great Capitalist Transformation and the Emergence of Socio-Economic RISC-Processes*

Operations of the Capitalist Engine	RISC-Processes
Average profits as basic requirement for long-term reproduction Growth processes for micro-units horizontally and vertically (production chains) Search for extra-profits New technology as a constant source of extra profits Birth-processes for new micro-units (firms) in a non-random manner Death-processes for established micro-units in a non-random manner	Firm size distribution Distribution of income and wealth Distribution of the frequencies of changes in jobs Distribution of innovations Distribution of technological accidents Rank-size distribution of spatial ensembles for economic production and distribution (cities, villages, etc.)

25 On this point, see especially White, 2002.

Turning to the nodes of the capitalist RISC-mechanism, the micro-units of the capitalist engine are composed of firms, farms, associations and the like, capable of economic production or service provision and embedded in a monetary system of purchases and sales. The basic reproduction requirement for these micro-units is to reach an average profit-rate in the medium and in the long-run. Furthermore, these micro-units are capable of expanding horizontally, *i.e.*, regionally, or vertically, *i.e.*, by integrating pre- or a after production processes. The capitalist engine is energized by the search for extra-profits which can be accomplished in a variety of ways. Following Schumpeter, extra profits can be earned *via*

*technological change in the production of commodities already in use, the opening up of new markets or of new sources of supply, Taylorization of work, improved handling of material, the setting up of new business organizations such as department stores—in short, any ‘doing things differently’ in the realm of economic life—these are instances of what we shall refer to as by the term innovation.*²⁶

Thus, innovations in their broadest possible variety constitute the incentives and attractors inherent in a global capitalist network. Again from a dynamic network perspective, the second basic feature of a capitalist network, aside from the search for extra profits or gainful innovations for short, lies in the creation of new actors with strong preferential attachments. New actors come into play preferably in those network domains or niches which are characterized by extra profits like in the case of the integration of new territories or in very large-scale technological innovations like in the diffusion of railroads or automobiles. Finally, network actors, failing the survival condition in the medium or in the long run, vanish from the network, although, in the long run, the birth rate of new micro-actors surpasses the death rate of outgoing micro-units to a significant degree.

From the right hand side of Table 10 it becomes clear that the economic RISC-mechanism for the first Great Transformation is accompanied by a large number of socio-economic RISC-processes which became part and parcel of societal reproduction processes.

Out of the total number of new societal RISC-processes a special emphasis will be devoted to Schumpeterian innovation processes since a permanent

26 Formally, Schumpeter defines innovations as any change that does not alter the quantities of production factors of a production function, but that leads to a variation in the production function itself.

flow of innovations, due to their creative destruction and building capacities, turn out to be the most important single feature of the capitalist RISC-mechanism. As one of the new elements of the RISC-framework, Schumpeterian innovations are assumed to follow a power-law distribution and, thus, to fall under the class of RISC-processes. At first sight, this point may be surprising to economists, historians or sociologists of innovation processes. So far, socio-economic historians of innovations were rather convinced that the Industrial Revolution marked the first of a series of long-term cycles or long waves.²⁷

Table 11 provides a customary overview of the succession of long innovation cycles from the 18th century onward.²⁸

These long innovation waves usually exerted significant effects on the overall economy. Table 12, for example, enables one to understand that before and after the railroad revolution the levels of societal transport, production and maintenance levels differed significantly. Around 1873, the world had become clearly different with regard to the transport dimensions than it had been thirty years earlier. Even though the question as to the proper dimensions and the adequacy of the historical data generally meets with great difficulties, the example of Germany between 1850 and 1873, around the time of the founding of the German Empire, provides substantial evidence that a big technological innovation wave must have taken place both in the overall performance dimensions of the transportation network and in its various other and more specific dimensions as well.

Table 6.11: Long Innovation Waves as Rare Events of a RISC-Process

Rare Innovations With Strong Consequences	Long-Term Diffusion Peak		
Steam engines/ Textile industry	1788	1814	1848
Railway	1848	1873	1896
Electrical industry	1896	1914	1945
Automobile	1945	1973	1996
ICT/Internet	1996	?	?

The repercussions of the railway construction can be quickly described in quantitative terms, using data for Germany. For iron and steel production, the strength of the linkages was assumed to be 40% to 50% of the output,

27 On long waves, see only Devezas, 2006, Kondratieff, 1928 or Schumpeter, 1961.

28 Table 2.11 is strikingly similar to the one found in Ayres, 2006.

Table 6.12: The Very Strong Effects of the New Railroad Transportation System in Germany, 1850–1873

	Beginning of the 2 nd Industrial Revolution	End of the 2 nd Industrial Revolution*)
Network Dimensions		
Persons employed in transport		
Value added railroads (mil. Mark)	132.000	349.000
Value added transport (total) (mil. Mark)	17 bill. M.	274 mill. M.
Freight traffic (in bill. Ton kilometers)	53 bill. M.	387 bill. M.
Capital stock of the railroads (in bill. Mark)	0,23 mill. TKM	9,9 bill. TKM
Dimension for the economy as a whole	1,15 bill. M.	6,74 bill. M.
Capital stock in trade (in bill. Mark)	7,16 bill. M.	13,70 bill. M.

*) Following Joseph A. Schumpeter, each of the long cycles can be qualified as an industrial revolution
Source: Hoffmann 1965

which, in turn, induced additional effects in iron ore and coal mining. Moreover, iron ore and coal were also linked directly to the railroad cluster between 5% and 10%. “The significance of railway construction as driving force in the process of industrialization ... with a strong inductive effect cannot be called into question.” [Spree, 1977:288] It can also be shown from the perspective of capital mobilization that the railroads changed the financial world, figuring both as an obscure object of speculation and desired object of financing.

If one takes into account the typical way capital was raised for railroads, mainly by way of the stock emissions as well as by way of the issuance bonds—as in the case of government financing—... the dominant role of railroads in the capital market becomes particularly evident in the 1840s to the 1860s. [Spree, 1977:266]²⁹

This brief description shows that the construction and expansion of the railway system resulted in a fundament shift in the traditional means of transportation and actually had revolutionary effects for both the economy and society. These radical changes to the previous production and distribution modes as a result of rapidly growing transport capacities were achieved by a cluster of enterprises in the domains of private railroad companies proper, of machine construction, iron industry, coal production but also in the realm of banks and insurance companies. This core segment in the second industrial revolution succeeded within only a few decades—almost from nothing—in increasing the distribution capacities of the productive sectors within and, above

29 Translation by K.H. Müller.

all, between regional or national economies to significantly higher levels. In broad terms, one can agree with Walt W. Rostow, who emphasized that the construction of railroads

*lowered transport costs; brought new areas and supplies into national and international markets; helped in some areas to generate new export earnings which permitted the whole process of development to move ahead at a higher rate; stimulated expansion in output and the accelerated adoption of new technologies in the coal, iron and engineering industries; set up pressures (via the need for more durable rails) which helped give birth to the modern steel industry; altered and modernized the institutions of capital formation; and accelerated the pace of urbanization, with all its dynamic feedback effects on economic as well as social and political development.*³⁰
[Rostow, 1978:153]

By substituting a RISC-perspective for the usual cyclical view, one is led, invariably, to assume that these long innovation waves constitute the peak in a distribution of innovations where a very large number of innovations has small and marginal impacts only. Table 13 provides a typology for four basic innovation types which separates innovations into different diffusion potentials (low/high), different outputs (product/process) and, thus, into different innovation classes.

Table 6.13: Types of Innovations

		Type of Innovation	
		Product	Process
Diffusion Potential	High	Type I (long waves)	Type II
	Low	Type III	Type IV

Thus, the emphasis of long waves research should shift from the few rare events to a spectrum of innovation types and their overall distributions. Here, the expanded typology for innovations in general places the Kondratieff technology waves or the Schumpeterian industrial revolutions in the broader context of four possible innovation types. If one differentiates—as in Table 13—between innovations according to their output in product and process innovations, as well as differentiating by high and low diffusion potential in innovations, then

30 Rostow 1978:153.

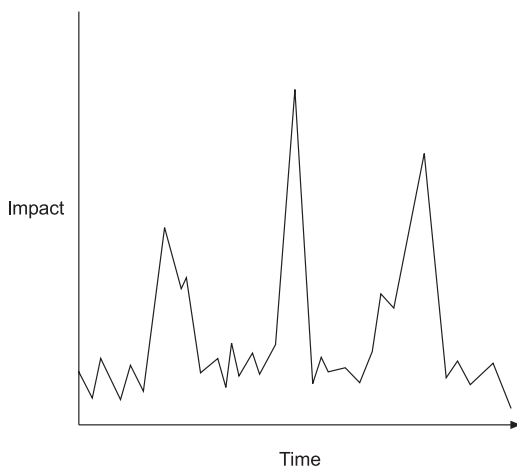
one reaches a configuration with a total of four different types of innovation, of which only a single group, *i.e.* the one at the interface of product innovation/ high diffusion potential, corresponds to the Kondratieff or Schumpeter waves.

Thus, large-scale innovations are not primarily arranged as long waves, reserved for a very few industrial revolutions, but innovations are arranged in a power law distribution, composed of a very large number of marginal or incremental innovations, of a limited number of medium-sized innovations and of a very small number of innovations with a very high diffusion level. These very few very large-scale innovations constitute the rare events or incidents with strong economic and societal consequences. Figure 9A reproduces fluctuations in a typical sequence of small, medium-sized and large innovations, which, at first glance, appear as three large innovation waves. Figure 9B, by contrast, shows that there is a highly structured power distribution behind or underlying the three long cycles from 9A. Power-law distributions, as shown in Figure 9B, can be either very steep or rather flat, depending on the exponential coefficient in equation (1). For instance, for $g = 1$, the slope consists of a 45° gradient.

$$P(k) \sim k^{-\gamma} \quad (1)$$

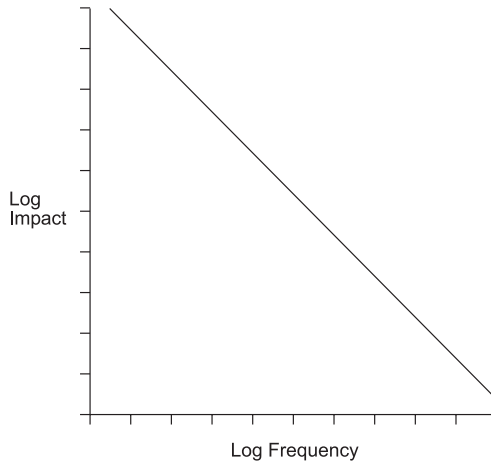
In the context of Figure 9B, the long waves or the seemingly cyclical patterns of big surges in technological development and in large-scale innovations are transformed into a highly structured configuration with a very small number

Figure 6.9A: Long Waves at First Sight



of innovations with very large-scale effects—the classical long waves—and a very large number of small changes with marginal or small effects. According to the distribution in Figure 9B, the cycles from 9A only depict those rare peaks that are embedded in an immense number of small changes.

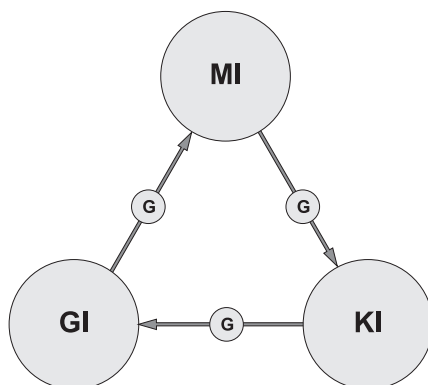
Figure 6.9B: Power Law Distribution at Second Glance



Yet Figure 9B does not only indicate a special distribution of innovations. These innovations, of different sizes and with different numbers, turn out to be generative with respect to their internal linkages. A very large-scale innovation enables, as is indicated by Figure 10, a number of medium-sized as well as smaller innovations across economic domains. Many small innovations, in turn, lead to bottlenecks and shortages in other areas of the economy and in the infrastructural domains which increases the propensity for a new large-scale innovation and so on. Figure 10 illustrates this generative and productive pattern between the many small, the less frequent medium-sized and the rare large-scale innovations.

In this way, an important substitute and a considerably richer empirical basis can be provided for the traditional view of long waves, which does not focus solely on the large-scale innovations *alias* long waves, but on the overall context of many small innovations, a smaller number of medium-sized innovations and a few large-scale innovations. It is in this sense that the substitution of the traditional cyclical paradigm in favor of fluctuations or, more generally, a RISC-framework is to be understood.

Figure 6.10: The Generative Relation between Small, Medium-Sized and Large-Scale Innovations



GI: large innovations MI: medium-sized innovations KI: small innovations

An important aspect of substitution has to do with the question why and how such power law distributions occur, why innovations are distributed in such an asymmetric way and what general mechanism not only produces, but also reproduces this special configuration. Here, it is important to point out that networks with power law distributions are not only found in the economy but are distributed ubiquitously across society and nature, and range from economic domains like firm sizes or income and wealth, to other societal spheres such as migration and agglomeration processes, to the evolution of languages and their word distributions or to ecological systems with their forest fires or ecological disasters to geological formations—earthquakes—and to many other phenomena of the natural world. In general, these processes are characterized by a high level of compositional complexity, by both global and local interactions, a relatively slow global dynamic and by critical thresholds and phase transitions.³¹

Turning to the engine for the second Great Transformation, Table 14 presents an overview of the basic operations for the science-based engine and the cluster of RISC-processes, linked with this knowledge-producing engine. Once again, the concept of an engine refers to a basic network structure and to a growth dynamics of this science-based network.³²

31 Regarding individual types of models see also Bak, 1996, Barenblatt, 2003, Jensen, 1996, Laughlin, 2005, McComb, 2004 or Ong and Bhatt, 2001.

32 On this point, see especially White, 2002.

Table 6.14: *The Great Knowledge Transformation and the Emergence of Science-Based RISC-Processes*

Operations of the Science-Based Engine	RISC-Processes
Average problem solving capacities as requirement for long-term reproduction Growth processes for micro-units horizontally and vertically (program chains) Search for extra-cognitive gains New research programs as a constant source of extra cognitive gains birth-processes for new micro-units (institutes) in a non-random manner Death-processes for established micro-units in a non-random manner	Innovations in science locations of radical breakthroughs in science Quotations of scientific articles Co-operation networks between scientists in a given field (Erdős number, etc.) Reputation distribution across scientific domains

With respect to the nodes of the science-based network, the micro-units of the science engine consist of research units in the form of labs, institutes, research centers, scientific schools or even individual scientists, capable of scientific production or service provision and embedded in a global system of scientific cooperations and publications. The basic reproduction requirement for these micro-units is to reach an average co-operation and publication rate in the medium and in the long-run. Furthermore, these micro-units are capable of expanding horizontally, *i.e.*, regionally, or across disciplinary boundaries, *i.e.*, by stretching out to other scientific disciplines. The science-based engine is energized by the search for radical breakthroughs in particular and for scientific innovations in general which can be accomplished in a variety of ways. These radical breakthroughs or scientific innovations can be accomplished, in a paraphrase to Joseph A. Schumpeter, *via*

*significant improvements in the available scientific research programs already in use, the opening up of new domains in the scientific landscape or of new sources of research infrastructures, advances in general or special methodologies, the setting up of new research organizations such as small trans-disciplinary research institutes—in short, any ‘doing things differently’ in the realm of scientific life—these are instances of what we shall refer to as by the term scientific innovation.*³³

33 Formally, Schumpeter defines innovations as any change that does not alter the quantities of production factors of a production function, but that leads to a variation in the production function itself.

Thus, scientific innovations in their broadest possible variety constitute the incentives and attractions inherent in the global science network. Again from a dynamic network perspective, the second basic dynamic feature of a science-based network, aside from the search for radical breakthroughs or, more generally, for gainful scientific innovations, lies in the creation of new actors with strong preferential attachments. New actors come into play preferably in those network domains or scientific niches which are characterized by a high innovation potential like in the case of the integration of new scientific domains of inquiry or in very large-scale scientific breakthroughs like the rapid diffusion of molecular biology in the 1950s or 1960s. Finally, scientific network actors, failing the survival condition in the medium or in the long run tend to vanish from the science network, although, in the long run, the birth rate of new micro-actors surpasses the death rate of outgoing micro-units significantly. From the right hand side of Table 14 one can see that the science-based engine for the second Great Transformation is accompanied by a large number of sociocognitive RISC-processes, too, which, by now, belong to the normal scientific reproduction processes. As an empirical corollary, the extensive studies of Rogers and Ellen Jane Hollingsworth on the locations of radical breakthroughs point to a clear power law distribution where a very small number of institutes is responsible for a very large number of these radical breakthroughs whereas most institutes are characterized by no radical breakthroughs at all.³⁴

The Infrastructural Constitution of Modern Societies

The discussion on the long-term evolution of societal RISC-processes offers a new perspective on the constitution of modern societies which places a special focus on their infrastructural domains and dimensions. Upon closer inspection, the rare events in technological innovations with a very large impact for societies occurred in special segments of the economic sphere which can be qualified as the infrastructural domain. These infrastructures, while part of the evolving economic production networks, occupy a special place since they offer and limit vital inputs and outputs for economic micro-units in three major areas, namely in the domain of energy, information and transport.³⁵ Table

³⁴ See, for example, Hollingsworth and Hollingsworth, 2000a and 2000b.

³⁵ One should add that infrastructures can be extended to other domains as well like water supplies or sewage systems. The focus on energy, information and transport has been made primarily because these three infrastructural areas are directly linked with the succession of industrial revolutions, discussed so far.

15 offers an interesting overview which connects the discussion on long waves with the three infrastructural segments of energy, information and transport.

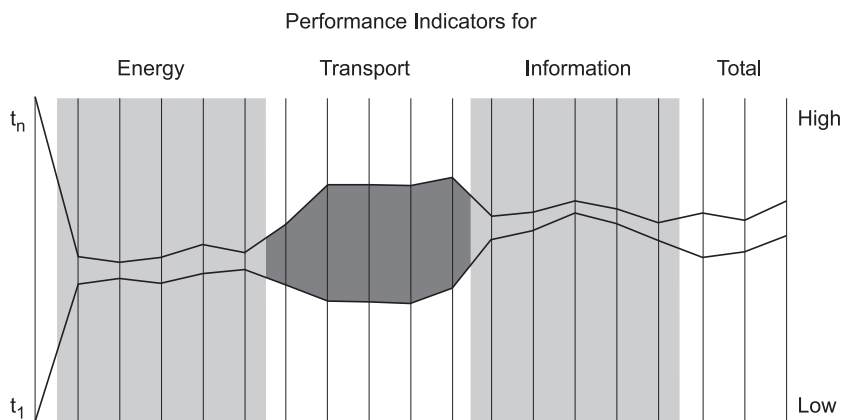
Table 6.15: Rare Innovation Events and Their Infrastructural Domains and Their Generating Capacities

with Strong Consequences	Long-Term Diffusion Peak			Infrastructural Segment	Infrastructural Networks
Steam engines/ Textile industry	1788	1814	1848	energy	No Networks
Railway	1848	1873	1896	Transport	Railroad network
electrical industry	1896	1914	1945	energy	Power grid
Automobiles	1945	1973	1996	Transport	Road network
ICT/Internet	1996	?	?	Information	Information net-Works (Internet, etc.)

A rare innovation event with a very large impact across several dimensions of infrastructural capacities can also be visualized diagrammatically. Sticking to the second industrial railroad revolution, Figure 11³⁶ creates a multi-dimensional space in the form of five performance dimensions for the three infrastructural domains of energy, information and transport as well as for the development of economy and society as a whole. The general dimensions can be measured by overall societal performance indicators such as gross national product per capita or by the capital stock in trade for the economic system. For the infrastructural transport segment the dimensions could include, for example, the transport of goods as a whole, the number of employees in the transportation network, the value added in railroads, the total freight traffic and the capital stock in railroads. Figure 11, which is vaguely based on the German data from Table 12, illustrates in general terms how between 1850 and 1873 in large parts of Europe as well as in the United States a very rare technological innovation with very large effects must have taken place within the infrastructural transportation domain. As can be seen from Figure 11, changes in the infrastructural transport domain lead to significant shifts both in the overall economic system and in societal spheres as well.

36 Figure 2.11 is based on Parallel Coordinates where each dimension is visualized by a single vertical line and the different time-trajectories from t0 to tn move horizontally through the different dimensions. On Parallel Coordinates, see especially Inselberg, 2009.

Figure 6.11: The Scheme of a Rare Innovation with Very Large-Scale Consequences in the Infrastructural Transport Domain



Over a period of two decades only, these changes led to a transformation of the overall societal production regime.³⁷

With the descriptions so far and with the help of Figure 11 it becomes possible to summarize the different effects, generated by a rare innovation event. Rare innovation events in a single infrastructural network create a large number of primary and secondary effects and, equally importantly, also second-order effects. More specifically, an industrial revolution within a single infrastructural network like the rapid diffusion of railroads induces effects

- first, by revolutionizing an existing infrastructural domain itself (primary effects) – second, by inducing a bundle of changes in other infrastructural areas (secondary effects for the infrastructure domain)
- third, by creating new nodes, linkages and linkage patterns for various economic arenas (secondary economic effects)
- fourth, by the changes in domains outside the economic sphere, like the state, households, the science system, etc. (secondary societal effects)
- fifth, by the changes within the induced changes of the infrastructural arena (second-order infrastructural effects)

37 For instance, the dimension of network density must have also increased on *a priori* considerations, namely, through the increased number of actors (new companies), through a rising network density in railroads, through the linkages of the financial sector with the railroad system, the linkages of domestic markets and finally through the new connections in the export sector.

- sixth, by the changes of these induced infrastructural changes in the economic sphere both for the immediately effected areas and for other segments of the economic system (second-order economic effects)
- seventh, by the influence of these induced impacts on societal arenas, etc. (second-order societal effects).

To sum up, very rare technological innovation events from the 18th century onward can be described as a number of simultaneous, substantial and mutually reinforcing changes³⁸ within performance dimensions and specific dimensions in one of the three infrastructural domains of energy, information and transport. More specifically, such a rare innovation event occurs

- within the diffusion period³⁹ of a new infrastructural regime either in energy, information or transport, which brings about
- significant and strong shifts in performance dimensions of the particular domain
- with strong repercussions or resonances [Niklas Luhmann] in other infrastructural arenas and in the economy and society as a whole.

This concludes the infrastructural dimensions of rare innovation events with very large-scale economic and societal effects.

Another striking feature becomes apparent in Table 15, however, as well. With the exception of the first industrial revolution which produced a significant rise in the energy sector for important parts of the economy, most notably for the cotton and textile industry, these rare innovation events with very large-scale consequences were accompanied by the emergence of new economic networks. Table 16 introduces—following the dimensions of Table 13 on innovation types—various network types, which are separated, on the one hand, according to the number of network actors into small-scale and large-scale networks and, on the other hand, according to their form of connections, into flow networks and into relational networks.

- Flow networks have, as their *differentia specifica*, physical connections between their network actors or nodes and manifest themselves, *inter alia*, as railroad networks, power grids, water networks, road networks, the Internet, high-frequency networks for mobile telephony, etc.
- Relational networks comprise attributes or operations of network actors or nodes and do not involve physical connection lines. Relational networks

38 See on this also point the account of Solomou, 1990.

39 Traditionally, one would write about the upswing phase of a so-called long innovation wave.

can be based on kinship, on friendship, on acquaintance, on cooperation, etc. What is absent in all these instances is a direct physical link between actors like in the case of a railroad-network, the power grid or a telephone network.

Furthermore, it becomes interesting to focus on the topology of these infrastructural flow networks.⁴⁰ As for the topology, networks—flow networks as well as relational networks—can be differentiated into two different architectures, namely, into so-called random or egalitarian networks and into complex networks, scale-free or aristocratic networks.

- Random networks, as depicted in Figure 12, evolve in a configuration in which the emergence of new nodes or links is not dependent on the prehistory of the overall topology. To put it differently, one does not find traces of memory effects. A typical random network, like the street connections of a region, links all relevant nodes. Here, the central goal is to reach all other nodes from one specific node with as little loss of distance as possible.
- Scale-free networks, as shown in Figure 13, emerge where the creation of new connections does not take place randomly, but are formed based on a non-random rule, giving higher probability to nodes with a high number of links already. Global air traffic—but also the Internet—exhibit such a complex architecture in which new connections tend to orient themselves to the strongest, *i.e.*, most connected nodes.

From a constitutional perspective, the new focus on infrastructure networks in the domain of energy, information and transport is so fascinating because these three areas—transport (or more generally: transport of material), energy and information—are, at the same time, the three basic ingredients in the constitution of the natural and the social world. What cannot be linked to matter, energy or information⁴¹ can hardly be imagined as being part of a natural or social ensemble. More importantly, energy, transport and information constitute a substructure that enables and maintains other societal domains as superstructures.⁴² Because of their central importance, these three infrastruc-

40 For an overview see Barabási, 2000, Buchanan, 2002, Newman, 2005, Newman/Barabási/ Watts, 2006, Sornette, 2003, 2006, Watts, 1999, 2003 and 2004.

41 See, for instance, Norbert Wiener's dictum that information is information, not matter and not energy, or Horst Völz's definition of information as everything that is not matter or energy. [Völz, 1994].

42 One might add water and air as necessary ingredients for societal infrastructures and metabolisms. But while air has been and still remains a free and public good, in the long run, water infrastructures, while being modernized continuously, have not had the potential for large-scale societal innovations during the last three centuries.

tural domains define and restrict the societal developmental capacities not only with respect to transport, energy and information, but also with respect to other capacities, like production, distribution or communication.

Figure 6.12: A Scheme for a Random Network

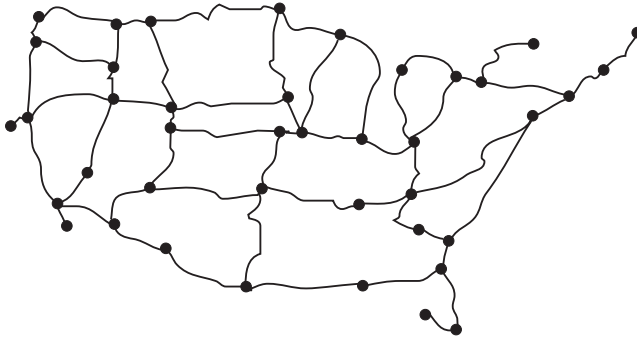
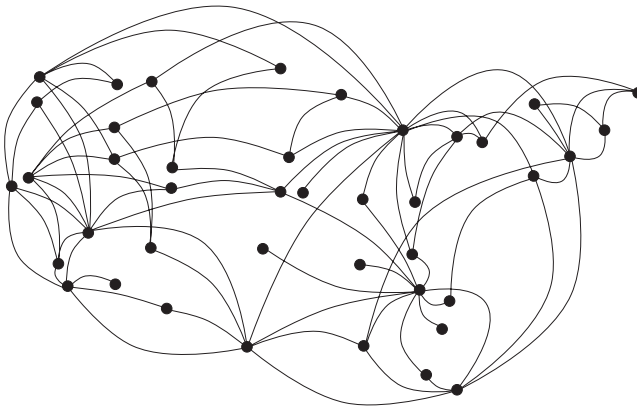


Figure 6.13: A Scale-Free Network



Several characteristics can be associated with each of these three infrastructural networks and their long-term developments.

First, these three infrastructural networks, in the course of their evolution, have become organized as globally distributed networks across the territories and regions of contemporary societies. In this sense, one can speak today of a global societal transportation system, a global information system or a global energy system, all of which extend to every relevant place in a particular nation, region or settlement.

Second, these three infrastructural networks have become intrinsic components of the economic world system and of practically all major societal configurations outside the economic arena, like the national systems of education, of the national systems of health or of the political-administrative systems. Thus, an economic system becomes embedded in infrastructural networks and other societal systems turn out to be embedded in precisely these three infrastructural networks as well.

Third, each of the three infrastructural networks can be observed by means of one or several performance indicators, which measure the overall capacity levels in the domains of information, energy or transport and by means of a large number of ensemble-specific indicators, which record particular levels or flows of an infrastructural ensemble. Performance indicators, such as the per capita-consumption of energy, capacities for information flows or transport capacities, serve as overall parameters for these three infrastructural ensembles. Generally, one can assume that each of the three infrastructural networks can be measured with at least one, but usually several performance indicators and a comparatively large number of network-specific indicators. In sum, each of these indicators constitutes one dimension of a given infrastructural network, be it transport, energy or information.

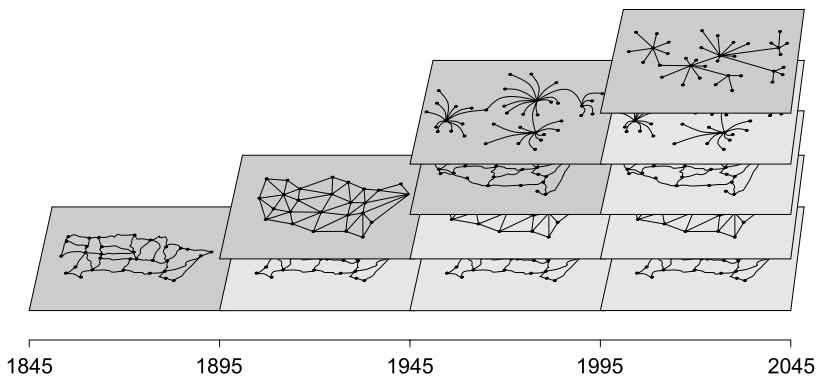
Fourth, the observations and measurements at the level of performance dimensions for these three infrastructural networks can be assumed to be evolutionarily stable. No matter how societies in the distant past, in recent history, in the present or in the future evolve, they can continue to be observed and compared on the basis of these performance dimensions. Evolutionarily stable dimensions have the advantage that they can be applied to almost any interval of societal time scale or time horizon. Over very long stretches of time, the distribution of values may change within these performance dimensions, but the dimensions themselves do not change.

Fifth, these three infrastructural networks also constrain the societal potential for self-organization and become, thus, critical parameters for dimensions such as degrees of societal complexity, of order or other structural configurations. For example, societal self-organization depends on the amount of transferable information and transport speed. A small message that needs several weeks to be transported restricts the domain of feasible forms of self-organization in the same way as a globally distributed instant access to very large quantities of information generates entire clusters of new forms of societal self-organization.

Sixth, these different dimensions constitute, naturally and formally, specific spaces. Since the observations or measurements of infrastructural networks can be carried out in these multi-dimensional spaces across time, the three infrastructural networks can be characterized by specific dynamics as well. Thus, regions, cities or nations change within these multi-dimensional spaces at different speeds, depending on the underlying capacities and dynamics of their infrastructural networks.

Seventh, in the long run, these infrastructural networks turn out to be accumulative. Figure 14 shows that from the mid-19th century to the present day several such large-scale flow-networks have evolved cumulatively, and at present can be found in an accumulation of co-existing and interactively linked large-scale infrastructural networks.⁴³

Figure 6.14: The Accumulative Evolution of Five Infrastructural Networks—Railroads, Electrification, Roads, Airports and the Internet between 1845 and 2045



What is interesting here is not just the cumulative character—at present all large-scale flow-networks are operating simultaneously. The reciprocal linkages, too, between these infrastructural networks in the three domains of energy, information and transport deserve special notice. In a certain sense, these networks mutually generate and stabilize each other. For their operation, railroads require a functioning power network, which in turn is based on a novel information network, which, in turn, requires a power network and so on.

⁴³ For clarification I would like to point out again that in the last two centuries several medium-sized and smaller flow-networks have also emerged, e.g., networks for water, telegraphy or urban trolleys, which have played an important role in the third infrastructural revolution, which Joseph A. Schumpeter described as the “electric revolution.”

The accumulation of infrastructural networks in the course of modernity puts a new flavor to Manuel Castell's notion of the "rise of the network society"⁴⁴ although these infrastructural networks, aside from the current ICT-revolution, play a very minor role Castell's oeuvre.

Eighth, these infrastructural networks—irrespective of whether they are random networks or scale-free networks—exhibit an interesting life cycle dynamic because, at an early stage, these networks are to be found practically nowhere. Railroads were a typical non-issue around 1760 as much as electric power in 1830 or automobiles and airplanes in 1875. These networks start as marginal forms in a new energy, information or transport niche, increase considerably in compositional or functional complexity⁴⁵ and reach their full diffusion potential in the context of one of the three infrastructural domains at a later period, only to lose their dominant position within a few decades.

Ninth, another interesting point lies in the sequence of these infrastructural revolutions. A specific rare innovation event in one of the three infrastructural networks of energy, information or transport leads to an asymmetry with respect to the two other networks. Historically, it becomes relevant that the sequence of such infrastructural revolutions changes the probability for subsequent rare innovation events. Relations (2) and (3) demonstrate that a rare innovation event RIE does not take place sequentially within the same infrastructural domain ($IN_{i,t}$) & ($IN_{i,t}$) at two consecutive points in time. Rather, a rare innovation event in one infrastructural network results, almost by necessity, in a subsequent, new rare innovation event in another infrastructural ensemble (IN).

$$RIE (IN_{i,t}) : < P(IN_{i,t}) \quad (2)$$

$$RIE (IN_{i,t}) : > P (IN_{j,t}) \quad (3)$$

After this intensive discussion of infrastructure domains, of flow, random or scale-free networks and of rare innovation events which are concentrated exclusively in these infrastructure domains, it becomes possible to develop a new architecture for modern societies. Figure 15 exhibits a macro-pattern of vertical and horizontal linkages that run counter to the conventional wisdom of the constitution of modern societies, especially in the modernization or neo-modernization tradition. In Figure 15, the economic ensembles as well as

44 See, for example, Castells, 1996, 1997, 1998 or 2000.

45 Compositional complexity refers—according to Rescher 1998—either to the number of modules or elements in a configuration or to the number of different types of such modules or elements. Functional complexity refers to the variety of modes of operation.

various societal systems all are horizontally linked with one another and vertically connected to a societal sub-structure which comprises infrastructural networks for energy, information and transport.

Figure 6.15: The Infrastructural Macro-Constitution of Modern Societies

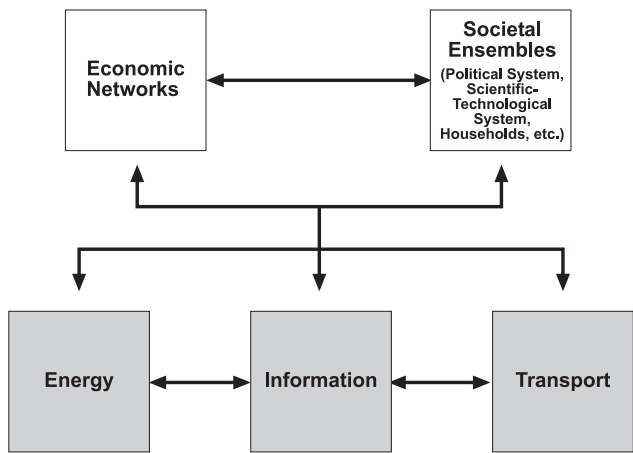
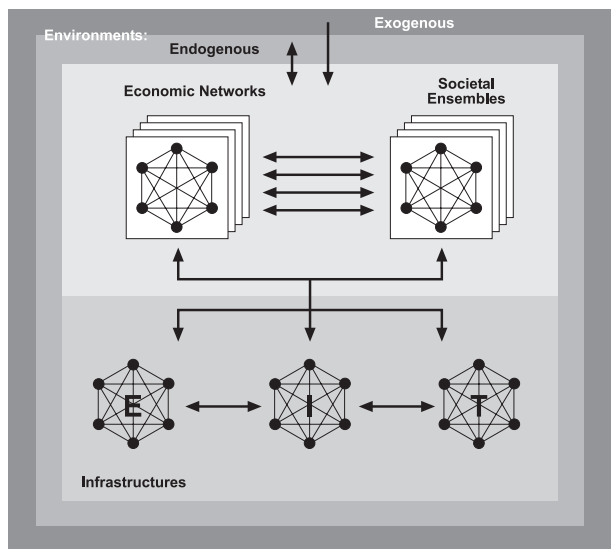


Figure 6.16: The Infrastructural Network Micro-Constitution of Modern Societies

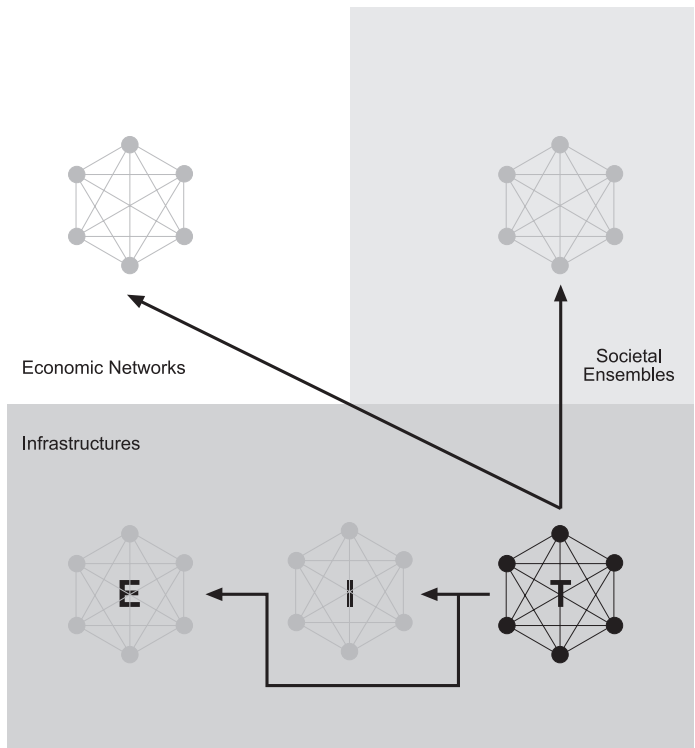


In this sense, Figure 15 shifts the emphasis from the economic sphere to infra-structural network as the core of societal sub-structures.

Figure 16 exhibits the micro-infrastructurel constitution of modern societies which in its overall structures reproduces the macro-ensemble of Figure 15 and which contains infrastructurel networks for energy, information and transport as its basic sub-structure.

Figures 17 and 18 summarize the different effects of the rare innovation events in infrastructurel networks. Figure 17 presents these primary and secondary effects and Figure 18 exhibits the second-order effects and adaptations, induced by these primary and secondary changes. In sum, rare innovation events in infrastructurel networks imply four large groups or clusters of restructurings or reconfigurations.

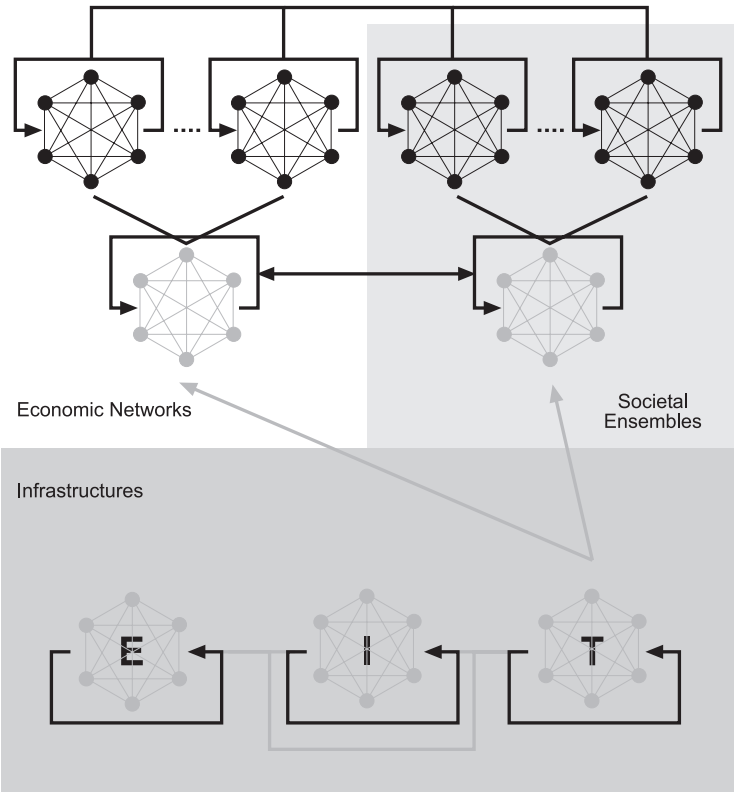
Figure 6.17: Primary and Secondary Effects of a Rare Innovation Event in a Single Infrastructure Network (Transport)



First, the primary effects usually manifest themselves as a big jump both in relevant performance dimensions as well as in specific network dimensions.

Second, a rare innovation within a specific infrastructural network opens up new horizons for innovations and can stimulate innumerable search processes for inventions, which can result in medium-sized or smaller innovations in other infrastructural networks, too. For instance, the expanding railroad network led to an end of the previous means of transport means for mails within the infrastructural information segment. In 1878 the last stagecoach closed its service in Germany and a series of innovations was needed to adapt the postal delivery system to railroads. By the same token, the packaging and delivery forms changed for many companies in response to the operations and requirements of railroad transport.

Figure 6.18: Second-Order Effect of a Rare Innovation Event in a Single Infrastructural Network (Transport)



Third, a big fluctuation in a specific infrastructure domain like transport leads to second-order changes that result from the ongoing diffusion of such an

infrastructural revolution and its continued proliferation of primary and secondary changes. For instance, a European railway network also means that the transportation potential for commodities within and between countries can be significantly expanded in the long run. More export and import diversifications, in turn, open up new directions of specialization, comparative advantages and economies of scale, which are then reflected as second-order effects on small business or on the local production.⁴⁶

Fourth, a significant element of diversity comes into play because a rare innovation event does not reproduce itself identically and does not occur at a uniform speed. From a global perspective, different types or families of development trajectories become possible, depending on the time-frame of a rare innovation event. Despite regional variations, however, a rare innovation event—for instance, the one that took place during the rapid expansion of the European or North American railroad networks—proves sufficiently homogeneous throughout various regions, cities or nations that the same general directions prevail within the various dimensions of the infrastructural transport network. With reference to the revolution in railroads one will look in vain for regions in which the transport capacities have declined during the course of the building up of the railroad network.

The Third Stage in the Coevolution of RISC-Societies: The Recombinations between Societal and Natural RISC-Processes

After the presentation of a new infrastructural perspective on the constitution of modern RISC-societies the present chapter will be concentrated on the current phase of RISC-societies and on the new configuration of natural and societal RISC-processes across regional, national or global levels.

The Recombinations between Societal and Natural RISC-Processes

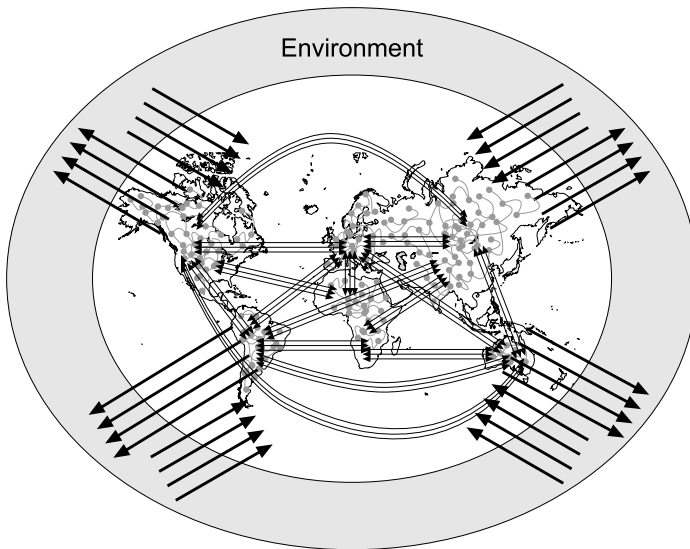
Figure 19 presents, once again, the state of RISC-societies around 1950 which marks the end of the second stage and the beginning of the third stage. Due to the two Great Transformations and the two RISC-network mechanisms for economic and knowledge production, the RISC-societies worldwide have become a densely interlinked ensemble with a large quantity of societal RISC-processes and, initially in strict independence, a relatively stable

46 On both the positive and the negative effects of railroad construction on processes such as the development of cities, of national companies and the destruction of local production *cf.* the classical studies by Allan R. Pred 1966, 1973 and 1980.

amount of natural RISC-processes. Prior to the third stage in the evolution of RISC-societies rare events with a high damaging societal impact shared the following three characteristics.

- First, these rare events, despite their usually strong effects, were local and affected relatively small parts of the world and left other regions virtually unaffected.
- Second, rare events were strictly independent from each other. Earthquakes and technological accidents, for example, were in no way related to each other and occurred for strictly independent reasons and within different generative mechanisms.
- Third, rare events, due to their local and strictly independent form of production, had rather weak effects for the continued development of entire nations or for the global survival in general.

Figure 6.19: The Global Configuration at the End of Stage II



Within a few decades, however, the third stage in the evolution of RISC-societies has led to an entirely new configuration and to a recombination of natural and societal RISC-processes. Currently, all three characteristic features, associated with rare events during the second stage, have changed dramatically. In recent decades, these rare events have been undergoing a triple transformation process which, as will be shown below, has spectacular consequences for cur-

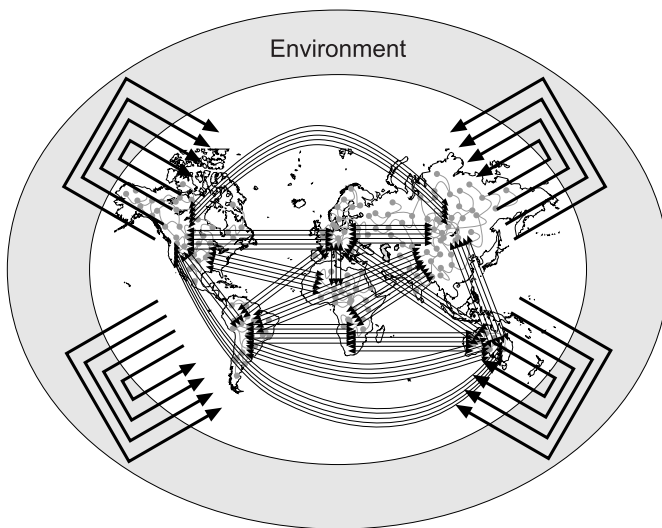
rent and future problems of regional, national or global stability or sustainability, for that matter.

The first novel feature lies in a new phase of globalization which differs significantly from the global diffusion processes of the economic and of the knowledge engine of the second stage. The decades after 1950 produced a broad range of new globalization processes through the emergence of transnational enterprises and global institutions like the World Bank, the IMF and the United Nations, and, more importantly, through new global infrastructural networks for transport, *i.e.*, the global airline network, and, especially important, through new ICT-based networks. In terms of RISC-processes, globalization has lifted societal RISC-processes to global dimensions as well.

- The global air-traffic-system has been organized as a global scale-free network with a small number of central nodes, *i.e.*, airports with large a number of global destinations, and a very large number of small nodes, *i.e.* airports with connecting flights to the large nodes. Complex networks possess a special vulnerability pattern since the elimination of two or three central nodes can lead to the collapse of the entire air traffic-network.
- The world-wide web is organized as a global scale-free network in a number of ways. Most notably, the global information network itself is characterized by a distribution of a small number of central nodes, a large number of small connectivity nodes and the same vulnerability pattern as for the global air traffic-network applies.
- Computer viruses, due to the architecture of the world wide web, have the potential of affecting a huge number of businesses, state-administrations and private households practically simultaneously.
- The combination of global information and communication technologies and financial markets has produced a global financial system which, so far, has been growing exponentially and outside the control of global, supra-national or national RISC-protection networks or systems. Moreover, due to the ICT-support financial markets have advanced to a stage of automatic trading where the number of actors are considerably enlarged through automatic algorithmic traders with a vastly increased operation speed. Currently, this new financial system experiences the rare event of a global crash which spreads throughout the global economic sphere and which affects national economies, regions or communities around the world in an unprecedented scale within the time-frame of the third stage of RISC-societies.

Aside from the globalization of economic, scientific or societal RISC-processes, one is confronted with a second fairly recent development which, however, becomes characteristic for the third stage in the evolution of RISC-societies as well. Economic development processes in goods and services, housing, transportation, energy, etc. in Asia, Latin America and Africa have passed, in conjunction with on-going processes of post-industrial growth in the highly developed regions, a critical level in greenhouse gas emissions, most notably in CO_2 . Figure 20 points to the fact that global societal development processes have become critically related to the world climate and, as a consequence, to global climate change in the form of global warming.⁴⁷

Figure 6.20: The Re-Combination of Societal RISC-Processes



The third stage in the evolution of RISC-societies experiences, thus, a double movement of RISC-processes.

- On the one hand, societal RISC-processes become rapidly global in scale. ICT-technologies, air-traffic systems, financial markets, but also wealth, income distributions or urban agglomerations have left their national or local boundaries and enter a new phase of global distributions.

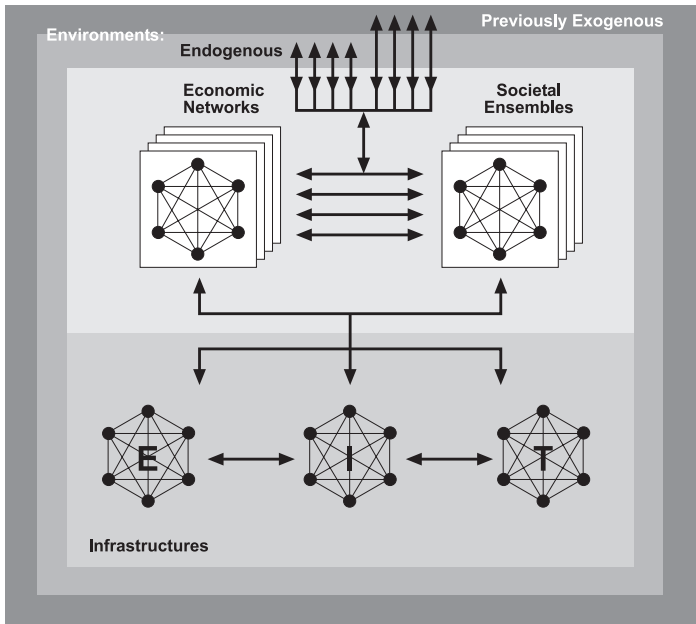
⁴⁷ For summaries, see, for example, Dessler and Parson, 2010 or Giddens, 2009.

- On the other hand, the capitalist RISC-mechanism with its associated RISC-processes becomes critically linked with a bundle of natural RISC-mechanisms for the global climate.

While a steadily increasing amount of CO₂ emissions is not a RISC-process by itself, climate change has direct effects on the distribution of a large number of atmospheric and natural RISC-processes like floods, droughts, hurricanes, tornados, forest fires, and the like.

This, in turn, leads to the third new critical feature of the current stage in the evolution of RISC-societies. The third critical feature stresses the fact that societal and natural RISC-processes begin to interact and become entwined and entangled in unprecedented and unintended ways. Climate change with its new distributions for RISC-processes can affect infrastructural networks like the power grid which, as a direct consequence, can lead to energy shortages and, as an obvious secondary effect, to the inability to sustain the internet-economy in an undisrupted and continuous manner. Figure 21 summarizes the new challenges for the infrastructural architecture of contemporary societies through the three new features of the third stage of societal RISC-evolution.

Figure 6.21: *The Constitution of Contemporary RISC-Societies*



The Growing Risk-Potentials of Contemporary RISC-Societies

The three new features of the third stage in the evolution of RISC-societies, *i.e.*, a new phase in globalization, critical links between the capitalist RISC-engine and societal RISC-mechanisms on the one hand and global atmospheric RISC-mechanism on the other hand and, finally, new couplings and recombinations between natural and societal RISC-processes, have far-reaching implications for the future of RISC-societies at regional, national or global levels. Due to the three-fold transformation of natural and societal RISC-processes contemporary societies across the world are faced with an entirely new pattern of threats to societal maintenance, sustainability or viability.⁴⁸ As a catchphrase, contemporary RISC-societies are at risk in an unprecedented manner. At the global level, the following mismatches and maladaptations can be observed, namely

- a diffusion mismatch because more and more societal or natural RISC-processes can have non-local or even global effects
- a governance mismatch because economic globalization, despite a fast growing segment of global NGOs, has not been accompanied by the buildup of global institutions⁴⁹
- a mismatch in the protection networks or systems because of changing distribution patterns of atmospheric RISC-processes due to climate changes and global warming and unchanging RISC-protection and RISC-support networks or systems, operating on constant average conditions with smaller or larger deviations.

For the national levels, new risk-potentials in the field of national security emerge which clearly transcend the usual profiles of military or terrorist attacks. Here, national security is understood in a comprehensive manner which includes military or terrorist issues alongside with economic, social, political, cultural or environmental dimensions. In this comprehensive context, national security is not simply synonymous with an absence of military or terrorist conflicts and violence, but depends on the well-functioning of the entire spectrum of societal and environmental networks and systems and their interactions in the face of the three new features of the third stage in the evolution of RISC-societies. Thus, countries like Slovenia are confronted

48 On the differences between sustainability and viability, see the introductory article to Part I.

49 See the paper by Stark, 2009 which has been published as RISC-Research Paper Nr. 5.

with a challenging new configuration which, *inter alia*, includes the following characteristics:

- an increased domestic vulnerability, due to a changing pattern of natural RISC-processes in Slovenia which are coupled with the economic RISC-mechanism in the form of global warming and climate change
- an increased vulnerability from outside, due to internal or external rare events in areas outside Slovenia, but with a high impact for Slovenia as well – new requirements for regulation and prevention-policies not only in traditional areas like building and construction, but also in financial markets, in the three infrastructural networks, in web-based technologies and in those environmental domains affected significantly from climate changes and from a different distribution of natural RISC-processes
- new capacities for damage control and for support networks which in the case of rare events are capable to operate with strongly improved soft skills and with locally adequate and accepted interventions.

In a separate article⁵⁰ different types of control challenges for contemporary RISC-societies will be outlined in greater detail.

Re-Dimensioning Sustainability: RISC-Robustness as a Third Dimension of Sustainability

The discussion so far on the evolution of RISC-societies opens up new perspectives for the concept of sustainability as well. The overall challenges ahead can be captured by Figure 22 which exhibits a new and third sustainability dimension alongside the two previously known ones. So far, sustainability has been discussed broadly in the following two dimensions:

- first, sustainability along a spatial dimension, *i.e.* the globalization of today's high socio-economic development levels to the entire globe and – second, sustainability along a temporal dimension, *i.e.* the inclusion of future generations at today's high socio-economic development levels.

But sustainability has to be enlarged with a third RISC-dimension, namely

- third, sustainability along the RISC-dimension, *i.e.*, robust, or, alternatively, resilient⁵¹ designs for the entire set of RISC-ensembles and for their environments across regional, national or global levels.

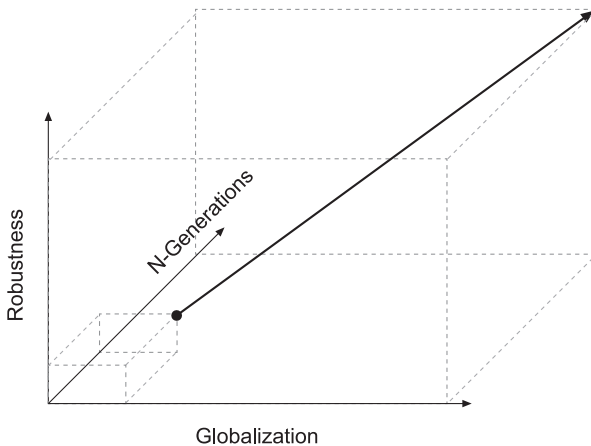
⁵⁰ See Karl H. Müller "RISC-Processes and Their Control Potentials" in this volume.

⁵¹ On the two equivalent notions of robustness or resilience, see Gunderson/Holling, 2002 or Gunderson/Allen/Holling, 2010.

Figure 22 points to the new three-dimensional space for sustainability where the arrow indicates a drift towards higher levels in each of the three dimensions simultaneously. Currently, very little is known whether an arrow as depicted in Figure 22 is feasible at all or whether substantial increases of sustainability along all three main sustainability dimensions simultaneously cannot be accomplished under the given constraints, barriers and empirically observable distributions and reconfigurations of societal and natural RISC-processes at present.

In this way, a new and richer perspective on sustainability can be gained which moves sustainability problems into a vastly unexplored three-dimensional configuration of time, space and RISC-robustness.

Figure 6.22: The Three Principal Components of Sustainability



Three Big Challenges for Future RISC-Research

Due to the globalization and the partial recombinations of natural and societal RISC-processes it should become obvious why RISC-research should provide the missing links for a theory of societal evolution. The building blocks and the theories for a dynamic and evolutionary perspective of societal evolution, so far, lacked three crucial elements.

- The first missing component was a comprehensive and structured arrangement of both internal and external RISC-mechanisms and their production of RISC-processes. Past or contemporary societies are not experiencing rare events as a random sequence, but as a highly complex and coupled arrangement of RISC-mechanisms inside and outside of society.

- The second missing link consisted of appropriate accounts of actions or operations at the micro-levels which so far were dominated by schemes like Rational Choice or weaker variants like bounded rationality. Here, the RISC-framework operates with non-trivial models of embedded cognition which rely and require a rich observation basis of actions observed, of the internal stances of actors of themselves as well as assessments by others.
- The third missing building block is a result from the consequences of the previous two missing components. Societal learning processes as a consequence of rare events can be described and analyzed in a far more comprehensive and more trans-disciplinary manner since these societal learning processes take place simultaneously across a wide variety of societal domains.

The present overview of RISC-processes and their generative mechanisms can be concluded with a short summary of necessary steps and research tasks for the immediate or medium-term future. Quite obviously, the discussion so far on the long-term evolution of RISC-societies has led to a long list of extremely demanding research challenges and to a wide variety of potential RISC-applications. Towards the end of this article three of these major survival-critical research challenges and their appropriate RISC-applications will be outlined briefly.

- First, there is a highly demanding challenge for coupled RISC-modeling. The new stage in the evolution of RISC-societies around the globe requires intensive explorations of model groups with positive mutual feedbacks and the general format of:

$$\begin{aligned} M_1 &= F(M_2, M_1) \\ M_2 &= F(M_1, M_2) \end{aligned}$$

These coupled RISC-models should be capable to specify the potential impacts for societal and environmental domains in a more comprehensive way than isolated and independent models.

- The second research challenge has to do with governance issues and new forms of institution building. The two most relevant governance challenges are directly linked with the ongoing globalization processes. The first very big problem has been mentioned already and lies in the asymmetry between the increasing set of global actors in the economic RISC-mechanism, the lack of actors of similar strength and scope at the global level within the RTISC-protection networks or systems and the need for a rapid catching up-process of global actors in the RISC-protection networks or

systems. The second very large-scale problem lies in the opposite direction of globalizing actors, namely in a de-globalization of the impacts of rare events. In this respect the construction of institutional firewalls and institutional barriers becomes of utmost importance in order to contain rare events in relatively small areas only and to prevent a rapid diffusion to global levels. Such an institutional containment of rare events is urgently needed in areas like computer viruses, the power grids or financial bubbles, to name only a few prominent instances.

- Finally, the third research challenge lies in the utilization of transactional or electronic data in the study, in the prevention or in the rescue operations of RISC-processes. The diffusion patterns of epidemics can be reproduced by studying Google-search operations, the contagious attractors inherent in financial markets become more transparent by the micro-data for selling and buying, or informal support networks can be created or activated in the case of disasters through recent Web 2-tools like twitter, facebook and the like. In this area, new observation devices and tools become available which must be integrated and utilized within the RISC-research tradition.

This small list of very big research challenges completes, in combination with the introductory RISC-primer, the overview on the potentials and the application domains for RISC-research, present and future.

7 Micro-foundations of Risk Societies in Slovenia and Europe I: Basic Concepts and New Inequality Scales

In Chapters 7 and 8, a new micro-perspective will be presented on the constitution of contemporary risk societies. Within the current text, it will be shown that the two major theoretical perspectives on risk societies, namely the frameworks of Ulrich Beck¹ and Niklas Luhmann,² do not offer sufficiently robust micro-frameworks. Subsequently, new micro-foundations will be introduced which will tie the concepts of risks and, as its Weberian counterpart,³ of life chances to living conditions and every day life practices of actors. Finally, a new aggregation procedure will be suggested which will use several underlying assumptions in the Beck-framework. In turn, the new risk-based scale will, towards the end of the article, exhibit a wide array of astonishing implications.

The Missing Micro-Foundations for Contemporary Risk Societies

As a theoretical introduction the broad sociological perspectives on risk and risk formation in contemporary societies rest largely on two different approaches which have been presented within a relatively short period during the late 1980s, namely on Ulrich Beck's "Risikogesellschaft" (Beck 1986) and on Niklas Luhmann's views culminating in a book on risk five years later (Luhmann 1991, 1993).⁴

In his national Post-Chernobyl bestseller, Ulrich Beck uses the pattern of a phase transition between two stages in modernity as a broad platform in which the notion of risks receives its proper attention. The initial stage is characterized, not surprisingly, as industrial or traditional capitalism. Using dialectical metaphors, Beck argues that industrial capitalism has an in-built logic which transcends its own boundaries and identities and which has, thus,

1 On Ulrich Beck's approach towards risks and risk societies, see Beck 1986/1989/1993/1997/1998a/1998b/2000/2002 or Beck/Giddens/Lash 1994.

2 In 1986, Luhmann published a book on ecological communication in which dangers, fears and threats occupy an important position, while the notion of risk, while mentioned at various places, does not figure very prominently within the book. Only with Luhmann 1991 and the 1993 version in English did the systemic approach to risk come into existence.

3 On Max Weber and life chances, see Weber 1975 or Giddens 1973.

4 For an interesting historical as well as contemporary summary on the concept of risk, see, aside from the Beck and Luhmann-approaches, Bonß 1995, for special versions see Baecker 1988, Banse/Bechmann 1996 or Japp 2000.

an endogenous drift towards a qualitatively different stage. Thus, driven by inner necessities, industrial capitalism is superseded by a new phase which has been labeled as risk society. Put briefly, risk societies have become the current stage in the capitalist evolution and a generalized logic of risk-production, and in contrast to the logic of wealth production of the industrial phase, stands at its center. This new logic of risk production manifests itself most vividly in the effects of high technology production and services which constitute, aside from their undeniable advantages in terms of volume, price, diversity or quality, a permanent threat to individuals or households. Again using dialectical metaphors of inner necessities, production and services under the new risk regime generate, by inner necessity, a large number of pollutants or the potential of very large scale-accidents within very large scale technologies, highlighted by the two major accidents in atomic power plants in Three Mile Island and Chernobyl. Due to the complexities of production and service processes or of the energy and information substructures involved, frequent occurrences of fatal accidents⁵ and high tech-disasters become the order of the risk-day within a risk-society environment.

It would have been fascinating to integrate the micro-world of socio-economic risks into this macro-profile of contemporary risk societies. In fact, Beck devotes the second part of his book on the growing individualization of life courses under the new regime of risk-societies. But despite the phase transition towards risk societies, socio-economic risks have not found their way into Part II of the book. Rather, for Beck the question of micro foundations of risk societies lie in higher degrees of contingencies, due to the de-standardizations of life courses, in a pattern of growing individualization, in higher degrees of societal complexities related to a larger number of options and technologically supported choices and in more discontinuities which give rise to patchwork configurations both at the level of individual actors and groups.

Additionally, social inequality seems to undergo a transformation itself, namely a secular change from vertical to horizontal forms. At various points, Beck gives the impression that social inequalities belong basically to the domain in which they originated in the first place, namely to the phase of industrial capitalism. Most notably in the phrase "Poverty is hierarchical, smog is democratic" (Beck 1986:51), Beck seems to suggest that vertical societal inequalities

5 At various points, Beck seems to suggest, too, that the metamorphosis of modernity I into its self-reflexive stage of modernity II brings about a shift in Charles Perrow's (1984) two dimensional diagram (with coupling and complexity as its vertical and horizontal dimensions) to the quadrant of dense coupling/high complexity.

become more and more marginalized and de-centered whereas new horizontal ways of inequality like regional, local inequalities or group-specific risks which affect, for example, all employees in a special high-technology plant or even in an entire technology cluster alike, are gradually occupying the central positions within contemporary risk societies. In essence, micro-foundations in Beck's work turn out to be too unspecific since they express themselves, on the one hand, in higher probabilities of being affected by high-tech disasters and catastrophes or, on the other hand, by higher degrees of contingencies, uncertainties and higher probabilities for discontinuities in areas like work, family or housing.

Niklas Luhmann, on the other hand, stresses the formation of risk production within the context of highly differentiated and highly complex social systems which despite their internal logic of recursively closed operations are confronted with the following problems. Increasingly complex systems within an increasingly complex environment produce, by sheer necessity, an increasing number of societal risks. In order to comprehend the basic line of the argument, it is important to emphasize that Niklas Luhmann distinguishes, on the one hand, risks from dangers and, on the other hand, risks from damages or accidents. To re-iterate one of Luhmann's examples, risks and dangers are separated by the following differences. Under circumstances of no efficient protection from rain and thunderstorms like umbrellas, wet coats and the like, going out with a group of people and getting considerably wet constitutes a danger and might bring small damages on clothing or threats to the group's health for which, however, nobody can be held responsible. Having umbrellas and other rain protection devices within one's decision set however, the decision of going out without these protective devices must be interpreted no longer as a possible danger but as a risk and the person or persons, responsible for organizing a walk without these protective devices can be held responsible for the consequences which came about as the after-effects of taking such a risk. This simple example is sufficient to differentiate between a variety of societal risk-configurations on the one hand and societal dangers/failure settings on the other hand. Table 1 gives an upshot of Luhmann's distinctions between risks, dangers, damages, failures or accidents.

From Table 1 it becomes clear that risks are associated with future consequences and with the *ex ante* side of decisions only. Risks on the one hand and dangers or threats on the other hand are separated according to the criterion of accountability or responsibility. Furthermore, damages, failures or

accidents are to be considered the ex post effects of decisions involving either a risk potential or an ex ante danger.

Table 7.1: Risks, Dangers and Damages in a Luhmannian Framework

	Accountability	Non Accountability
Ex ante	Risk	Danger
Ex post	Accountability for Damages or Accidents	Non-Accountability for Damages or Accidents

Following up the Luhmannian arguments on societal complexifications and differentiations, another important distinction is to be made between risk-actions and risk-systems. The latter are to be considered as any organized societal ensemble, ranging from marriages up to very large-scale transnational enterprises. Due to the increasing internal as well as external complexities, decisions within large societal risk systems have to be undertaken in view of growing uncertainties and in view of non zero probabilities even for massive failures or large-scale accidents. Thus, contemporary societies produce a large amount of risks, some of which become failures, accidents and damages. Niklas Luhmann goes on to provide a fascinating array of examples which demonstrate various strategies of risk aversion or, above all, risk transfer from the inner side of complex systems into their environment.

Despite several fascinating insights on current processes of risk-transfers and on the over-burdening of private households with accountabilities in areas like bio-technology or medicine, the overall framework is too weak a micro-foundation for risk societies. Several reasons can be given to substantiate this assessment. First, risks in the Luhmann sense are typically located in a special segment of the time axis only, namely on present decisions and their future consequences. "Being at risk" in Luhmann's sense cannot occupy a long time span which starts somewhere in the past and extends to the present as well as to the future. Likewise, changes from a risk state to a non-risk state and back are almost impossible to occur within a Luhmann framework. Second, the focus on decisions and their potential consequences runs counter to the majority of recent micro-foundations for contemporary societies which rest on concepts like routines, practices, rules and habits and on their recurrent and recursive character.⁶ Routines, practices and habits exhibit an almost natural

⁶ Most prominently, Anthony Giddens (1984), Pierre Bourdieu (1982/1985) or J. Rogers Hollingsworth (2003) have emphasized the importance of recurrent and recursive practices, routines or habits as the basic micro-foundation for the social universe.

capacity to link themselves with socio-economic risks. Daily working routines with hazardous materials, working in dangerous work settings or with tightly coupled and complex technologies constitute paradigmatic examples for the notion of “being at risk”. Typically however, recurrent practices like daily working routines are not subject to decision making.

Third, in a number of relevant cases individual resources like qualifications or income cannot even be considered as elements in Luhmann’s risk-universe. However, low qualifications or marginal incomes should be characterized as socio-economic risks *par excellence* since they have so many important consequences like limited access to labor markets, major barriers for adequate housing or living facilities and the like.

Fourth, Luhmann’s framework is not able to incorporate societal inequalities into its research agenda. One of the main reasons is linked to the *ex ante* definition of risks, the other one to the dependence on decision configurations and uncertainties. Thus, core domains of socio-economic risks like poor qualifications, hazardous working conditions, pollution of one’s housing area and the like cannot enter into the overall compound of risks, risk systems, dangers, uncertainties or accountabilities. The Luhmannian research strategy on societal risks, too, does not lead even near the domains of societal inequalities and disparities.

As a consequence, neither Niklas Luhmann’s “On Risk” nor Ulrich Beck’s “Risikogesellschaft” offer a sufficiently broad micro-perspective which would be able to capture essential aspects of the corresponding macro-frameworks.

Introducing the Micro-Dimensions of Socio-Economic Risks and Life-Chances

In view of the failure of combining existing frameworks on risks with an appropriate micro-foundation, a new approach will introduce a somewhat unusual way for defining socio-economic risks as well as its complementary notion of socio-economic life chances.⁷ Moreover, both notions of risks and life chances will be defined in a highly encompassing manner for various domains of the socio-economic universe including its technological or infrastructural

7 For similar basic ideas, see, aside from the Weberian notion of life chances, also Anthony Giddens and the politics of life chances (Giddens 1997). It should be added though, that the subsequent operationalization and aggregation procedures for societal stratification patterns of multiple risks and multiple (life)chances will be new attempts to link these risk and life chance-based notions with empirical data. For the notion of accumulated risks see Habich 1994, Habich/Krause 1994, Habich 1996.

arenas. Additionally, the concepts of risks and life chances will be linked directly to a probability measure, establishing, thus, a well-defined instrument for ex ante analyses as well.

The starting point for the subsequent micro-definitions of risks and life chances lies on socio-economic actors, on their essential attributes as well on their daily routines, practices or habits. Actors are in no way restricted to individuals but may include firms, organizations across different spatial levels and even a state-apparatus, a multi-national agency or a transnational NGO.⁸ For reasons of simplicity, the subsequent discussion will focus on actors at the level of individuals since individual actors were the subjects of the classical approaches to micro-foundations and to social inequality.⁹

As a consequence of Beck's macro-sketch on risk-societies, the main emphasis changes from the once dominant focus on labor-capital-relations to the overall daily routines of actors which include, quite naturally, their work practices, but which consist of other forms and areas of action and interaction as well. Following strongly established traditions within social psychology,¹⁰ the cognitive sciences¹¹ or micro-sociology,¹² actors can be described by two main groups of attributes, namely

- by attributes related to their resources, their internal organization or their pre-history (arena I)
- by characteristics of the contexts or the settings in which actors usually follow their routines and practices (arena II).

Within empirical survey research, both domains have found their way into numerous questionnaires and item batteries. Essential dimensions for the first arena include coping capacities, the emotional constitution, life satisfaction,

8 It should be added that spatial ensembles, too, could become basic building blocks for this type of risk analysis. Spatial ensembles include, above all, groups of actors in a specific space-time area like districts, regions, cities, nations or supra-national domains. For a detailed analysis of regions with the new approach towards risks and life chances, see Müller/Link 1999.

9 The risk and life chance definitions for individual actors will be generalized to include at least for broad arenas for risk analysis, namely individual actors, organizations, spatial units like cities, regions or nations and, finally, technological systems. In this way, the reference domains for traditional risk analysis of the Beck-Luhmann variety, namely organizations and technology, are preserved.

10 For interesting overviews and approaches, see Palombo 1999, Ryckman 2000.

11 Within the cognitive science arena, one finds meanwhile numerous sub-fields and disciplinary niches covering the entire range of senso-motoric, emotional and cognitive routines as well their still puzzling interplay. For a diverse set of literature, see 1998 Calvin 1996, Calvin/Bickerton 2000, Campbell 1984, Damasio 1994/1999, Deacon 1997, Holland 1995, Hofstadter 1982, Hofstadter/Dennett 1982, Hofstadter 1985/1995/1997, Lakoff/ Nunez 2000, Minsky 1990, Norretanders, Pert 1997, Pinker 1997, Plotkin 1997, Pollock 1989, Ratey 2001, Roth 1999 or Sternberg/Wagner 1994.

12 For micro-sociology see, for example, Goffman.

the pre-history of actors or critical life-events. For the contextual domain, important and relevant attributes comprise, *inter alia*, the quality of housing conditions, including the environment of one's home, conditions on the working place, the technical infrastructure at the working place or less tangible areas like social networks, political participation, broadly conceived, etc. Thus, the initial configuration for the subsequent introduction of risks and life-chances is given by a comprehensive set of actor attributes, summarizing, to use a phrase from Ludwig Wittgenstein, an entire form of life.

The subsequent definitions for socio-economic risks and life-chances will occupy some of the semantic terrains only which are currently covered by these two highly heterogeneous concepts. According to standard dictionaries, risks and chances range over wide fields from gambling and decision theory to the realm of failures or favors. Following one of the Webster's definitions, the term "chance" is to be understood here in terms of an "opportunity", "a slight possibility of a favorable outcome" (Webster's 1993:162) or "the more likely of possible outcomes" (Ibid.) whereas the risk concept is linked, again following Webster's, rather generally to the "possibility to loss or injury" (Webster's 1993:881).¹³

Generalizing this specific aspect of risks and life-chances for the domain of essential actor attributes, risks will be linked semantically to severe restrictions, losses, barriers, injuries in the action and interaction potential of actors and with unfavorable conditions in their overall contexts whereas life chances are to be understood in terms of easy access, high participation, no or low barriers and of significantly high action or interaction potentials within highly favorable societal settings or contexts. In both instances, the concepts of socio-economic chances and risks are to be utilized along the entire time axis, i.e., for risk-chance-analyses in the past, the present and the future. To be more specific, an assessment in terms of socio-economic risks or life chances can be undertaken for any socio-economic dimension if and only if four conditions are met simultaneously:

- First, the socio-economic dimensions under consideration must constitute essential characteristics of actors and their overall routines within their everyday contexts.
- Second, these essential socio-economic traits must be interpretable in a vertical fashion so that significantly below average or distinctively above

13 In Webster's, one finds, additionally, risk as "the chance(!!!) of loss or perils to a person or thing" which, however, would be too misleading to be included in the beginning. (Webster's 1993:881)

average values correspond, quite generally, to the semantic regions of favorable (socio-economic life chance) and unfavorable (risk socioeconomic risk) conditions.

- Third, more specifically, below average (risk) values must be closely associated with internal integration problems of actors or to contextual restrictions, limitations, barriers or detrimental shocks.
- Fourth, likewise, above average (life chance) values have to be in close correspondence to successful integration operations of actors or with contextual conditions of easy access, high resources, low or no barriers, no or marginal restrictions or no detrimental shocks.

Since risks and life chances have been separated according to significantly below or above averages of a given population distribution, an intermediate area around the average opens itself up quite naturally (insignificantly below or insignificantly above average) which for obvious reasons will be qualified as indifference region between risks and life chances.¹⁴ Tables 2 and 3 offer some basic characteristics for different risk-, indifference- and chance areas (Table 2) as well as several essential socio-economic dimensions and their corresponding values for risk or chance positions (Table 3).

At this point it might be useful to differentiate between the risk-chance dimension and the luck-bad luck (misfortune) dimension, offered by Nicholas Rescher. (Rescher 1997) In Rescher's case, luck and bad luck (misfortune) are positive and negative evaluations based on random events, unpredictable and unknowable for the actors in question, whereas the risk-chance dimension, developed here, is based on the distribution of any socio-economic attribute or process which are partly known to network actors and partly of an unforeseeable character only.

Thus, traffic noise may be a constant disturbance to the household area of a specific network actor whereas the sudden death of a family member falls under the random category. Additionally, both dimensions are entangled in

¹⁴ Once again it must be emphasized that the new semantic domains for risk and chances are not confined to individuals only but can be extended to different actors across various levels like enterprises or state organizations or to spatial ensembles like regions, cities or nations and even to seemingly remote areas like computer programs, low, medium and high technologies or even to scientific articles and books whose essential attributes can be assessed in terms of their risk/chance profiles, too.

a variety of strange loops (Douglas R. Hofstadter), where bad luck in a socioeconomic situation, e.g. a traffic accident, may lead to injuries and bad health conditions which seriously hamper and restrict the day to day routines and give rise to new social risks like reduced social contacts. These newly acquired risks, in turn, bring about new socio-economic random configurations in which bad luck or good luck can operate again.

Table 7.2: Main Characteristics of Socio-Economic Risks and Life Chances for Individual Actors

	Socio-Economic Domains of	
	Risks	Life Chance
ARENA I (Inside Actors)	High Internal Adjustment Problems	Low Internal Adjustment Problems
	Low Degree of Self-Confidence or Self-Esteem	High Degree of Self Confidence or Self Esteem
	Large Difficulties for Coping and Integration	Small Difficulties for Coping and Integration
	Many Shocks and Disturbances in the Past	Few Shocks and Disturbances in the Past
ARENA II (Contexts)	High Barriers	Low Barriers
	High Restrictions	Low Restrictions
	Low Access	High Access
	Few Linkages to the Environment of Actors	Many Linkages to the Environment of Actors
	High Degree of Disturbances and “Shocks” in Living Areas	Low Degree of Disturbances and “Shocks” in Living Areas
	Few Linkages from Outside	Many Linkages from Outside

Consequently, the concepts of socio-economic risks and chances can be defined in the following manner.

- An actor A from a given population P is in a position of socio-economic risk if and only if one can assign (a) a comparatively high value for internal integration problems or (b) a comparatively low value for internal adaptation capacities (Arena I) or (c) a comparatively high value for barriers, restrictions or outside disturbances for the interaction potential or (d) a comparatively low value for action and interaction patterns (Arena II). Here, the term comparatively has to be specified with respect to the overall distribution L(P) and to a significantly below average position of A within L(P).
- An actor A from a given population P is in a position of high socioeconomic life chances if and only if one can assign (a) a comparatively low value for internal integration problems or (b) a comparatively high value for

internal adaptation capacities (Arena I) or (c) a comparatively low value for barriers, restrictions or outside disturbances for the interaction potential or (d) a comparatively high value for actual action and interaction routines (Arena II). Once again, the term comparatively has to be specified with respect to the overall distribution $L(P)$ and to a significantly above average position of A within $L(P)$.¹⁵

Table 7.3: *Selected Dimensions for Socio-Economic Risks and Life Chances*

Dimensions	Risk	Indifference	Chance
Income	Low	Medium	High
Qualifications	Low	Medium	High
Job Security	Low	Medium	High
Work-Stress	High	Medium	Low
Stress from Household Work	High	Medium	Low
Social Contacts	Low	Medium	High

Socio-economic risks and life chances, understood in the sense of significantly different degrees of barriers, disturbances or significant losses or gains with respect to the intra- and interaction potential of actors, have at least another distinctive advantage since these definitions can be utilized for other types of actors like small, medium or large-scale organizations,¹⁶ for spatial ensembles like cities, regions or nations¹⁷ or for small, medium and large-scale technological systems.

15 Likewise indifference between risks and life chances can be introduced as follows: An actor A from a given population P is in a position of socio-economic indifference iff one can assign (a) a comparatively medium value for internal integration problems or a comparatively medium value for internal adaptation capacities (Arena I) as well as (b) a comparatively medium value for barriers, restrictions or outside disturbances for the interaction potential and a comparatively medium value for actual action and interaction routines (Arena II) where the term “comparatively” has to be specified with respect to the overall distribution $L(P)$ and to an average position of A within $L(P)$.

16 Basically, the same definition which has been proposed for individual actors can be used for defining risks and chances, or alternatively, opportunities for different types of organizations as well. (For a concrete example of an organizational risk-analysis, see Müller et al. 2002).

17 In the same manner, spatial units like a district in a city, a sub-national region or a nation can become the primary objects of this new risk-approach since the basic definitions for socio-economic risks and life chances for individual actors can be applied to spatial entities as well. It is legitimate to define a spatial unit like a city district at risk if and only if one can assign (a) a comparatively high value for internal integration problems or (b) a comparatively low value for internal adaptation capacities (Arena I) or (c) a comparatively high value for barriers, restrictions or outside disturbances for the interaction potential or (d) a comparatively low value for actual action and interaction routines (Arena II). Similarly, the term comparatively has to be specified with respect to the overall distribution $L(P)$ and to a significantly below average position of A within $L(P)$.

Finally, the new risk and chance-based framework operates along the entire time-axis and is applicable for ex ante investigations as well.¹⁸ More formally, the cardinal probability concept can be based on the empirically available ex post evidence and can be obtained as a transformation from empirical distributions and transitions to probability distributions and probability transitions. More concretely, the empirical evidence from the past that 80% of the population within a given population P has two or less rooms can be transformed into an ex ante probability statement, stating that for a member of a specific multiple risk group in the population P the ex ante probability of having two or less rooms is 0.8.

For transition probabilities a similar procedure can be applied. Assuming for example that the empirical transition rate of moving from a very low income position into a medium income position within a period of five years is 10%, then the probability ex ante of moving from a very low income segment upward to a medium domain within the next five years can be specified as $p = 0.1$. With the help of this highly simplified examples¹⁹ a wide road for an ex post as well as an ex ante risk analysis has been opened up. Socio-economic risks and life chances have entered as significant barriers or facilitators for actors and their routines in the past or within the present contexts and determine, such, the actual probability values for the intra- and interaction potential of actors in the future. To sum up, contrary to Ulrich Beck, socio-economic risks are no longer exclusively or even largely dependent on the high technology infrastructures in the energy, production or in the information sector of contemporary societies or on a particular new production logic within a different, second or other stage of modernity.²⁰ And contrary to the systemic

18 The general definitions for probabilities on risks and chances can be introduced in the following way.

- An actor A from a population P with current state S is in a position of socio-economic risk ex ante if and only if one can assign a high probability for the transition $S \rightarrow S(R)$. Here, $S(R)$ denotes a state of risk for a specific socio-economic dimension like income, employment, the quality of housing, etc.
- An actor A from a population P with current state S is in a position of socio-economic life chance ex ante if and only if one can assign a high probability for the transition $S \rightarrow S(LC)$. Here, $S(LC)$ denotes a state of life chances for a specific socio-economic dimension like income, employment, the quality of housing, etc.
- An actor A from a population P with current state S is in an intermediate position ex ante if and only if one can assign a high probability for the transition $S \rightarrow S(I)$. Here, $S(I)$ denotes an intermediate state for a specific socio-economic dimension like income, employment, the quality of housing, etc.

19 The linkages between past evidence and predictions are not as direct and obvious as these two simple examples suggest. Aside from philosophical considerations along the lines of Hume's and Goodman's paradoxes, statistical theory offers a wide array on techniques, ranging from classical methods to Bayesian statistics.

20 For a series of examples on technological systems and the new communication and information technologies, see Müller/Purgathofer/Vymazil 1999.

risk tradition by Niklas Luhmann, socio-economic risks are no longer confined to decision configurations only or to larger risk system, their uncertain decision configurations and their detrimental or non-intended consequences. While the new micro-foundations for socio-economic risks and life chance are applicable to the core-domains of the Beck-Luhmann approaches, the new foundations can be extended to many other areas as well which, so far, have not been captured by the two main sociological risk perspectives.

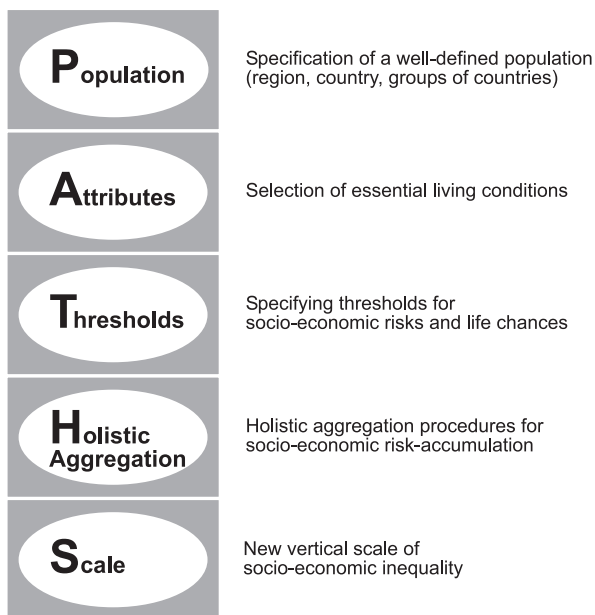
PATHS: A Stepwise Procedure towards a New Inequality Scale

One of the extensions of the new micro-foundations will be undertaken already within the present section. Its aim lies in the construction of a new inequality scale which is entirely built on the various dimensions of risks and life chances. In order to achieve this goal, five analytical steps must be performed which have been summarized by Figure 1. Following this Figure, the first step lies in the specification of a well-defined population. In the course of this article, the population will include a total of 6 countries (Switzerland, Austria, Germany, Slovenia, Spain, Hungary) which have conducted the EU-RO-Module Survey.

The second step requires the construction of a comprehensive set of dimensions which capture the variety of living conditions across a wide range of domains. Here, Table 4 gives a summary of the fourteen socio-economic dimensions chosen. From Table 4 one can see that the socio-economic dimensions have been clustered into two main groups, namely into a first set which reflects both available socio-economic resources (income, education) or living conditions (number of rooms, actual living standards) and into a second group which is focused on the internal domain of cognitive-emotional organization in general and on specific self-evaluations in particular.²¹

21 At this point it should be noted that a highly promising interface domain is opened up, linking social survey research with the broad arenas of the cognitive sciences or artificial intelligence. For a selection of potentially relevant literature, see for example Damasio 1994/1999, Dennett 1986/1991, Hofstadter 1982, Hofstadter/Dennett 1982, Hofstadter 1985, Maturana/Varela 1987, Minsky 1991 or Nørretanders 1998.

Figure 7.1: Five Steps towards Transforming Multi-Dimensional Living Conditions and Socio-Economic Risks into an Inequality-Scale



As third step along the PATHS-line, the specific thresholds for risks and life chances have to be specified. This move can be accomplished basically in two stages which can be visualized with the help of Figure 2.²²

On the one hand, the twelve essential socio-economic dimensions in Table 4 have been subdivided into three different segments, namely into a risk-segment, an intermediate segment and, finally, into a segment of life-chances. On the other hand, the lowest 25 to 33% of a population in a specific dimension have been defined as being at socio-economic risk, the upper 25 to 33% of a population as being in a life chance position, while the intermediate group has been characterized as being in an indifference position.

It should be added that these specific thresholds for socio-economic risks and life chances have been selected for each of the twelve dimensions as well as for each of the five EUROMODULE-countries separately. Thus, the distribution of the Hungarian or German population in areas like income, education,

22 For a summary, see Müller/Link 1997, Müller 1998 or Müller 2002.

or anomia determined the choice of the specific risk and chance thresholds in each country. In this way it has been guaranteed that different levels of risk-thresholds have been generated for each country which, in turn, can be compared separately and may give rise to a rather illuminating comparative study of being at socio-economic risk in specific socio-economic dimensions across various parts of Europe.

Figure 7.2: The Specification of the Thresholds for Socio-Economic Risks and Life Chances

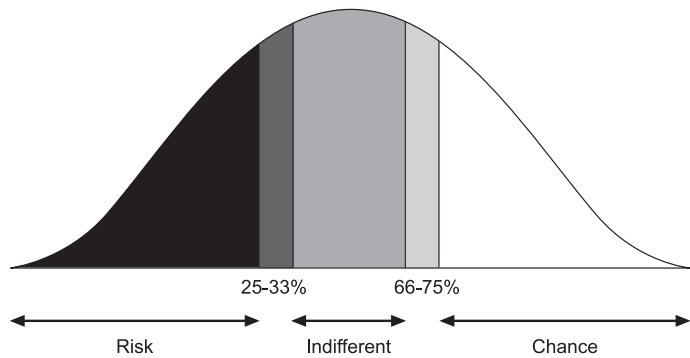


Table 7.4: Twelve Dimensions Dimensions for Socio-Economic Risks and Chances in the EURO-MODULE*

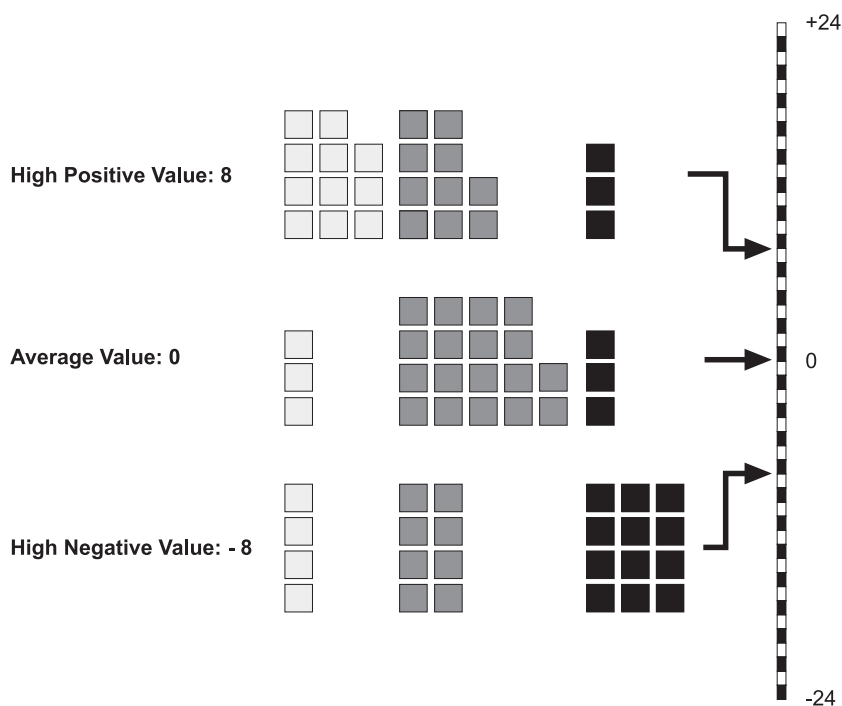
	Actor-Domain		
Dimensions	Risk	Indifference	Chance
Household Income	Low	Medium	High
Educational Degree	Low	Medium	High
Income Changes to Last Year	Low	Medium	High
Make Ends Meet	Low	Medium	High
No Influence (Anomia I)	High	Medium	Low
Loneliness (Anomia II)	High	Medium	Low
	Setting-Domain		
Dimensions	Risk	Indifference	Chance
Number of Rooms	Low	Medium	High
Actual Living Standards	Low	Medium	High
Missing Living Standards	High	Medium	Low
Social Networks	Low	Medium	High
Public Safety	Low	Medium	High
Environmental Complaints	Low	Medium	High

* More specifically, the following variables have been selected from the EUROMODULE data-base: V! V4, [V13, V14], V21, V24, V26, V27, V33, V34, V40, V49, V52, V54, V55a plus the degree of education.

As a fourth step along the PATHS-design, all positions of risks and life chances must be aggregated and scaled. From the very outset it should be made clear that any scaling procedures, old or new alike, should meet the following two conditions.

- First, the aggregation and scaling operations must be able to include a multiplicity of heterogeneous socio-economic dimensions. In particular, this variety of socio-economic dimensions must be sufficiently encompassing to account for the relevant day-to-day routines of actors or, alternatively, for the diversity of post-industrial or of post-modern lives. (Condition of requisite variety).

Figure 7.3: The Transformation of Positions of Risks and Life-Chances into the New Inequality Scale



- Second, the aggregation and scaling procedures leading from a set of multiple dimensions to a measure of social inequality should be undertaken

on the basis of non-linear and holistic algorithms and not of conventional index constructions. (Condition of holistic,²³ non-linear aggregation).²⁴

The main reasons for both requirements are easy to give. The first condition demands a high-dimensional array of relevant living conditions, the second requirement simply asks for new types of aggregation procedures. In the PATHS-design, the inequality position IP of an actor A within a given population P is calculated in a holistic fashion²⁵ as the sum of life chance positions minus the sum over all risk positions.²⁶

$$IP^{A(P)} = \sum LCP_i - \sum RP_j$$

Figure 3 gives a stylized example of such an aggregation procedure by using a total of 24 dimensions.

- The first actor has a total sum of eleven in life-chances, a total of three risk-positions as well as ten indifference positions and reaches, thus, a relatively high value of $IP = [11 - 3] = +8$.
- The second actor occupies an intermediate position with a total of eighteen indifference values, of three risk positions, of three positions of life chances and a resulting value of $IP = [3 - 3] = 0$.
- The third actor accumulates a total number of eleven socio-economic risks, of three life-chances only (as well as ten indifference positions) and obtains, thus a high negative score of: $IP = [3 - 11] = -8$.

It is important to note that the new scale has been constructed in a holistic mode²⁷ of summation and subtraction. In doing so, several unusual assumptions have to be made and, moreover, have to be justified and supported.

- First, a strong evolutionary assumption must be utilized since all the thresholds across all qualitatively different dimensions are constructed in

23 In conjunction with Neurath's arguments against the possibility of context-free comparisons and against linear index-constructions, one can detect another powerful line of reasoning which to some extent should be able to compensate for the insufficiencies and limitations of measurements and index constructions. Already in 1910, in his "Theory of the Social Sciences" (reprinted in Neurath 1981), Neurath develops an alternative which is based on a holistic comparison of the total number of socio-economic measurements and rankings. (Neurath 1981:39) And up to 1944, to the publication of Neurath's "Foundations of the Social Sciences", this holistic line of argument remains unchanged (see, e.g., Neurath 1970:37).

24 See again Neurath 1981.

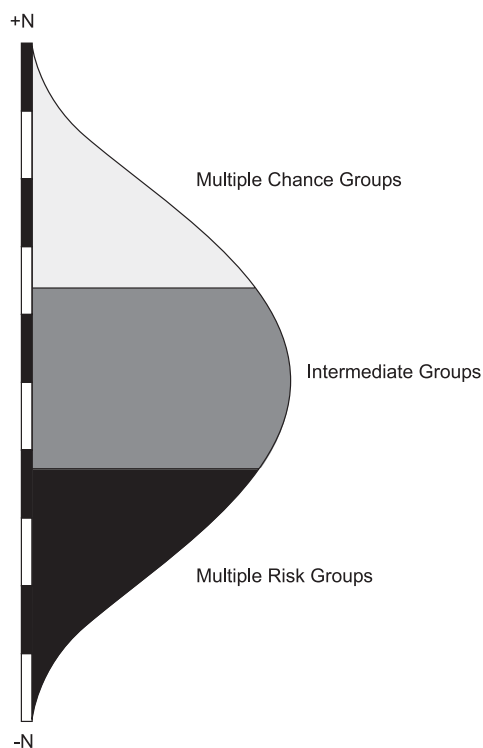
25 On current summaries of neuro-cognitive architectures, see Gazzaniga 2004 or Calvert/ Spence/Stein 2004.

26 It must be emphasized that the risk-life chance transformation to the $[-1, 0, +1]$ interval is identical to the transformation within genetic algorithms into the $[-1, \#, +1]$ domain where # stands for "don't care". On this point, see John Holland et al. 1989.

27 This specific form of aggregation is based on insights by Otto Neurath (1971/1981) into the need for comparing overall distributions and sums and not their constituent parts and elements.

- an identical fashion, placing heavy emphasis on the overall population distribution and, thus, to an evolutionary or ecological background.
- Second, a symmetry assumption is used in order to arrive at an appropriate arrangement of socio-economic dimensions. Settings and actors, setting domains and actor domains, different dimensions within settings and dimensions within the arena of actors are constructed in a symmetrical fashion, placing, implicitly, equal weights to actors and settings, equal weights to each of the actor domains or the arenas for settings. In other words, actors and contexts, nature and nurture, are being constructed in a symmetrical fashion.
 - Third, as a consequence of the symmetry assumption, all socio-economic dimensions which have been included in the set of heterogeneous living conditions are assumed to be of equal weight. This heroic and obviously post-modern assumption of an equal weight condition reflects, inter alia, a growing literature on the individualization of life-courses or of changing

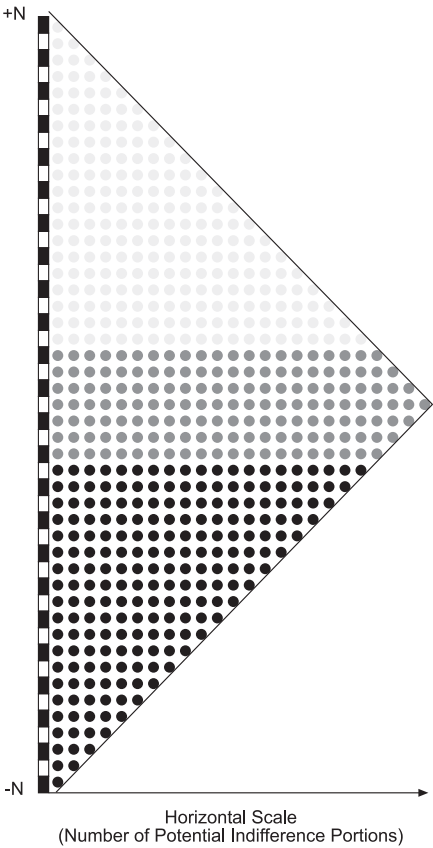
Figure 7.4: The Normal Distribution of Accumulated Risks and Life Chances within Contemporary Risk Societies



life-course plans towards more complex and multi-dimensional targets, including goals outside the area of labor and employment. Due to these equal weights, risk or life chance positions in areas like emotions, safety or social networks carry the same impact or weight as the classical dimensions for status and inequality like income, qualification or occupational status. It goes without saying that the equal weight condition has itself a highly risky status, too.

- Fourth, the aggregation or integration goal lies in the summation of the overall number of risk positions irrespective of their origins and the overall number of life chance positions, once again irrespective of their origins. Once again, this assumption seems highly risky and even implausible itself since actors with high resources in terms of income or qualification may find themselves in the lower third of the inequality scale and vice versa.

Figure 7.5: The Specification of Socio-Economic Risks and Life Chances



In general, for a total number of N dimensions, the new scale of socioeconomic inequality ranges from $-N$ to $+N$. $-N$ is reserved for actors with a maximum number of risk positions (no indifference positions, no positions of life chances) and $+N$ is occupied by actors with life chances across all dimensions (no indifference position, no risk position). In between, the new scale has $2(N - 1)$ different degrees. Due to the underlying construction, the overall inequality distribution for a given population must result in a normal distribution with a mean-value around zero and variance 1.²⁸

Moreover, Figure 5 exhibits an additional interesting feature of the PATHS-design. Overall values around the mean can come about in a variety of different ways. Take the mean value of zero, then this value can be obtained by a total of N indifference positions or, at the other extreme, by $N/2$ risk positions and $N/2$ positions of life chances.

The Socio-Demographic Profiles of Multiple Risk Groups and Groups with Multiple Life Chances in Five Countries

As usual, the comparative advantages of the new inequality scale do not lie primarily in the field of conceptual sophistication and differentiation, but in the range and the frequency of successful problem solutions.²⁹ In order to demonstrate the *prima facie* validity and reliability of the new scale, a comparative data-set has been used and analyzed which has been compiled under the auspices of Wolfgang Zapf at the Science Center Berlin and which, under the heading of EUROMODULE,³⁰ provides a comprehensive picture of living conditions both in their objective as well as in their subjective dimensions³¹ in

28 It should be added that the new scale can be interpreted in terms of social exclusion/ inclusion as well since the lower region of unspecific risk-accumulation can be clearly associated with social exclusion whereas the upper region of the scale is a good indication for social inclusion. (On the exclusion/inclusion literature, see, for example, Levitas 1998, Nolan/Whelan 1996, Room 1995, Silver 1994 or Townsend 1979).

29 On this point, see, for example, Donovan/Laudan/Laudan 1988, Kuhn 1973/1977, Lakatos 1979/1984, Laudan 1977/1981, Lakatos/Musgrave 1974, Laudan/Laudan 1988 or Popper 1965/1968/1972.

30 For a Euromodule-documentation, see Delhey/Böhnke/Habich/Zapf 2001.

31 For the underlying apparatus of indicators, the following terminological remarks become necessary. First, indicators have been separated according to their source of information into subjective and objective. Subjective indicators like the satisfaction with specific domains or with the life in general qualify as subjective since they can only be confirmed by the respondent alone. Conversely, indicators like the number of rooms, personal income, marital status, long spells of unemployment and the like count as objective, being measurable in principle via the help of other sources. Second, indicators can be grouped into performance and domain-specific. Performance indicators characterize the overall state of an actor whereas domain-specific indicators are situated in well-defined domains like family, social structure, housing, employment and the like. In this sense, overall life satisfaction qualifies as a subjective indicator whereas the self-reported status of health falls, despite its actor-dependent assessment, under the objective performance category. (For a classical categorization of health at the inter-section of welfare (having)/levels of living, see Allardt 1981).

six countries, namely in Switzerland, Austria, Germany, Spain, Slovenia and Hungary.³²

The preliminary plausibility test will be performed for the new inequality scale and their resulting population distribution. Put in a brief fashion, does the new risk-life chance-based scale measure social inequality at all? In order to answer this question, the new scale should be able to fulfill four basic requirements.

- First, the risk/chance-based scale should exhibit a significantly positive correlation with qualifications. Low degrees of education should be accompanied by a high accumulation of multiple risks and high degrees of education should go hand in hand with high concentrations of multiple life chances.
- Second, the risk/chance-based scale has to be significantly related with income. Low income levels should be associated with high multiple risk values and high income standards high values of multiple life chances.
- Third, the risk/chance-based scale should show a clear gender asymmetry. In short, the female population should be over-represented in the multiple risk segment and under-represented in the groups of multiple life-chances.
- Fourth, age should not be related with the distribution of multiple risk-groups in a strong positive manner. The main reason for this requirement has to do with the subsequent inclusion of health conditions. Since the state of health is very powerfully linked with increasing age, it would, thus, reduce the cognitive value of a high correlation between the new risk/chance scale and health substantially.

32 It can be safely assumed that in the course of the next months, the number of countries will increase substantially so that the EUROMODULE produces a highly interesting comparative data set which is able to monitor existing dimensions of individual welfare, including the subjective side of self-assessments and evaluations.

Figure 7.6: The New Risk/Chance-Scale and Degrees of Education

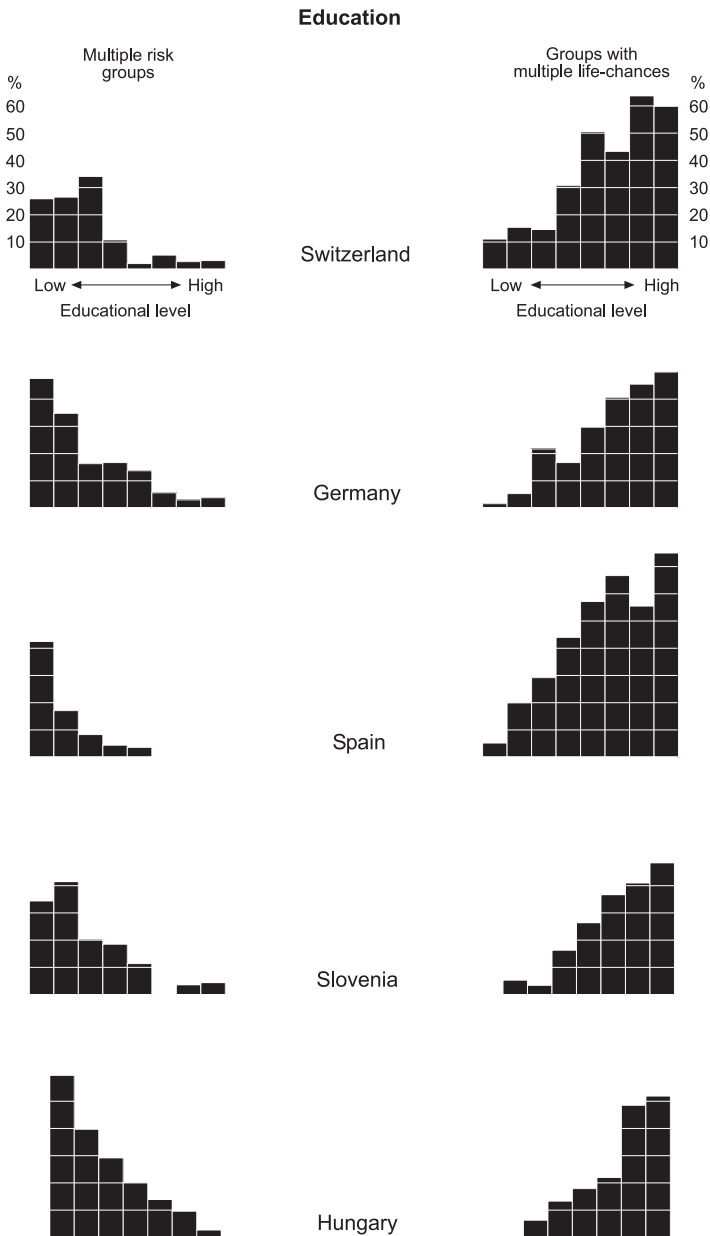


Figure 7.7: The New Risk/Chance-Scale and Household Income

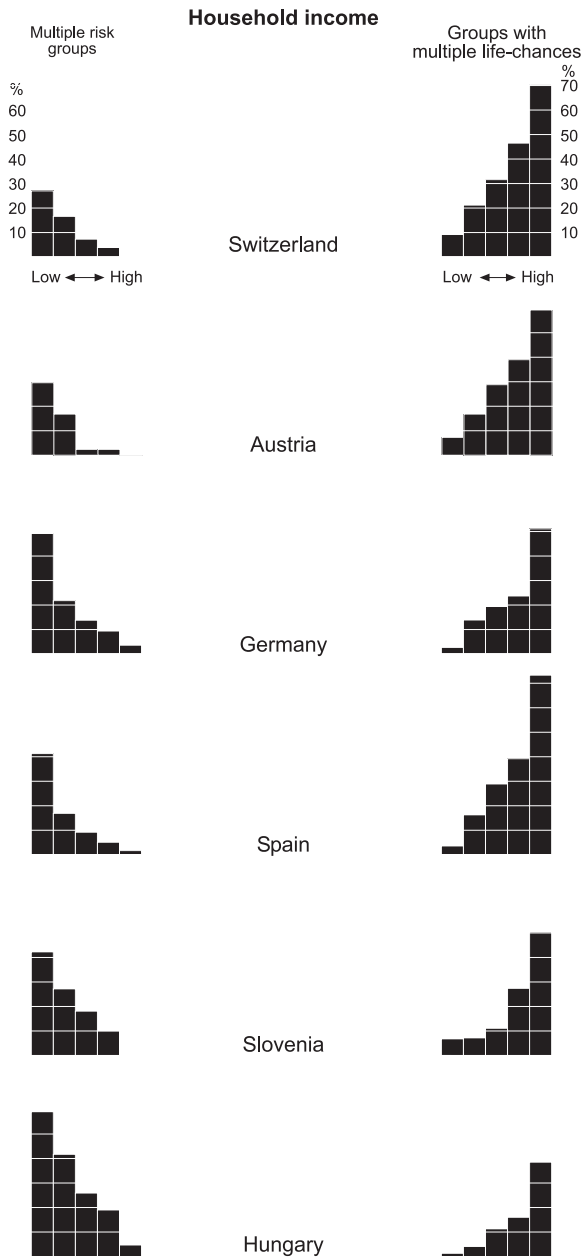


Figure 7.8: The New Risk/Chance-Scale and Gender-Asymmetries

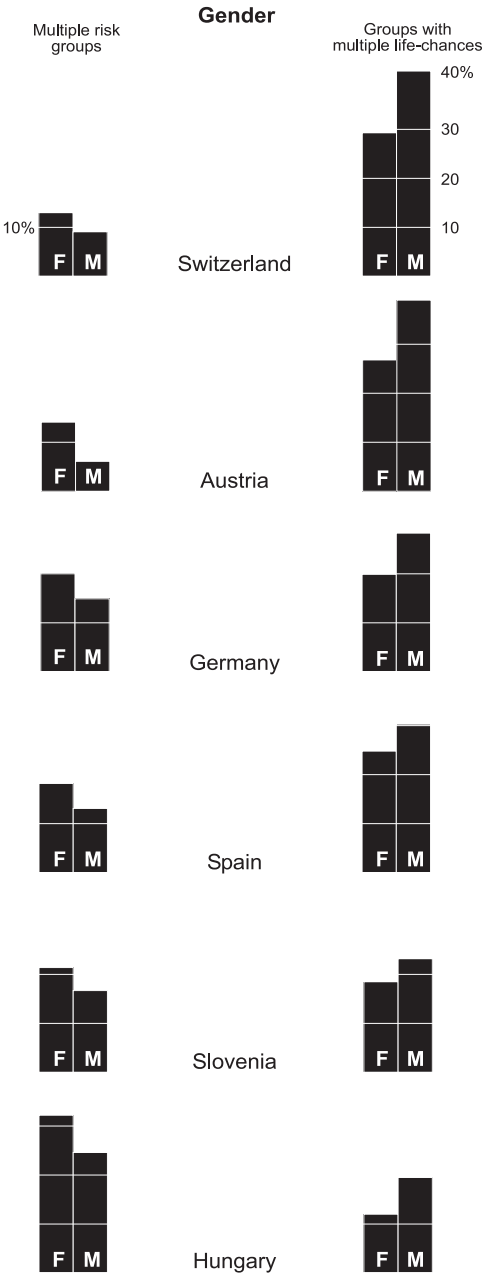
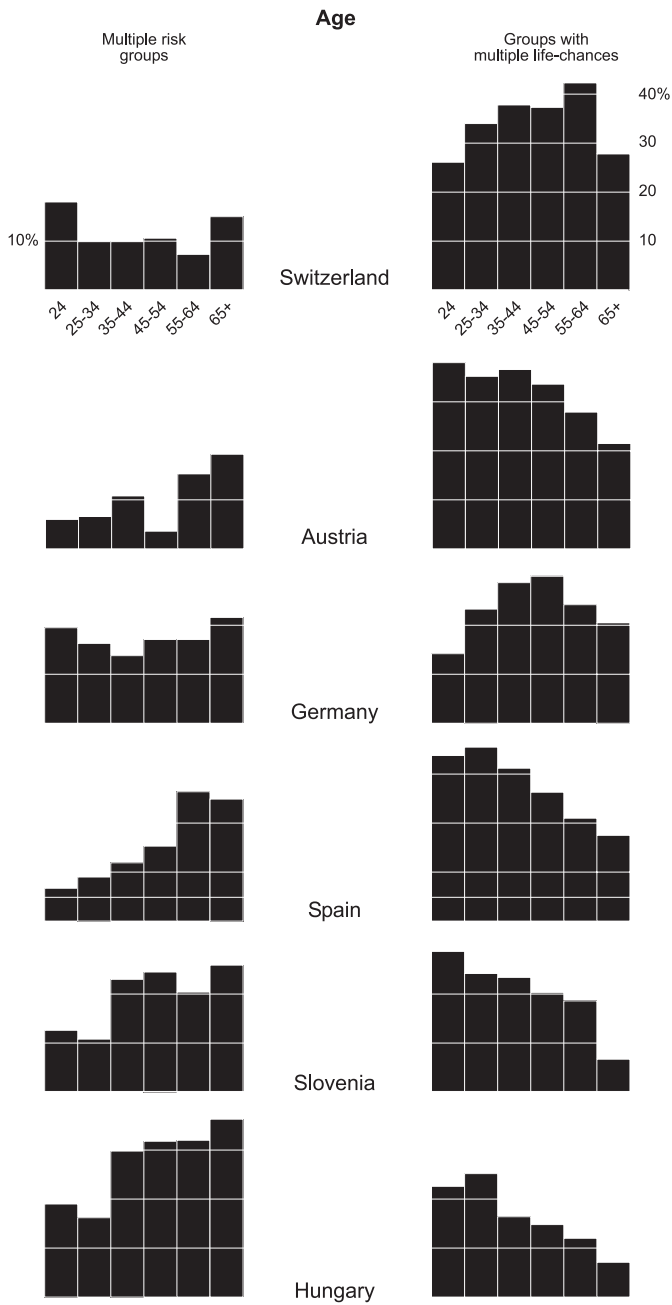


Figure 7.9: The New Risk/Chance-Scale and Age-Distributions



Given this short list of four essential inequality requirements for the new risk-chance-based scale, the following series of Figures (Figures 6 to 9) provides clear graphical answers to each of these conditions. In these figures, two large societal segments have been selected, one group of multiple risks with an accumulated risk value of -4 and lower and one group of multiple life-chances with an accumulated value of life chances of +4 and higher.³³

First, Figure 6 shows that the new vertical scale fulfils the conventional criteria for identifying inequality in the domain of education. Risk-accumulation is directly related with low degrees of education whereas a high concentration of life chances is to be found within the highly qualified societal strata only. Second, individuals with lower incomes are, as can be seen in Figure 7, highly concentrated among the multiple risk groups. Across all five countries, income seems to be linearly related with risk and life chances, with positive slopes for the relation between income and life chances and with negative slopes for the income-risk relationship.

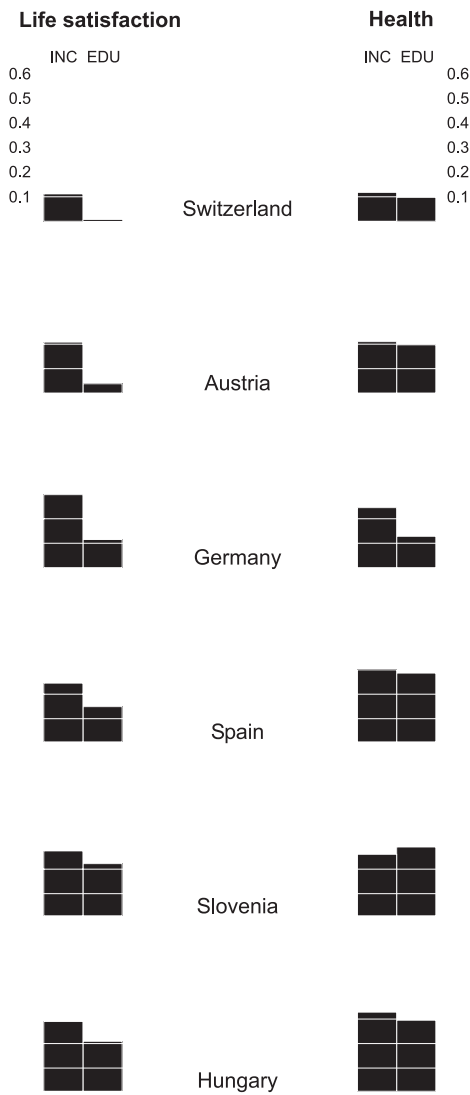
Third, the gender distribution along the scale of multiple risk and multiple life chances reconfirms older as well as recent studies which emphasize a deep-seated gender divide within contemporary societies. More specifically, the investigations conducted so far indicate a significantly higher concentration for women at the lower end of the scale and a somewhat weaker predominance of men on the upper end of the scale. In numbers, the ten to twenty percent of a population with the highest degree of multiple risks exhibits in general a gender distribution of 2:1. In other words, two thirds of a population with the highest accumulation of unspecific risks is female. (See also Figure 8) Fourth, the age distribution of the population of multiple risks and multiple chances may seem surprising at first sight since, according to Figure 9, there is a marked tendency for weak linkages between multiple risk-formations and younger age cohorts in Switzerland and Germany and a converse pattern, namely a linkage between multiple-risk accumulation and older cohorts in Austria, Spain, Slovenia and Hungary.

33 To be more precise, risks and chances as well as risk groups and chance groups have been constructed for each of the six countries separately and independently. For comparative analysis though, multiple risk groups with an overall value of -4 and lower have been selected. As a consequence, countries with a high concentration around the mean value of zero like Switzerland have a relatively small number of persons with an overall value of -4 and less whereas countries like Hungary and Slovenia with a flat distribution have a larger number of persons with an overall value of -4 and less.

In sum, the new risk/chance-based scale fulfills all four essential requirements for an appropriate measure of societal inequality which have been laid out at the beginning of this chapter.

Testing of Three Hypotheses

Figure 7.10: The Weak Correlation between Income and Education with Life Satisfaction and Health



Seemingly, the new scaling procedure offers a new perspective on vertical inequalities in contemporary risk societies. In order to determine the actual cognitive cash value of the new micro-foundations a far more challenging test must be performed, however.

To set up the test-design, Figure 10 presents the current state of linkages and connectivity patterns between three essential micro-domains, namely overall life satisfaction, the subjective state of health with the most important socio-economic dimensions, namely income or qualifications. Figure 10 summarizes the main outcomes of a correlation analysis performed between these three domains. From Figure 10 it becomes clear that the overall correlations between life satisfaction with income or qualifications turn out to be relatively weak. Likewise, the same configuration applies to the correlations between the subjective state of health with income or qualifications. Moreover, looking at the differences between Switzerland on the one hand and Hungary or Slovenia on the other hand, one can see a significant development effect. Apparently, the higher the state of societal development as expressed in GDP p.c., the weaker the correlations become between life satisfaction and income or qualification as well as between the state of health and income or qualifications. Given the results in Figure 10, three strong counter-hypotheses will be proposed which, if confirmed, would offer strong cognitive support for the new micro-foundations.

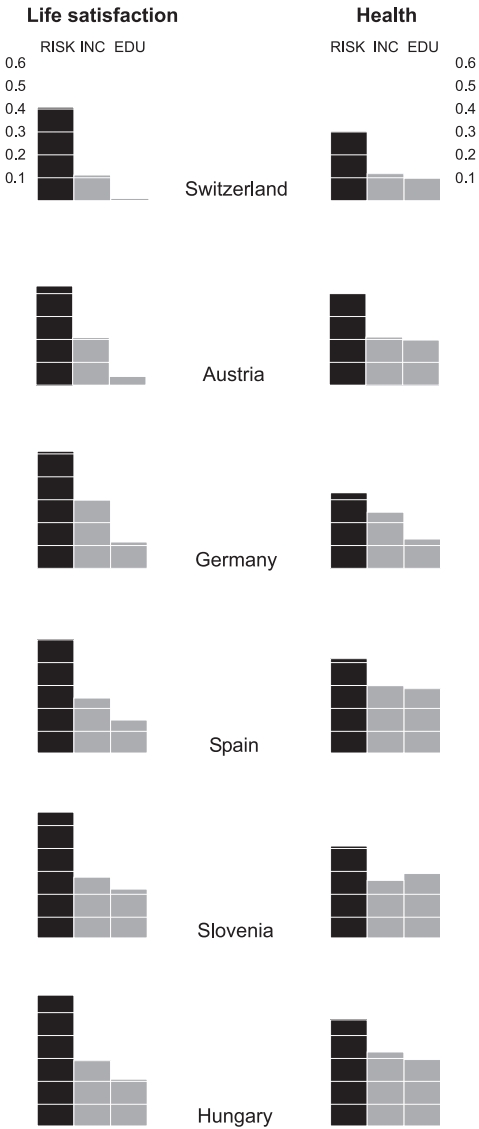
- (H1) The correlations between the position on the scale for risk/life chances and subjective general performance assessments like overall life satisfaction should turn out to be significantly higher when compared to traditional inequality measures like income, qualifications or status.
- (H2) The same result should be obtained between the position on the scale of accumulated risks and life chances and the general state of health.
- (H3) H1 and H2 can be confirmed in roughly similar ways across Europe. Thus, no significant developmental or regional effects come into play.

From Figure 11, two general conclusions can be drawn.

- First, Figure 11 shows that the correlations between the new vertical risk/chance measure and the personal status of health, expressed in the ten point scale of satisfaction with health, are considerably higher than the conventional picture in Figure 10. Apparently, the new micro-perspective captures an important systematic component in the grading of the life satisfaction of actors.
- Second, the new PATHS-design exhibits surprisingly dense linkages with the status of personal health.

- Third, both results have been obtained irrespective of the increasing complexities of post-industrial or, alternatively, of postmodern lives since these correlations are only weakly separated between countries like Switzerland or Hungary.

Figure 7.11: The New Linkages between Socio-Economic Risks, Inequality and Health



Risky Outlooks

One of the weak points of the present article lies in the small number of countries which have been part of the EURO-MODULE initiative. For example, no country from Scandinavia or, with the exception from Spain, from Southern or Western Europe has been selected. Nevertheless the article will conclude with the very risky assumption that all three hypotheses which have been corroborated for the six countries of the EURO-MODULE data set can be confirmed for Europe as a whole.

Moreover, the next article will, aside from using a large cross-national survey with a total of 28 countries, add new theory elements in order to strengthen and widen the micro-foundations for contemporary risk-societies.

8 Micro-foundations of Risk Societies in Slovenia and Europe II – Towards High Theory

Chapter continues to use the new micro-methodology on risk- formations and their inequality profiles and will undertake attempts to widen both the empirical and the theoretical basis of the new micro-foundations substantially. First, the article will try to confirm or reject a set of hypotheses on the comparatively strong linkages between the new type of risk-formation and subjective assessments of the quality of life and of the health status on the one hand and on the generality of the new perspective across Europe on the other hand. In subsequent parts of this article, new theoretical connections will be opened up towards the cognitive sciences, towards medical research and, finally, towards evolutionary frameworks.

The Quality of Life Survey and Its Relevant Dimensions of Risks and Life-Chances

For a more general test a very large data set for 28 countries in Europe has been used which runs under the heading of “Quality of Life-Survey” and which has been collected by the European Foundation for the Improvement of Living and Working Conditions in Dublin.¹

The Quality of Life Survey contains a relatively small set of relevant risk/ life chance dimensions and, thus, a total of twelve different dimensions has been selected for the new inequality scale. Figure 1 and Table 1 summarize these twelve dimensions where six dimensions can be characterized as essential attributes of actors and the second group as attributes or routines in different settings or contexts.²

Following the PATHS-procedure,³ the thresholds for risks and life chances have been specified for each of the 28 countries separately. Thus, the new

1 On the Quality of Life Survey, organized by the Dublin Foundation, see, inter alia, Albers/ Fahey 2004, Albers/ Köhler 2004, Böhnke 2004, Delhey 2004, European Foundation 2004, Russell/Whelan 2004.

2 More specifically, the following dimensions and variables have been selected: Actor Attributes: Income (Q 65); sufficiency of income (Q 58 – Q 61); trust (Q 27 – Q 28); perceived quality of public services (Q 54a – Q 54e); stress (Q 13a – Q 13c); cognitive coping (Q 30a – Q 30e). Contexts: Working hours (Q 7, Q 10); occupational work (Q 12a – Q 12g); social networks (Q 34 – Q 35); living space (Q 17); quality of home (Q 20 – Q 21); reachabilities (Q 53)

3 On the PATHS-procedure, see the previous article as well as Müller 2004.

inequality scale has been calibrated for each of the 28 countries and each respondent has been assigned a specific value in the interval of -12 to +12 along the respective national risk scale.

Figure 8.1: Central Features for Actors and Their Living Conditions in the Quality of Life-Survey

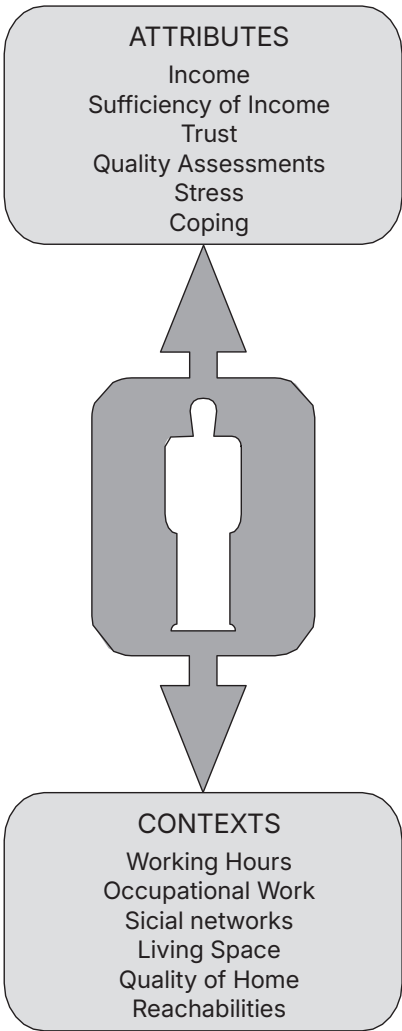


Table 8.1: Twelve Dimensions for Socio-Economic Risks and +Life Chances in the Quality of Life-Survey

Dimensions	Risk	Indifference	Chance
Income	Low	Medium	High
Sufficiency of Income	Insufficient	Medium	Sufficient
Trust	Low	Medium	High
Quality Assessments	Low	Medium	High
Stress	High	Medium	Low
Coping	Low	Medium	High
Working Hours	Long	Medium	Short
Type of Work	Simple	Medium	Complex
Social Networks	Weak	Medium	Strong
Living Space	Small	Medium	Large
Quality of Home	Low	Medium	High
Reachabilities	Low	Medium	High

The Quality of Life-Survey as Empirical Testing Ground

At this point, the three hypotheses which have been tested toward the end of the previous article with a data-set from six countries will be re-iterated for the case of the much larger Quality of Life-Survey and its 28 nations.

- (H₁) The correlations between the position on the scale for risk/life chances and subjective general performance assessments like overall life satisfaction should turn out to be significantly higher when compared to traditional inequality measures like income, qualifications or status.
- (H₂) The same result should be obtained between the position on the scale of accumulated risks and life chances and the general state of health.
- (H₃) H₁ and H₂ can be confirmed in roughly similar ways across Europe.

Thus, no significant developmental or regional effects come into play. In order to test these three hypotheses, two groups of correlation analyses have been performed, namely correlations between life satisfaction and income, education as well as the position on the new inequality scale and correlations between health and the three aforementioned dimensions of income, education and risk accumulation. Figure 2 shows the results of the various correlation analyses and provides a strong support for all three hypotheses.

- First, Figure 2 exhibits an unusually clear pattern between the new vertical risk scale and the overall quality of life evaluations of actors. Compared to conventional dimensions like income or qualifications the new scale

apparently captures an important systematic component in the general quality of life evaluations.

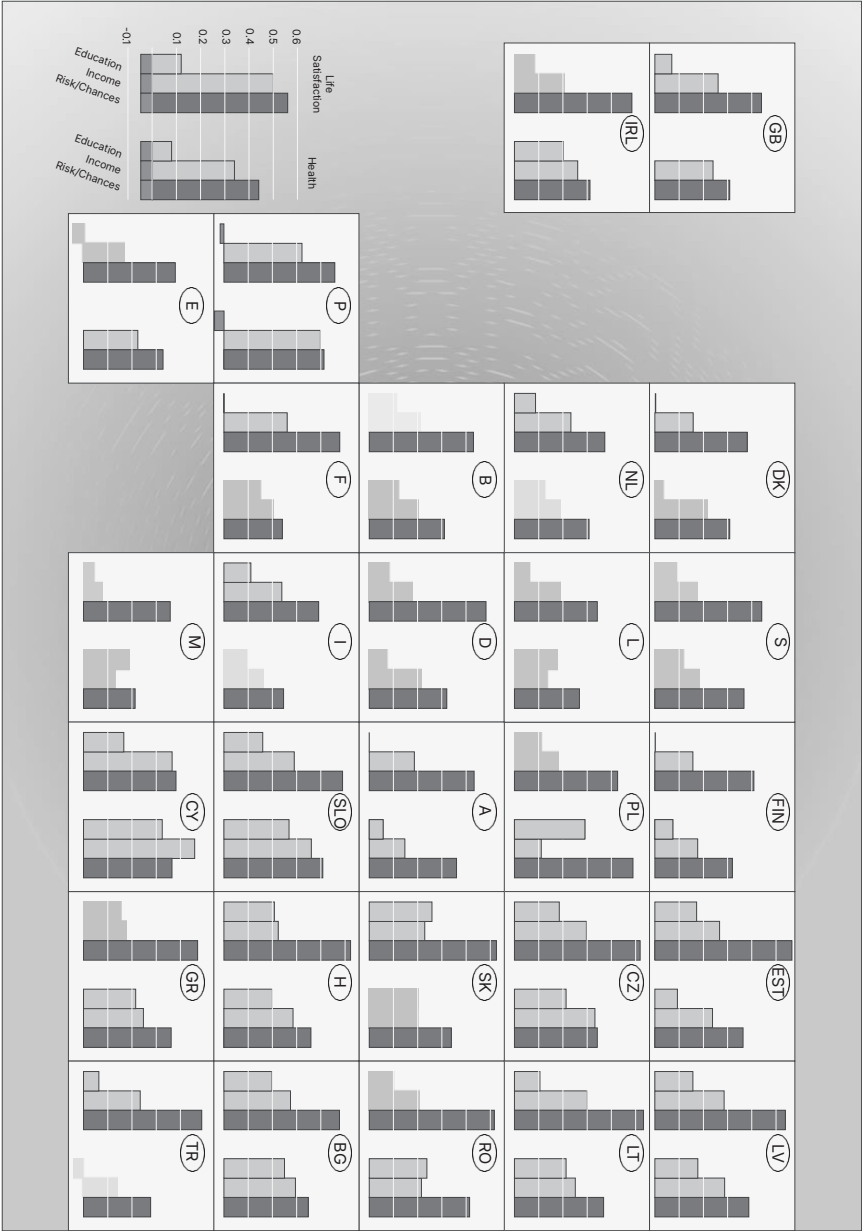
- Second, still according to Figure 2, much closer linkages can be recorded between the new positions of actors on the inequality scale and the status of subjective health.
- Third, both patterns are homogeneous across all 28 countries and no income or regional effects can be observed, i.e., the relation is invariant with respect to the level of BIP p.c. across Europe or with respect to larger European regions like Scandinavia, Central and Eastern Europe or the Mediterranean.

These results suggest that a new and powerful micro-perspective on the constitution of contemporary risk societies has been achieved which establishes strong links between living conditions, socio-economic risks, social inequalities, life satisfaction and health. It should become a valuable strategy to apply the new research perspective to the large quantities of available social health survey data for regions and nations across Europe and to other socio-economic domains in which populations of actors and their essential attributes become the key determinants for the evolution of risk societies.⁴ Moreover, the new micro- perspective should be able to open up new insights on the current profiles and dynamics of societal inequalities as well as on the changing patterns between socio-economic living conditions, health, ailments and sicknesses.

The subsequent parts of the article will advance the micro-foundations of contemporary risk societies still further, this time not by empirical data analysis, but by linking and combining the new micro-perspective with three large-scale theoretical domains, namely with the cognitive sciences, the medical health research and, finally, with evolutionary theorizing.

⁴ It should be added that this new evolutionary risk-approach has been applied successfully to the organizational domain, in particular to a population of scientific institutes in Austria. (See Müller et al. 2002) Due to the importance of populations, the new risk-framework can be easily recombined with the existing literature on organizational ecology (see, for example, Carroll/Hannan 2000, Aldrich 1999).

Figure 8.2: The Strong Linkages between RISK Accumulation, Quality of Life Assessments and Health



Roads to the Cognitive Sciences: The Principle of Undifferentiated Encoding and the Principle of Cognitive Holism

As a first linkage to High Theory, the scale construction according to the PATHS-design can be additionally strengthened with two important principles from the fields of the cognitive neuro-sciences.⁵

The first building block has been labeled as Principle of Undifferentiated Encodings (PUE), has been put forward again and again by Heinz von Foerster (e.g., Foerster 2002, Foerster/Glasersfeld 1999) or Ernst von Glasersfeld (Glasersfeld 1997) and can be summarized in three distinct parts.

- Its first part concerns the border between actor-inputs and their internal transformations and asserts that only undifferentiated quantities at different levels of intensities, but not qualitatively differentiated signals cross the border between the external and the internal worlds of actors. The response of a nerve cell does not encode the physical nature of the agents that caused its response. Encoded is only ‘how much’ ..., but not ‘what’ (von Foerster 2002:215).
- The second PUE-part stresses the fact that the quantities are not encoded in a continuous fashion, but in a discrete and non-linear manner.
- Finally, the third PUE-building block emphasizes the necessity for an overall integration and that the varying quantities have to be integrated into a single overall value.

At first sight there are no research-paths in sight which could lead from the principle of undifferentiated encodings within the cognitive neuro-sciences to the domain of multi-dimensional data aggregation and scaling. Upon second thought however, the following three methodological family resemblances can be suggested which come sufficiently close to the PUE in the neuro- science domains.

- First, the type of scale construction within the PATHS-design implies a transformation of qualitatively different inputs or withinputs of actors into a single quantitative dimension. It becomes interesting to note that the introduction of risks and life chances can be considered as an instantiation of this requirement since socio-economic risks and life chances constitute formally speaking a single quantitative dimension within the interval of

5 On current summaries of neuro-cognitive architectures, see Gazzaniga 2004 or Calvert/ Spence/Stein 2004.

$[-1, +1]$ and, thus, a transformation of qualitatively different inputs into a single quantity.

- Second, the qualitatively different inputs are not to be encoded in a continuous fashion. In the PATHS-design, a grand departure has been undertaken from the conventional wisdom of index constructions where a small or large number of indicators is standardized, appropriately weighted and calculated, finally, as weighted average over the entire indicator class. Instead, two threshold values have to be specified which lie on the discrete points of -1 , 0 , and $+1$.
- Third, the different positive or negative values below or above the critical thresholds have to be integrated or aggregated. Once again, an alternative trajectory has been used when compared to the usual practices of index-summations. Here, a very simple and straightforward aggregation algorithm has been introduced, namely simply adding up the sums of positive and negative values and calculating the resulting overall value.

Aside from the Principle of Undifferentiated Encoding another support element can be provided which further strengthens the PATHS-aggregation and scaling procedures. More specifically, it can be shown that the new scaling procedure adheres to another important principle, advocated initially by Heinz von Foerster, too. The principle in question is called “Principle of Cognitive Holism” and has been put forward already in 1969 (Foerster 2002). In its generalized form this principle entails the subsequent four theses:

In the stream of cognitive processes one can conceptually isolate certain components, for instance

- (i) the faculty to perceive,
- (ii) the faculty to remember,
- (iii) the faculty to infer,
- (iv) the faculty to learn,
- (v) the faculty to evaluate,
- (vi) the faculty to communicate, or
- (vii) the faculty to move

Functional Thesis: If one wishes to isolate these faculties functionally, one is doomed to fail. Consequently, if the mechanisms that are responsible for any of these faculties are to be discovered, then the totality of cognitive processes must be considered ...

Local Thesis: If one wishes to isolate these faculties locally, one is doomed to fail. Consequently, if the mechanisms that are responsible for any of these

faculties are to be discovered, then the totality of cognitive processes must be considered ...

Genetic Thesis: If one wishes to isolate these faculties genetically, one is doomed to fail. Consequently, if the genetic mechanisms that are responsible for any of these faculties are to be discovered, then the totality of genetic processes must be considered ...

Epistemological Thesis: If one wishes to describe these faculties in an external stance, one is doomed to fail. Consequently, if the mechanisms that are responsible for any of these faculties are to be discovered, the mode of description has to change into an internal stance. (von Foerster/Müller 2003:29f.)

Here, the epistemological thesis becomes of foremost importance since it demands a radical turn towards an internal mode of behavioral descriptions. Following, once again, Heinz von Foerster, one of the straightforward formalizations of an internal stance goes as follows. The behavior B of an actor A can be seen as a function of the internal state S, the inputs I, the overall context C and the previous history H):

$$B^A = f [S, I, C, H]$$

Turning more specifically to the context of survey research, a general assessment GA by an actor A like the general quality of life assessment should be viewed, following an internal mode of description, in the subsequent way.

$$GA^A = f [S, T, C, H]$$

where T stands for the totality of relevant inputs which enter into the overall evaluation.

From the above formula, a group of hypotheses can be put forward almost instantly which are further supporting the new approach on socio-economic risks, life-chances, unspecific aggregations and scalings. In essence, the new scaling procedure captures an important element of an overall assessment procedure, namely the factor T, the totality of heterogeneous inputs.

- First, the quality of life perception of actors should reflect the underlying distribution of socio-economic risks, life chances and positions on the vertical scale. More specifically it can be assumed that the new compound of heterogeneous socio-economic dimensions captures T, the totality of inputs, in a highly significant fashion. Here, the reference case is given by using single dimensions like income, level of education or social status.

- Second, due to the context specific construction, the underlying correspondence should be invariant across space and time. More specifically, one should find roughly similar value distributions across different regions and countries.
- Third, the presence of at least three other factor groups, namely the internal states of actors S, the immediate and wider contexts C as well as the pre-history of actors H makes it obvious that the correlations will be far from perfect. Nevertheless, in the absence of relevant information on the three other factor groups S, C and H the empirical correlations should reach the highest possible values.

In this way, an interface has been built between the micro-foundations of contemporary risk societies and the domains of cognitive neuro-science which lends an essential support for the proposed scaling and aggregation procedure.

A New Path to Medical Stress Research

A second bridge towards High Theory can be opened up, this time leading from the present micro-foundations for risk societies to the area of stress research and neuro-immunology. As a starting point, a taxonomy of different types of stressors will be presented which have been catalogued within the relevant body of literature.⁶ Here, one finds a complex set, comprised of sensory stressors (strong light, noise, sensory deprivation, etc.), block-stressors (preventing essential routines like eating, sleeping, social contacts, etc.), achievement stressors (tests, examinations, work-tasks, but also monotony at work, etc.), social stressors (large crowd of people, loneliness, isolation, etc.), environmental stressors (noise, pollution, toxic materials, etc.), decision-based stressors (goal conflicts, quick decisions, but also lack of decision-making, etc.) or future-based stressors (fear, anxiety of the future, etc.)

Seemingly, the heterogeneity of stressors is accompanied by a heterogeneity of stress reactions which vary in time (minutes, hours, days, weeks ...), in intensity as well as in emotions, associated with each stress reaction. Nevertheless, common to all these stress reactions is an attempt to reduce the discrepancy between the effects of stressors and internal target values. Moreover, all stress reactions involve the activation of the hypothalamus- pituitary-adrenal axis and produce comparatively high quantities of endocrine hormones, particularly corticosteroids with cortisol as the most important one and catechola-

6 See on this point see Cooper 1996, Horwitz/Scheid 1999, or Sarafino (2002).

mines. Likewise, all physiological reactions to stress manifest themselves in a broad range of measurable changes like in the higher production of stress hormones, already mentioned, but also in higher degrees of blood pressure, heart rate, respiration rate, galvanic skin responses or in larger amounts of free fat acids.

The upshot of the argument of a common general pattern of stress responses with a high degree of variation in its manifestations (duration, intensity, emotions, etc.) lies in the fact that the general pattern of stress responses possesses at least two main connections to the domain of sickness and ailments, namely through their direct effects on the cardiovascular system on the one hand and through their immediate impact on the immune system on the other hand.

Given the short background on stress-research, it seems possible to link the list of socio-economic risks which have been defined in the course of the last and the present article to special classes of stressors like social, environmental, future-based or decision-based stressors. Moreover, the following subset- relation will be proposed:

$$\text{Socio-economic Risks} \subset \text{Stressors}$$

It is quite obvious that this subset-relationship would need a very detailed additional justification which cannot be provided within the framework of the present article. Five main arguments can be presented, however, which should give considerable initial plausibility to the conjecture of a risk-stressor subset relationship.

- First, the socio-economic risks, which have been introduced on the basis of a wide array of living conditions, are characterized, *inter alia*, by their permanence. Thus, many of the socio-economic risks defined within the Quality of Life-Survey like low, insufficient or deteriorating incomes or low degrees of qualifications are to be classified as long-lasting or, like in the case of low qualifications, as (nearly) permanent. Thus, socio-economic risks would act as continuous stressors and not as single, rare or isolated occurrences.
- Second, the distribution-dependent specification for thresholds of socio-economic risks provides additional support for the subset relationship between socio-economic risks and stressors. Since the majority of the population is, by definitional necessity, above the risk-threshold, individual actors, falling under a specific risk-segment, perceive themselves relatively deprived. Thus, the available literature on the importance of relative

deprivation⁷ can be added as further evidence for the proposed risk-stress linkages.

- Third, while stress reactions vary in length, intensity and emotional involvement, the basic physiological reaction patterns are unspecific with respect to the sources of stress. In other words, one does not find a “bad boss-stress reaction”, confined to a specific region in the neuro-immune system in contrast to a “loud noise-stress reaction”, affecting other parts of the neuro-immune system. Thus, a multi-dimensional array of essential living conditions across the contexts or settings of actors and across their cognitive-emotional organization can be interpreted as a summary of all relevant potential stressors whose scope and degree of completeness is limited by the restrictions inherent in conventional survey research only.
- Fourth, stressors and stress reaction are clearly not invariant to the actual number of stressors since stress reactions are functionally related, probably in a complex and non-linear manner, to the overall number of stressors. This, in turn, provides additional support why the new risk-chance based scale should be interpretable in terms of a net value for the overall number of stressors.
- Fifth, there exists a remarkable symmetry between the language of socio-economic risks and life chances on the one hand and the physiological stress language on the other hand. While risk and chances have been introduced symmetrically in the range of $[-1, 0 +1]$, a different range between $[-1, 0]$ can be identified for the stress domains. Feeling unsafe in the public sphere (socio-economic risk=stressor) does not have a life chance corollary in terms of stressors. Feeling safe in the public domain does not constitute an alternative source for positive stressors. Likewise, a noisy environment at the workplace or at home implies an essential socio-economic risk and at the same time an environmental stressor whereas a quiet atmosphere at work or at home cannot be associated with a different group of positive stressors. Thus, socio-economic risks can be linked to stressors, socio-economic life-chances imply, by and large, the absence of stressors.

7 On this literature, see more recently Walker/Pettigrew 1984 or Olson/Hafer 1996.

Figure 8.3a: Socio-economic Risks and Medical Stress Research. Different Degrees of Socio-economic Risks as Permanent Stressors

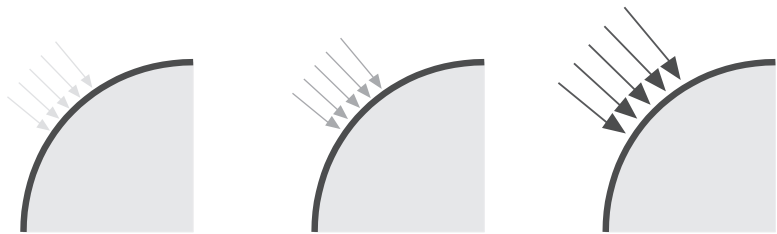


Figure 8.3b: Selected Relationships between Socio-economic Risks and the Internal Stability of Actors

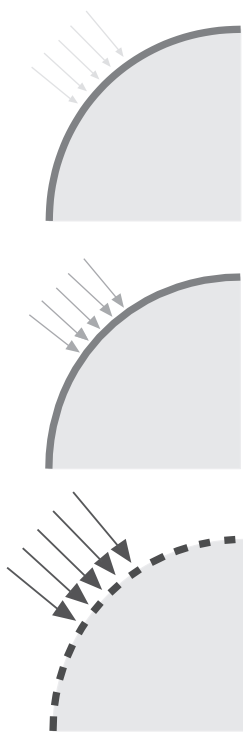


Figure 3 captures the new view of the linkages between socio-economic risk and medical stress research by differentiating between two different configurations. In Figure 3a one has relevant information on relevant stressors only, captured via the new inequality scale. In Figure 3b one possesses additional

survey information about the internal states as well as about the coping abilities of actors and is able, thus, to distinguish between various configurations (high internal stability / weak outside stressors, medium internal stability, medium outside stressors, low internal stability, strong outside stressors). In this way, a new bridge which links multi-dimensional living conditions, socio-economic risks, social inequality with medical stress and health research has been built up. Moreover, a considerably deeper common description-level can be obtained for these domains, namely the physiological description level of stressors and stress reactions. As a consequence, the links between the new inequality scale and the health status should increase significantly. Once again, the reference case is given by using conventional dimensions like income, level of education or social status.

Bridges to Evolutionary Theorizing

The third bridge towards High Theory leads from the new micro-foundations of contemporary risk societies to evolutionary frameworks and evolutionary theorizing. At first sight, a theory of evolution which emphasizes mutation and selection in the natural world seems too far away from living conditions and essential barriers in the socio-economic universe. Thus, a group of arguments will be built up why the notion of an evolutionary or ecological risk-framework is not simply a second best choice given that the best choice for a trademark, namely the concept of systemic risks, is already strongly connected with a particular risk perspective in general and with Niklas Luhmann in particular. On the contrary, the present approach on socio-economic risks and life-chances exhibits a substantial number of evolutionary deep-structures⁸ which may be difficult to detect at the surface but which move the socio-economic risk-life chance approach within the wider arena of contemporary evolutionary theorizing.⁹

First, the new risk and life chance approach can be applied primarily to a wide range of actors where the actor concept must be understood in an unusually

8 For reference points of the contemporary structure of evolutionary theory, see, among many others, Bendall 1983, Brooks/Wiley 1988, Casti/Karlqvist 1995, Dennett 1995, Ereshefsky 1992, Goodwin 1995, Kauffman 2000, Lloyd 1994, Margulis 1981/1993/1998, Maynard Smith 1982, Michod 1999, Oyama 2000, Oyama/Lewontin 2000, Riedl 1980, Rosen 1991, Shaffner 1999, Sigmund 1995, Skelton 1993, Skole/Goodwin 2000, Sober 1986 or Weiner 1995.

9 After an early mismatch between evolution and the social world under the heading of "social darwinism", a new intra-scientific integration is well under way in which societal dynamics, especially the economic side, is more and more conceived of and conceptualized as evolutionary. For the economics side, see, for example, Anderson/Arrows/Pine 1988 or Arthur/Durlauf/Lane 1997; for linking societal development with evolution, see, inter alia, Durham 1991, Fabian 1988, Freese 1997, Jones/Martin/Pilbeam 1995, Koch 1986 or Lumsden/Wilson 1981.

broad sense, covering not only persons or groups of persons like households but also organizations, again very broadly understood, like firms, voluntary associations, government agencies or scientific institutes. In addition, spatial ensembles like a city district, a county, a nation, a group of nations can be chosen as the basic focus for risk-analysis as well. Moreover, persons, organizations or spatial ensembles can be situated at different levels, ranging from local levels up to urban, regional, national, supra-national or global levels.¹⁰ Thus, the variable *x* in “*x* at risk” can assume values from individual persons, households, organizations or spatial ensembles.¹¹ Interestingly though, this scope of potential applications in socio-economic risk-research is structurally similar to the overall evolutionary framework where the analysis can be concentrated on a multi-level arena of individuals, species or spatial eco-systems as well. Additionally, the units of analysis are not to be confined to a specific reference set only like individuals in the case of socio-economic risk and life chance research or genotypes within the evolutionary framework. Rather, the units of analysis vary, depending largely on the structure of the underlying research question.

Second, the approach on socio-economic risks and life chances has its focus on characteristic features or dimensions of actors, organizations or spatial ensembles. These core features should be distributed over the internal as well as over the external side of actors, organizations or spatial ensembles. Thus, the cognitive-emotional organization, the sensory order of actors or the within-organization of organizations have to be as much part of the list of central characteristics as the specific interaction patterns or the frequency of interactions in specific actor contexts or organizational environments. Here, a more obvious link to evolutionary theory can be established since these essential features of the intra- and interaction potential of actors, organizations or spatial ensembles can be classified as important characters or traits. In turn, characters or traits have been a core concept within the evolutionary framework from its very beginnings. Darwin’s “Origin of Species” even starts with the observation of high variations in important characters of individuals within the same species (Darwin 1979) where important characters were located at the level of the individuals themselves as well as at the level of their habits or, alternatively, instincts.

10 On more elaborate versions on actors and multi-level configurations, see Hollingsworth 2002.

11 More concretely, in “*x* at risk” *x* can be replaced with the names of specific persons, with a special district in a city, with a particular life-course (youth, old people, etc.) or gender group (women, men), with a nation, with an occupational group (blue collar workers, technicians, etc.).

Third, the new socio-economic risk and life chance approach uses populations of actors, organizations or spatial ensembles and the distributions of characteristic features within specific populations as its only reference point for defining the thresholds for socio-economic risks or life-chances. Populations can be defined over the entire set of persons, organizations and spatial ensembles as well as over the entire range of levels (local, regional, national, supra-national, global). Due to this focus on specific populations and the distribution of important characters within a given population, an important deep structure link has been established with the evolutionary framework which from its very structure must be focused on specific populations or species and the distribution of core characters within given species. Otherwise, evolutionary concepts like fitness or catch phrases like the survival of the fittest would become completely tautological and void of any empirical content or predictive impact.

Fourth, socio-economic risks and life chances, defined for specific populations of actors or spatial ensembles constitute, thus, comparative advantages and comparative disadvantages in core characteristics of actors, organizations and spatial ensembles. Turning to evolutionary theorizing, comparative advantages and disadvantages of characters or traits have become the basic ingredients in the operationalization of measures of fitness, broadly conceived and in the construction of fitness landscapes.¹² Initially, no obvious link can be found between fitness in biological fields and risks and life chances within the social world. Nevertheless, socio-economic risks and life chances will be used to introduce a new risk-chance based scale, ranging for a given number of essential characteristics N from $-N$ (maximum number of socio-economic risks) to $+N$ (maximum number of socio-economic life chances). Upon closer inspection, this new inequality scale and the particular values on this scale offer one possible way to evaluate the overall position of an individual, an organization or of a spatial ensemble within their specific environments or, alternatively, within a particular population of individuals, organizations or spatial ensembles. Moreover, the various dimensions for socio-economic risks and life chances as well as the new risk-chance based evaluation measure can be used to construct specific risk-chance landscapes. In this sense, the new risk approach, too, is able to specify a general evaluation measure for the socio-economic world which fulfills the basic formal requirements for the evaluation measures

12 On this point, see especially Kauffman 1990/1993/1995.

within the evolutionary framework¹³ and to build up various landscapes of risks and chances for individuals, organizations, socio-technological systems or spatial ensembles.

Fifth, probably the most important link between the new socio-economic risk approach and evolutionary theory can be established when moving to the dynamics of risk and chances. From the construction of evaluation measures and risk-chance landscapes, it follows directly that individuals, organizations and spatial ensembles follow along specific trajectories within the risk-chance state space over time. The importance of such a measure can and should be seen, *inter alia*, in the formation of a general drift alongside the risk-chance- axis. In evolutionary theory, natural drifts (Maturana/Varela 1987:119pp.) have been defined as the general directions and tendencies in the results of repeated replications of the genetic make-up of biological species and organisms. Within the socio-economic risk-framework, the notion of a societal drift may be characterized as a general direction inherent in any of the risk-chance dimension. Thus, the evaluation measure in terms of risks and chances can be interpreted as an arrow or a gradient which manifests or reproduces itself in the course of recurrent day to day practices and in daily decision making. More specifically, the risk-chance axis implies that actors can be characterized in an (almost) tautological sense by a general disposition or preference for the selection or the search of chance-domains whenever such a selection or search process is possible or, alternatively, by the avoidance of risk-areas.

Sixth, despite the wide applicability of the socio-economic risk approach and of the social drift of risks and chances it must be clearly stated that the risk-chance axis is not a universal societal evaluation measure, being applicable to all essential characteristics of actors or spatial ensembles. For a socio-economic core dimension like partnership, it would be extremely difficult to attribute risk-chance values to the status of being single, married, living together with a partner, etc. Likewise, the fact that partnerships can be maintained without children, with a single child, with two children or with more than two children, cannot be transformed along the risk-chance dimension. Thus, even within a core domain like partnership, no meaningful and justifiable risk-chance attributions can be performed. Interestingly though, the same situation occurs for comparative advantage and disadvantages of important characteristics within the evolutionary framework since only a subset of core features is actually used when determining the fitness of individuals or species.

13 On formal requirements for fitness functions, see, for example, Kauffman 1990 or 1993.

As a consequence, both evaluation measures have their in-built restrictions and limitations and one has to select, thus, very carefully for which types and classes of variables an interpretation in terms of risks and chances or comparative advantages and disadvantages in fitness can be applied.

Seventh, like in the evolutionary framework generally, the new socio-economic approach to risks and life chances is compatible and dependent on a wide range of patterns and trends which cover all possible configurations from linear and gradual types to non-linear and chaotic configurations. Thus, like in the wider evolutionary contexts, the close semantic affiliations between evolution and gradualism has to be replaced entirely by a new semantic map where gradualism, linearity or point-attractors become just one of many possible dynamic configurations for evolutionary processes both in the natural and in the social universe.¹⁴

Table 8.5: Deep Structural Similarities and Homologies between the New Micro-foundations and Evolutionary Theory

	Socio Economic Risk Approach	Evolutionary Framework
Domain	Actors, Populations of Actors, Spatial Ensembles	Individuals, Species, Eco- Systems
Focus	Essential Characteristics (Internal/ External) of Actors and Spatial Ensembles	Important Traits (Internal/ External) of Individuals, Species and Eco-Systems
Core concepts	Risks and (Life) Chances	Comparative Advantages and Comparative Disadvantages
Populations as reference point	Thresholds for Risks and Chances Dependent on Population Distribution	Thresholds for Comparative Advantages and Disadvantages Dependent on Population Distribution
Evaluation measure	Risks and Chances as Constituents for an Inequality Measure and for Risk-Chance Based Landscapes	Comparative Advantages and Comparative Disadvantages as Constituents for Fitness Measures and for Fitness Landscapes
Dynamics	Risk-Chance Drifts	Natural Drifts
Types of dynamics	All Possible Forms, Including Path-Dependencies and Memory-Effects	All Possible Forms, Including Path-Dependencies and Memory Effects

Theses seven arguments combined offer sufficient grounds why the new approach to risks and life chances will run as evolutionary or, alternatively, as ecological framework.

¹⁴ On the entire range of dynamic patterns, see, among others, Casti 1992/1994/1996/ 1997/2000.

Outlooks

In a series of two articles a new micro-perspective has been presented which can serve as a comprehensive basis for the analysis of the micro- and macro-dynamics of contemporary risk societies. It will require additional articles in order to demonstrate that the micro-components proposed by Ulrich Beck and Niklas Luhmann can be easily integrated into the newly established micro-foundations. And it will take many more articles, research reports and books to explore the empirical as well as the theoretical potential inherent in this ecological or evolutionary approach on risks and life-chances.

Part IV

Empirical Analysis and Examples

9 Living Conditions, Socio-Economic Risks, Inequality and Health. Establishing New Theoretical Foundations and Closer Empirical Linkages

This chapter presents new theoretical as well as empirical perspectives which strongly contradict the conventional wisdom on the inter-relationships between living conditions, socio-economic risks, social inequalities and the state of health within and across contemporary societies.

* * *

Part I will summarize the “received views and will show that from a theoretical point of view the problem of linking living conditions, conceived in a diversified and multi-dimensional manner, inequality, socio-economic risks and health simultaneously has produced, so far, an empty set of conceptual solutions. Multi-dimensional approaches towards living conditions, running under the headings of life-styles, have lost their vertical inequality dimension, conceptions of contemporary risk societies have been constructed beyond the domains of socio-economic living conditions, viable research traditions on stratification and inequality bear no relations with health issues and current research on inequality and health uses a very narrow focus of economic inequality and income distribution only. From an empirical perspective though, the need for integrating socio-economic risks, living conditions, broadly understood, inequality and health is of only marginal relevance since the linkages between these different domains, expressed in statistical measures like correlation coefficients, are comparatively weak and, moreover, are undergoing a process of gradual dissolution.

Within Part II, a new evolutionary approach on socio-economic risks and on socioeconomic risk groups will be introduced which embeds risks into objective as well as subjective dimensions of living conditions. Additionally, the new operationalization of socio-economic risks will be accompanied by the introduction of a complementary notion, namely by the concept of socio-economic life chances. Consequently, socioeconomic risks and life chances will be used for the construction of a new vertical scale for societal inequalities and disparities, with risk-accumulation on the lower end of the scale and life

chance accumulation on the upper end. Moreover, the new vertical scale on inequality will be able to capture the multi-dimensional and heterogeneous aspects of post-industrial or, alternatively, postmodern lives.

In Part III, it will be demonstrated that the new vertical scale based on risks and chances fulfills the essential empirical requirements for a measure of social inequality. Using the EUROMODULE-data from five countries (Switzerland, Germany, Spain, Slovenia, Hungary), it will be shown that socio-economic risk accumulation is accompanied by low income and by low degrees of education and qualifications and affects a significantly higher proportion of women whereas, towards the upper end of the scale, accumulated life chances are strongly linked with high income, high qualifications and a significantly higher share of the male population.

Part IV will extend the new platform on socio-economic risk-analysis and inequality to the health domain. In doing so, it will generate surprisingly strong and powerful linkages between the position on the new inequality scale and overall life satisfaction, on the one hand, and the state of health on the other hand. More concretely, the new approach towards risks and inequality will provide substantially new empirical evidence on the direct impact of unequal socio-economic living conditions on overall life satisfaction, on the state of health in general and on ailments, mental health or sicknesses in particular.

Towards the end of the paper, a short note on the neuro-physiological basis for these new patterns will be provided which should give additional justification to the new evolutionary perspective on multi-dimensional living conditions, socio-economic risks, inequality formations and the state of health.

The article will start with a summary of guiding assumptions and empirical hypotheses which capture the essence of the available knowledge base in the interface domain of living conditions, socio-economic risks, inequalities and health. As often, niche-buildings, disciplinary boundary formations and gate-keepings within the social sciences, social psychology and medical research have created as a largely un-intended side-effect a practically empty set of theoretical answers for the important questions on the inter-relationships between living conditions, inequalities and health on the one hand as well as a powerful empirical justification on the irrelevance of establishing such an interface-platform on the other hand.

The Conventional Wisdom on Socio-Economic Risks, Inequalities, Multi-Dimensional Living Conditions and Health

The conventional wisdom on the linkages between living conditions, inequality, risks and health can be captured in the following eight guiding assumptions, five of them theoretical, three empirical in content:

- First, multi-dimensional approaches on living conditions (see esp. Schulze 1992) have become, by and large, horizontally stratified, loosing their vertical dimensions in the course of widening the relevant socio-economic dimensions. Thus, current life-style frameworks, while focusing on a broad range of living conditions and socio-cultural practices, have become by and large unable to arrange the resulting life style formations into a vertical ordering.
- Second, with respect to Weberian or Neo-Weberian approaches (see e.g., Blau/ Duncan 1967, Giddens 1973, Hodge 1981), the main emphasis on social inequality goes hand in hand with substantial restrictions on the admissible set of socioeconomic resources and living conditions. In sum, the actual space utilized for the Weberian status groups is only covering a small domain of the much broader range of post-industrial lives (Hage/ Powers 1992).
- Third, current class-approaches with multi-dimensional scope and vertical stratification, especially the frameworks by Pierre Bourdieu (1982/1985) or Eric Olin Wright (1997), exhibit significant shortcomings to incorporate the domains of socioeconomic risks and health conditions and are in all probability ill-suited to be able to integrate these field into their research program.
- Fourth, the concept of risks and risk-societies has been developed, especially within the German sociological tradition, in a highly specialized manner, restricting the notion of risks to contemporary technological advances within a post-industrial societal development stage (Beck 1986) or to decisions under conditions of uncertainty and accountability (Luhmann 1991). Thus, within current societal risk-research, no pattern between risk-societies and social inequalities or health has been established.
- Fifth, recent advances in linking health with socio-economic conditions (especially Wilkinson 1996), have been concentrated on a small set of economic variables only and have, thus, neglected the multi-dimensionality of contemporary living conditions. Besides, the wide arena of socio-economic risks, apart from monetary risks, has not been incorporated within the fifth theoretical tradition.

In effect, a trade-off has been produced between a new emphasis on postmodern living conditions and a new wave towards individualization on the one hand and vertical stratification on the other hand. Interestingly though, this trade-off can be substantially reduced in its cognitive impact since three essential empirical findings have been identified on the relatively weak or marginal linkages between multi-dimensional living conditions, socio-economic risks, inequality and health.

- Sixth, the linkages and correlations between essential dimensions of living conditions, traditionally associated with social inequality like qualifications or income, and subjective general performance assessments like overall life satisfaction turn out to be significant, though rather weak.¹
- Seventh, significant, but moderate and weak linkages only can be identified between the key indicators of vertical inequality like income and education with the general state of health.
- Eighth, for highly advanced societies the links between core-inequality indicators like income or education with subjective self-assessments are considerably weaker than in the transformation societies of Central and Eastern Europe or for advancing societies in general. Similarly for the health domain, the correlations between inequality indicators and health become weaker still in the case of highly advanced nations.

Thus, the course of modernization or post-modernization produces apparently a pattern of growing independence between overall self-assessments, health and the cognitive-emotional organization of actors on the one hand and their socio-economic resources and living conditions on the other hand. Within the first section, these eight guiding assumptions will be discussed in greater detail and with the help of empirical data as well.

The Failures of Incorporating Inequality and Risks into Multi-Dimensional Approaches of Living Conditions

The first path within the current theory space along the dimensions of multi-dimensional living conditions, risks, inequality and health starts with a broad view on living conditions, synthesizes and clusters these multiple dimensions into different “life styles” and loses in the course of clustering the vertical dimensions of inequality or socio-economic risks for that matter.

1 In more precise terms, correlations are to be qualified as (weakly) [medium], (strongly) significant iff they fall into the range of (0.1 to 0.25) [0.25 – 0.4] > 0.4}

The subsequent discussion will have its focus mainly on Gerhard Schulze's book on „Erlebnisgesellschaft“ (1992). Here, a representative sample of roughly 1000 persons from the city of Nuremberg has been selected and a large number of questions on cultural practices or on daily routines of information gathering have been asked. In the theoretical core of Schulze's work lies a universal social grammar (Ibid 243pp.) which, at least according to Schulze, is capable to detect and identify hidden homologies between inhomogeneous and seemingly contradictory or incoherent domains. At various places, Schulze speaks of a latent pattern which connects diverse surface appearances or of a universal pattern in the relation between actors and their environment or worlds (Schulze 1992:36).

Essentially, Schulze uses age and education as the basic socio-demographic dimensions in order to differentiate between five different milieus or lifestyles, namely between an entertainment-milieu (age low, education low), a harmonious milieu (age high, education low), a self-realization-milieu (age low, education high), an integrative milieu (age high, education medium) and a distinctive high-level milieu (age high, education high). Each of these five milieus is characterized by specific recombinations between dominant forms of style which are summarized under the headings of high culture, trivial culture or excitement/event culture.

Within the present context, the most important critical finding lies in the fact that the new life-style typologies which have been able to integrate large proportions of everyday routines and cultural practices, widely conceived, have lost the vertical dimension of inequalities almost completely. While these five life-styles can be arranged within a two-dimensional field, consisting of degrees of education on the one hand and age on the other hand, vertical distances and vertical inequalities have been largely reduced and replaced by horizontal disparities of self-contained clusters of socio-cultural practices. Additionally, classical problems of upward and downward mobility are substituted by new rites of passage, with age being a key determinant to change from one lifestyle-cluster to the next. Furthermore, problems of inter-generational inequality and mobility seem to have been reduced to marginal issues since the universal grammar sub specie Schulze reproduces these different clusters in the way it is supposed to reproduce them, namely universally. Finally, the potential space for socio-economic policies has been greatly reduced, too, since these self-sufficient clusters do not lend themselves easily to intervention or compensation.

Apparently, Schulze's analysis and many other life-style studies² are subject to a critical trade-off which can be summarized in the following manner. Relying on a small number of objective inequality indicators like income, education or status loses its linkages with overall self-assessments rapidly since many aspects and dimensions of cultural and everyday practices have not been included. Taking the diversified set of habits and routines in areas like information, housing, arts and culture, media or fashion into account, the resulting life styles have lost their connections with vertical dimensions and inequalities almost completely.

The Failures of Incorporating Risks and Health into Multi-Dimensional Approaches of Status-Groups

Second, within Weberian or Neo-Weberian approaches³, two clearly vertical stratification perspectives are opened up by distinguishing, on the one hand, classes and the economic order from status groups and the world of the social order. Classes are defined on the basis of the position and of the interests within capitalist markets which determine, to use a central Weberian term, the life-chances of large groups of individuals. Status-groups, on the other hand, are conceptualized as specific communities, sometimes of an amorphous kind, where the distinctive elements are determined on the basis of a specific social estimation of honor and on particular life-styles which have become another core Weberian notion. Classes and status groups, the economic and the social order, are performing, according to Max Weber, any type of societal dance, sometimes very intimately linked, probably more often than not, opposed to each other and at times in aggressive disharmony.

While the conceptual differentiation within Weber's own work still can be considered as remarkably complex and multi-dimensional, the subsequent empirical research trajectories along Weberian lines suffer from the peculiar fact of being too highly reduced in their conceptual complexities. The wide design spaces for Weberian classes and status groups have been severely under-utilized so far since the index constructions leading to status scales are either based on occupational ratings or on small sub-sets of a considerably wider group of socio-economic indicators on living conditions or life-styles.

2 For other life-style studies, see for example Spellerberg 1996, Schneider/Spellerberg 1999 or for an interesting summary Matjan 1998.

3 For a summary on the Weberian tradition, see Parkin 1979, Sørensen 1991/1994 or Treiman 1977.

Thus, the Weberian and Post-Weberian traditions have retained their emphasis on vertical stratification, but apparently at the expense of restricting the multi-dimensionality of life styles and the social order to a small number of key variables only. Consequently, the available Weberian or Post-Weberian platforms simply have become too narrow for linking them with additional notions like risks and health-conditions. This situation is unfortunate since it would have been relatively easy to introduce risks within the context of life chances and of exclusion processes. Nevertheless, it would become far too risky to base socio-economic risks on a small number of empirical key variables only.

The Failures of Incorporating Risks and Health into Multi-Dimensional Approaches of Class-Analysis

The third integration attempt starts with current frameworks on class formation and vertical stratification and tries to integrate multi-dimensional living conditions within its overall framework. However, the traditional or post-traditional perspectives in this domain (for a most comprehensive summary, see Grusky 1994) share a fundamental shortcoming due to the clearly under-complex conceptual frameworks for reducing the complexities of current living conditions.⁴ Basically, three types of arguments can be put forward to support the assessment of a failure strategy.

Referring to contemporary class-analyses as advanced by Pierre Bourdieu (1982, 1985) or by Eric Olin Wright (1997), the main argument rests basically on too little diversity in the underlying class-concepts, including Bourdieu's habitus formations. In essence, two main-dimensions in the case of Wright (relations to means of production (including power relations) and qualifications (expert/skilled/non-skilled)) or the three Bourdieu dimensions with economic, social and cultural capital do not reach the requisite dimensional variety necessary for mastering the highly heterogeneous life-courses of individuals or households. Taking, for example, Ulrich Beck's phenomenology of lifestyles and life-courses within his framework of contemporary risk-societies seriously⁵, one needs highly diversified multi-dimensional instruments in order to be able to identify vertical differences and social inequalities between individuals or households across different regions, age groups, gender-groups

4 For an interesting summary and discussion see e.g., Giddens 1989:209pp.

5 For a summary, see e.g. Beck/Beck-Gernsheim 1994, Beck/Sopp 1997, Beck/Erdmann Ziegler 1997.

and the like. This argument of an under-critical conceptual core can be put in the format of a *reductio ad absurdum*.

Suppose there is the desired Bourdieu/Wright reference set of few class variables, taken from relations of productions (Wright) or from a more diversified three-dimensional capital space (Bourdieu), then this reference set has to be classified as exogenous in a very strong sense, being capable to explain empirical processes of attitude formations or living conditions – and being itself unexplainable by any of these factors. The reference set must act or function as a singular generator and effector for the empirically accessible diversity of life styles and attitudes. The main problem for such a restricted variable set arises from the multiplicity of different domains with different velocities in their adjustment processes and pattern formations. The realm of living conditions, political attitudes or civil practices is characterized by a high heterogeneity from very rapid to extremely slow process velocities so that any small set of key determinants or core factors is confronted with an insurmountable problem, namely with the lack of "requisite variety" (W. Ross Ashby) in the underlying conceptual apparatus. The small set of exogenous key factors lacks, by necessity, a sufficient amount of requisite variety in order to accommodate for the extremely wide and diversified range of process velocities and pattern formations which have become characteristic for contemporary societies. In other words, an instrument capable of explaining very heterogeneous domains alike must be itself very heterogeneous and diversified, too. Thus, any small set of key factors cannot achieve the necessary requisite variety and cannot cope, thus, with the heterogeneity of living conditions, life courses or attitude changes.

Due to the under-critical conceptual apparatus, multi-dimensional living conditions would have to be included into a class-analysis framework as additional components. However, such a strategy runs counter to the conceptual core of class-analysis, especially in the case of Pierre Bourdieu. But for Eric Olin Wright too, the problem of integrating living conditions into class analysis means for him to study the effects of class formations on living conditions in a peculiar way for which Wright uses a seemingly compelling analogy from medical research.

Class analysis is based on the conviction that class is a pervasive social cause and thus it is worth exploring its ramifications for many social phenomena ... Understood in this way, class analysis is what might be called an 'independent variable' specialty. It is a discipline like endocrinology in medicine. If you are

an endocrinologist you are allowed to study a vast array of problems – sexuality, personality, growth, disease processes, etc. – in addition to the internal functioning of the endocrine system ... Endocrinology is monogamous in its explanatory variable – the hormone system – but promiscuous in its dependent variables. (Wright 1997:1)

Though considerably weaker, this version has the distinctive disadvantage that a large amount of "independent variable specialties" are available, in principle. Take age groups, cohorts, gender, regional differentiations or life-styles, to mention just a few, then one could justify their relevance for socio-economic analysis in Wright's own terms, namely "that age (cohort, gender, life style, region) is a pervasive social cause and thus it is worth exploring its ramifications for many social phenomena." In the end, the socio-economic endocrine system turns out to be itself highly "promiscuous".

To conclude, the two most advanced class approaches by Pierre Bourdieu and Erik Olin Wright are by their very structural organization unable to integrate multidimensional aspects of current living conditions, including, above all, the aspects of attitudes and self-assessments. Thus, it would be ill-founded to link socio-economic risks with second-best approaches.

The Failures of Integrating Inequality and Multi-Dimensional Living Conditions into Frameworks of Societal Risks

As a fourth trajectory in theory space, the two most prominent sociological perspectives on risk and risk formations⁶ in contemporary societies have been presented within a relatively short period during the late 1980ies, namely in Ulrich Beck's "Risikogesellschaft" (Beck 1986) and in Niklas Luhmann's views, culminating in a book on risk five years later (Luhmann 1991).⁷ In his national Post-Chernobyl bestseller, Ulrich Beck uses the pattern of a phase transition between two stages in modernity as a general platform in which the notion of risks receives its proper attention. The initial stage is characterized, not surprisingly, as industrial or traditional capitalism. Driven by inner or endogenous necessities, industrial capitalism is superseded, however, by a new phase which has been labeled as risk society. Put briefly, risk societies have become the current stage in the capitalist evolution and a generalized logic of risk-production, in contrast to the logic of wealth production of the in-

6 For a historical-conceptual summary on the emergence of risk, see, *inter alia*, Bernstein 1996, Bonß 1995.

7 On additional literature on risk-research especially within the German tradition, see Baecker 1988, Banse/Bechmann 1998, Japp 2000.

dustrial phase, stands at its center. But despite a phase transition towards risk societies, socio-economic risks and inequalities have not found their way into Beck's framework. Rather, for Beck the question of social inequality seems to undergo a transformation itself, namely a secular change from vertical to horizontal forms. At various points, Beck gives the impression that social inequalities belong basically to the domain in which they originated in the first place, namely to the phase of industrial capitalism. Thus, combining Beck's framework with vertical social inequality runs the serious risk of contradicting the main structure of his transformation argument.

Niklas Luhmann, on the other hand, stresses the formation of risk production within the context of highly differentiated and highly complex social systems. In order to comprehend the bottom line of the argument, it is important to emphasize that Niklas Luhmann distinguishes, on the one hand, risks from dangers and, on the other hand, risks from damages or accidents. For Luhmann, risks are always conceived as *ex ante* and under the auspices of accountability whereas dangers like a potential earthquake, while likewise *ex ante*, are introduced under the conditions of non-accountability. Damages and accidents, on the other hand, are always occurrences *ex post* and can be viewed either as accountable – the effects of an actual high-technology accident – or as non-accountable like in the case of the impact of an actual earthquake. Another important distinction for Luhmann lies in the differentiation between risk-actions and risk-systems. The latter are to be considered as any organized societal ensemble, ranging from marriages up to very large scale transnational enterprises. Due to the increasingly internal as well as external complexities, decisions within large scale risk systems have to be undertaken in view of growing uncertainties and in view of non zero probabilities for massive failures or large-scale accidents. Niklas Luhmann goes on to provide a fascinating array of examples which demonstrate various strategies of risk aversion or, above all, risk transfer from the inner side of complex risk-systems into their environment. Despite several illuminating insights, the overall framework is too weak a foundation for being able to incorporate social inequalities into its research agenda. Core domains of socio-economic risks like poor qualifications, hazardous working conditions or weak coping capabilities cannot enter into Luhmann's decision-based framework which, like Beck's approach, does not lead even near the domains of social inequality.

The Failures of Incorporating Risks and Multi-Dimensional Living Conditions into Analyses of Inequality and Health

As a fifth major theoretical integration failure, current approaches linking health with social inequality suffer from the fact that they are centered on a small segment of available living conditions only, namely on income, financial poverty and income distribution. Highlighted, above all, by Richard Wilkinson's "Unhealthy Societies" (1996), a set of compelling arguments has been established on the close and direct linkages between income inequalities and the state of health.⁸

First, Wilkinson was able to stress the importance of the shape of income distribution as the key economic factor for the overall state of health. As an essential consequence for social and health policies, Wilkinson demonstrates convincingly that improving the absolute levels of income or living standards plays a clearly secondary or marginal role when compared to changes in the income distribution towards a more egalitarian shape. Second, in his book Wilkinson was able to show (*Ibid.*, 113–172) how a wide class of ailments, sicknesses or mental disorders is relatively closely linked with a more general phenomenon which has been characterized by him as social cohesion. Once again, social cohesion varies significantly with different shapes of the income distribution, being high for egalitarian societies and low for very unequal societal formations.

Third, Wilkinson produces a substantial amount of cross-country evidence on the heterogeneity and of the high variety in national mortality rates as well as on their links with socio-economic positions. France, for example, exhibits large inequalities in alcohol-related causes of death but shows relatively insignificant linkages between socioeconomic positions and death from heart diseases. Sweden and England, on the other hand, exemplify relatively small connections between socioeconomic strata and cancer mortality but strong links between death from heart diseases and low socio-economic positions. Adding the example of death from violence with a strong socioeconomic component in the United States it becomes relatively easy to generalize that both mortality and morbidity rates across various regions or nations are dependent to a significant extent to particular life-styles within these regions and nations.

8 On recent literature of the links between health and society, see for example Davey/Gray/ Seale 2001, Lupton/Najman 2001 or Petersen/Waddell 1998.

Fourth, Wilkinson puts forward a powerful conjecture on a new globalization pattern whereby local, regional or national socio-economic groups across the world at the upper end of the socioeconomic scale become increasingly homogeneous whereas the local, regional or national sections of society at the lower side of the vertical scale are subject to particular spatial clusters of morbidity and mortality.

The way of life of the upper socioeconomic groups in each country is more internationalized and so more homogeneous across countries. In contrast, lower socioeconomic groups are perhaps more likely to show the cultural characteristics particular to each country. (Wilkinson 1996:153)

Impressive as it stands, Wilkinson's book fails, however, to integrate a wider class of living conditions, both of the economic and, above all, of the social variety. While Wilkinson has put a renewed emphasis on the close linkages between income, income distribution and health-issues, he fails to create a sufficiently wider socioeconomic framework which would account for essential living conditions outside the narrow confines of incomes or income distributions.

The Weak Links between Subjective General Self-assessments and Objective Dimensions of Social Inequality

With the present section, a shift from theoretical frameworks to empirical results has been undertaken. Within this paper, a large comparative data-set has been used and analyzed which has been compiled under the auspices of Wolfgang Zapf at the Science Center Berlin and which, under the heading of EUROMODULE⁹, provides a comprehensive picture of living conditions both in their objective as well as in their subjective dimensions in five countries, namely in Switzerland, Germany, Spain, Slovenia and Hungary.¹⁰

From Diagram 1, two general conclusions can be drawn.

First, general self-assessments like overall life-satisfaction are significantly, though relatively weakly linked with a core class of socio-economic indicators which reflect, on the one hand, essential attributes of actors and are strongly associated, on the other hand, with social inequality. Thus, the degree of

9 For a Euromodule-documentation, see Delhey/Böhnke/Habich/Zapf 2001.

10 It can be safely assumed that in the course of the next months, the number of countries will increase substantially so that the EUROMODULE produces a highly interesting comparative data set which is able to monitor existing dimensions of individual welfare, including the subjective side of self-assessments and evaluations.

education as well as the total household income have been selected from the data-set and a correlation analysis has been performed with overall-life-satisfaction. In Diagram 1, one clearly recognizes that these correlations are situated in the range between zero and 0.3 and are to be qualified in most instances as significant, though rather weak or of medium significance only.

Diagram 9.1: The Weak Correlation between Income and Education with Life Satisfaction and Health

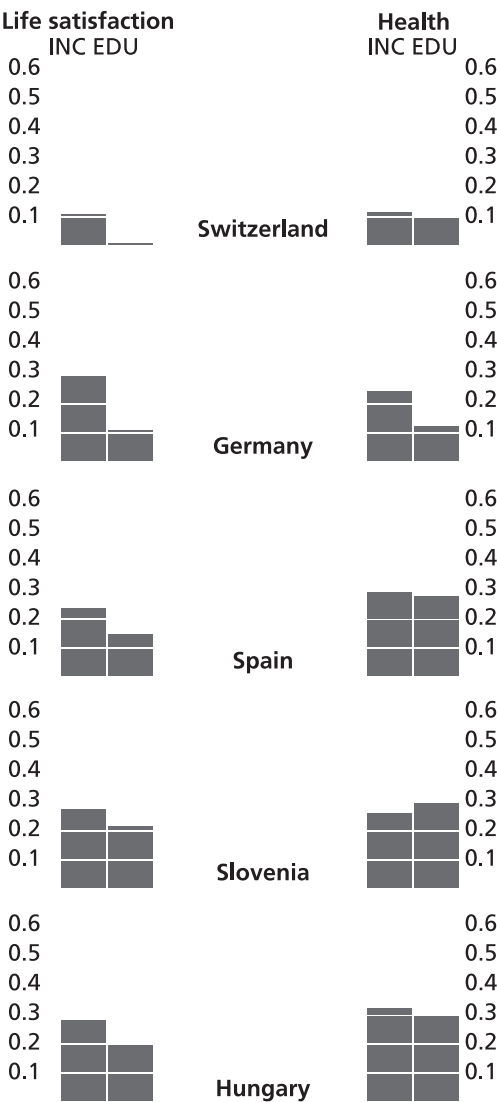
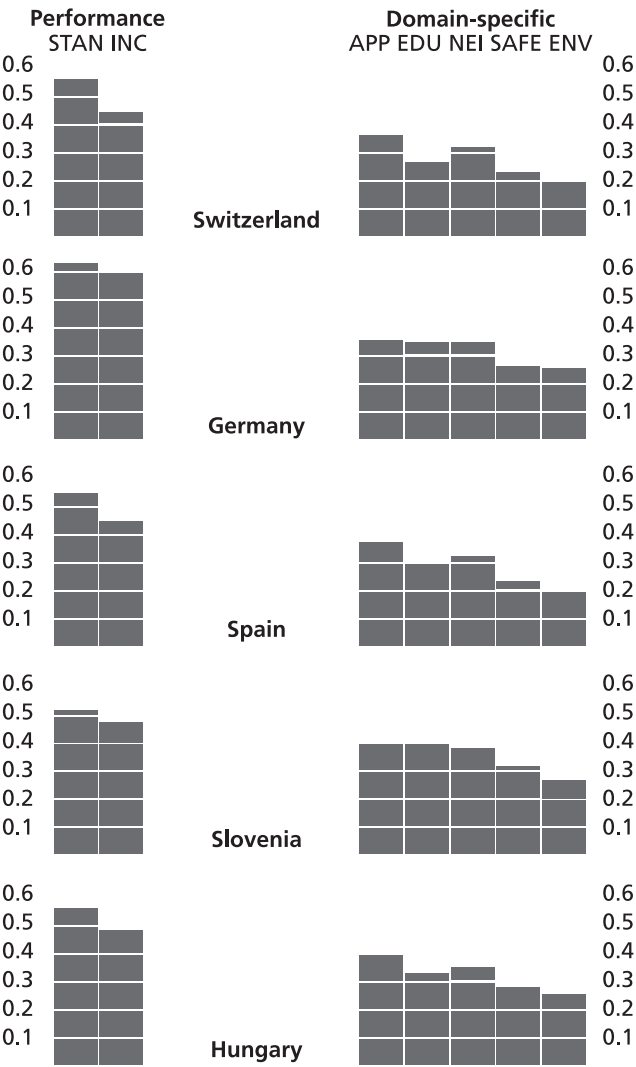


Diagram 9.2: The Strong Correlations between Different Forms of Overall Self-Assessments and the Relatively Weak Correlations between Overall and Specific Evaluation Domains



Second, household income and qualifications differ rather substantially with respect to their correlation patterns with overall life satisfaction since in all instances one can observe higher degrees of correlation between household income and life satisfaction than between educational degrees and life satisfaction.

The Weak Links between Social Inequality and Health

Similarly, the links between the main inequality indicators like income or education with the general state of health can be assumed to be rather weak only. The right hand side of Diagram 1 captures the relevant empirical evidence and strongly supports the seventh guiding hypothesis, presented at the outset of the article. Looking at all five countries within the EURO-MODULE set, one detects a slightly more heterogeneous picture since one does not observe the same uniform rank-ordering across all countries between income and health on the one hand and educational degrees and health on the other hand. In one country (Slovenia), the educational degree is higher correlated with health than the income-health linkage whereas in the other four countries the same type of rank ordering persists that has been already found in the case of overall life satisfaction.

The Weakening Patterns between Societal Developmental Levels, Social Inequality and Overall Life Satisfaction

In contrast to the weak linkages between general subjective assessments and health on the one hand with social inequality on the other hand, Diagram 2 points to the fact of strong correlations between three different indicators assessing general subjective performances, namely between overall life-satisfaction, satisfaction with standards of living and, finally, income satisfaction. These high correlations must be emphasized especially in view of the fact that the auto-correlation of overall life-satisfaction with itself turns out to be roughly of the same numerical size than the correlation between life satisfaction and standards of living.¹¹ Thus, the three indicators of overall life satisfaction, satisfaction with living standards or income satisfaction should be seen as highly similar performance measures, assessing and evaluating the general state or position of an individual actor.

Additionally, Diagram 2 makes it rather obvious that assessment questions are not strongly correlated with each other simply by their virtue of being self-assessments. Taking more specific assessment indicators like satisfaction with one's home (APP), with the educational level (EDU), the neighborhood (NEI), public safety (SAFE) or the state of the environment (ENV), one can

11 As a highly illuminating, non-intended experiment, the question of overall life-satisfaction has been included in the 1984 Welfare Survey twice in the questionnaire, the first time at the beginning and the second time towards the end. The auto-correlation of the identically phrased life-satisfaction question turned out to be 0.6 only which is, following Diagram 2, roughly the same value than the correlation between overall life satisfaction and standard of living. (See Glatzer 1984, Zapf 1984)

immediately recognize a marked discrepancy between general performance assessments on the one hand and specific domain assessments like the environment and public safety on the other hand.

Thus, in view of Diagrams 1 and 2, a strong final guiding assumption can be put forward which assumes weaker linkages between social inequality and subjective wellbeing in the course of societal complexification and diversification. Using performance measures for societal development levels or, alternatively, for societal complexity like GDP per capita, highly complex modern or postmodern societies like Switzerland and Germany exhibit lesser and weaker linkages between social inequality and subjective well-being than societies in Central and Eastern Europe like Slovenia and Hungary, while Spain, quite consistently, occupies a middle position. In this sense, the problem of the linkages between social inequality, living conditions, risks and health has lost its urgent and immediately relevant aspects since it belongs to the class of self-eliminating problems only, disappearing in the course of further societal development and evolution altogether.

Thus, the theoretical failure to integrate socio-economic risks, inequality, multidimensional living conditions and health is entirely compensated by the empirical evidence that an ever-weaker pattern connects these domains and will eventually vanish in the not too distant future.

Socio-Economic Risks and Life-Chances within an Evolutionary Context

Despite the initial failure of combining existing frameworks on risks, inequalities, multi-dimensional living conditions and health and despite the empirical evidence on decreasing linkages between these arenas, four unusually strong hypotheses will be proposed, three of them empirical, one theoretical, which run counter to the previously established conventional wisdom.

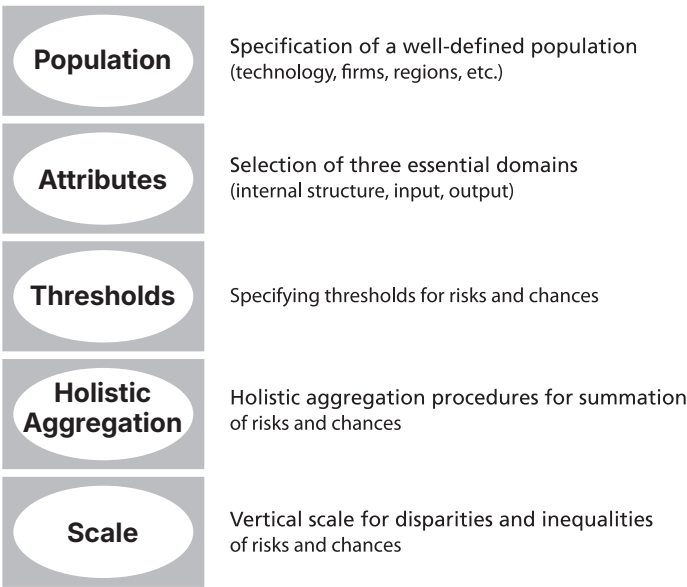
- First, starting with the empirical side of socio-economic risks, living conditions, inequality and health, the linkages and correlations between multidimensional living conditions, newly aggregated, and subjective general performance assessments like overall life satisfaction turn out to be not only significant, but strongly significant.
- Second, significant and strong linkages can be identified between vertical inequality, newly conceived, and the general state of health.
- Third, for highly advanced societies the linkages between objective inequality indicators with subjective self-assessments are almost at the same levels than in the transformation societies of Central and Eastern Europe

or in advancing societies in general. Similarly, the linkages between inequality indicators and health remain almost constant for highly advanced nations or for the advancing regions of Central and Eastern Europe. Thus, the course of modernization or post-modernization does not lead to a pattern of growing independence between overall subjective self-assessments or health on the one hand and their objective living conditions and inequality on the other hand.

- Fourth, in order to support these three counter-intuitive and, in view of Diagrams 1 and 2, seemingly risky assertions, a new approach will be built up which is able to combine and integrate multi-dimensional living conditions, socio-economic risks and inequality.

In order to provide strong empirical evidence for the three empirical claims, the comprehensive EUROMODULE-data-set with five different European countries, two of them EU-members (Germany, Spain), two of them accession countries (Hungary and Slovenia) as well as a highly advanced neutral country outside the EU (Switzerland) has been selected. In doing so, the three alternative hypotheses proposed above would have to be highly robust in nature since the economic, cultural or institutional differences between these five countries are even at first sight considerable.

Diagram 9.3: Five Steps towards Combining Multi-Dimensional Living Conditions, Socio-Economic Risks and Inequality



Initially however, a unified framework on living conditions and risks has to be built up. In order to achieve this goal, five analytical steps must be performed which have been summarized by Diagram 3.

Following Diagram 3, the first step, namely the specification of a well-defined population, has been accomplished already since five populations from five countries have been selected.

The second step requires the construction of a comprehensive set of indicators which capture multi-dimensional living conditions across a wide range of domains. Here, Table 4 gives a summary of the fourteen socio-economic dimensions chosen. From Table 4 one can see that the socio-economic dimensions have been clustered into two main groups, namely into a first set which reflects both available socio-economic resources (income, education) or living conditions (number of rooms, actual living standards) and into a second group which is focused on the internal domain of cognitive-emotional organization in general and on specific self-evaluations in particular.¹²

Table 9.4: Fourteen Dimensions for Socio-Economic Risks and Chances in the EURO-MODULE¹³

Dimensions	Risk Domain	Indifference Domain	Chance Domain
Number of Rooms	Low	Medium	High
Social Networks	Low	Medium	High
Actual Living Standards	Low	Medium	High
Household Income	Low	Medium	High
Income Changes to Last Year	Low	Medium	High
Make Ends Meet	Low	Medium	High
Educational Degree	Low	Medium	High
Satisfaction with Apartment	Low	Medium	High
Satisfaction with Neighborhood	Low	Medium	High
Satisfaction with Public Safety	Low	Medium	High
Satisfaction with Environment	Low	Medium	High
Job Satisfaction	Low	Medium	High
No Influence (Anomia)	High	Medium	Low

12 At this point it should be noted that a highly promising interface domain is opened up, linking social survey research with the broad arenas of the cognitive sciences or artificial intelligence. More specifically, the internal cognitive-emotional organization of actors could and should be operationalized as an inter-disciplinary effort between cognitive scientists and survey researchers. For a selection of potentially relevant literature, see for example Damasio 1994/1999, Dennett 1986/1991, Hofstadter 1982, Hofstadter/Dennett 1982, Hofstadter 1985, Minsky 1991 or N_rretanders 1998.

13 More specifically, the following variables have been selected from the EUROMODULE data-base: V1, V4, [V13, V14], V21, V24, V26, V27, V33, V40, V49, V52, V54, V55a plus the degree of education.

As third step along the PATHS-line, the concept of socio-economic risks has to be introduced and specific risk-thresholds have to be specified. This move has been accomplished basically in two stages which can be visualized with the help of Diagram 4.¹⁴ On the one hand, the fourteen essential socio-economic dimensions in Table 4 have been subdivided into three different segments, namely into a risk-segment, an intermediate segment and, finally, into a segment of life-chances. On the other hand, the lowest 25 to 33% of a population in a specific dimension have been defined as being at a socio-economic risk, the upper 25 to 33% of a population as being in a life chance position, while the intermediate group has been characterized as being in an indifference position.

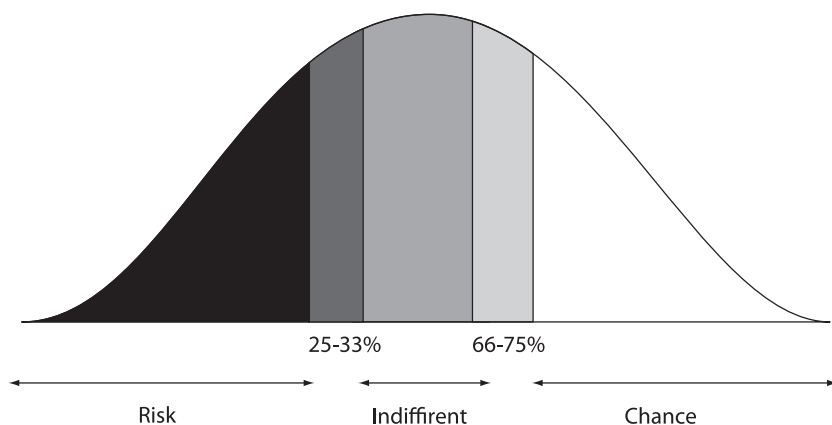
It should be added that these specific thresholds for socio-economic risks and life chances have been selected for each of the fourteen dimensions as well as for the five EUROMODULE-countries separately. Thus, the distribution of the Hungarian or German population in areas like income, education, or anomia determined the choice of the specific risk and chance thresholds in each country. In this way it has been guaranteed that different levels of risk-thresholds have been generated for each country which, in turn, can be compared separately and may give rise to a rather illuminating comparative study of being at socio-economic risk in specific socio-economic dimensions across various parts of Europe.

As a fourth step along the PATHS-Diagram, all risks and life chances must be aggregated which has been accomplished in a holistic mode¹⁵ of summation and subtraction. More specifically, for each survey-respondent, the total number of risks has been subtracted from the total number of life-chances. In the case of a large sum of life chances, subtracting a comparatively small number of risks generates a relatively high positive value. Otherwise, a large total of socio-economic risks, subtracted from a small sum of life-chances, must result in a negative value. In this manner, a new risk/chance-based indicator has been calculated for each survey respondent in each of the five countries of the EUROMODULE-data set.

14 For a summary, see Müller/Link 1997, Müller 1998 or Müller 2002.

15 This specific form of aggregation is based on very early insights by Otto Neurath (1971/ 1981) into the need for comparing overall distributions and sums and not their constituent parts and elements.

Diagram 9.4: The Specification of Socio-Economic Risks and Life Chances



Finally, a new risk-chance based scale has been introduced which depends crucially on the total number of socio-economic dimensions selected as essential actor attributes. In general, N different socio-economic dimensions lead to a new risk/chance based scale which has its lower end-point at $-N$ (maximum number of risks, no single life chance) and its upper end-point at $+N$ (maximum value of life chances, no single risk). In the case of the EUROMOD-ULE-data, the scale goes from -14 (maximum number of socio-economic risks) to $+14$ (maximum number of socio-economic life chances).¹⁶

For the subsequent empirical analysis, two large societal segments have been selected, one group of multiple risks with an accumulated risk value of -4 and lower and one group of multiple life-chances with an accumulated value of life chances of $+4$ and higher.

The Socio-Demographic Profile of Multiple Risk Groups and Groups with Multiple Life Chances: Establishing a New Basis for Multi-Dimensional Living Conditions, Socio-Economic Risks and Inequality

The first major point which has to be established lies in the successful integration between multi-dimensional living conditions and socio-economic risks and life-chances with inequality. Put in a brief fashion, does the new risk/

¹⁶ It should be added that the new scale can be interpreted in terms of social exclusion/inclusion as well since the lower region of unspecific risk-accumulation can be clearly associated with social exclusion whereas the upper region of the scale is a good indication for social inclusion. (On the exclusion/inclusion literature, see, for example, Levitas 1998, Nolan/Whelan 1996, Room 1995, Silver 1994 or Townsend 1979) For similar ideas of linking poverty with an accumulated set of different indicators, see Habich 1994, Habich/Krause 1994, Habich 1996.

chance-based scale measure social inequality at all? In order to answer this question, the new scale should be able to fulfill four basic requirements.

- First, the risk/chance-based scale should exhibit a significantly positive correlation with qualifications. Low degrees of education should be reflected in a high accumulation of multiple risks and high degrees of education in high concentrations of multiple life chances.
- Second, the risk/chance-based scale has to be significantly related with income. Low income levels should exhibit high multiple risk values and high income standards high values of multiple life chances.
- Third, the risk/chance-based scale should show a clear gender asymmetry. In short, the female population should be over-represented in the multiple risk segment and under-represented in the groups of multiple life-chances.
- Fourth, age should not be related with the distribution of multiple risk-groups in a strong positive manner. The main reason for this requirement has to do with the inclusion of health conditions. Since the state of health is very powerfully linked with increasing age, it would, thus, reduce the cognitive value of a high correlation between the new risk/chance scale and health substantially.

Given this short list of four essential inequality requirements for the new risk/chancebased scale, the following series of Diagrams (Diagram 5 to 8) provides clear graphical answers to each of these conditions.

First, Diagram 5 shows that the new vertical scale fulfils the conventional criteria for identifying inequality in the domain of education. Risk-accumulation is directly related with low degrees of education whereas a high concentration of life chances is to be found within the highly qualified societal strata only.

Second, individuals with lower incomes or insufficient qualifications are, as can be seen in Diagram 6, highly concentrated among the multiple risk groups. Across all five countries, income seems to be linearly related with risk and life chances, with positive slopes for the relation between income and life chances and with negative slopes for the income-risk relationship.

Third, the gender distribution along the scale of multiple risk and multiple life chances reconfirms older as well as recent studies which emphasize a deep-seated gender divide within contemporary societies. More specifically, the investigations conducted so far indicate a significantly higher concentration for women at the lower end of the scale and a somewhat weaker predominance of men on the upper end of the scale. In numbers, the ten to twenty percent of a population with the highest degree of multiple risks exhibits in general

a gender distribution of 2:1. In other words, two thirds of a population with the highest accumulation of unspecific risks is female. (See also Diagram 7)

Diagram 9.5: The New Risk/Chance-Scale and Degrees of Education

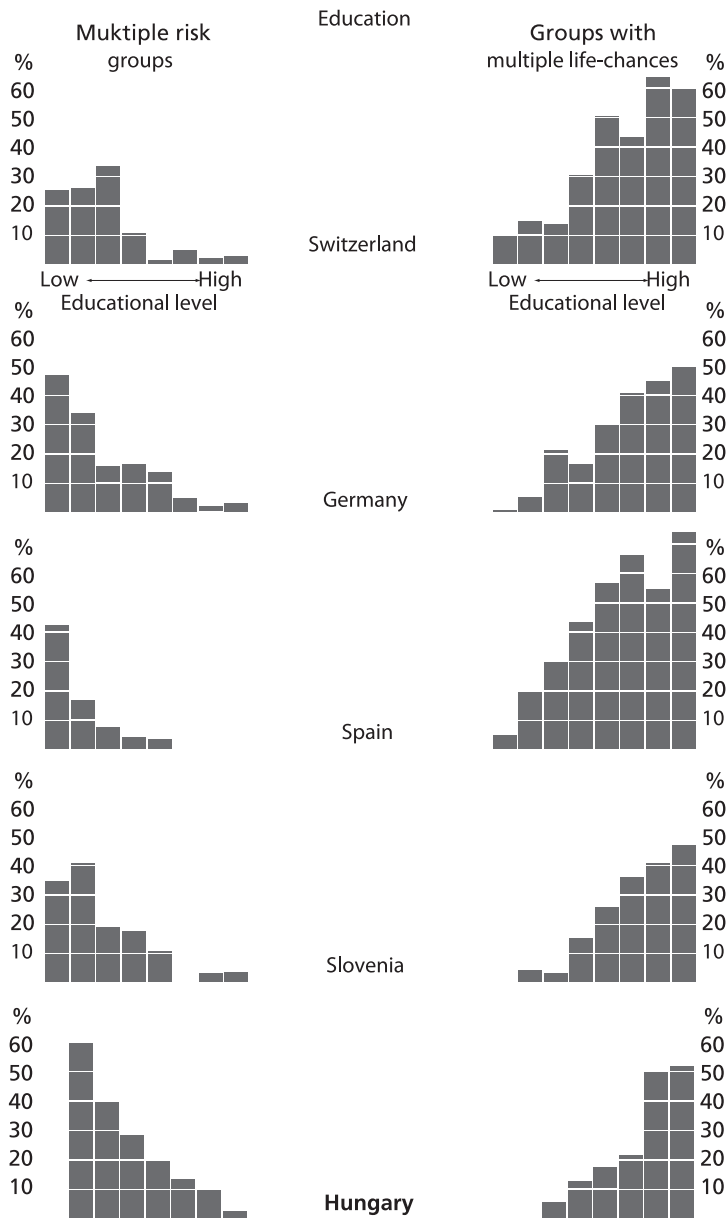


Diagram 9.6: The New Risk/Chance-Scale and Household Income

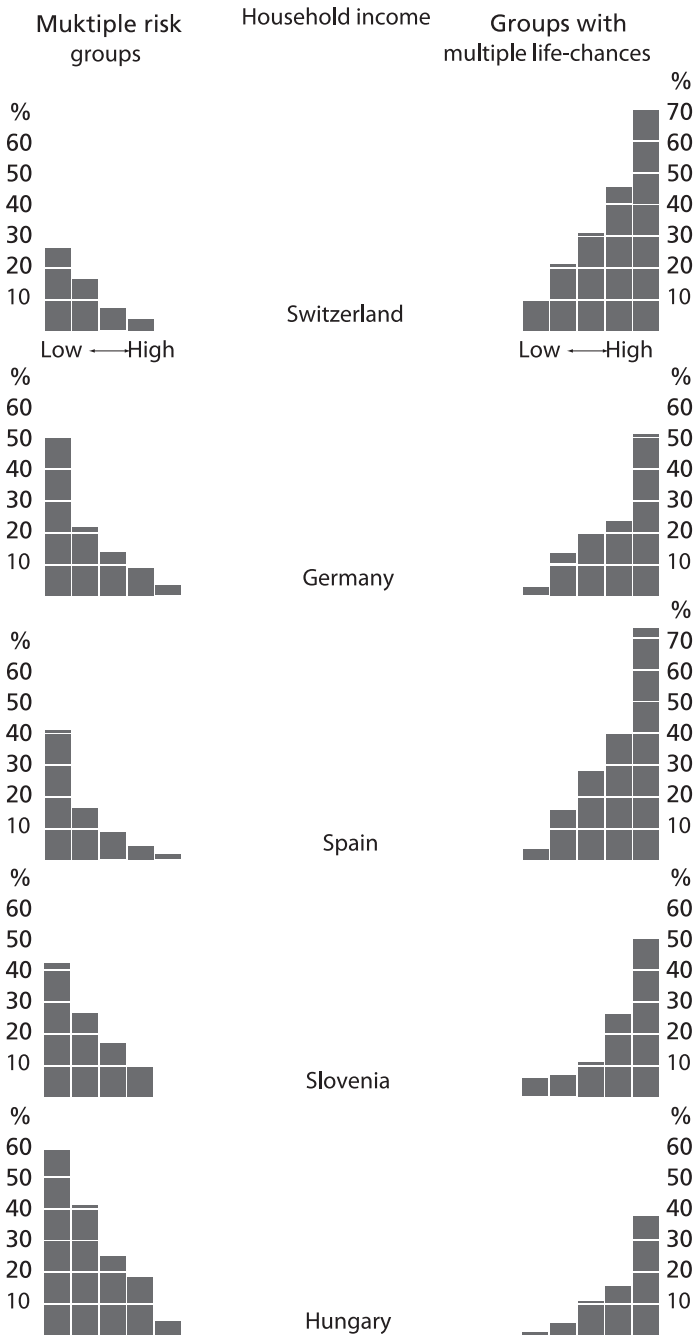


Diagram 9.7: The New Risk/Chance-Scale and Gender-Asymmetries

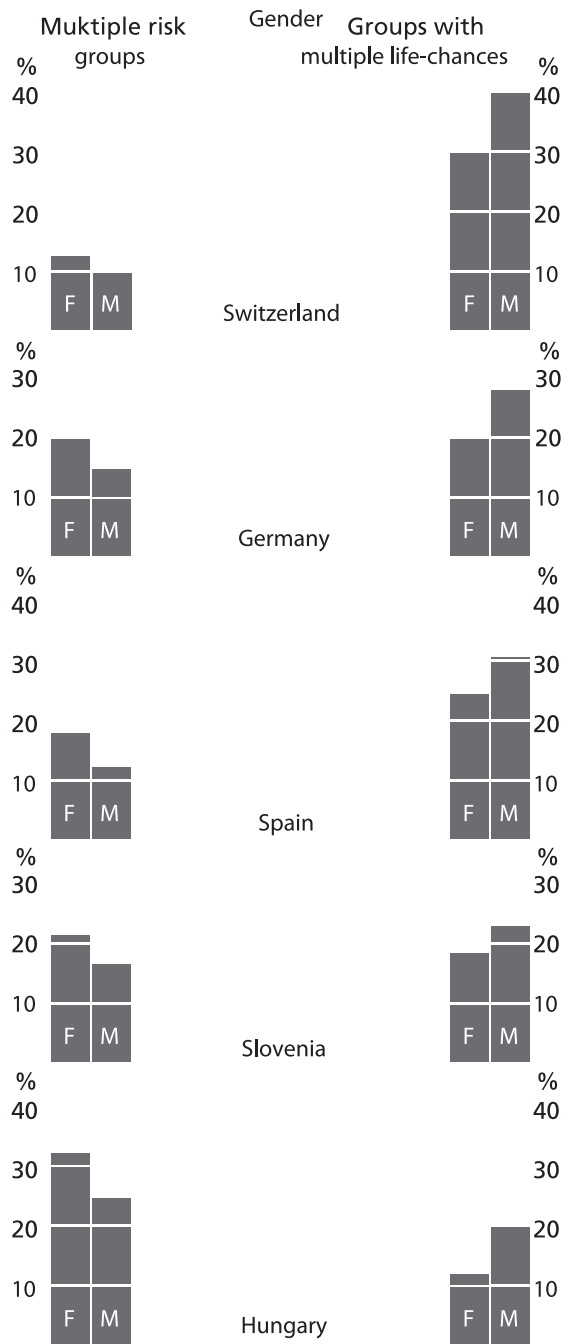
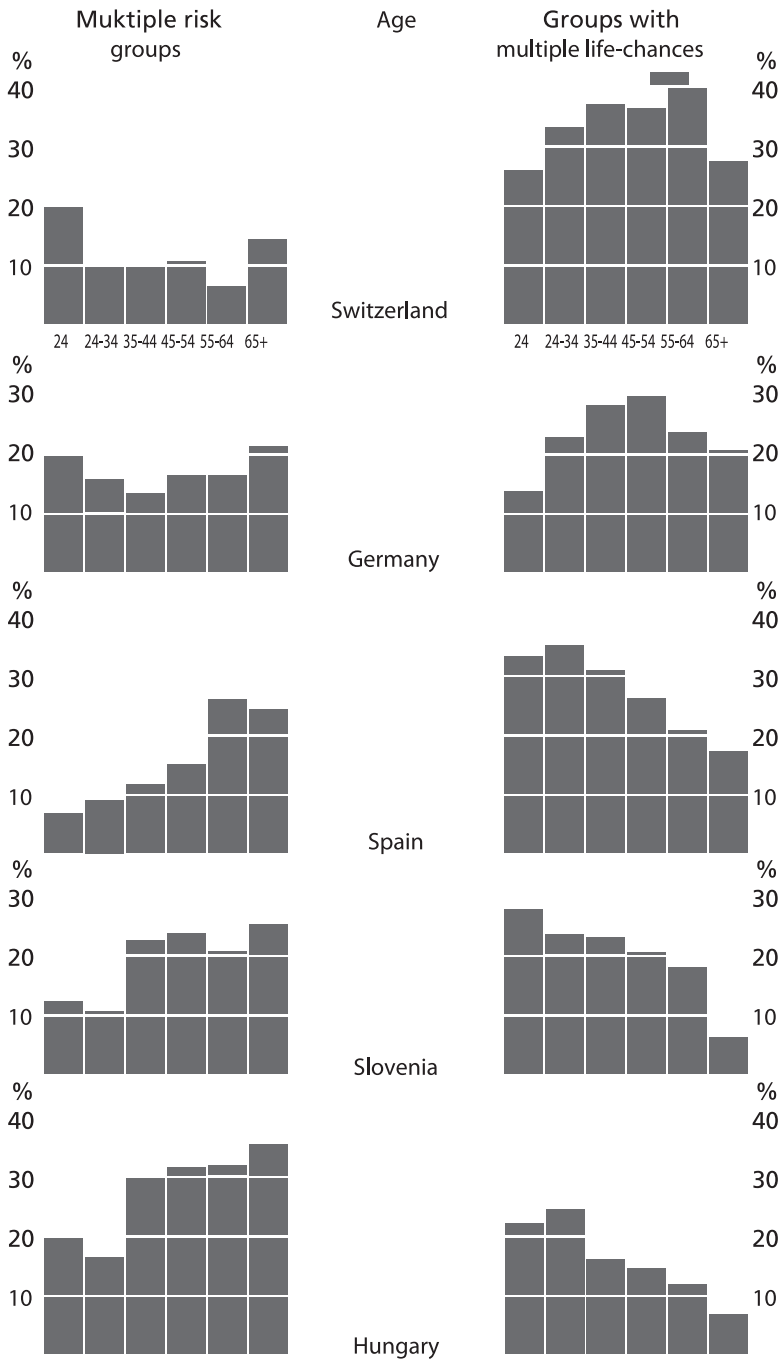


Diagram 9.8: The New Risk/Chance-Scale and Age-Distributions



Fourth, the age distribution of the population of multiple risks and multiple chances may seem surprising at first sight since, according to Diagram 10, there is a marked tendency for weak linkages between multiple risk-formations and younger age cohorts in Switzerland and Germany and a converse pattern, namely a linkage between multiple-risk accumulation and older cohorts in Spain, Slovenia and Hungary.

In sum, the new risk/chance-based scale fulfills all four essential requirements for an appropriate measure of societal inequality which have been laid out at the beginning of Part III.

The New Links between Multi-Dimensional Living Conditions, Socio-Economic Risks, Inequality, Life Satisfaction and Health

With the new platform on multi-dimensional living conditions, socio-economic risks and inequality it remains still open and undecided at this stage whether the last of the eight guiding assumptions introduced at the beginning can be refuted and replaced. The eighth assumption has stated, once again, that the course of (post)modernization produces a pattern of growing independence between overall self-assessments, health and the cognitive-emotional organization of actors on the one hand and their multi-dimensional living conditions on the other hand. After all, this guiding assumption could be supported, in principle, with large quantities of contemporary research on values, happiness or subjective well-being as well. (See, for example, Zapf 1994)

Fortunately, the new risk-approach offers a high “value added” by establishing much closer links between overall life satisfaction or health on the one hand and the position on the risk/chance scale on the other hand. Figure 10 highlights this result by showing that the correlations between the new vertical risk/chance measure and the personal status of health, expressed in the ten point scale of satisfaction with health, are considerably higher than the conventional picture of Diagram 1. Apparently, the new perspective on evolutionary risks opens up new and surprisingly dense linkages with the status of personal health as well irrespective of the increasing complexities of postindustrial or, alternatively, of postmodern lives. Moreover, Diagram 9 exhibits surprisingly strong linkages between the new risk/chance based scale and overall life satisfaction.

The results so far suggest that under the heading of evolutionary risk-research a new and powerful perspective on the strong links between living conditions, socioeconomic risks, social inequality and health has been established.

It should become a valuable strategy to apply the new research tool, on the one hand, to the large quantities of available social health survey data both for highly developed as well as for developing regions and nations across the globe and, on the other hand, to all socio-economic domains in which population of actors and their essential attributes become the key determinants for their overall evolution.¹⁷

Towards the end of the present article few brief hints will be given which will support the closer empirical linkages between multi-dimensional living conditions, risks, inequality and health from a medical and physiological point of view. In brief, it will be shown that one can find a common deep-level physiological language through which the domains of living condition, risks and health become connected in a direct and immediate fashion.

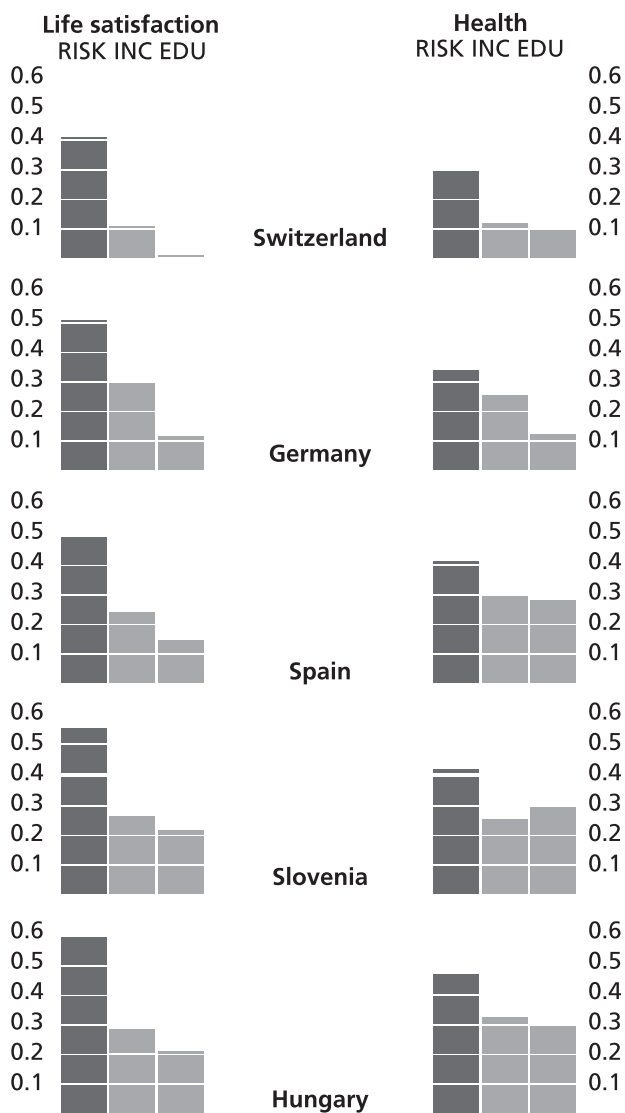
Turning to the language of stressors and, thus, to neuroimmunology, it turns out to be useful to start with a taxonomy of different types of stressors which have been catalogued within the relevant body of literature¹⁸. Here, one finds a heterogeneous set, comprised of sensory stressors (strong light, noise, sensory deprivation, etc.), blockstressors (preventing essential routines like eating, sleeping, social contacts, etc.), achievement stressors (tests, examinations, work-tasks, but also monotony at work, etc.), social stressors (large crowd of people, loneliness, isolation, etc.), environmental stressors (noise, pollution, toxic materials, etc.), decision-based stressors (goal conflicts, quick decisions, but also lack of decision-making, etc.) or future-based stressors (fear, anxiety of the future, etc.)

The important physiological point lies in the heterogeneity of stressors is accompanied by a heterogeneity of stress reactions which vary in time (minutes, hours, days, weeks ...), in intensity or in the emotional clusters, associated with each different physiological stress reaction. Nevertheless, common to all these stress reactions is an attempt to reduce the discrepancy between the effects of stressors and internal target values. Moreover, all stress reactions involve the activation of the hypothalamus-pituitary-adrenal axis and produce comparatively high quantities of endocrine hormones, particularly corticosteroids with cortisol as the most important one and catecholamines. Likewise,

17 It should be added that this new evolutionary risk-approach has been applied successfully to the organizational domain, in particular to a population of scientific institutes in Austria. (See Müller *et al.* 2002) Due to the importance of populations, the new risk-framework can be easily recombined with the existing literature on organizational ecology (See, for example, Carroll/Hannan 2000, Aldrich 1999)

18 See on this point see Cooper 1996, Horwitz/Scheid 1999, or Sarafino (2002).

Diagram 9.9: *The New Linkages between Socio-Economic Risks, Inequality and Health*



all physiological reactions to stress manifest themselves in a broad range of measurable changes like in the higher production of stress hormones, already mentioned, but also in higher degrees of blood pressure, heart rate, respiration rate, galvanic skin responses or in larger amounts of free fat acids.

The upshot of the argument of a common general pattern of stress responses with a high degree of variation in its manifestations (duration, intensity, emotions, etc.) lies in the fact that the general pattern of stress responses possesses at least two main connections to the domain of sickness and ailments, namely through their direct effects on the cardiovascular system on the one hand and through their immediate impact on the immune system on the other hand.

Given the short background on stress-research, it seems possible to link the list of socio-economic risks which have been defined in the course of the present article to special classes of stressors like social, environmental, future-based or decision-based stressors. Moreover, the following subset-relation will be proposed:

Socio-economic $\subset$ Risks

It is quite obvious that this subset-relationship needs a very detailed justification which cannot be provided within the framework of the present article. Five main arguments will be provided, however, which should give the bold conjecture of a risk-stressor subsumption considerable initial plausibility.

- First, the socio-economic risks, which have been introduced on the basis of a wide array of living conditions, are characterized, *inter alia*, by their permanence. Thus, many of the socio-economic risks defined within the EUROMODULE context like low, insufficient or deteriorating incomes or low degrees of qualifications are to be classified as long-lasting or, like in the case of low qualifications, as (nearly). Thus, socio-economic risks would act as continuous stressors and not as single, rare or isolated occurrences.
- Second, there exists a remarkable asymmetry between the language of socioeconomic risks and life chances on the one hand and the physiological stress language on the other hand. While risk and chances have been introduced symmetrically, no symmetry can be identified for the stress domains. Feeling unsafe in the public sphere (socio-economic risk=stressor) does not have a life chance corollary in terms of stressors. Feeling safe in the public domain does not constitute an alternative source for stressors. Likewise, a noisy environment at the workplace or at home implies an essential socio-economic risk and at the same time an environmental stressor whereas a quiet atmosphere at work or at home cannot be associated with a different group of stressors. Thus, socio-economic risks can be linked to stressors, socio-economic life-chances imply, by and large, the absence of stressors.

- Third, the distribution-dependent specification for thresholds of socio-economic risks provides additional support for the subset relationship between socio-economic risks and stressors. Since the majority of the population is, by definitional necessity, above the risk-threshold, individual actors, falling under a specific risk-segment, perceive themselves relatively deprived. Thus, the available literature on the importance of relative deprivation¹⁹ can be added as further evidence for proposed the risk-stress linkages.
- Fourth, while stress reactions vary in length, intensity and emotional involvement, the basic physiological reaction patterns are unspecific with respect to the sources of stress. In other words, one does not find a “bad boss-stress reaction”, confined to a specific region in the neuro-immune system in contrast to a “loud noise-stress reaction”, affecting other parts of the neuro-immune system. Thus, a multidimensional array of essential living conditions across the contexts or settings of actors and across their cognitive-emotional organization can be interpreted as a summary of all relevant potential stressors whose scope and degree of completeness is limited by the restrictions inherent in conventional survey research only.
- Fifth, stressors and stress reaction are clearly not invariant to the actual number of stressors since stress reactions are functionally related, probably in a complex and non-linear manner, to the overall number of stressors. This, in turn, provides additional support why the new risk/chance based scale should be interpretable in terms of a net value for the overall number of stressors.

In this way, a new approach for integrating multi-dimensional living conditions, socio-economic risks, social inequality and health has been built up which, towards the end, was even able to point to a considerably deeper description-level for these four domains, namely to the physiological description level of stressors and stress reactions.

19 On this literature, see more recently Walker/Pettigrew 1984 or Olson/Hafer 1996.

10 The Organization of Modern Societies: Core-Periphery or Vertically Stratified?¹

The chapter attempts to shed new light on the basic organization of contemporary societies. Initially, two models of societal organization are introduced which are classified as core-periphery model and as a homogeneous vertical stratification model. The second section points to a notorious weakness in currently available stratification schemes which are hardly capable to account for the multi-dimensionality of contemporary living conditions. The third part of this article introduces a complex stratification scheme with a multiplicity of different domains and dimensions. As a next step, the two societal stratification models are combined with the complex stratification scheme so that both societal models can be expressed in terms of different stratification patterns. The fifth section produces the results from two parallel surveys in Slovenia and in Austria which were implemented with two groups of 400 fully employed and 400 unemployed persons. The outcomes of the surveys clearly support the homogeneous vertical model and reject, by and large, the center-periphery model. In a final section one of the empirical findings, namely the strong relations between the lower segment of unemployed persons on the one hand and their health conditions on the other hand are further discussed in theoretical terms and new theoretical links are suggested between social inequality research and medical research.

* * *

It belongs to the conventional wisdom in social and economic research that inequality has increased substantially over the last three decades both at the national and at the global levels. However, significant increases in equality can have quite different effects, depending on the overall organization of contemporary societies. On the one hand, the societal periphery could increase in size and move further away from a diminishing societal core-domain. On the other hand, societies, due to increasing inequalities, could drift further and further apart in their upper and lower segments which leads to a crumbling of the middle stratum in between.

1 Special thanks go to Richard Fuchsbichler from the Austrian Ministry of Labour, Social Affairs and Consumer Protection (BMASK) who was mainly responsible for the funding of this study.

The present article will address the crucial issue of societal organization which despite its centrality is seldom posed or answered. The article will focus on labor processes as the central societal distributive engine for societal stratifications and will introduce a complex stratification scheme which produces two significantly different data patterns for the two different models of societal organization. Additionally, the article will bring empirical evidence from two recent surveys which were conducted in Slovenia and in Austria and which should be capable to support one of the two basic models of societal organization.

Two Models for the Basic Organization of Contemporary Societies

Modern societies can be described, in principle, in a variety of ways with respect to their composition in groups, classes, strata, clusters and the like. In accordance with the broad Marx-Weber tradition it will be assumed that labor processes can be considered as the main societal machinery for the distribution of life chances (Max Weber) as well as of socio-economic risks.

Labor Processes → Vertical Stratifications

But labor processes and their distributive capacities can operate in at least two different forms or models.

The first model emphasizes the emergence of more and more peripheral groups which, aside from unemployed persons, include marginally employed, peripherally self-employed, temporally employed and other groups which fall outside the realm of fulltime employment. Here, the main emphasis lies on a core-periphery segmentation and on a deep vertical split between the core of fulltime employment and other forms of employment, including unemployment. The center-periphery model presumes a core status for fulltime employment, relatively small differentiations within the core of fulltime employment and large vertical distances to peripheral groups like unemployed or marginally employed persons.

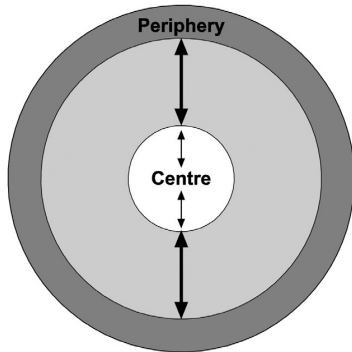
The second model of societal organization assumes that labor processes lead to a strong vertical separation into classes or strata. According to the second model the basic vertical divisions occur already within the domain of fulltime employment and other societal groups follow along these strong vertical divisions within the domain of fulltime employment. Thus, the vertical model postulates relatively large vertical differentiations within the sphere of fulltime employment and similar distributions for other societal groups.

It should be noted that both models have different implications for social policy issues. According to the first model, the main emphasis lies in a transfer of persons and groups from the periphery to the core and, thus, to a widening of the core-segment. Within the second model, the main attention is devoted to the lower strata of fulltime employment and to the lower strata of other societal groups as well as to a gradual reduction between upper and lower strata within the domain of fulltime employment.

Figure 1 presents a visual display of these two models of societal organization which stand in the center of the present article.

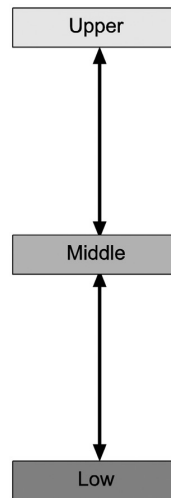
Figure 10.1: Two Models of Societal Organization

Model I: Core-Periphery



Model II: Vertical Segmentations

Vertical Differentiations

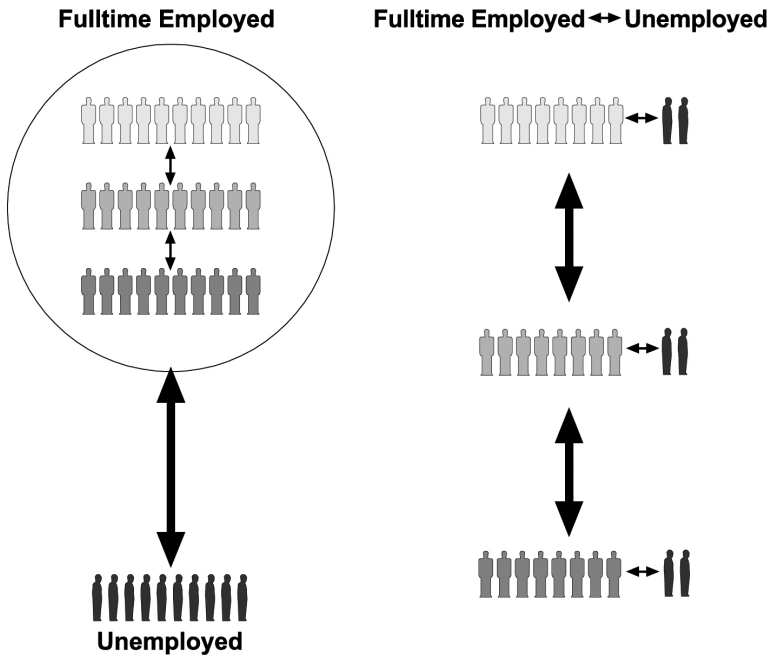


Taking two extreme groups within labor processes as reference examples, namely fulltime employed and unemployed persons, the two models exhibit the following characteristic features.

The core-periphery model places heavy emphasis on the deep split between the core domain of fulltime employment and unemployed groups. Thus, the first model expects strong divisions along the deep chasm between core and periphery. In sharp contrast, the vertical model sees the deep vertical differentiations within the domain of fulltime employment. Consequently, the group of unemployed persons is assumed to be strongly stratified as well and to

follow closely the pattern of the fulltime employed group. Figure 2 presents these two models and their characteristic features.

Figure 10.2: Two Models of Societal Organization for Fulltime Employed and Unemployed Groups



At first sight, the core-periphery model looks far more plausible than the homogeneous vertical model. After all, unemployed persons have not only lost their job, but they experience financial restrictions and various forms of social exclusion as a consequence of their job losses. It seems highly implausible to assume that the group of unemployed persons has an upper stratum with relatively low differences to the upper stratum of fulltime employed persons.

Nevertheless, both models go along with significantly different empirical data patterns which largely depend on the current stratifications within the core domain of fulltime employment on the one hand and on the gaps between fulltime employment and marginal forms of employment, including unemployment, on the other hand.

The Missing Links between Labor Processes, Vertical Stratification and the Multi-Dimensionality of Living Conditions

Surprisingly, the currently available stratification schemes suffer from two characteristic deficits which can be summarized in the following way. Classical stratification schemes in the Marx-Weber tradition which are based on labor processes operate with a very small number of variables which, however, are not able to capture the multi-dimensionality of living conditions. Alternative stratification schemes which usually fall outside the sphere of labor processes emphasize horizontal differentiations and operate largely independent from vertical stratification schemes.

Labor Processes	→	Small Set of Key-Dimensions	→	Irrelevant for Multi-Dimensional Living Conditions
Multi-Dimensional Living Conditions	→	Life Styles	→	Irrelevant for Vertical Stratification Schemes

Within the Marx-Weber tradition, the Marxian frameworks on class formations and vertical stratifications try to account for multi-dimensional living conditions within their overall conceptual schemes. However, the traditional or post-traditional approaches in the Marxian tradition (for a comprehensive summary, see Grusky, 1994) share a fundamental shortcoming due to the clearly under-complex conceptual frameworks for reducing the complexities of current living conditions.² Referring to contemporary class-analyses as advanced by Pierre Bourdieu (1982, 1985) or by Eric Olin Wright (1997), the main argument rests basically on too little diversity in the underlying class-concepts, including Bourdieu's habitus formations. In essence, two main-dimensions in the case of Wright (relations to means of production (including power relations) and qualifications (expert/skilled/non-skilled)) or the three Bourdieu dimensions with economic, social and cultural capital do not reach the requisite dimensional variety necessary for mastering the highly heterogeneous life-courses of individuals or households.

Due to the under-critical conceptual apparatus, multi-dimensional living conditions would have to be included into a class-analysis framework as additional components. However, such a strategy runs counter to the conceptual core of class-analysis, especially in the case of Pierre Bourdieu. But for Eric Olin Wright too, the problem of integrating living conditions into class anal-

2 For an interesting summary and discussion see e.g., Giddens, 1989: 209 pp.

ysis means for him to study the effects of class formations on living conditions in a peculiar way for which Wright uses a seemingly compelling analogy from medical research.

Class analysis is based on the conviction that class is a pervasive social cause and thus it is worth exploring its ramifications for many social phenomena ... Understood in this way, class analysis is what might be called an 'independent variable' specialty. It is a discipline like endocrinology in medicine. If you are an endocrinologist you are allowed to study a vast array of problems – sexuality, personality, growth, disease processes, etc. – in addition to the internal functioning of the endocrine system ... Endocrinology is monogamous in its explanatory variable – the hormone system – but promiscuous in its dependent variables. (Wright, 1997: 1)

Though considerably weaker, this version has the distinctive disadvantage that a large amount of "independent variable specialties" are available, in principle. Take age groups, cohorts, gender, regional differentiations or life-styles, to mention just a few, then one could justify their relevance for socio-economic analysis in Wright's own terms, namely "that age (cohort, gender, life style, region) is a pervasive social cause and thus it is worth exploring its ramifications for many social phenomena." In the end, the socio-economic endocrine system turns out to be itself highly promiscuous.

To conclude, the two most advanced class approaches by Pierre Bourdieu and Erik Olin Wright are by their very structural organization unable to integrate multi-dimensional aspects of current living conditions, including, above all, the aspects of attitudes and self-assessments.

Turning to the shortcomings of the Weberian tradition in their current versions³, these approaches offer vertical stratification schemes by distinguishing between different classes or status groups. Classes, on the one hand, are defined on the basis of the position and of the interests within a capitalist mode of production which determine, to use a central Weberian term, the life-chances of large groups of individuals. Status-groups, on the other hand, are conceptualized as specific communities, sometimes of an amorphous kind, where the distinctive elements are determined on the basis of a specific social estimation of honor and on particular life-styles which has become another core Weberian notion. Classes and status groups produce, according to Max

3 For a summary on the Weberian tradition, see e.g., Blau/Duncan, 1967, Giddens 1973, Hodge, 1981, Parkin, 1979, Sørensen, 1991/1994 or Treiman, 1977.

Weber, different configurations, sometimes very intimately linked, probably more often than not, opposed to each other and at times in aggressive disharmony.

While the conceptual differentiation in Max-Weber's work can be considered as remarkably complex and multi-dimensional, the subsequent empirical research trajectories along Weberian lines suffer from the peculiar fact of being too highly reduced in their conceptual complexities. The wide design spaces for Weberian classes and status groups have been severely under-utilized so far since the index constructions leading to status scales are either based on occupational ratings or on small sub-sets of socio-economic indicators on living conditions or life-styles.

Thus, the Weberian and Post-Weberian traditions have retained their emphasis on vertical stratification, but apparently at the expense of restricting the multi-dimensionality of life styles and the social order to a small number of key variables only. Consequently, the available Weberian or Post-Weberian platforms simply have become too narrow for linking them with additional domains like culture, risks or health-conditions.

Turning to stratification schemes outside the Marx-Weber tradition, one finds a new societal perspective which emphasizes risks and risk formations, and which rests largely on Ulrich Beck's "Risk Society" (Beck, 1986)⁴. Ulrich Beck in his national Post-Chernobyl bestseller uses the pattern of a phase transition between two stages in modernity as a broad platform in which the notion of risks receives its proper attention. The initial stage is characterized, not surprisingly, as industrial or traditional capitalism. Using dialectical metaphors, Beck argues that industrial capitalism has an in-built logic which transcends its own boundaries and identities and which produces, thus, an endogenous drift towards a qualitatively different stage. Thus, driven by inner necessities, industrial capitalism is superseded by a new phase which has been labeled as risk society. Put briefly, risk societies have become the current stage in the capitalist evolution and a generalized logic of risk-production, in contrast to the logic of wealth production of the industrial phase, stands at its center. This new logic of risk production manifests itself most vividly in the effects of high technology production and services which constitute, aside from their undeniable advantages in terms of volume, price, diversity or quality, a per-

4 For an interesting historical as well as contemporary summary on the concept of risk, see, aside from the Beck, 1986/1989/1993/1997/1998a/1998b/2000 or Beck/Giddens/Lash, 1994 also Bonß, 1995, for special versions see Baecker, 1988, Banse/Bechmann, 1996 or Japp, 2000.

manent threat to individuals or households. Again using dialectical metaphors of inner necessities, production and services under the new risk regime generate, by inner necessity, a large number of pollutants or the potential of very large scale-accidents within very large scale technologies, highlighted by the two major accidents in atomic power plants in Three Mile Island and Chernobyl. Due to the complexities of production and service processes or of the energy and information substructures involved, frequent occurrences of fatal accidents⁵ and high tech-disasters become the order of the risk-day within a risk-society environment.

It would have been fascinating to integrate socio-economic risks into this profile of contemporary risk societies. In fact, Beck devotes the second part of his book on the growing individualization of life courses under the new regime of risk-societies. But despite the phase transition towards risk societies, socio-economic risks have not found their way into the Part II of the book. Rather, for Beck the question of social inequality and vertical stratification seems to undergo a transformation itself, namely a secular change from vertical to horizontal forms. At various points, Beck gives the impression that social inequalities belong basically to the domain in which they originated in the first place, namely to the phase of industrial capitalism. Most notably in the phrase "Poverty is hierarchical, smog is democratic" (Beck, 1986: 51), Beck seems to suggest that vertical societal inequalities become more and more marginalized and de-centered whereas new horizontal ways of inequality like regional, local inequalities or group-specific risks which affect, for example, all employees in a special high-technology plant or even in an entire cluster alike, are gradually occupying the central positions within contemporary risk societies.

Similarly, current multi-dimensional approaches on living conditions (see especially Schulze, 1992) have become, by and large, horizontally stratified, loosing their vertical dimensions in the course of widening the relevant socio-economic dimensions. Thus, current life-style frameworks, while focusing on a broad range of living conditions and socio-cultural practices, have become by and large unable to arrange the resulting life style formations into a vertical ordering on different life styles

5 At various points, Beck seems to suggest, too, that the metamorphosis of modernity I into its self-reflexive stage of modernity II brings about a shift in Charles Perrow's, 1984 two dimensional diagram (with coupling and complexity as its vertical and horizontal dimensions) to the quadrant of dense coupling/high complexity.

The subsequent discussion will have its focus mainly on Gerhard Schulze's book on "Erlebnisgesellschaft", 1992. Here, a representative sample of roughly 1000 persons from the city of Nuremberg has been selected and a large number of questions on cultural practices or on daily routines of information gathering have been asked. In the theoretical core of Schulze's work lies a universal social grammar (Ibid: 243 pp.) which, at least according to Schulze, is capable to detect and identify hidden homologies between inhomogeneous and seemingly contradictory or incoherent domains. At various places, Schulze speaks of a latent pattern which connects diverse surface appearances or of a universal pattern in the relation between actors and their environment or worlds (Schulze, 1992: 36).

Essentially, Schulze uses age and education as the basic socio-demographic dimensions in order to differentiate between five different milieus or life-styles, namely between an entertainment-milieu (age low, education low), a harmonious milieu (age high, education low), a self-realization-milieu (age low, education high), an integrative milieu (age high, education medium) and a distinctive high-level milieu (age high, education high). Each of these five milieus is characterized by specific recombinations between dominant forms of style which are summarized under the headings of high culture, trivial culture or excitement/event culture.

Within the present context, the most important critical finding lies in the fact that the new life-style typologies which have been able to integrate large proportions of everyday routines and cultural practices, widely conceived, have lost the vertical dimension of inequalities almost completely. While these five life-styles can be arranged within a two-dimensional field, consisting of degrees of education on the one hand and age on the other hand, vertical distances and vertical inequalities have been largely reduced and replaced by horizontal disparities of self-contained clusters of socio-cultural practices. Additionally, classical problems of upward and downward mobility are substituted by new rites of passage, with age being a key determinant to change from one lifestyle-cluster to the next. Furthermore, problems of inter-generational inequality and mobility seem to have been reduced to marginal issues since the universal grammar sub specie Schulze reproduces these different clusters in the way it is supposed to reproduce them, namely universally. Finally, the potential space for socio-economic policies has been greatly reduced, too, since these self-sufficient clusters do not lend themselves easily to intervention or compensation.

Apparently, Schulze's analysis and many other life-style studies⁶ are subject to a critical trade-off which can be summarized in the following manner. Relying on a small number of objective inequality indicators like income, education or status looses its linkages with overall self-assessments rapidly since many aspects and dimensions of cultural and everyday practices have not been included. Taking the diversified set of habits and routines in areas like information, housing, arts and culture, media or fashion into account, the resulting life styles have lost their connections with vertical dimensions and inequalities almost completely.

The Stratification Step: Constructing a Complex Configuration of Living Conditions

At this point the article is apparently bound to end with the uneasy conclusion that general problems of societal organization and differentiation cannot be pursued analytically as long as labor processes are assumed as the central engine for vertical societal stratifications. However, the significant weaknesses of available stratification schemes can also lead to an alternative approach which operates in two steps. In a first step a new vertical stratification scheme is introduced which accounts for the multi-dimensionality of living conditions and which produces, contrary to the horizontal life style models, a vertical stratification pattern for different societal groups. The second step focuses then on the research design itself and will be introduced in the subsequent section.

Turning to the new stratification scheme, the following result must be obtained:

Multi-Dimensional Living Conditions	→	Forms of Life	→	Vertical Stratification Scheme
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Recently two surveys were conducted in Slovenia and in Austria which tries to integrate a large number of socio-economic dimensions on living conditions. The survey contained three major areas with three distinct sub-domains which can be classified as

- Life worlds (work, housing, social capital)
- Resources (income, qualifications, consumption)

6 For other life-style studies, see for example Spellerberg, 1996, Schneider/Spellerberg, 1999 or for an interesting summary Matjan, 1998.

- Cognitive-emotional states (perspectives on the future, self attributions, critical life vents)

For each of the domains and sub-domains a varying number of dimensions has been selected which could be interpreted in terms of life chances or socio-economic risks. In particular, high personal income can be associated with life chances whereas relatively low incomes constitute a specific socio-economic risk. Approximately fifty different dimensions were used in order to arrive at a complex vertical stratification scheme.

Figure 3 shows the complex overall configurations with the three main domains, the three subdomains in each of the main areas as well as the number of dimensions in each sub-domain.

For each respondent in the survey an overall index was calculated which differed from 0 to 1. This overall index was sequentially computed by starting with the individual dimensions in each of the sub-domain and by finding an aggregate value for each of the three major areas. Finally, the three domain-specific indices were aggregated to an overall index for each of the survey respondents. Dependent on the overall distribution of these indices a group-specific separation has been undertaken between

- an upper stratum (upper 33 % of the population distribution, group with multiple life chances)
- an intermediate segment (middle group with 33 % of the population)
- a lower segment (lower 33 % of the population distribution, group with multiple socio-economic risks)⁷

7 For more details, see Toš/Müller, 2005, Toš/Müller, 2009 or Müller/Nemeth/Toš, 2002.

Figure 10.3: A Complex Stratification Scheme for the Multi-Dimensionality of Living Conditions

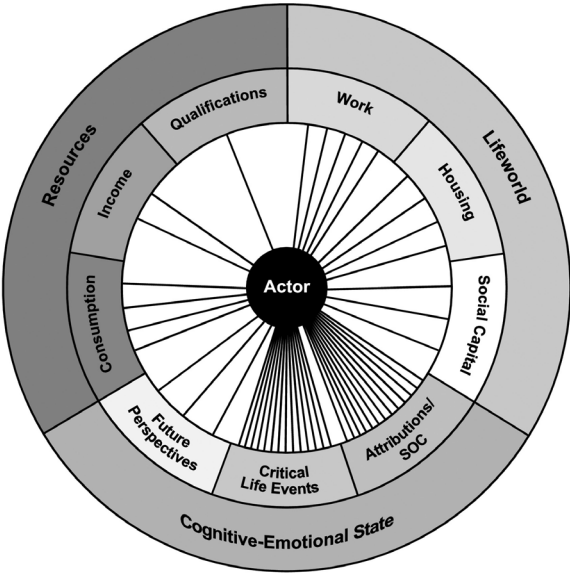
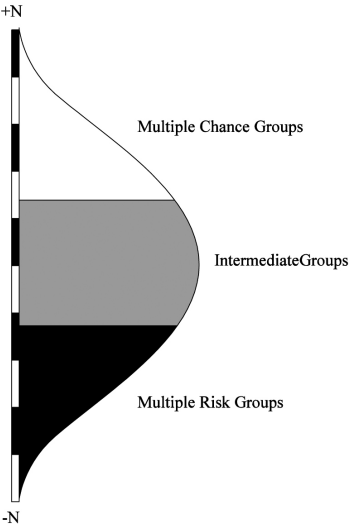


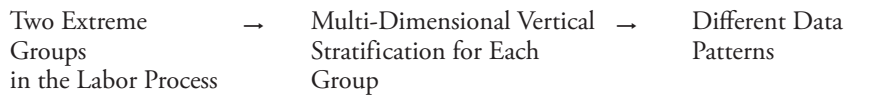
Figure 4 shows the new vertical stratification scheme which is based on roughly fifty dimensions across the three main survey domains of resources, cognitive-emotional states and life worlds.

Figure 10.4: A Multi-Dimensionality Stratification Scheme



The Design-Step: Focusing on Groups of Fulltime Employed and Unemployed Persons, Their Multi-Dimensional Living Conditions and Their Stratification Patterns

While the first step led to a new stratification scheme which was sufficiently diversified for a broad range of domains and dimensions of living conditions the second step operates with the research design itself which has its focus on two extreme groups with respect to their position in the labor process, namely on fulltime employed persons and on unemployed persons only.

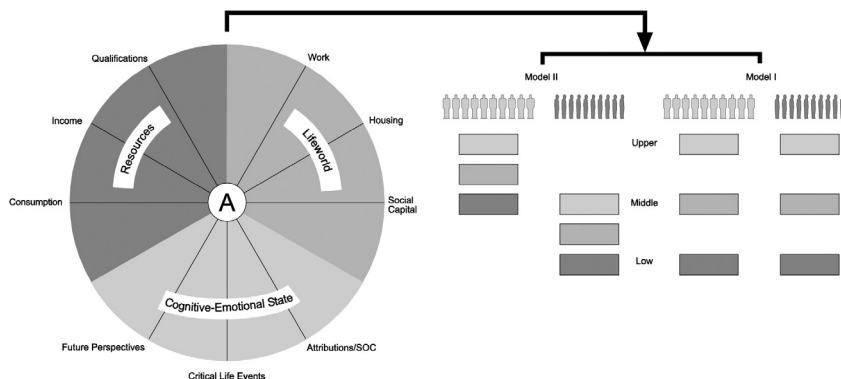


In fact, the two surveys in Slovenia and in Austria were focused on samples of 400 fulltime employed and 400 unemployed persons. The survey questions and items were formulated in an identical manner for both extreme groups and the multi-dimensional vertical stratification scheme was applied to both groups respectively.

With the help of the multi-dimensional vertical stratification scheme for both extreme groups it should be possible to produce a data pattern which either follows the core-periphery model or the homogeneous vertical stratification model.

Figure 5 presents an overview on different data configurations for these two models. The core-periphery model should exhibits deep vertical distances between the groups of fulltime employed and unemployed persons and weaker differences within the three segments of each group. The vertical stratification model should produce strong vertical differences within each group and relatively small horizontal differences between the different segments in each group. Phrased differently, the core-periphery model should show significant differences between the two groups whereas the homogeneous vertical model should emphasize the differences within each of the two extreme groups in the labor process.

Figure 10.5: Two Different Stratification Patterns for Contemporary Societies



In this manner the two models of societal stratification can be expressed in terms of different data patterns.

The Main Results from a Parallel Survey in Slovenia and Austria

Turning to the results of the surveys in Slovenia and in Austria more specifically the first general finding was that the general data patterns were highly similar for both countries. In both countries the vertical differences within each of the two extreme groups were by far stronger than the horizontal differences between the two groups.

Subsequently, several typical empirical results can be presented, starting with one of the central dimensions in survey research, namely with overall life satisfaction. As can be seen from Figures 6 and 7, the horizontal differences between the three groups with multiple life chances, the middle group and the group with multiple socio-economic risks are considerably smaller than the differentiation within the fulltime employed and the unemployed persons. Interestingly, these differences turn out to be smaller in the Slovenian case, but even here the vertical differences within the unemployed and fulltime employed persons exceed the horizontal differences.

Apparently, even the central domain of life satisfaction differs significantly within the group of unemployed persons. Likewise, contrary to the assumptions of the modern economic theory of happiness, the multiple risk group, despite its fulltime employment status, expresses significantly lower levels of life satisfaction than the upper or the medium stratum of unemployed persons.

Figure 10.6: Overall Life Satisfaction (Austria)

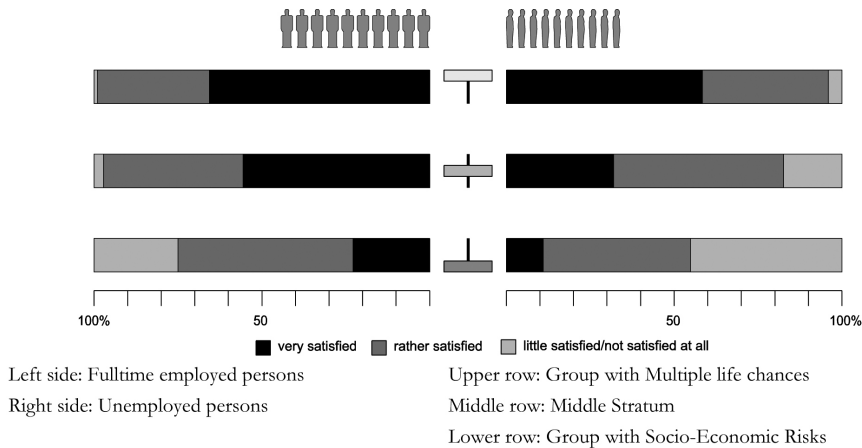


Figure 10.7: Overall Life Satisfaction (Slovenia)

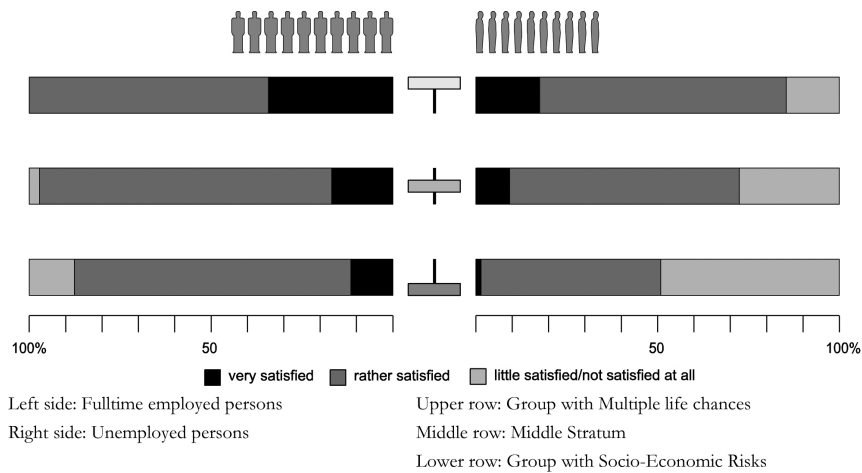


Figure 8 presents a particularly revealing example, namely the feeling of stress across all six groups in Slovenia. The first remarkable result lies in the overall distribution with relatively low stress values for the upper strata and high values for the lower strata. Equally astonishing is the finding that the horizontal differences between fulltime and unemployed persons are almost negligible.

Figure 10.8: Stress in Everyday Life (Slovenia)

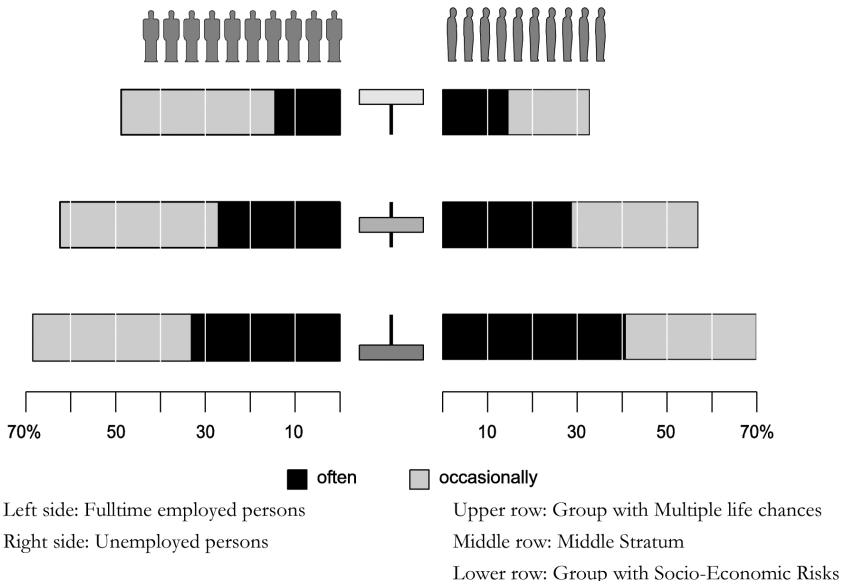
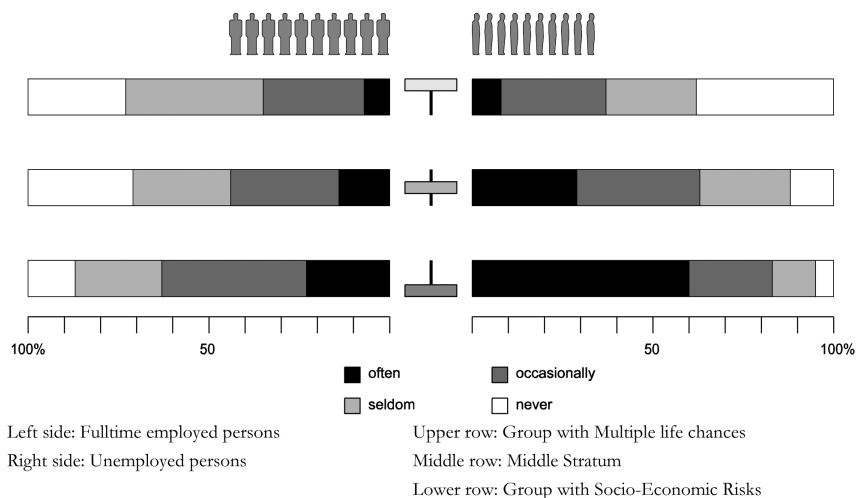


Figure 9 exhibits a typical result from a set of items on internal and external-attributions. Again, the vertical differences between the three groups are striking, compared to the relatively small horizontal differences.

Patterns like these were found practically across all major domains, sub-domains and dimensions. For example, a high satisfaction with one's former or current work produced in the Slovenian case the following values for the three groups of fulltime employed persons: 51 % for the upper group with multiple life chances, 24 % for the middle group and 20 % for the group with multiple socio-economic risk. The corresponding values for the group of unemployed persons was 41 % in the upper stratum, 36 % in the middle group and 19 % in the group with multiple socio-economic risks.

In fact, most of the sub-domains with their different dimensions gave support to the homogeneous vertical stratification model and rejected the core-periphery model. However, the big exception could be found in all the dimensions which were directly linked with the income of persons. In the income-domain, but only in the income area, one could find support for the core-periphery model with deep horizontal differences between the corresponding strata of fulltime employed and unemployed persons.

Figure 10.9: Times are Bad (Austria)

Closing the Gap from Social to Medical Research: Inequality, Stress and Health-Conditions

Another interesting general result could be found both in Slovenia and in Austria alike. In the health domain one can see significant differences between the lower strata of fulltime-employed and unemployed persons. The values for the multiple risk group of the unemployed persons were clearly worse than their counterparts from the multiple risk group of fulltime employed persons.

Figure 10 shows the self-reported state of health in Austria where one can see a strong difference between the two lower multiple risk groups especially with respect to bad health conditions.

This result can also be supported by Figure 11 which shows the distribution for different numbers of ailments. Again, the lower strata of multiple risk groups differ significantly since more than 30 % of the unemployed group reports ten and more ailments, compared to 13 % in the multiple risk group of fulltime employed persons.

The same result prevails in two rather psychological ailments, namely for feeling nervous and feeling tired as expressed in Figures 12 and 13.

Figure 10.10: General State of Health (Austria)

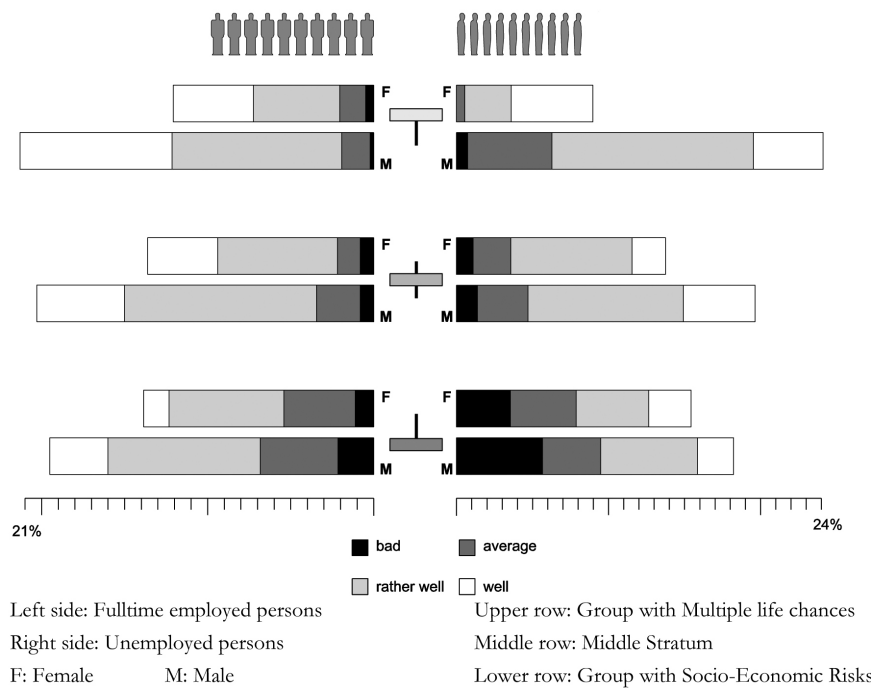


Figure 10.11: Number of Ailments (Austria)

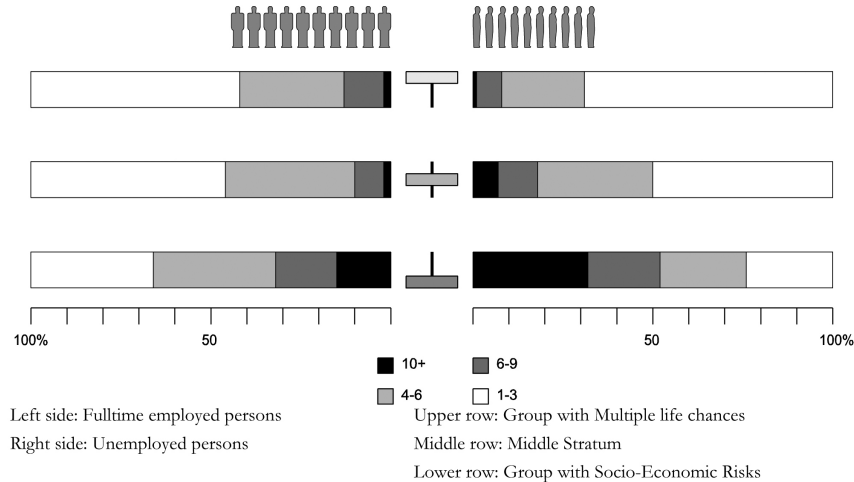


Figure 10.12: *Feeling Nervous (Austria)*

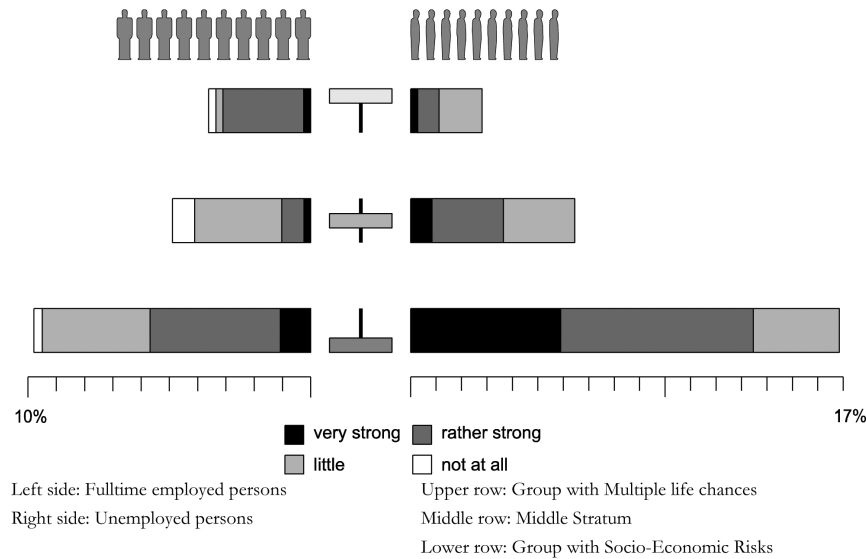
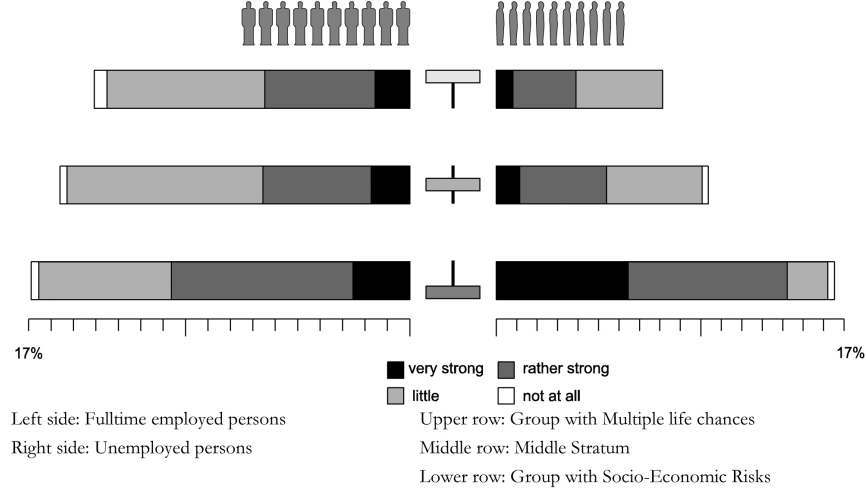


Figure 10.13: *Feeling Tired (Austria)*



These findings in the health domain suggest a new bridge which leads from social survey analysis to the areas of bio-medical health research. Through this bridge one can move from various domains of vertical socio-economic dimen-

sions, from socio-economic inequalities, from vertical stratification as well as the self-reported health status to a deeper language level and to a homogeneous vocabulary of stressors and of neuro-immunological processes.

Initially, it is useful to start with a taxonomy of different types of stressors which can be found within the relevant body of literature (see, for example, Cooper, 1996, Horwitz/Scheid, 1999, or Sarafino, 2002). Here, one is confronted with a heterogeneous set, comprised of sensory stressors (strong light, noise, sensory deprivation, etc.), block-stressors (preventing essential routines like eating, sleeping, social contacts, etc.), achievement stressors (tests, examinations, work-tasks, but also monotony at work, etc.), social stressors (large crowd of people, loneliness, isolation, etc.), environmental stressors (noise, pollution, toxic materials, etc.), decision-based stressors (goal conflicts, quick decisions, but also lack of decision-making, etc.) or future-based stressors (fear, anxiety of the future, etc.)

Seemingly, the heterogeneity of stressors is accompanied by a heterogeneity of stress reactions which vary in time (minutes, hours, days, weeks ...), in intensity or in emotions, associated with each stress reaction. Nevertheless, common to all these stress reactions is an attempt to reduce the discrepancy between the effects of stressors and internal target values. Moreover, all stress reactions involve the activation of the hypothalamus-pituitary-adrenal axis and produce comparatively high quantities of endocrine hormones, particularly corticosteroids, with cortisol as the most important one, and catecholamines. Likewise, all physiological reactions to stress manifest themselves in a broad range of measurable changes like a higher production of stress hormones, higher degrees of blood pressure, heart rate, respiration rate, galvanic skin responses or in larger amounts of free fat acids.

The general pattern of stress responses possesses at least two main connections to the domain of sickness and ailments, namely through their direct effects on the cardiovascular system on the one hand and through their immediate impact on the immune system on the other hand.

With the short background on stress-research, it appears plausible to create a bridge from the current findings on the status of health to special classes of stressors like social, environmental, future-based or decision-based stressors. In order to move along this bridge, one needs a special subset of survey dimensions which are linked to societal inequality. In particular, the lower segments of dimensions like degree of education, income, but also working conditions, work autonomy or environmental constraints like pollution or traffic noise

can be seen as external determinants of societal inequalities. From this perspective, the following subset-relation can be put forward:

Lower Segments S^L of Dimensions of Societal Inequalities $\subset$ Stressors

It is quite obvious that this subset-relationship needs a very detailed justification which cannot be provided within the framework of the present article. However, five main arguments can be given, however, which should offer some plausibility for a sub-set relation between S^L , the lowest decile, lowest quarter up to the lower third in the different dimensions of societal inequalities and stressors.

- First, S^L -positions, which can be specified in a wide array of living and working conditions, are characterized, *inter alia*, by their relative permanence. Thus, many of the S^L -parts of socio-economic inequality dimensions like low, insufficient or deteriorating incomes or low degrees of qualifications are to be classified as long-lasting or, like in the case of low qualifications, as (nearly) permanent. Thus, being positioned in the S^L -parts normally acts as a continuous stressor and not as a single, rare or isolated occurrence.
- Second, there exists a remarkable symmetry between the language of societal inequality, in particular the focus on the lower parts of a distribution on the one hand and the physiological stress language on the other hand. In both cases, no equivalences can be found for the upper side of the inequality dimensions. Feeling unsafe in the public sphere does have a corollary in terms of stressors. But feeling very safe in the public domain does not constitute an alternative source for stressors. Likewise, a noisy environment at the workplace or at home implies at the same time an environmental stressor whereas a quiet atmosphere at work or at home cannot be associated with a different group of stressors. Thus, the lower segments of the distribution of inequality dimensions can be linked to stressors, whereas upper segments in the distribution imply, by and large, the absence of stressors.
- Third, the distribution-dependent specification for thresholds for the S^L -parts provides additional support for the subset relationship between the S^L -areas of dimensions of societal inequality and stressors. Since the majority of the population is, by definitional necessity, above the S^L -threshold, individual actors, falling in a specific S^L -part, perceive themselves usually relatively deprived. Thus, the available literature on the importance of relative deprivation (Olson/Hafer, 1996 or Walker/Pettigrew, 1984) can be added as further evidence for the proposed S^L -part-stress linkages.

- Fourth, while stress reactions vary in length, intensity and emotional involvement, the basic physiological reaction patterns are unspecific with respect to the sources of stress. In other words, one does not find a “bad boss-stress reaction”, confined to a specific region in the neuro-immune system in contrast to a “loud noise-stress reaction”, affecting other parts of the neuro-immune system. Thus, a multi-dimensional array of essential living conditions across the contexts or settings of actors and across their cognitive-emotional organization can be interpreted as a summary of all relevant potential stressors whose scope and degree of completeness is limited by the restrictions inherent in conventional survey research only.
- Fifth, stressors and stress reaction are clearly not invariant to the actual number of stressors since stress reactions are functionally related, probably in a complex and non-linear manner, to the overall number of stressors. This, in turn, provides additional support why a survey analysis should focus on the aggregation of dimensions because these aggregate values should be interpretable in terms of a net value for the overall number of socio-economic stressors.

In this way, a bridge can be built to biomedical stress research which could offer a plausible hint on the specific data patterns found in the two surveys in Slovenia and in Austria. Unemployment as an additional permanent stressor operates especially within the multiple socio-economic risk groups which could account for the significant horizontal differences in the health domain. It is hoped that this suggestion could lead to a much deeper understanding of the complex interactions between daily routines at the workplace or at home and patterns of health conditions.

Outlooks

It should be emphasized that the empirical results from our study should have strong implications for social policies, broadly conceived. Due to the deep vertical differences already in the domain of fulltime employment much more emphasis should be devoted to the lower stratum with multiple-socio-economic risks which differs so strongly from the upper or the medium strata of the unemployed group. After all, bringing people back to work can also become a failed strategy if such a return to work implies an integration into the ranks and files of multiple socio-economic risk groups.

11 Trust in Institutions of the System – European Comparisons – and Slovenia

Introduction and Definition of the Problem

Definition. In their classic study on political (civic) culture, Almond and Verba [1963], emphasize the necessity of trust in order for democracy to function properly. Trust, therefore, becomes a central concept in the study of political culture, on which Inglehart also reports exhaustively [1997]. A survey of people's attitudes towards politics, and more specifically, of people's attitudes towards the political system, is based on the premise that the level of its legitimacy differs from one cultural and historical system to another. This can be seen in the different levels of trust in particular political and institutional systems. Whereas institutions in developed democracies are believed to enjoy higher levels of trust, it is assumed that trust in new democracies is on the rise. Needless to say, this is but a simple indication of the different levels of trust in particular systems.¹

In recent decades, researchers have found several examples of initiatory and transitional circumstances in the expression of trust in the institutions of democratic systems. Lipset and Schneider [1987], for example, found a significant confidence gap with regard to the most important social and political institution in the USA. Although citizens are aware of the importance and indispensability of the institutions, they are increasingly critical of and indifferent to them. Similar findings were made by researchers in Germany, especially with regard to attitudes towards political parties. Research conducted in recent decades into trust in institutions has resulted in the identification of several important paradigms. These include the reciprocal relationship between trust in individuals and trust in institutions, the influence of conflicting structures on trust, the influence of preferential adhesion to political parties on trust, the influence of experience on trust, and the influence of the accumulated experience of the elderly on higher levels of trust – or a higher level of conformity, etc. Our analyses of trust in institutions are supported in Easton

1 We must not overlook the fact that a highly developed democratic system also presumes, even postulates, the expression of distrust. Distrust is an expression of discord between prevailing individual and collective values, between institutions as the proponents of collective values and the representatives of institutional authority. If the centers of authority are not intimately linked to the values of the system, or if they have no clear value orientation, we can expect social instability, increased uncertainty, and a decline in social activity. A positive response to such a situation would be to initiate reinstitutionalization.

[1975], who describes political trust as the feeling that one's own interests are taken into consideration by the political process. When one trusts another individual or institution, they express a positive feeling (emotional component) and attribute a positive value (evaluative component) towards that person or institution, and the evaluation is normally based on moral norms and values criteria. In addition to emotional, affective and evaluative components, trust also comprises cognitive elements, which are more difficult to determine. Trust is always linked to some "object", an individual (a friend or group of friends, such as colleagues), an institution (parliament, the Catholic Church, etc.), or a system (a social state, market economy) as a collective subject. Trust is based on qualities and characteristics that are seen as positive, and the person expressing the trust is not always necessarily aware of these qualities.

It is important for the purpose of evaluating the trust in institutions to distinguish between specific and diffuse trust, and to determine how strongly trust is associated with individual subjects and under which conditions it emerges. Whether trust is specific or diffuse depends on our comprehension of the concept in each context. If the individual expressing the trust expects a specific result or service, trust can be defined as specific. If, however, the subject of the trust is a system and not an individual or specific organization, then the trust is diffuse relative to the subject. We must not assign absolute qualities to trust, because these are often derived from its diffuse nature. Trust is not always entirely independent of specific results. Resistance to disappointment is, above all, related to the diffuseness of expectations. Anyone expecting specific results will be disappointed if those results do not materialize and will react by withdrawing their trust. The probability of trust being generalized or transferred is influenced by the specific subject of the trust. Trust in an individual (an official, for example), does not necessarily translate into trust in an institution. If, however, one trusts in democracy (a diffuse object), they cannot feel a lack of trust in all democratic institutions. Generally, when trust is surveyed, several gaps emerge in the results if the survey only takes the subject of the trust and not the expectations into account, assessment criteria and assessed values are not. The minimum prerequisite for trusting an institution is that the institution is perceptible to the individual. A direct relationship based on personal contact is not necessary; credible mediators will do. It is much easier for us to develop trust in institutions to which we assign positive characteristics. Our values may determine how quickly our trust develops. Societal values and ideologies thus significantly affect our trust in institutions. Individuals comprehend the ambitions of institutions in different ways.

In typical working democracies, political rivals and opponents are free to follow their aspirations and to play by the rules in a free contest. However, even in democracies, trust in institutions is not evenly distributed. Whenever disputes and rifts between groups of people endure, it becomes very difficult for one of the disputing sides to be trusted by the other. In the case of Slovenia, it would appear that these enduring divisions are related to its recent history, the Partisan and Home Guard movements, national reconciliation, Communism and anti-Communism, the left and right political wings. Needless to say, it may also be that cultural, religious and social divisions have become increasingly important. These differences are ideological in nature: for example, the libertarian-conservative relationship, or (in an atmosphere of increasingly assertive, neoliberal economic principles) the divide between workers and trade unions on the one hand and managers and capitalists on the other.

When trust in an institution is reasserted repeatedly, it may become firmly established and independent of specific results. When trust grows over an extended period (a lifetime, for example), a positive relationship may emerge between age and trust in institutions. This is a socialized assumption: trust in institutions stems from childhood. It is worth noting that certain levels of trust develop between people during primary socialization. With growing experience and the emergence of social perspectives during secondary socialization, this trust broadens to include basic groups, eventually institutions, and the system as a whole. The expression of trust also depends on short-term circumstances; trust can be shaken by negative results, distinct changes in institutions, etc. This is particularly true when the analysis not only encompasses diffuse, stable trust which is resistant to disappointment and which evolves over a long period of time, but also the expression of (dis)trust as a response to a specific, short-term event.

Surveys to Date – Secondary Sources

Survey of Trust in Western, Central and Eastern Europe in the 1990s²

In the 1990s, the most important empirical analysis of trust in institutions was undertaken [Listhaug, Wiberg, 1995]. The research was based on extensive empirical data collected in 14 European countries over the course of

2 In reviewing past surveys of trust in institutions, we relied on the most recently published study in Slovenian by Rus/Toš [2005] and its supplement [Toš, 2007]. The study exhaustively describes the empirical sources used in this part of the paper. The first part of the review comprises international comparative surveys from the 1990s, and the second part comprises surveys conducted in Slovenia from the 1990s up to 2006.

two observation periods.³ The analysis covered ten institutions, including the Church, armed forces, trade unions, police, parliament, major corporations, etc. Richard Rose's analysis [Rose, 1984], which classifies six institutions as government (the armed forces, education system, judicial system, police, parliament, and social services), and four as non-government (the Church, the press, trade unions, and major corporations), is also important in understanding the issue. Results show that there is a greater willingness to trust state institutions than private ones. If, however, the analysis includes the results of additional surveys, one can see that trust in government institutions is more or less stable or is declining slightly, while trust in private institutions is slightly increasing. For example, trust in government institutions is decreasing in Norway, Belgium, Sweden and the United Kingdom, while it is growing in Denmark; the most discernible increase in trust in private institutions can be seen in Italy, the Netherlands and Spain. It must be noted, however, that in most countries during the 1990s, one sees a greater inclination to trust government institutions than private institutions.⁴

Within the group of government institutions, parliament has enjoyed a relatively high standing in all observed countries, particularly in Norway, Finland, Germany, Ireland, the Netherlands and Spain. Intermediate comparisons show that the high levels of trust enjoyed by parliament between 1982 and 1990 are visibly declining. This is particularly pronounced in Norway, applies partly to Iceland, Germany, Ireland, France and Spain, and is standard for the 14 European countries under observation. Some of the countries display the opposite trend, namely, growing levels of trust in parliament, as is the case in Belgium, the Netherlands, the United Kingdom and Italy. Also apparent are the different levels of trust in different countries. Despite the negative trend, the levels of trust in parliament in Norway are still relatively high. The same applies to Finland, the Netherlands, Germany and, to a slightly lesser degree, Italy as well.

State institutions enjoying the highest levels of trust include the education system, the armed forces and the police. The trend is also positive in these cases. This prevailing positive trend is characteristic for the education system, which enjoys high levels of trust. Only Belgium, the Netherlands, Italy and especially the United Kingdom show a departure from this trend. The police

3 The European Value System Study Group, 1981, 1990.

4 Basanez, M., Inglehart, R., Moreno, A.: *Human Values and Beliefs, A Cross Cultural Source-book*, World Value Survey 1990–1993; International Values Survey, SJM 92, SJM 95 in SJM 99. See Toš, N., ur., *Vrednote v prehodu I–III, Dokumenti SJM*, Ljubljana 1997–2004.

enjoyed a relatively high level of trust over the course of several observation periods in all countries; however, a negative trend was observed in individual countries (Sweden, Belgium, the United Kingdom). The Church occupies a special position among civil institutions. The highest levels of trust in the Church – far higher than in any other institution – were expressed in Ireland and Iceland, albeit a negative trend has also been observed in both countries. In all other countries, a more or less negative trend was observed, especially in Belgium, Germany, Ireland, the Netherlands and Spain. This is an indication of the progression and the extent of secularization in Western Europe during the observation period. If we look at the average expression of trust in the Western European countries under observation, we notice that the highest levels of trust are seen in the police, followed by the education system, judicial system, armed forces, the Church, large corporations, parliament, trade unions, etc. The lowest levels of trust are observed in the press, followed by the trade unions. Parliament ranked sixth out of ten observed institutions.

A Comparison of Studies Carried out in Slovenia (WVS, 1992)⁵

A comparison of studies carried out in Slovenia (WVS, 1992) and in Western European countries during the same period (1992–1994) shows a number of differences. In Slovenia, the level of trust in parliament is only half of the European average and far lower than in the observed countries. Slovenia already departs from the European average by having low levels of trust in the police, judicial system, trade unions, the Church and corporations. Trust in the education system is on par with the European average, while trust in the armed forces is slightly below the European average and trust in the mass media is significantly below the European average. It is apparent that Slovenia departs from the European average when it comes to trust in institutions. However, it is also clear that in Slovenia, the highest level of trust is enjoyed by the education system, and that the police and the armed forces also enjoy high levels of trust. The results of studies (1995–1999) seem to confirm this first impression. The final study shows that trust in parliament is at an exceptionally low level – far lower than initially; the same applies to public services. There is a strong affinity between trust and the education system and the mass media. Here, too, it becomes evident that Slovenia is a young democracy in which state institutions with a tradition (the police or armed forces, for example) enjoy higher levels of trust than the legislative branch (a politically plural

5 World Value Survey, WVS Group, Ronald Inglehart *et al.*

parliament representing the democratic nature of the system). Is this a conflict between the “undemocratic” nature of the state and its citizens? Slovenia is, undoubtedly, still undergoing the legitimation of its democratic system.

*Results of Surveys on Trust in Institutions in Central and Eastern European Countries*⁶

Data collected in 1995 for ten Central and Eastern European countries indicates⁷ that trust in institutions in these countries is at a much lower level than in Western European countries. This is particularly true for political or state institutions. In addition, we also notice differences in levels of trust between individual Central and Eastern European countries. Of the observed countries, trust in the government is highest in Slovenia and the Czech Republic; trust in parliament is highest in Croatia and Slovenia; trust in the Church and clergy is highest in Romania and Ukraine; there is a high level of trust in banks in Slovenia, Slovakia, Bulgaria and the Czech Republic, and a very high level in Ukraine and Belarus. Of the observed institutions, the Church enjoys the highest level of trust in most of the countries, especially in Romania, Ukraine, Belarus and Poland, while the lowest levels of trust are found in Slovenia and the Czech Republic. The president of the republic, in most cases elected directly, enjoys a relatively high level of trust, except in Slovakia, and this is significantly higher than for parliament. Social movements and the mass media generally enjoy a high level of trust – much higher than, for example, parliament or the government. This leaves the impression that the legitimacy of government institutions is subject to their cooperation with non-governmental institutions.

A similar survey conducted on a group of Eastern European countries [Plasser, Ulram, 1996] confirms that there are differences in levels of trust in political institutions in the observed countries. For example, the president of the republic enjoys the highest level of trust in Hungary, the Czech Republic and especially in Slovenia. This is probably related to the presidents' personalities as well as to their limited constitutional power, which elevates them above daily political bickering by making them the representative of the system, moral arbitrator and proponent of internal balance and sensible compromise. This is in sharp contrast to the constitutional and political situation in Russia and

6 Based on studies conducted under the auspices of the New Democracies barometer [Rose, 1996].

7 Rose, R., Haerpfer, Ch.: New Democracies, Barometer IV: A 10-Nation Survey, Studies in Public Policy, University of Strathclyde, Glasgow, 1966

Poland, where the president, with broad powers, direct influence on executive power and the right to veto, plays the role of a “presidentially charismatic” defender of the constitution [Offe, 1994]. In such systems, presidents do not enjoy a high level of trust, except in Croatia, where the president was highly trusted in 1995, when the Homeland War ended. Other sources show that lack of trust in political institutions is particularly the case in Russia, where, with the exception of the armed forces – an object of national identification – all other institutions are subject to a high level of distrust and suspicion. This is similar in Poland, where the armed forces enjoy a high level of trust, in contrast to the political elite (parliament, government). Even traditional institutions, such as the Polish Church, have lost a significant share of their support and are subject to distrust at a similar level as parliament and the government. Similar changes in the patterns of trust can be observed in the Czech Republic, the difference being that the government enjoys a high level of trust, in contrast to the Church and parliament.

By comparing the results of surveys conducted in Western, Central and Eastern Europe, we may conclude that, following the social changes of the mid-1990s, the levels of trust in Central and Eastern Europe are significantly lower than in Western European countries with long-established democratic traditions. The results also show that trust in civilian institutions is lower than in Western Europe, however, this departure is not as significant. As mentioned earlier, trust in the Church in the two predominantly Orthodox countries (Romania and Ukraine) far exceeds the European average, while trust in two predominantly (Slovenia) or partially (Czech Republic) Catholic countries is typically below the European average. This illustrates the peculiarity of the secularization process, which has not proceeded at the same rate or under similar conditions in all Eastern Bloc or post-socialist countries. Secularization in Eastern Europe was mainly coercive and often ostensible, while the primary religiousness of the people remained deeply rooted; in contrast, secularization in Slovenia and the Czech Republic was less influenced by political diction and – at least in Slovenia – was part of the general current that characterized the Western European social and cultural environment. In other words, they were part of the processes of modernization (and urbanization) and the prevailing liberalism.

An analysis of the scale and power of trust in political institutions (parliament, government, the president) in Central and Eastern European countries gives us an expected ordering of countries: at the top of the list is Slovenia, followed by Croatia and the Czech Republic, while Ukraine and Belarus are at the

bottom of the list. In the two highest ranked countries, the “pre-democratic” political practice, which evolved under the Yugoslav system of self-governing socialism, and the openness and western orientation of these two former federal entities of the defunct Yugoslavia should not be overlooked. Analyses from the mid-1990s have indicated that in Slovenia (and the Czech Republic), the government enjoys a very high level of trust and the president of the republic even more so. The central bank also enjoys an unusually high level of trust, thus legitimizing the system’s economic dimension, as do women’s movements (also in the Czech Republic and Slovakia), which legitimizes the system’s human rights dimension.

*Survey of (Dis)trust in Institutions in Slovenia (1991 – 2006)*⁸

After independence (1991), the sociological community in Slovenia participated in several international comparative projects (EVS, WVS, ISSP, CSES, ESS and others). Ever since, trust in institutions has been intensively surveyed, both conceptually as well as in terms of the institutions themselves and the frequency of the surveys (see table). This chapter focuses on the results of the most recent survey (2006), and also illustrates trends in the expression of trust. The SPOS 2006⁹ survey applied a four-level confidence scale¹⁰ and was conducted on 20 institutions, including eight institutions representing the state (political) sector and others representing the civil society, the institutional and the individual environment. The resulting ranking shows that of all surveyed institutions, the highest average level of trust is enjoyed by family, while political parties have by far the lowest average. Our observations, however, should not be limited to the rank of the institutions; rather, we should attempt to show the relationship between the ranks of individual institutions and their broader significance and affiliation. We can do this by clustering the institutions into groups or categories according to their characteristics. The first is the group of strictly governmental institutions (parliament, government, the prime minister, the president of the republic), the disciplined and security services (police, armed forces) and the judiciary (courts of law). Next are the institutions related to the welfare state: commercial and financial institutions (banks, companies, the Slovenian Tolar) and civil institutions (schools, mass media, the Church and clergy). Political parties may also be

8 Faculty of Social Sciences, Centre for Public Research under Prof. Niko Toš.

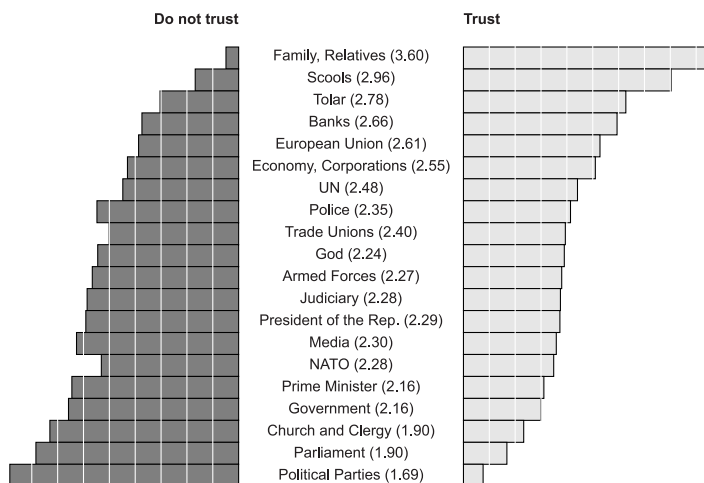
9 Slovenian Public Opinion Survey 2006/2, Role of Government, CJMMK, representative sample of adult population in Slovenia, N = 1516, October-December 2006.

10 Scale: 1 – do not trust at all / 4 – trust entirely.

considered among the state institutions (a precondition for their functioning), especially in relation to legislative and executive authority. Finally, there is the independent group, which includes international organizations (UN, NATO, EU). The ranking of these groups by trust level places the institutions with which people are intimate, as well as civil, welfare state and international institutions at the top of the scale, while state institutions (political parties, parliament, the prime minister, government) rank at the bottom, as do the Church and clergy as the only civil institution so low on the scale. It is evident that, in addition to trust in family which ranks highest, people look for and find social stability mainly within the context of civil society, and that they feel limited and restricted by, even excluded from, the political and religious context.

The institutions can also be ranked according to different criteria, namely, the relationship between trust and distrust.¹¹ Here (Figure 1), the institutions are still ordered as before, however, the perception in the minds of people of their position in the “treasury of trust” is even more acute.¹²

Figure 11.1: TRUST IN INSTITUTIONS



Aggregate of answers: 1-none + 2-slight and 3-very strong + 4-complete

Source: Faculty of Social Sciences – Public Opinion and Mass Communication Research Centre, Slovenian Public Opinion Survey 2006/2, N=1003

11 Trust: complete (4), very strong (3); Distrust: slight (2), none (1)

12 The Figure only shows the values for trust and distrust. The difference up to 100% represents the undecided.

In addition to family, which enjoys a high level of trust, the group in which trust characteristically outweighs distrust includes schools, the Slovenian Tolar, banks, the European Union and commercial institutions, including companies; the UN also falls into this group. Next is the group in which trust does not outweigh distrust as heavily. This group includes trade unions, armed forces, the judiciary, the president of the republic, media and the UN. The last group includes institutions in which the level of distrust far outweighs the level of trust.¹³ These are institutions that guarantee the functioning of the state and its democratic character.

Determining Factors and Expression of Trust in Individual Institutions and Groups of Institutions

We shall illustrate the structural characteristics of the expression of trust in institutions. We shall be more thorough in the discussion of state institutions and less so in the discussion of civil institutions, particularly where there are small differences in the levels of trust. Analyses of trust in family and political parties will not be discussed, as there are only slight differences in the prevailing expression of trust and distrust (4.9% for family and 7.6% for political parties), leaving little to analyze.

a) National Assembly, Government and Prime Minister. The national assembly ranks the lowest of all institutions in terms of trust. The number of respondents expressing trust in the national assembly increases or decreases depending on age and to some extent on education, however, the most pronounced fluctuations are seen in connection with party preference, satisfaction with democracy and trust in the prime minister. Respondents who prefer coalitions evaluate state institutions positively when they have the feeling of participation. The other two lowest placed state institutions are the government and the prime minister. Typically, the level of distrust expressed in the government heavily outweighs the level of trust. Among the considered groups, the highest level of trust in government is expressed by supporters of the coalition parties. An unusually high level of trust in the government is expressed by respondents who also show a high level of trust in the Church, worshippers who regularly attend weekly religious ceremonies, respondents who are satisfied with the level of democracy or self-declared supporters of the political right. The highest

13 The percentage of distrust is greater than that of trust by a factor of two or more. At the bottom of this group, with the lowest trust and highest distrust by far, are the prime minister (1:2.1), the government (1:2.2), the Church and clergy (1:3.1), national assembly (1:4.6), political parties (1:12)d.

level of distrust in the government is expressed by supporters of opposition parties, left wing supporters, individuals from lower social strata, respondents who do not attend religious ceremonies, the youngest respondents in the survey and secondary school and university students. A casual analysis shows that the harsh attitude of people towards government in general is primarily influenced by their attitude towards the principal politicians in government.

Similar rankings and correlations can be found regarding the support for the prime minister. It is interesting to note that trust in the prime minister changes dramatically from one age group to another: the youngest respondents express a lower level of trust than the oldest respondents. The trust expressed by the youngest respondents is far below average and a full three-quarters do not trust the executive branch. Among the oldest respondents, the level of trust in government is far above average while the level of distrust far below average, albeit prevalent. Analyses based on education show smaller fluctuations, however, those with a lower level of education expressed a lower than average level of distrust and those with a higher level of education expressed a higher than average level of distrust.

Since levels of trust and distrust among students and pensioners are the same for the government and prime minister alike, the executive's authority in pursuing development and reforms on behalf of the younger segments of the population is called into question.

A comparison of the level of trust expressed in the government and prime minister does not show any typical deviation. As expected, the prime minister – as the personification of an institution – does not enjoy a high level of trust. Trust in the prime minister is also strongly influenced by ideological beliefs. The highest level of trust is expressed by supporters of the coalition parties, respondents who express trust in the Church or attend weekly religious ceremonies, respondents who are satisfied with the level of democracy, self-declared supporters of the political right, and those with negative views on socialism. Respondents from the youngest age group, students, supporters of opposition parties, and respondents who do not trust the Church or are not satisfied with the level of democracy have a high level of distrust. There is a conspicuous level of distrust towards the executive branch, which forms a fundamental part of the attitude towards the authorities held by the youngest, most highly educated, liberal, opposition supporting, and secular groups of voters. This again highlights the exclusion of a significant part of the electorate from the political process.

b) President of the Republic. The president of the republic is the state institution that enjoys the highest level of support. The president is trusted by a good third of the respondents and is distrusted by two-thirds; generally, the president is ranked above the prime minister, government and national assembly. The aforementioned correlation between age and education is reaffirmed in this case. The youngest respondents express much higher levels of distrust than trust in the president of the republic, departing from the average in both cases. The oldest respondents express higher levels of trust and lower levels of distrust than average. Differences based on education are indistinct and extrinsic. Supporters of the opposition parties are more trusting of the president of the republic, while supporters of the coalition parties, self-declared supporters of the political right, and respondents with negative views about socialism or who trust the Church are conspicuously distrusting.

c) Church and Clergy. The Church and clergy are the lowest ranked of all civil institutions. Hardly a quarter of all respondents express trust in the Church. Analyses show that the expression of trust and distrust are unevenly distributed and confirm the logical and anticipated correlations based on age, education, employment, physical location – and, in particular, ideological belief. Analyses by age group show a gradual and distinct shift towards trust in the case of the oldest respondents, and towards distrust in the case of the youngest respondents. A similar picture emerges regarding level of education. There is a high level of distrust among those with post-secondary and tertiary education. The level of distrust falls below the average among those with primary school education. Generally, the level of trust in the Church is above average among elderly respondents and those with lower levels of education, as well as the unemployed, people living under difficult material conditions, and the rural population. One can see a correlation between trust in the Church and clergy and (ideological) proximity to the ruling authority. Conversely, there is a very strong distrust of the Church and clergy among the youngest respondents, students, respondents with post-secondary and tertiary education, the urban population, self-declared left-wing supporters and supporters of opposition parties.

In order to better understand the current low level of support for the Church and clergy in Slovenia, attitudes of believers, nonbelievers and those who attend religious ceremonies must be determined. One-half of the believers, who account for slightly more than half of the respondents, do not express trust in the Church, and a good two-thirds express distrust in the Church. The level of trust in the Church and clergy drops drastically among the religiously unde-

terminated respondents, while only individual nonbelievers express trust in the Church and clergy. Practically all respondents who consider themselves non-religious express distrust in the Church, as well as four-fifths of the religiously undetermined, and one-half of the respondents who consider themselves religious. A similar but more vague picture is drawn by analyses on the frequency of attendance of religious services: two-thirds of those who regularly attend Sunday Mass express trust and only one-quarter express distrust. This trend is reversed when we look at respondents who attend religious services less regularly: three-fifths do not trust the Church and two-fifths do. The percentage of those who trust the Church has fallen and is lowest among those who do not attend any religious services. As a rule, the functioning of civil institutions is based on a high level of general trust for the more universally oriented institutions, or on a high level of segmental trust for institutions operating in narrower social segments. The Roman Catholic Church undoubtedly belongs to the former. Nominally, it focuses its activities on believers; however, its larger mission greatly exceeds this, as it pervades all of society in its pastoral role and as the defender of certain values.

And from this perspective, the legitimate role of the Roman Catholic Church in Slovenian society is highly controversial, as it enjoys the majority support of only a small segment of those who regularly attend religious services.¹⁴

d) The Media. Among the observed institutions, television, newspapers and radio were ranked in the middle in terms of trust. The media held a relatively high and stable position in Slovenia during the late 1990s. The same applies to the SPOS 20062 survey, in which the media was ranked ninth among the observed institutions. It emerges that the expression of trust and distrust is influenced by education (a higher level of distrust of the media is expressed by respondents with secondary school or higher education). Among groups based on employment, only students and the youngest respondents show a markedly higher level of distrust than trust. Greater fluctuation in the expression of trust can be observed among supporters of political parties. Of all the variables included in the survey, two ideological variables exert the strongest influence on the level of trust or distrust: (1) a significantly larger percentage of the respondents who trust the Church also trust the media; (2) trust in the prime minister influences respondents' opinions regarding the media. Three-quarters of the respondents who do not trust the prime minister

14 This group represents approximately one-sixth of all respondents.

also do not trust the media, while those who trust the prime minister express above-average trust for the media.

e) Trade Unions. Trade unions fall under the category of civil institutions that ranked relatively low in Slovenia up to the late 1990s, but have moved up in the rankings to the top of the middle third in this decade. Intermediate comparisons indicate a high position and stability during the 2000–2006 period. In 2006, trade unions ranked far above most state institutions, the armed forces, NATO, the judiciary, the media and the police. Analyses hint at the circumstances that influence the expression of trust in the unions. It appears that factors influencing the expression of trust are life experience, political socialization under the previous social system, and employment status. As expected, employed persons and pensioners more often express their trust in trade unions than the unemployed and students. One can also see that very difficult material conditions influence the expression of distrust in the unions. Ideological belief also influences trust in trade unions, as illustrated by the findings that a significantly higher percentage of opposition party supporters express trust in the unions, while the opposite applies to supporters of the coalition parties. Another illustration of the influence of ideological belief is the fact that respondents with positive views about socialism and self-declared supporters of the political left also express a higher level of trust in trade unions.

f) Judiciary and Police. The placement of the judiciary in terms of trust is somewhere in the middle; slightly less than three-fifths of the respondents express distrust and slightly more than a third express trust in the judiciary. Younger and better-educated respondents, pensioners and supporters of the political right, etc, express a higher than average level of trust. The lowest level of trust in the judiciary is expressed by the oldest group of respondents, respondents with the highest level of education, supporters of the political left, and those of the lowest social stratum.

Actual surveys of trust place the police at the top of the middle third of the scale, immediately after the trade unions. The percentage of respondents who express trust remains characteristically lower than the percentage of those who express distrust. Analyses show uniformity in the responses; there are no differences between the age, education, or other categories.

g) The European Union and the United Nations. The European Union is ranked in the first third, among the institutions that enjoy an above-average level of trust. Barely one-third of the respondents express distrust. Analyses show that

the expressions of trust and distrust towards the European Union is rather monotonous and level. Respondents with lower levels of education, those who are dissatisfied with the level of democracy, those with negative views about capitalism, and respondents who are dissatisfied with their domestic material situation express above-average levels of distrust. Far higher levels of trust than distrust are expressed, especially among respondents with higher education, students, supporters of government coalition parties, self-declared supporters of the political right, respondents who are satisfied with the level of democracy, respondents with positive views about capitalism and a negative view about socialism, respondents who regularly attend religious ceremonies, etc.

h) Slovenian Tolar and Banks. Of the civil institutions in the economic sector, the highest level of trust was expressed in the Slovenian Tolar, followed by banks and the economy (commercial companies). All three institutions are ranked very high up in the upper third of the scale, and, on average, the respondents characteristically express a higher level of trust than distrust. This particularly applies to the Slovenian Tolar. In late 2006,¹⁵ almost two-thirds of the respondents expressed trust in the Tolar and only one-third expressed distrust. The oldest respondents, respondents with higher education, materially well-off respondents, supporters of the political left and right, respondents who are satisfied or very satisfied with their material situation, etc. expressed the highest level of trust in the Tolar. A correlation also appears between ideological and political beliefs. The Tolar enjoys the highest level of trust from supporters of the coalition parties, respondents who trust the prime minister and the Church, and respondents who are satisfied with the level of democracy.

Banks also rank very highly among the observed institutions. Three-fifths of the respondents express trust in banks, while slightly less than two-fifths do not trust banks. More distrusting than average are respondents living under poorer material conditions or who are not satisfied with their material conditions, etc. Supporters of the political left express above average levels of trust in banks.

i) Schools, the Education System. Schools rank second, immediately after family, with four-fifths of the respondents expressing support. Throughout the observation period (1991–2006), schools ranked very highly in terms of trust,

15 Slovenia adopted the Euro in January 2007.

which corresponds to the high value attributed to education. Analyses show that there are no fundamental differences between the observed groups in their expression of trust, however, respondents with higher education and supporters of the political right expressed above-average levels of trust. There are higher levels of dissatisfaction than average among respondents with primary school education, the unemployed, respondents with negative views about socialism, respondents who classify themselves as belonging to the lowest social stratum, and respondents who are dissatisfied with their material conditions.

Trust in Institutions – Intermediate Comparisons 1991–2006

Table 1 (see annex) displays the results of all surveys of trust in institutions taken during the 1991–2006 period.¹⁶ (a) The extreme right column of the table displays the average of all measured percentages of trust, which provides a view of the final, overall placement of the observed institutions; (b) the bottom of the table displays the annual average of trust in all (14 selected) institutions, which indicates the changes in the expression of trust towards all observed institutions during that period. In (a), we have already determined that at the very top of the scale, with the highest total average percentage of trust is family, while at the very bottom, with the lowest percentage by far, lie political parties. In addition to family, schools, educational institutions, the Slovenian Tolar and the Central Bank rank very highly. These are followed by the group of institutions that enjoys an average level of trust of between one-third and one-half. At the top of this group are the president of the republic, the United Nations, banks, the European Union, the Slovenian army, and neighbors, while at the bottom of the group lie NATO, the police, the prime minister, companies, God and the media. The lower group, which enjoys an average level of trust (below 33%), includes the judiciary, government, trade unions, the Church and clergy, the national assembly and political parties. In a sense, this classification is misleading because it blurs the sharp increase and decline in the expression of trust in individual institutions during the observation period. In (b), the sharp increase and decline are illustrated in the column at the edge of the table, which gives the annual average for all observed institutions and individually for the 14 institutions under observation during the entire period. Figure 2 illustrates the dynamics and changes in the averages during the 1991–2006 period: it shows higher levels of trust in 1991 (37.4%),

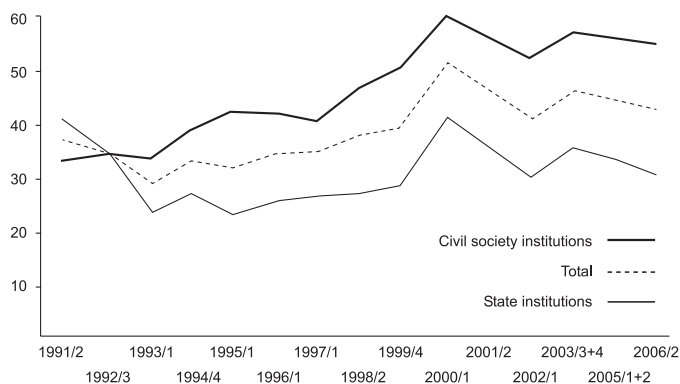
16 For each survey, the sum of the responses “trust very strongly”, “trust considerably” (3 + 4) are given for each institution individually.

the gradual decline to 1993 (28.5%), and the eventual increase, peaking in 2000 (50.7%) and reaffirmed in 2001 (46.1%). The figures for 2002 (41.1%) already indicate the characteristic decline in overall trust; figures for 2003 (45.3%) and 2005 (44.2%)¹⁷ again show an increase in the average level of trust to the 2001 level; the 2005–2006 (44.3%) period again shows a decline in the average level of trust in institutions.

From the perspective of the development of a democratic institutional system, two distinct periods emerge. The first starts in 1991 with a relatively high percentage (37.4%), falls two years later (1993: 28.5%) and climbs to its initial level of trust in the late 1990s (1998: 37.5%, 1999: 39.5%). The second period starts in 2000 when overall trust in institutions reaches its highest point (50.7%) before falling to its lowest point in 2006 (42.3%), which is still higher than during the first period.

Figure 2 illustrates the trends in trust in civil and state institutions. With the exception of the starting period (1991–1993), civil institutions are ranked far above state institutions; the final average level of trust in state institutions is almost half of that in civil institutions.

Figure 11.2: Trust in Institutions: Averages for Civil Society and State Institutions, and Overall Average for the 1991–2006 Period (Sum of the responses: “trust completely” + “trust considerably”)



Source: Public Opinion and Mass Communication Research Centre, Slovenian Public Opinion Survey, 1991–2006

17 In the 2004 general election, the government was replaced after three consecutive mandates 1992–2004.

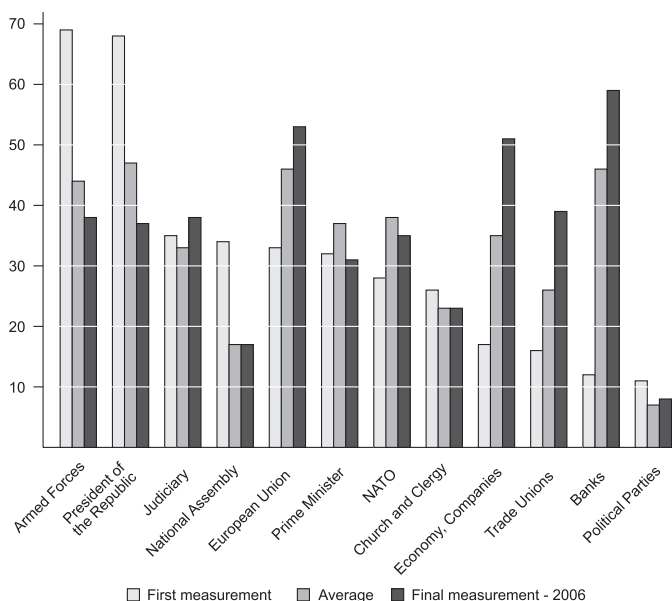
Comparisons between the First, Final Surveys and the Average of All Surveys. Figure 3 illustrates the level of overall trust in the observed institutions: the first column shows the level trust from the first survey for each institution, followed by the average level of trust for all the surveys, and finally the third column shows the level of trust during the final survey.¹⁸

The Figures shows surveys of trust for selected political, civil and international institutions. It is evident that by the last survey of trust, the initially high level of trust in the president of the republic, the armed forces and the national assembly declined past the lower average, and in the case of political parties, to the lowest level. The opposite tendency, namely, a lower initial level, higher average and higher final level, is characteristic for schools, educational institutions, banks, the central bank, companies, the media, trade unions and the European Union. The third group of institutions, in which a low level of trust is relatively “stable” during both observation periods, includes the Church and clergy, the government, police, etc.

These different “models” in the expression of trust in political and civil institutions illustrate the specifics of their belief, however, they are undoubtedly also an expression of the entire course (more or less) of the democratic institutionalization of Slovenian society and its development between 1991 and 2006. The position of economic operators, for example, exhibits an initial commotion within commercial structures and their gradual stabilization (the economy, banks). The gradual but increasing awareness of the population and their recognition of the opportunities provided by establishing links with the European Union, for example, becomes evident. The “model” that covers the majority of the political institutions reveals (higher) initial expectations, which are later not reaffirmed. The transition to a new political system, characterized by political plurality and the introduction of a market economy, brought with it disappointment. This model also conceals within itself the high level of post-independence enthusiasm, which particularly applies to fluctuations in the expression of trust in the armed forces, president of the republic and political parties. The low initial levels of trust in the economy is an expression of the frustrations and fears surrounding existential issues and economic development; the final low level of trust and growing distrust in the institutions of the political system – after 15 years of development – invites a critical view and warning about the nature, situation and result of the democratic political institutionalization of Slovenia.

18 The first survey was made in 1991 or later, whilst the final survey was made in 2006.

Figure 11.3: *Trust in Institutions: First, Final Measurements and Average (Sum of the responses: “trust completely” + “trust considerably”)*



Source: Public Opinion and Mass Communication Research Centre, Slovenian Public Opinion Survey, 1991-2006

The different dynamics of trust hide the specifics in the processes of democratic institutionalization in Slovenia. Subjects related to an individual's intimate environment (family, for example) have not undergone any characteristic changes. However, significant changes, which are significant from the perspective of the final status (2006), have been observed with regard to political institutions. Over the last five years, and particularly the last two, following the change in government and legislature, the process of democratic institutionalization has not taken a turn for the better. Overall trust in institutions has fallen again, and trust in political institutions has fallen dramatically. The change in government did not, therefore, result in new incentives and a “relaxed” atmosphere, as predicted, which would have been expressed by an increasing trust in political institutions.

Intermediary Summaries and Conclusions

For the most part, studies conducted in the 1990s in Western, Central and Eastern Europe confirm the assumption that, on the basis of cumulative pos-

itive experiences, institutions in the original, traditional democracies are valued far more highly than in countries considered to be young democracies. The results of our research places Slovenia at the top of the latter, or at the bottom of traditional democracies.

The purpose of our analysis was to point out the characteristics of democratic institutionalization in Slovenia as demonstrated by the expression of trust in the institutions of the system. We have relied on the trends in the expression of trust in state and civil institutions between 1991 and 2006 (Figure 9.02). One can see that the initial level of trust in political institutions immediately after independence (1991) was relatively high – higher than the level of trust in civil institutions. Surveys conducted two years after independence (1992–1993) show a general decline in the level of trust, defined by the opposing trends in the expression of trust in civil institutions, which increases, and state institutions, which decreases dramatically. From this period forth, we notice a gradual and steady trend of increasing trust in civil institutions and the stagnation (at a low level) with regard to state institutions. A sharp increase in the expression of trust in civil and state institutions is only recorded in 1999–2000. The trend is negative again over the next few years, during which we see a decline in both cases. However, trust in civil institutions remains at a high level, while trust in state institutions falls almost to the level of a decade earlier. Between 2002 and 2006, there is a slight increase in the level of trust (2003), which falls again by the end of the survey period (2006). At this point, the level of trust in state institutions again almost reaches the lowest point recorded a decade earlier, while the level of trust in civil institutions declines only slightly, albeit at a high level, and remains higher than the level of trust in state institutions. Such a summary of the dynamics of trust in institutions partially confirms the hypothesis of a low but increasing level of trust in the institutions of the systems in young democracies. It does not, however, confirm the expectation of a more favorable position of state institutions vis-à-vis civil institutions during this period in Slovenia.

In order to correctly interpret this general image of democratic institutionalization in the state and society in Slovenia, it would be advantageous to show which state (political) and civil institutions are related to higher or lower levels of trust, thus decisively influencing the general trend. The poor performance of state institutions is mainly the result of the expression of distrust in political parties and the national assembly, while the government, president of the republic, armed forces and police retain a higher level of trust. However, during the 15-year observation period, the latter institutions also became subject to

the general dynamics of trust, which includes this negative trend. Three observed state institutions (the national assembly, the armed forces and the president of the republic) initially (1991) enjoyed a very high level of trust. Trust in the national assembly declines sharply during all subsequent observation periods and remains at a low (the lowest) level, while trust in the president of the republic and the armed forces falls to a lower level but retains a relatively high, above-average level in comparison to other political institutions. Within this group, only political parties remain at a low level, without any discernible level of trust.

We shall not summarize here the detailed analyses of time dynamics or structural analyses of the expression of trust in individual institutions or groups of institutions. We can, however, confirm the hypotheses put forward at the beginning. The analysis confirms the assumption that the expression of trust in institutions depends on the knowledge, education and degree of political culture of the individual. Categories in which interpersonal trust is more easily achieved also more readily and strongly express trust in institutions. The analysis also confirms the relationship between trust and experience, that the elderly, with more social experience, are more trusting of the institutions of the system, and conform more readily, which also results in a higher level of trust. If it is characteristic of the younger segment of the population that they maintain an inchoate critical distance from political institutions, the older and oldest segments of the population display a tendency to conform to, recognize and accept the given situation, and show a friendlier demeanor towards institutions and the persons associated with them. The analyses also confirm the assumption that the expression of trust reflects ideological beliefs and the political proximity of the respondents to executive authority. It is clear (not only for the 2006 period but for other surveys as well) that supporters of parties in the current ruling coalition express a significantly higher level of trust in state institutions, and vice versa, that supporters of the current opposition parties are more reserved when expressing their trust in political institutions. In both cases, this especially applies to the parliament, government, prime minister, and to a lesser degree to the president of the republic, the armed forces, police and the judiciary.

The situation regarding the expression of trust cannot be said to be critical but it would be difficult to term it as satisfactory. When evaluating the general level of trust in civil institutions, especially the educational system and the economic operators under observation, the level of trust may be regarded as satisfactory and favorable. Indeed, civil institutions play an important role in

ensuring the internal stability and legitimacy of the social system as a whole. The levels of trust expressed in state and political institutions depart dramatically from this favorable situation.

Trust in Institutions – European Comparative Studies¹⁹

Researching Trust in Institutions in the ESS – Classification of the Problem

First conducted in 2002, the European Social Survey seeks, inter alia, to research the processes of democratization in Europe. This is achieved through a series of thematic modes and operations, a part of which is the research of trust in institutions. This has been at the core of the ESS since 2002, i.e. for all three rounds. This theme is investigated through determining trust in national assemblies, legal systems, the police and politics, the European Parliament and the United Nations. Political parties join these six institutions only in the third round (2006). The choice is thus limited to a narrow field of political institutions, which does not provide a good basis for broader comparisons with the older surveys mentioned earlier, which penetrated further into the political subsystem, as well as into the civil subsystem. Nevertheless, within its scope, the ESS provides the opportunity to analyze the processes of democratization. The survey covers most of the EU member states as well as a few non-members. The third round of the survey (ESS, 2006) includes important non-EU countries (Russia and Ukraine). The fact that the survey was conducted in three rounds (2002, 2004, 2006) serves as a basis for an intermediate analysis of the course of the processes of democratization in Europe. Surveys conducted thus far only cover a four-year period, which is important for recent European history²⁰ but represents only a brief period in the restructuring of the common democratic political culture.

The three rounds of the ESS cover a total of 27 countries, namely, the 25 member states plus Russia and Ukraine. A total of 21 countries participated in the first round, of which 18 were EU member states and three were in membership negotiations (Poland, the Czech Republic and Slovenia). The same countries participated in the second round (ESS, 2004). In the third round, some of previous countries did not participate²¹ (the Czech Republic, Greece,

19 The European Social Survey 2002, 2004, 2006

20 During this period several Central and Eastern European countries joined the EU.

21 Primarily as a result of difficulty in securing funding for national empirical surveys.

Italy, and Luxembourg), while a number of countries participated for the first time (two new members: Bulgaria and Slovakia, and Russia and Ukraine).

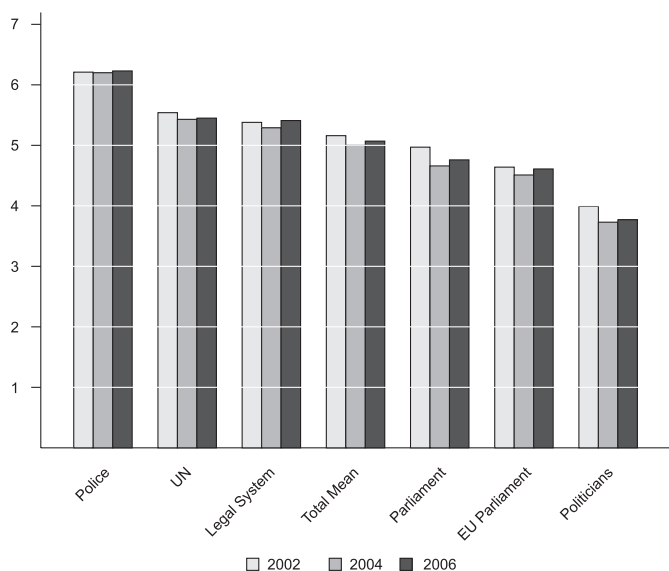
The ESS has gathered a large amount of data about trust in political institutions. It provides a wide stage for an analysis of the state of democratization in individual countries, a comparative analysis of the state of democratization in all countries under observation, for uncovering the changes that took place during the period under observation (2002–2006), and – at the level of state records – recognizing the patterns of their mutual similarities and differences. We shall attempt to answer the following questions within the scope of this paper:

- how is trust expressed in the six political institutions under observation (within individual countries, in all countries under observation during a specific time period, and during the three periods, individually and overall);
- how is trust expressed in an individual institution, what are the trust profiles in individual countries, groups of countries and overall for all countries under observation; is there any significant departure in the trust profiles and the level of the trust in individual institutions or groups of institutions;
- are we able to confirm the inferred similarities and differences between individual countries or groups of countries regarding the expression of trust in institutions; what is the result of the analysis and how can it be explained, etc.

The analysis will be presented in several steps. The first step is descriptive and presents the distribution of the measurement of trust.²² In addition to reviewing the frequency of distribution, we also review each country, institution and round individually, and review each vis-à-vis all countries, institutions and rounds – which we present using mean values (Table 2. – in annex). From this basis, we make summaries and aggregates of the results by institution in all three rounds, and of the results of the overall expression of trust in institutions in all countries (Figure 4). We then present the expression of trust in all institutions under observation by country, for 17 and 27 countries, depending on whether three, two or one survey was conducted in an individual country. This serves as the basis for the creation of a scale for ranking the countries, as shown in Figure 5.

22 Measurements were based on an 11-grade scale (0=complete distrust, 10=high level of trust).

Figure 11.4: Trust in Institutions by Countries Participate in all 3 Waves (Total 3 wave Mean for 6 Institutions, scal 0-10); ESS-European Social Survey



Source: ESS: 2002–2004–2006

We continue by analyzing intermediate aspects of the expression of trust in the six institutions by country. The results of this analysis are presented in Figures 6 to 8. All the above is based on the calculation of mean values and the differences between them. Thus, we also illustrate the basic tendencies for the three rounds, which can perhaps be seen as an upward or downward trend in the expression of trust.

In the second step of the analysis, we factor the results of measurements by country and round, and overall. One can see that the expression of trust is consistent for countries both in individual rounds and in all the rounds overall, as well as for all levels overall, and that it is expressed in one dominant factor. The only departure from this finding are the results for Bulgaria and Ukraine, where there are two factors, the first for four national institutions, and the second for two international institutions. This suggests that these two countries occupy a common position within the group of countries under observation, which is separate from the position of the other countries. This is further investigated in the analysis.

In the third step, we use the hierarchical clustering method to analyze the relationship between groupings of countries on two levels, first for the 17 countries that participated in all three rounds, then for all 27 countries participating in the three rounds. We thus come to the basic configuration of similarities and differences between the countries. The position of the traditional democracies (old EU member states), the post-transition countries (new EU member states), and Russia and Ukraine will be shown. Considering the state of democratization and the level of prosperity,²³ we may expect some disparities by individual countries and the reclassification of individual western countries.

We first describe the results of the hierarchical cluster method for the 17 countries that participated in all three rounds, then for each round individually. Separately, we present the results that include the countries that only participated in one or two rounds. This includes some “old” (Italy, Greece, Luxembourg) and “new” EU member states (Bulgaria, the Czech Republic, Cyprus, Estonia and Slovakia), as well as the non-members Russia and Ukraine. The results of these analyses are shown in Figures 1 to 3 and 4.

Expression of Trust – in Six Political Institutions

The expression of trust in six institutions, measured in 17 countries over three rounds is illustrated in Figure 4. One can see a common European profile of trust in institutions (over three rounds), with the police in first place (6.21),²⁴ the UN in second place (5.47), followed by national parliaments (4.80), the European Parliament (4.58) and politicians (3.83). The hierarchy of the six institutions under observation is strict and distinct, and departure from this profile by individual countries is exceptional. Such a ranking begs the question, how is democratic institutionalization taking place in Europe if the police are the most trusted institution while national parliaments rank significantly lower. Further, what is the significance of the fact that the UN enjoys a higher level of trust than national parliaments and national legal frameworks? That the European Union is still being established is expressed in the low level of trust in the European Parliament. That the low level of trust in politicians is a pan-European phenomenon is also validated.

23 Based on GDP as well as the ranking of the country in the Human Development Index.

24 Mean values are based on a scale of 0 to 10, where 10 is the highest level of trust.

Table 2 shows how trust is formed and expressed in individual institutions by country. Only Russia, Ukraine and Bulgaria show a significant departure from the general definition model. This is not only expressed in the low (or lowest) overall level of trust, but also in the low (or lowest) level of trust in certain individual institutions, which are accorded a high (or highest) level of trust the other countries. For example: in Ukraine, the level of trust in the police, legal system and parliament is far below average, which also applies to Bulgaria and Russia, though to a lesser degree. A second characteristic illustrated by the same group of countries is the higher level of trust expressed in the EU and UN. In Bulgaria, these two international institutions are, on average, subject to double the level of trust as the domestic institutions. In Russia, the European Parliament enjoys a higher level of trust than the Russian parliament, the Russian legal system and particularly the Russian police and politicians.

We also mention a number of other details but remain limited mainly to the results of the third round (Table 2, ESS 2006). For example, the expression of trust in the police during the period under observation (2002: 6.21; 2004: 6.06; 2006: 5.74) is on the decline; however, it maintains its primacy in intermediate periods and individual rounds: the police enjoy the highest level of trust. A review of the results of the third round (2006) shows that the police enjoy the highest level of trust in Finland (8.05); this is the highest level of trust expressed in any of the six institutions under observation in any of the countries.

This high ranking in Finland is not coincidental and is validated by a similarly high ranking in previous surveys (2002: 7.95; 2004: 7.96),²⁵ as well as by the high overall level of trust in Finland in all political institutions under observation. Ukraine stands out as having the lowest level of trust in the police, or more precisely, the highest level of distrust (2.61). This is a significant departure from the overall average for the police (by a factor greater than two), but remains at the average level of distrust for all institutions under observation in Ukraine (2.80). The highest level of distrust in Ukraine is expressed for the national parliament (2.32), the legal system (2.45) and politicians (2.04), but this general distrust is partially allayed by the expression of trust in the European Parliament (3.89) and the UN (3.75).²⁶

25 We shall not at this point discuss what contributes to the high level of trust in the police in Finland.

26 Which remains characteristically below average.

As mentioned earlier, politicians enjoy the lowest level of trust (3.58). This distrust is expressed primarily in Bulgaria (1.72), Ukraine (2.04), Russia (2.51) and Hungary (2.53). Three surveys conducted in Hungary show that between 2002 and 2004, there is a sharp decline in the expression of trust in politicians (2002: 3.88; 2004: 2.68; 2006: 2.53).

The European Parliament, which ranks second to last among the institutions under observation (4.63) in individual countries, enjoys an above average level of trust. This, for example, applies to Cyprus (5.84), as well as Slovakia (5.14), Bulgaria (4.76) and even Ireland, Portugal and Russia, where it is highly ranked, reaching second or third place. In Russia, for example, the European Parliament ranks much higher than the Russian parliament or legal system in terms of trust. A similar situation is that of the UN, which ranks second overall among all six institutions under observation. It scores low in Cyprus²⁷ and Austria but high and above average in Finland, Hungary and Norway.

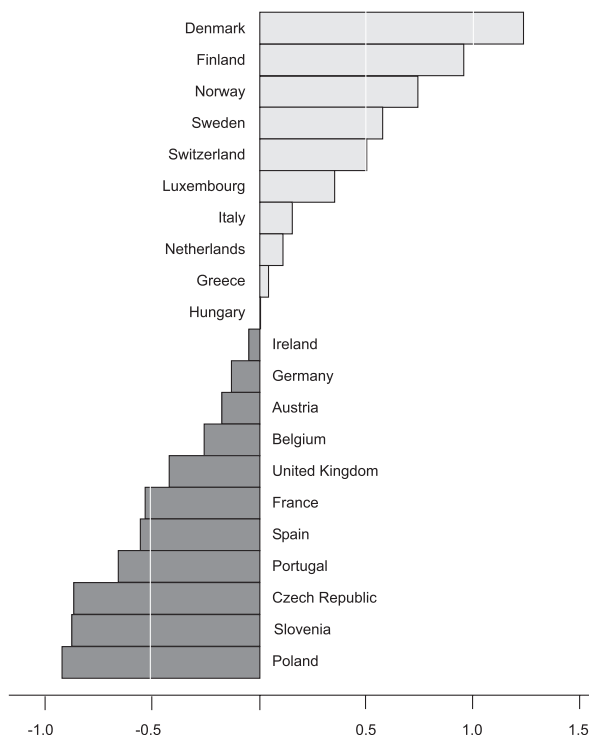
Trust in Institutions – by Country

We shall first show the ranking of the countries by the overall expression of trust over the three rounds. Figure 5 shows the ranking of 21 countries by overall expression of trust, which is at the axis of the Figure.²⁸ Deviations from this average are also shown. The four Scandinavian countries are at the top of the ranking, followed by Switzerland and Luxembourg. In the middle, characterized by smaller positive or negative deviations, are Italy, the Netherlands, Greece, Hungary, Ireland, Germany and Austria. Falling below the average are the remaining “old” member states: Belgium, the United Kingdom, France and Spain. At the bottom of the ranking are Portugal, the Czech Republic, Slovenia and Poland.

27 This is despite, or perhaps due to, the direct experience of the UN intervention and prolonged conflict resolution.

28 The 0 axis represents the average for the 17 countries that participated in all three rounds.

Figure 11.5: Trust in 6 Institutions, Summarized by Countries (Mean – scale 0–10; zero point = mean on 17 Countries); ESS 2002 (complete first wave)

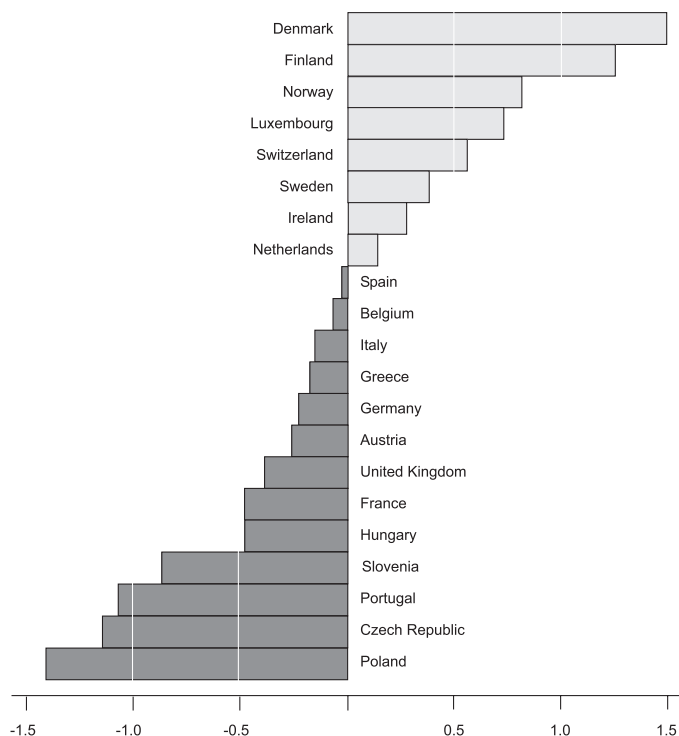


The second survey (2004 – Figure 6) only serves to bring this ranking into focus. Denmark and Finland rank highest, while Poland, the Czech Republic, Portugal and Slovenia rank lowest. Conspicuously, Italy and Hungary characteristically fall below the average level they had in the first round. Also characteristic is the increase in trust in Poland, the Czech Republic, etc. In the second round, a much higher level of overall trust is measured in Denmark, Belgium and Finland.

The third round of measurements (2006 – Figure 7) confirms that citizens in the Scandinavian countries (Denmark, Finland, Norway, Sweden and the Netherlands) as well as Switzerland express an above average level of trust in politicians. Also, trust in political institutions in Ukraine, Bulgaria and Russia shifts to strong distrust. Those countries that initially ranked higher in 2004 show a tendency of increasing trust, while those that were ranked lower show a tendency of declining trust or increasing distrust. This not only applies to

the post-transitional group of countries, but to the lower-ranking (according to the scale) “old” member states of the EU. By including additional groups of countries in the survey in the last round (2006 – Figure 7), the differences become even more apparent.

Figure 11.6: Trust in 6 Institutions, Sumarized by Countries (Mean – scale 0–10; zero point = mean on 17 Countries); ESS 2002 (complete second wave)



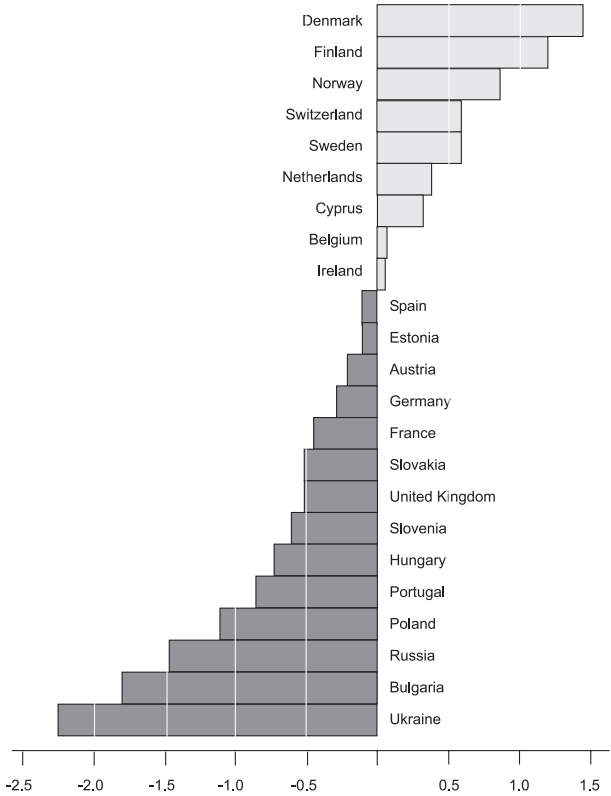
Finally, Figure 8 shows the overall ranking of 27 countries on the basis of whether they participated in one, two or three rounds of the survey.²⁹

High in the ranking, with the highest measured overall level of trust, are the Scandinavian countries (Denmark, Finland, Norway, Sweden, and also Luxembourg and Switzerland). At the bottom of the ranking, with the lowest measured level of trust or highest measured level of distrust are mostly the post-transition countries, including Ukraine, Bulgaria, Russia, etc. The 17

²⁹ As before, the 0 axis represents the average for the 17 countries that participated in all three rounds.

countries that participated in all three rounds are ranked higher, while the countries that only later joined the survey, primarily Russia, Bulgaria and Ukraine, are ranked at the bottom.

Figure 11.7: Trust in 6 Institutions, Sumarized by Countries (Mean – scale 0–10; zero point = mean on 17 Countries); ESS 2002 (complete third wave)



The range between the highest and lowest level of trust is significant (6.47 – 2.80). Whereas the top ranks are occupied by the traditional democracies, which are characterized by a higher level of prosperity, the bottom ranks are occupied by the post-transition countries where the level of prosperity is lower. Considering the exceptionally high level of distrust in political institutions in some of these countries, it can be said that the legitimacy of the democratic institutions is under threat. If the top ranks are occupied by countries from Western Europe, primarily from Scandinavia, then the bottom is occupied by countries from Eastern Europe, which are bound by a common history

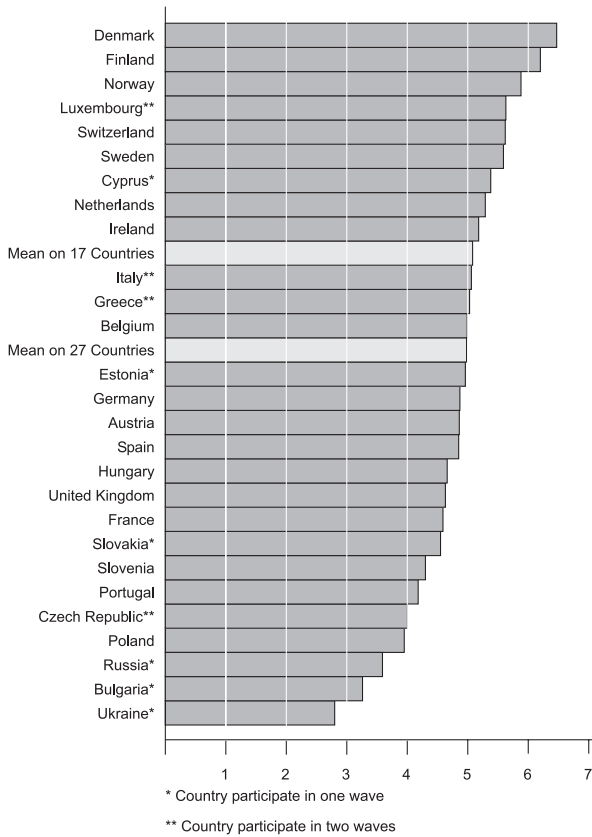
of the Eastern Bloc, albeit each has followed its own destiny and all are still undergoing the transition process to a greater or lesser degree. In addition to the three countries mentioned above, this group at the bottom of the ranking includes the other “new” member states of the EU, namely, Poland, the Czech Republic, Slovenia and Slovakia, as well as Portugal. Slovenia and Portugal do not share a common history with the other countries of this group, but the transition processes they underwent are similar.³⁰

In the middle, between the topmost and bottommost ranks, are all “Western European” countries participating in the survey. This includes (according to the expressed level of trust) Estonia, at average level, and Hungary, which characteristically falls below average. Below them are ranked the United Kingdom and France, as well as Germany, Austria and Spain.

A comparison of ranking (according to the level of trust) in the three rounds validates the conjecture that increasing or declining trust can be detected during the individual periods, which, however, is not illustrated in Figure 7. A comparison of the results of the surveys enables us to rank the countries in which the expression of trust has been increasing (Belgium, Denmark, also Spain and Finland) or declining (the United Kingdom, Hungary) between the first and third rounds. In most countries, however, there was a decline in trust between the first and second rounds, and an increase in trust between the second and third rounds (Austria, Sweden, Germany, Poland, Portugal, Slovenia). The opposite model is that in which an increase is followed by a characteristic decline in the third round (Ireland). These four models also apply to countries that participated in only two rounds. A declining trend was observed in the Czech Republic, Greece and Italy, while an increasing trend was observed in Luxembourg. When determining the increase or decline in trust over two or three periods, we must take into consideration that change can take place at either a high or low measured level of overall trust, as can be seen in the ranking of the countries (Figure 8).

30 In Slovenia, this followed the collapse of the Yugoslav system of self-management and the Yugoslav federation; in Portugal, it followed the establishment of a democratic system 15 years earlier, however, its economy significantly lagged behind the other “old” member states of the EU.

Figure 11.8: Trust in Institutions, by all 27 Participating Countries (Total Mean for 6 Institutions, scale 0–10); ESS – European Social Survey



Source: ESS: 2002 – 2004 – 2006

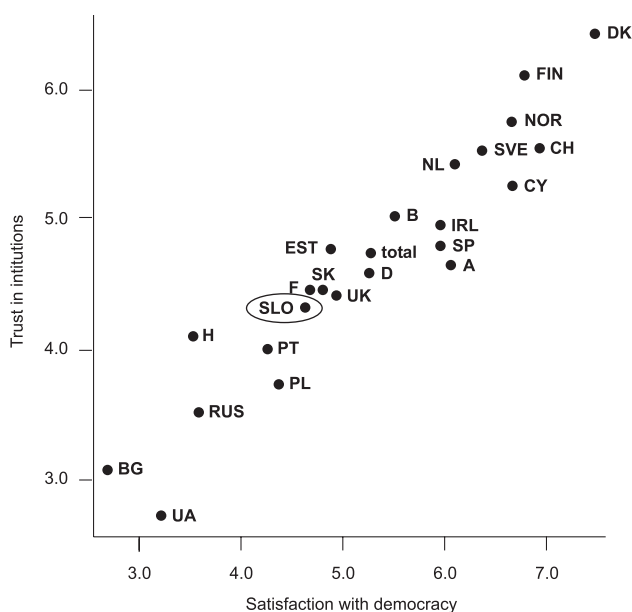
Trust in Institutions and “Satisfaction”

Analyses of the relationship between trust in political institutions, “trust in people” and “satisfaction” with conditions in the system help to explain the cause of these phenomena. On the basis of the results of the ESS 2006, we looked into the relationship between the overall expression of trust in seven political institutions³¹ and a group of intervening variables: trust in people, satisfaction with life, satisfaction with economic conditions in the country, satisfaction with the functioning of the government, and satisfaction with the functioning of democracy. The survey, conducted through a sample taken

31 Including political parties.

from all the countries combined, confirms the relationship between the level of trust in the institutions of the system and the above-mentioned intervening variables. They may, therefore, be referred to as predictors of the expression of trust. There is a high level of correlation. One can see that the political dimension holds primacy over the economic dimension. This is most apparent in the close relationship between trust in institutions and satisfaction with democracy.³² All other surveys confirmed the same, albeit with a lower intensity. This also applies to the survey on trust in institutions vis-à-vis the expression of trust in people.³³ Figures 9 and 10 show how these relationships are manifested in individual countries.

Figure 11.9: *Trust in 7 Institutions by Satisfaction with Democracy*



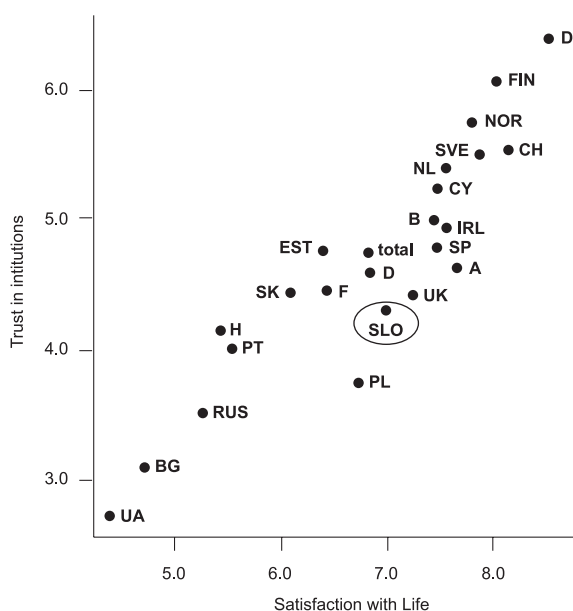
The relationship between the index of trust in institutions and the “predictors” is also confirmed at the level of national records. However, there are characteristic differences in the level of trust in institutions and the predictors between countries. Figure 9 illustrates the diagonal relationship between the

32 (Pearsons corr. c. 0.61; sig. 0.000). (corr. c. 0.329; sig. 0.000).

33 Corr. c. 0.329; sig. 0.000.

measurement of the variables and the corresponding ranking of the country. Scandinavian countries, as well as Switzerland and Cyprus, which rank highly on the index of trust in institutions, are characterized by a high level of satisfaction in democracy. In contrast, countries with a low(er) level of trust in institutions are also characterized by a low(er) level of satisfaction with democracy. Slovenia, Poland, Portugal, Russia and Hungary are to be found at the bottom left of the figure, below the average level. In the middle part of the figure, hovering at about or slightly above average, are the remaining Western and Eastern European countries. The figure shows the position of Estonia and Slovakia at the average level together with the United Kingdom and France. At the bottom of the expression of satisfaction with democracy are Ukraine and Bulgaria.

Figure 10.10: Trust in 7 Institutions by Satisfaction with Life in General



The survey on the relationship between the index of trust with “satisfaction with the government” also confirms expectations, only that there is a greater dispersion with regard to conditions in individual countries. The trend, however, is the same as above (see Figure 9): at the bottom are Bulgaria and Ukraine; in the middle are Poland, Hungary and Portugal. Slovakia, Estonia,

Slovenia and Russia³⁴ stand out as expressing a higher level of satisfaction in the government; at the very top is the group of Scandinavian countries.

Figure 11 shows the ranking of the countries with regard to trust in institutions and general satisfaction with life. The diagonal classification of countries remains the same, with only minor deviations. Again, Bulgaria and Ukraine are at the bottom of the group while the Scandinavian countries and Switzerland are at the top right. Two diametrically opposed groups emerge: Denmark records the highest level of trust in institutions and satisfaction with living conditions; Ukraine and Bulgaria are characterized by the lowest level of trust in institutions and satisfaction with life. Portugal, Hungary, Poland and Russia are still at the bottom (left) of the scale; Slovenia and Estonia rank in the middle.

The survey on satisfaction with economic conditions confirms the rectilinear relationship. The variables included in the analysis help to explain the origin of trust in political institutions; clearly, we cannot exclude the possibility of an opposite (reverse) effect.

Survey of the Relationship between Countries – Characteristic Groups

The final step in analyzing the survey results is based on the hierarchical clustering method.³⁵ The descriptive analysis presented above provides an indication as to how and where individual countries rank with regard to the measured overall level of trust both for each round as well as for all of the three rounds. However, this only provides a superficial image; it can be further analyzed by ranking groups that comprise all individual measurements for each institution at every round and for each country. This means that the ranking not only shows the hierarchy according to the “quantity” of overall trust expressed, but that it also presents all the specific profiles that emerge from the measurement of trust in individual institutions for each round. In such a “quantitative” hierarchy, it would seem that Estonia and Hungary, typical post-transition

34 2006: the Putina era.

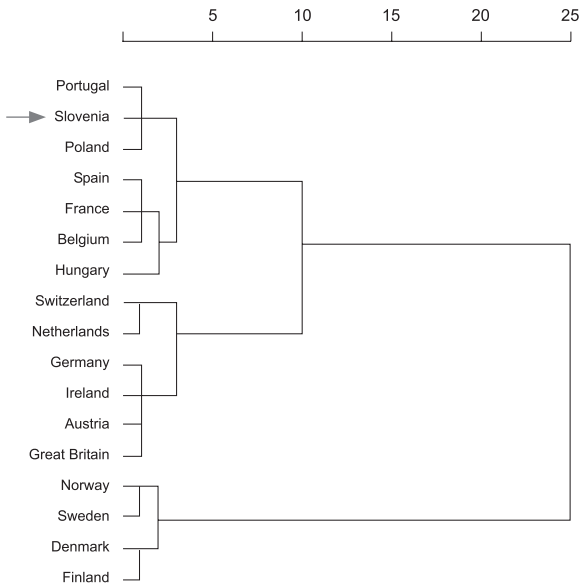
35 In the hierarchical clustering method, the calculation of distances between units creates groups or clusters. The graphically presented dendrogram shows the process of separating the units or groups of units. We can observe the ranking of the units at each step or level. The proximity of the units, or more precisely, the length of the line connecting the units, shows the distance (difference or similarity) between the units. Units connected in the first step are most similar to each other, while those connected by the longest arch differ the most. The basis for our calculation of the distances was the square of the Euclidian distance, while the connections are based on the Ward method. The classification criteria are the six above-mentioned criteria – assessment of trust in parliament, the legal system, police, politicians, the EU Parliament and the UN. The classification is thus based on similarities in the assessments for trust in the said institutions in the individual countries.

countries, rank quite highly with the more developed countries in the individual rounds. They are, however, typical post-transition countries according to their political and economic status.

We used the hierarchical clustering method on the three groups of data acquired in the three rounds of the survey. The analysis only covers the 17 countries that participated in all three rounds. The reason for this limitation is that the results of analyses from all three time periods need to be compared and the trends identified.

Figure 9 shows the results of the hierarchical clustering method from the first round [ESS, 2002]. At the primary level are five major groups of countries (S1–S5). The most obvious relationships are those between: S1 Portugal, Slovenia and Poland; S2 Spain, France and Belgium; S3 Switzerland and the Netherlands; S4 Germany, Italy, Austria and the United Kingdom; and S5 Norway, Sweden Denmark and Finland. The second group (S2) also includes Hungary. On a higher relationship level, S3 and S4 combine to form a new unit that includes Switzerland, the Netherlands, Germany, Italy, Austria and the United Kingdom, and S1 and S2 combine to form a new unit that includes Portugal, Slovenia, Poland, Spain, France, Belgium and Hungary.

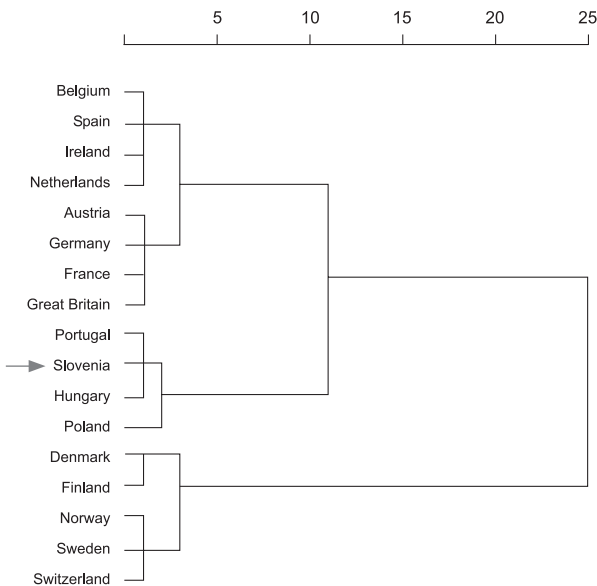
Figure 11.11: Trust in Institutions; 17 Countries (ESS – European Social Survey)
Wave 1 – ESS 2002



After the second survey [ESS, 2004], the hierarchical clustering method reveals four distinct groupings within the set of 17 countries: the first (S1) includes Belgium, Spain, Ireland and the Netherlands. The second (S2) includes Austria, Germany, France and the United Kingdom. The third group (S3) includes Portugal, Slovenia, Hungary and Poland, while the fourth group (S4) includes Denmark, Finland, Norway, Sweden and Switzerland. It is apparent from this classification that the Central European, post-transition countries (Poland, Hungary, Slovenia) and Portugal fall into one group regarding the expression of trust in political institutions.

An analysis of results of the third round [ESS, 2006] shows an even more distinct clustering. The first (S1: Belgium, Ireland, Spain) and second groups (S2: Austria, Germany, France, the United Kingdom) are related at the highest level. The third group (S3) includes the Central European, post-transition countries (Hungary, Slovenia, Poland – and Portugal). Finally, the fourth group (S4) includes the Scandinavian countries (Denmark, Finland, Norway, Sweden, the Netherlands) and Switzerland. This profile is similar to that of the second round.

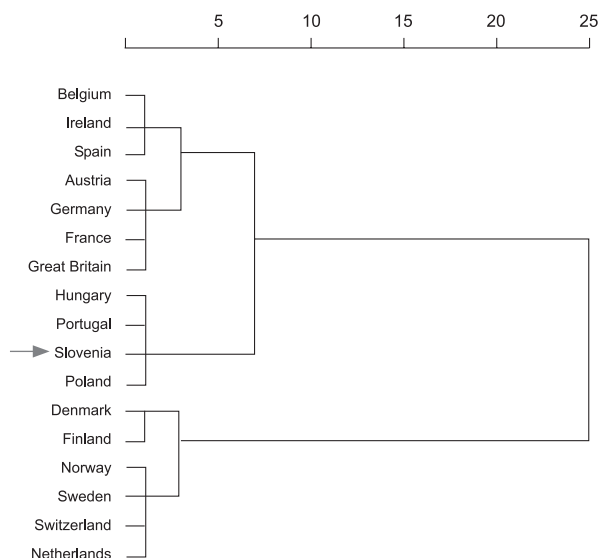
Figure 11.12: Trust in Institutions; 17 Countries (ESS – European Social Survey)
Wave 2 – ESS 2004



Finally, we have applied the hierarchical clustering method to all the countries that participated in the survey (2002, 20004, 2006), regardless of the number of rounds. Figure 12 shows the classification for the 27 countries.

The profile reveals four distinct groups. The first group (S1) includes all the Scandinavian countries as well as Switzerland and Luxembourg. These are countries with a strong tradition of democracy. The second group (S2) includes Ireland, Italy, Belgium, Spain, Austria, Germany, France and the United Kingdom, as well as Cyprus and Greece. These are developed, Western European and Mediterranean countries with differences in the conditions and course of democratization. In a group of their own (S3) are Bulgaria and Ukraine. Finally, the fourth group (S4) comprises all post-transition countries (Slovenia, Slovakia, Estonia, Hungary, the Czech Republic, Poland, Russia) and Portugal.

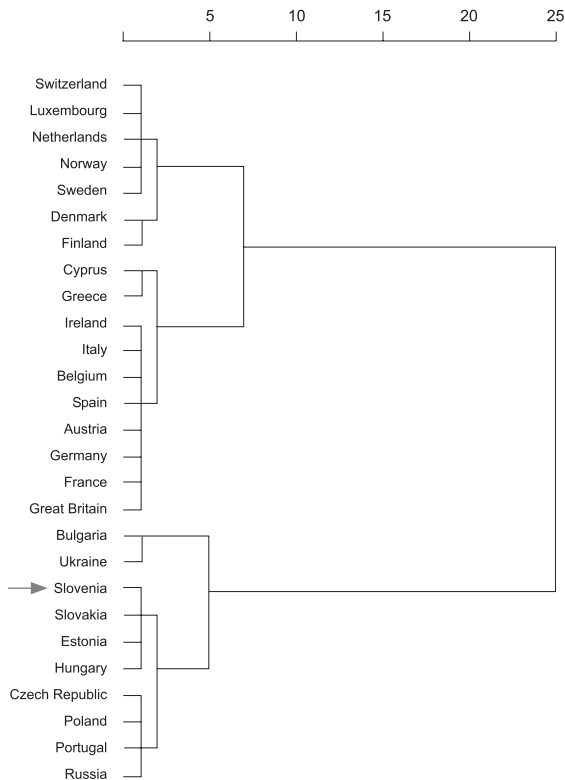
*Figure 11.13: Trust in Institutions; 17 Countries (ESS – European Social Survey)
Wave 3 – ESS 2006*



The countries that fall in the first group (S1) are characterized by a high level of expressed overall trust and small deviations from the overall high level of trust in institutions. It is characteristic of these countries that the expression of trust in individual institutions never transforms into a prevalent distrust. The same applies to the second group (S2), however, at a lower level of inten-

sity and with more distinct fluctuations (including downward) between the three observation periods. The third group (S3) is characterized by a general low level of overall trust in political institutions and a low level of trust in all domestic institutions, which is partially allayed by a higher level of trust in the EU and the UN. Finally, the fourth group (S4) includes all Central European, post-transition countries, as well as Russia and Portugal. In terms of the expression of trust, Estonia (single survey) and Russia (single survey) represent the top and bottom levels, respectively, of trust in this group. Between them are countries characterized by a significant decline in the level of trust from one round to the next (Hungary, the Czech Republic), as well as countries with significant fluctuations (increase, decrease) in the expression of trust (e.g. Poland and Slovenia). The group comprises countries with different levels of material prosperity and includes Portugal as a “Western” country with a long tradition of democracy but a relatively low level of economic development.

Figure 11.14: Trust in Institutions, 27 Participating Countries in 3 Waves
(ESS 2002 – 2004 – 2006) Merged Data Set (ESS – European Social Survey)



Needless to say, the illustration of the characteristics of the countries in the four groups provides only a superficial explanation of the causes. Among the circumstances that influence the development of a democratic culture, trust in the democratic system as a whole and trust in individual institutions are the level of general development of the society, economic development and the development of social services that serve the needs of the population and guarantee their quality of life. It is sufficient to point out the relationship between the grouping of the countries on the basis of the hierarchical clustering method and their rank in the “human development index”³⁶ for the purpose of explaining these aspects. A comparison between the classification of individual groups with the classification of the participating countries in the human development index shows that the first group (S1), which can be referred to as the “Viking” group, ranks highest on the human development index (second to 18th place); this is followed by group S2, namely, the “Western” and “Southern” European group, which has a high ranking in the human development index (fifth to 28th place). Next is the post-transition group (S4), which is ranked in the middle and bottom of highly developed nations (27th to 67th place), and finally group S3 comprising the two countries that are characterized by transitional problems and are ranked lowest in the human development index, at the transition between highly developed and developing countries (53rd to 76th place). Obviously, on this basis, we cannot come to a firm conclusion about the relationship between the expression of trust in political institutions and the quality of individual and social life. We have less of a basis still in determining the relationship between the causes. However, it is apparent that the survey and analysis contribute to explaining the phenomenon.

The stepwise hierarchical clustering method after the individual rounds and the final overall survey of the relationship between all countries in all rounds conceals some of the first impressions from the classification (Figure 8). Primarily the first impression that, in terms of the expression of trust, Estonia is closer to Belgium and Germany and Hungary is closer to Spain and the United Kingdom than to their post-transition partners (Poland, Slovakia, the Czech Republic, Slovenia), which is unexpected. We would sooner have expected this of Slovenia, which after 1990 was considered more highly developed and which went through the transition processes with fewer problems. We would have expected Slovenia to be in the same group as Portugal and

Greece. Such expectations are bolstered by the results of surveys conducted in the 1990s. Nevertheless, Slovenia ranks among the post-transition countries, together with Poland, the Czech Republic, Hungary, Slovakia and Estonia. Analyses should not, therefore, be based solely on quantitative indicators (level of overall trust), but on the profiles of distrust in the participating countries. Likewise, Switzerland and Luxembourg stand out by falling into the “Viking” block. Switzerland, therefore, is closer to the Scandinavian countries and falls under a group that is characteristically different from other Western European countries.

Conclusions

We determine in the introduction that the trust of the people in the system forms the basis for democratic institutionalization. This is pointed out by Almond and Verba, who have also investigated the relationship between the expression of trust and the legitimacy of the system. Lipset and Schneider suggest that gaps in the level of trust in the most important political institutions result from increasing criticism of the legislative and executive branches of state, and particularly of political parties. Initially, we presume that the traditional democracies will display a high level of trust in institutions and that the new democracies will show a gradual rise in the level of trust. We also assume that cultural, economic and political conditions will be significant in the development of democratic institutions, and therefore, expressions of trust will manifest differently in each particular system.

We present our analysis in two parts. The first is based on surveys of trust from Western and Southern Europe, some from Central and Eastern Europe, and particularly those from Slovenia. We present the trends in the expression of trust and rank the countries accordingly; the results of the survey in Slovenia are analyzed in detail regarding trust in institutions, the political and civil subsystem, and a detailed account of the timeline of the expression of trust between 1992 and 2006 is given.

A longitudinal view of the expression of trust in general and in Slovenia in particular reveals oscillations, which result from both people’s past experiences and also their high expectations for improvement. In Slovenia, for example, the “subject” of trust is the renovation of the entire system. It becomes apparent that the expression of trust depends increasingly on people’s expectations of individual institutions. The fewer expectations fulfilled, the greater the dissatisfaction; this is expressed as a decline in the level of trust in individual

institutions of the system. The analysis in the second part demonstrates that trust in institutions is not expressed when expectations are not met. Easton has determined that the level of support or legitimacy of the political community, expressed as a sense of community, is formed through trust in political institutions, in civil institutions and in other people. The second part of the analysis also shows that people's expectations are left increasingly unfulfilled. An investigation in the 1990s asked what level of "trust" is required for a democratic society to function normally and efficiently. It is difficult to determine the level of trust necessary for an individual society to be deemed democratic. When, then, is the democratic deficit cancelled? In Slovenia, where distrust does not yet undermine the foundations of the democratic political system, this deficit is most clearly seen in the trust in the legal and judiciary systems, but it also applies to the executive, parliament and especially to political parties. Intermediate analyses show that, following an initial wave of enthusiasm after the introduction of the democratic system (1990–91), the zeal began to decline, not only for political parties but for parliament and the government as well. We also demonstrate that trust in the civil society has increased during the same period. Only trust in the Church, clergy and political institutions declines or remains at the initial low levels.

An analysis of the data from Slovenia³⁷ confirms a series of assumptions on social and structural factors that influence the expression of trust. Thus, the correlation between the conditions of primary socialization, age, education and philosophical and political orientation is confirmed. Older people, for example, express a higher level of trust in political institutions, which is not only the result of their greater experience, but also of their greater tendency to conform. Generally, the better educated and more politically active express a higher level of trust in institutions. The expression of trust is also linked to "affiliation" with those in power; restraint in the expression of trust is characteristic of the opposition. All this is in accordance with expectations. The second part of our analysis, based on the results of the European Social Survey, focuses on the attitudes towards six or seven institutions, in three consecutive surveys,³⁸ for several participating countries. In addition to countries in the European Union, the survey includes Russia and Ukraine. One can see that of all the institutions included in the survey, the police rank highest, followed by the UN, the legal system, national parliaments, the European Parliament

37 The analysis is based primarily on the Slovenian Public Opinion Survey 2006.

38 ESS 2002, 2004, 2006; participation of 17 to 23 countries, a total of 27 countries.

and, at the bottom, politicians and political parties. We describe in detail the differences in the expression of trust between countries. At the top of the scale are the Scandinavian countries, in the middle are the transition countries, and at the bottom, Bulgaria and Ukraine. It is apparent that the expression of trust in political institutions is a function of a developed democracy – and vice-versa. This trust in institutions reflects a developed democratic culture. This particularly applies to institutions of the political system. It is difficult to speak of a democratic system in countries where trust in political institutions has failed to develop or where there is a stronger expression of distrust. Again, we ask what level of trust in the system is required before we can speak of it as being democratic. The analysis, presented in several steps, always shows the same ranking of the countries, based on the level of democratic culture and the democratic system. The question is whether we may consider countries in which there is a high level of distrust in parliament and the legal system, as well as the police and political parties, as democratic states. This especially applies to Bulgaria and Ukraine. It is, however, not limited to these two countries – there are several other countries also in the early stages of democratic transition that can be considered pre-democratic. Our analysis, however, do not include these latter countries.

We find both similarities and large differences between countries regarding the expression of trust in individual institutions and the group of institutions as a whole. Whereas there is a strong emphasis on national institutions in one cluster of countries, a second also regards international institutions (the EU, UN) very highly, while a third only shows a high level of trust in the international institutions. By looking at the first rankings and especially the clustering of countries into groups we could see the relationship between the ranking of countries and their place in the Human Development Index. This confirms the assumption that the democratic climate in a society – namely, trust in institutions – develops hand-in-hand with the development of democratic and economic conditions. The cluster analysis shows that countries that share similar characteristics are ranked together. Two large groups of countries emerge. In one group are the developed European countries with a long tradition of democracy; while in the other the group are the post-transition countries and Portugal. Despite mutual differences, countries in both cases show a high level of internal similarity, some with a developed democratic nature, others with a tendency towards it.

We can, once again, confirm that trust in the system is the core of democratic institutionalization. Distrust (which is more-or-less characteristic for

post-transition countries, especially Bulgaria, Russia and Ukraine) is not only an expression of unfulfilled expectations, but also of the disharmony between the prevailing individual and collective values, between institutions as the agents of collective values and the agents of institutional power. If the centres of power are not intimately linked to the values of the institutions, we can expect an unstable social construct, greater uncertainty and a decline in social activity. A positive response to such a situation would be to initiate the process of re-institutionalization and to replace the elite that occupies institutional roles. These processes are placid in developed democracies and more extreme in undeveloped democracies.

Table 11.1: Results of Surveys of Trust in Institutions During 1991–2006 (Sum of the Responses “Trust Very Strongly” and “Trust Considerably” – in %)

	1991/2	1992/3	1993/1	1994/4	1995/1	1996/1	1997/1	1998/2	1999/4	2000/1	2001/2	2002/1	2003/3+4	2005/1+2	2006/2	Average 1991–2006
God	30,3	28,1	26,0	29,2	32,1	29,3	–	33,5	35,3	44,0	41,8	33,8	38,9	42,2	39,0	34,5
Neighbours	38,0	38,9	33,9	38,8	37,2	35,2	28,9	45,4	47,0	50,3	48,6	43,2	53,0	52,2	–	42,2
Family and relations	87,9	88,9	87,8	89,4	89,7	86,9	86,7	89,0	92,0	93,6	91,0	88,1	94,1	94,3	94,6	90,3
Church and priest	25,7	20,3	17,4	19,4	21,1	22,2	17,4	21,5	23,6	30,1	26,8	21,4	23,8	25,2	23,3	22,6
Television, newspapers, radio	25,5	23,1	19,0	23,7	25,7	28,2	31,8	34,7	43,7	52,2	46,1	36,1	45,1	38,6	35,9	34,0
Educational institutions	52,7	56,7	56,7	67,4	71,6	68,8	69,8	76,1	73,0	82,7	80,3	77,2	82,4	77,2	80,3	71,5
Trade unions	16,2	13,1	11,5	12,0	14,5	14,2	12,8	29,0	29,2	39,9	36,3	40,6	42,6	44,4	39,4	26,4
Political parties	11,3	7,7	3,2	4,7	4,5	4,4	6,4	4,3	6,0	13,6	9,4	6,3	8,9	11,4	7,6	7,3
National Assembly	33,6	20,1	15,0	15,0	10,1	11,2	13,0	9,1	11,7	23,6	17,7	14,6	21,5	20,7	16,8	16,9
President of the Republic ¹	67,8	59,1	46,6	45,3	36,3	40,2	41,7	44,0	44,8	59,2	55,6	45,9	41,0	41,0	37,3	47,1
Government	32,5	34,4	13,6	14,3	27,9	28,7	27,6	26,3	29,7	43,9	41,3	29,7	34,9	35,0	29,9	30,0
Prime Minister	–	–	–	–	32,4	34,7	30,9	33,0	36,1	48,3	48,6	36,2	37,4	35,0	31,1	36,7
Armed Forces	69,0	59,8	41,8	48,7	29,0	33,1	31,6	35,2	39,3	53,3	45,9	38,9	55,4	47,8	38,0	44,5
Judiciary	34,7	31,4	24,5	26,2	25,7	24,3	29,6	33,2	31,6	45,3	41,7	35,6	34,4	32,6	37,5	32,6
Police	37,7	31,2	20,7	27,9	28,3	34,0	33,5	36,8	37,3	53,1	46,9	40,0	44,8	40,8	41,4	37,0
Banks	11,6	21,4	27,7	35,2	40,2	44,2	46,4	52,7	54,6	65,5	65,5	58,0	54,9	59,1	59,4	46,4
Economy, companies	16,8	15,6	13,8	25,8	28,8	28,8	26,8	32,8	37,1	53,2	45,3	42,4	50,0	50,8	51,0	34,6
Slovenian tolar	–	–	–	–	55,2	53,6	52,6	63,3	61,8	69,2	69,8	64,6	64,4	64,2	62,8	62,0
Central Bank	–	–	–	–	45,8	48,8	50,4	59,6	61,5	68,7	68,2	60,0	57,9	61,9	–	58,3
NATO	–	–	–	–	–	–	28,2	–	42,8	44,7	38,4	31,5	40,1	42,5	34,9	37,9
EU	–	–	–	–	–	–	33,4	–	47,6	41,0	41,8	42,2	55,8	55,2	52,8	46,2
UN	–	–	–	–	–	–	37,2	–	48,1	51,0	49,9	41,6	52,3	51,3	44,1	46,9
Total average all	37,0	34,4	28,7	32,7	34,5	35,3	35,1	40,0	42,4	51,2	48,0	42,2	47,0	46,5	42,9	
Total 14 institutions	37,4	34,5	28,5	32,5	32,4	33,5	33,9	37,5	39,5	50,7	46,4	41,1	45,3	44,2	42,3	

Source: S POS 1991–2006 Survey; CJMMK FDV

¹ Slovenian Assembly ² Presidency of the Republic of Slovenia⁵⁰ ³ No survey taken that year

Table 11.2: *Trust in Institutions by Countries in Three Waves: 2002–2004–2006 (Mean Scale 0–10); ESS – European Social Survey*

Countries participate in all 3 waves	Institutions (2002)						Institutions (2004)						Institutions (2006)						Mean (total) 3 waves	Mean (total)
	UN	EU- Parliament	Politicians	Police	Legal system	Parliament	UN	EU- Parliament	Politicians	Police	Legal system	Parliament	UN	EU- Parliament	Politicians	Police	Legal system	Parliament	Mean (total)	Mean (total)
Austria	5,10	6,08	6,44	3,52	4,21	4,54	4,77	5,83	6,18	3,25	4,02	4,50	4,91	5,97	6,30	3,26	3,97	4,70	4,84	4,86
Belgium	4,99	4,39	5,64	4,28	4,88	5,10	4,68	4,83	5,78	4,24	4,98	5,10	4,99	4,89	5,94	4,36	5,15	5,28	5,12	4,99
Switzerland	5,75	6,19	6,80	4,93	4,81	5,42	5,52	6,14	6,86	4,77	4,61	5,36	5,56	5,76	6,24	4,94	4,76	5,38	5,65	5,62
Germany	4,47	5,73	6,73	3,50	4,52	5,18	4,21	5,54	6,48	3,23	4,18	4,94	4,78	4,22	5,61	3,26	4,07	4,74	4,78	4,87
Denmark	6,18	7,13	7,90	5,47	4,84	6,54	6,29	7,21	7,94	5,59	4,83	6,65	6,47	6,40	7,45	7,83	5,61	4,96	6,52	6,47
Spain	4,83	4,31	5,43	3,37	4,82	4,71	4,60	5,09	4,72	5,91	3,68	5,05	4,98	5,00	5,01	6,04	5,03	5,07	4,97	4,85
Finland	5,79	6,75	7,95	4,78	4,88	6,46	6,01	6,90	7,96	4,88	5,00	6,58	6,24	5,99	7,05	8,05	4,99	6,48	6,26	6,20
France	4,45	4,83	5,89	3,63	4,39	4,61	4,64	4,27	4,77	5,66	3,49	4,31	4,53	4,33	4,90	5,71	3,29	4,37	4,62	4,59
United Kingdom	4,68	5,03	6,04	3,79	3,64	5,31	4,75	4,29	5,12	6,12	3,59	3,55	4,62	4,20	5,00	6,00	3,41	3,49	4,54	4,63
Hungary	5,00	5,11	4,91	3,88	5,67	5,99	3,63	4,43	5,17	2,68	5,22	5,68	4,53	3,35	4,34	5,12	2,53	4,96	4,31	4,66
Ireland	4,43	5,14	6,53	3,75	5,11	5,68	4,71	5,21	6,59	3,92	5,37	5,81	5,28	4,82	5,02	6,15	3,82	5,26	5,11	5,18
Netherlands	5,22	5,38	5,82	4,87	4,72	5,41	5,28	4,67	5,50	5,97	4,69	4,61	5,14	5,34	5,75	6,18	5,04	4,78	5,45	5,29
Norway	5,70	6,33	6,99	4,58	4,68	6,76	5,91	5,42	6,35	7,13	4,24	4,55	5,80	5,65	6,55	7,16	4,43	4,74	5,92	5,88
Poland	3,48	3,68	4,95	2,72	4,75	5,64	4,24	2,40	3,01	4,58	1,92	4,26	3,60	2,68	3,75	5,01	2,10	4,80	3,96	3,95
Portugal	4,44	4,26	5,13	2,82	4,85	5,37	4,49	3,72	3,94	5,06	2,06	4,04	3,95	3,81	4,03	5,13	2,51	4,55	4,21	4,18
Sweden	5,92	6,06	6,76	4,72	4,02	6,58	5,35	5,77	6,49	4,19	3,95	6,32	5,38	5,62	6,04	6,54	4,46	4,49	5,64	5,59
Slovenia	4,04	4,28	4,89	3,07	4,65	4,90	4,29	4,13	3,85	4,71	3,10	4,53	4,15	4,22	4,17	5,01	3,21	4,98	4,46	4,30
Total	4,97	5,38	6,21	3,99	4,64	5,54	5,16	4,66	5,29	6,20	3,73	4,51	5,00	4,76	5,41	6,23	3,77	4,61	5,07	5,08
Mean (total 3 waves)	4,80	5,36	6,21	3,83	4,58	5,47	5,08	4,80	5,36	6,21	3,83	4,58	5,08	4,80	5,36	6,21	3,83	4,58	5,07	5,08

Continuing Table 11.2

Countries participate in all 3 waves	Institutions (2002)						Institutions (2004)						Institutions (2006)						Mean (total)	Mean (total) 3 waves		
	UN	EU-Parliament	Politicians	Police	Legal system	Parliament	UN	EU-Parliament	Politicians	Police	Legal system	Parliament	UN	EU-Parliament	Politicians	Police	Legal system	Parliament				
Countries participate in 1 or 2 waves	Bulgaria		3.62	3.81	4.98	3.22	4.67	5.33	4.29	3.19	3.72	4.23	2.73	4.38	4.92					3.26	3.26	
	Czech Rep.															3.88				4.00	4.00	
	Cyprus																			5.38	5.38	
	Estonia																			4.96	4.96	
	Greece		4.83	6.27	6.43	3.46	5.75	4.61	5.21	4.69	5.38	6.03	3.59	5.34	3.96	4.84				5.03	5.03	
	Italy		4.83	5.49	6.66	3.54	5.54	5.62	5.32	4.41	4.92	6.36	3.23	4.88	5.19	4.85				5.06	5.06	
	Luxembourg		5.68	6.23	6.43	4.75	5.03	5.10	5.52	5.76	6.14	6.47	5.18	5.22	5.50	5.73				5.63	5.63	
	Russia																			3.59	3.59	
	Slovakia																			4.55	4.55	
	Ukraine																			2.80	2.80	
Mean (total)		4.94	5.42	6.21	3.94	4.76	5.46	5.16	4.59	5.20	6.06	3.68	4.59	5.30	4.93	4.48	5.06	5.74	3.58	4.63	4.86	4.98
Mean (total 3 waves)		4.66	5.22	6.00	3.73	4.66	5.35	4.98	4.66	5.22	6.00	3.73	4.66	5.35	4.98	4.66	5.22	6.00	3.73	4.66	5.35	4.98

12 Comparative Analysis of Religiosity – in Slovenia and Central and Eastern European Countries

Introductory Remarks

Along with the democratic institutionalization of contemporary societies, religiosity, the church and its place in society and politics, have been in the focus of sociological discussion and research in recent decades. This is evident from the frequency and social breadth of research into religion, as exemplified by major empirical projects such as the European and World Value Surveys,¹ surveys on religion and the church in the framework of the International Social Survey Program,² and the Europe-wide survey of religiosity and morality and, finally, the survey into the state of religiosity and attitudes towards the church in the Central and Eastern European countries after the transition from communism.³ Slovenia was included in most of these projects. As a consequence there is an exceptionally rich treasury of empirical data referring to the state, structure, and shifts in religious consciousness, and the realm of values that it shapes, the structural and other circumstances that determine it – and all this not merely in the narrow internal context of social-political and religious consciousness in Slovenia but also in the broad regional, international and even international socio-cultural context. It is this broad international comparative plane that gives an opportunity to evaluate the determinants of human consciousness, the formation of values, as well as religiosity. We are witnessing extremely abrupt and profound changes in contemporary society, dynamic modernization processes that more recently have above all taken the form of the globalization of the contemporary world, its rising interdependence, and the simultaneous emphasis on the individual essence of the person, social groups, national communities, nations, states ... The *Aufbruch* survey,⁴ dealing with the state of and changes in religious consciousness and attitudes towards the church in ten Central and Eastern European countries marked by transition from an authoritarian to a democratic system, also falls within this

1 World Value Survey (WVS); European Value Survey (EVS).

2 International Social Survey Programme (ISSP).

3 *Aufbruch* der Kirchen in Ost (Mittel) Europa – (Aufbruch).

4 *Aufbruch*: survey established in the framework of the Pastoral Forum in Vienna, 1997.

framework. It included Slovenia as well. Furthermore, there is a long thread of empirical research into religion conducted solely in Slovenia leading back to the mid-1960s.⁵ Regular annual surveys of the state of religiosity have been made since then and from time to time were thematically rounded out and extended to attitudes on the relationship between church and society, the status of the religious, and the conditions for free expression of faith, as Z. Roter and M. Kerševan have reported.⁶ It was largely the interest of sociologists and sociology of religion researchers that generated this density of empirical research in Slovenia this past decade. Indeed the surveys have followed international trends. Accordingly, they sought to ascertain the significance of shifts that have or are taking place in the process of social transition, under democratic development conditions, and are reflected in the church's social position and changes in the determinants of the formation and expression of personal religiosity. The extensive empirical data collected in the course of 1990–2000 enables international and temporal comparative analysis; in this decade it may be expected to gradually be incorporated into deeper analyses and discussion of religion.

Religiosity: the Object and Goals of the Research

This essay is concerned with religiosity in Slovenia in an international comparative context. The analysis of seven Central and Eastern European countries leads ultimately to an attempt to classify religiosity. It is an endeavour to resolve the perennial problem of distinguishing and classifying manifestations of religiosity. Le Bras,⁷ one of the first modern empirical researchers into religiosity, noted that it is a psychological state that defies direct empirical observation and of course attempts at classification. He consequently concentrated on empirically recordable religious practices in accordance with the Catholic custom of equating religious practice with religiosity. However in Protestant or Orthodox communities attendance at church services is not considered the most important measure of religiosity. Research has shown the limitations of reliance on the frequency of attendance at religious services, that is on 'devoutness'. Clearly little of any certainty can be deduced about a person's inner religiosity from mere attendance. Nevertheless, Le Bras did rely on church attendance and observance of religious rites and drew up a typol-

5 Slovenian Public Opinion Project, 1968–2000.

6 Two groundwork studies are important: – See Roter, 1973 and 1982

7 See Le Bras, 1955/56.

ogy which encompasses non-religious (unaffected) and a three-part typology of the religious (seasonal faithful, observant believers, and devout believers). The present essay does not extend to a review of different views of personal religiosity and attempts to classify it or construct typologies. Z. Roter and M. Kerševan present a review of this problem in their book.

The *Aufbruch* study includes classical indications of religiosity such as devoutness and declarations of faith, but they are included only secondarily in the present analysis. Instead a central place is given to expressions of inner religiosity, that is personal statements, affirmation or rejection of fundamental Christian beliefs or tenets of the universe of Christian faith. The orientation then is towards the psychological state which is only partially verifiable on the external recordable plane. An alternative typology of religiosity and its 'dimensioning' in a comparative international context is laid by means of a complicated procedure of simultaneous analysis of numerous factors using the data collected in the course of Slovenian surveys, and comparative data for six other countries.

Measuring religiosity in any society, particularly one in transition from a predominantly anti-church and anti-religious orientation towards a state of settled pluralistic democratic relations between state and society, is of multiple theoretical and practical significance. It contributes to understanding religiosity as an expression of the openness and pluralistic development of a particular world-view (political and cultural); it reveals the effects of earlier restrictions; it also reveals the mood in a society undergoing rapid modernization and exposing itself to the general impacts of globalization. Of course it may also provide guidelines for the church's work in a particular milieu and its self-awareness (including critical). In Slovenia, just as in the earlier authoritarian period, even now with the drive for re-evangelization, dimensioning religiosity may serve as an argument for changing the state of affairs.

Constraints and Operationalization of the Problem

In view of the extensive operationalization⁸ of the *Aufbruch* study (1997), which is described by M. Tomka and P. Zulehner (1999), and owing to the limited scope for analysis, two kinds of constraints have been adopted.

First constraint – relating to the countries encompassed by the analysis. The ten countries ranging from the Baltic to the Black Sea are seemingly linked by

8 See: Tomka and Zulehner, 1999.

a common fate: for five decades or more they lived under conditions that may be described as a communist system, and subsequently the collapse of this system at the beginning of the 1990s. They all fall within the so-called Central and Eastern European region yet they differ widely from each other culturally, historically, socially, economically and politically as well as in religion. They differed not only in level of development at the time of transition, but in the course of their internal cultural, political and social development from that turning-point up to 1997 when the empirical phase of the *Aufbruch* study was carried out. These countries vary in religious tradition and affiliation: predominantly Orthodox, Protestant or Catholic. There are also substantial differences in national history and tradition of state independence. Some preserved statehood continuously, others regained it after the breakdown of the communist system and yet others, like Slovenia, have only attained statehood for the first time. This is an important consideration because of the association between expression of religious consciousness and national identity.

It was therefore decided to restrict the present analysis to three planes. Firstly, the plane of the Slovenian national sample, because that is the primary goal of this analysis.⁹ Secondly, where it seems meaningful, a particular phenomenon is examined at the level of the combined ten national samples that is on the plane of the whole of the 'Central and Eastern Europe' region studied. All comparative analyses are based on national samples of residents aged between 18 and 65 years.¹⁰ Thirdly, to examine differences in religiosity amongst seven countries with a predominantly Catholic tradition, even if the Catholic community prevails over others at a low level, such as in Slovenia. Thus, Slovenia is compared with Lithuania, Hungary, Poland, Czech, Slovakia and Croatia. Romania and Ukraine are not dealt with because they are predominantly Orthodox, nor is former-East Germany, which is predominantly atheist with Protestants predominating amongst the religious. Second Constraint. Although this study of religion is extensive the analysis and discussion is restricted to manifestations of religiosity in its multifarious expressions and its social and personal determinants. The influence of religiosity on the formation of individual and social group values is left to subsequent study.

9 The Slovenian sample included 1011 residents of Slovenia aged over 18 years, without an upper limit.

10 The national samples number 1000 randomly selected adult residents. The samples are not weighted: general two Slovenian samples are shown in the tables. The one including respondents up to 65 years only is comparable with the samples from the other countries examined; the other, without an upper age limit, is representative for a review of religiosity in Slovenia since it includes the eldest residents, those over 65 years of age, for whom religiosity is the most characteristic.

As already stated, the analysis is not based solely on personal statements about faith. A more original approach, in our view, is taken to reveal religiosity through the respondent's understanding of the concept of god, resurrection and death, and his acceptance of basic Christian tenets. Separate analysis of each of these three Christian tenets, each of which were suitably operationalized – and are expressed as three complex dimensions of religiosity – and examination of their internal consistency will show whether they overlap and denote the same phenomenon, namely inner religiosity, as expressed within Christian belief, or not.

Should examination of the relations amongst these three dimensions of religiosity confirm that in effect they are one and the same and further tests against other dimensions of religiosity confirm its applicability, it will be possible to deepen and expand this research, namely to proceed to the second step.

First Step: Three Dimensions of Inner Religiosity

Three concepts of inner Christian religiosity are dealt with in the analysis: understanding of the concept of god, belief in resurrection, and the basic tenets of Christian doctrine (orthodoxy).

Belief in God

Belief in god is at the center of most contemporary religions irrespective of the varying ideas of god. At the center of Christian religions is a personal god. Belief in god imparts meaning to life and helps the person come to grips with the milieu as well as himself/herself. The concept of god then takes center-stage in Christian religions and religiosity.

Accordingly, belief in god and understanding of the concept of god has been suitably operationalized in this analysis. The study has examined statements regarding the relationship between living and god, the meaning of life, sorrow, and suffering in connection with god; faith in a personal god who watches over each person, etc. Of course the view of god is manifested in general statements about religiosity, views of Christ, resurrection, and the so-called Christian universe of beliefs. The latter two aspects of faith shall be presented later, here we deal with four statements concerning the understanding of and belief in god, as presented in Table 1.

The four statements in question (Q23, 25, 28 and 29) are strongly associated as shown by the highly significant correlation found in all samples. This justifies the construction of an index as a new dimension, 'belief in god'.

The degree of congruence on the four statements was measured with each respondent rated from 0 to 4.¹¹ The frequency distributions obtained with the Slovenian and the seven-country samples are presented in Table 2.

Table 12.1: Belief in God (4 variables) – frequency distribution

		Do not agree at all	Mostly do not agree	Do not agree nor disagree	Mostly agree	Fully agree
Statement	Database	(1)	(2)	(3)	(4)	(5)
23. Life only has meaning for me because here is a god	SLO over 18	37.2%	13.9%	17.7%	13.8%	17.5%
	SLO 18-65	39.4%	15.3%	17.8%	13.0%	14.5%
	7 count. 18-65	23.0%	12.4%	20.8%	19.3%	24.5%
25. God redetermines the course of our lives	SLO over 18	41.1%	13.0%	17.6%	12.3%	16.1%
	SLO 18-65	42.8%	13.6%	18.2%	11.7%	13.7%
	7 count. 18-65	27.2%	14.9%	22.7%	17.8%	17.4%
28. Sorrow and suffering make sense only if you believe in god	SLO over 18	38.0%	13.6%	17.8%	13.2%	17.4%
	SLO 18-65	40.0%	14.6%	17.7%	12.5%	15.1%
	7 count. 18-65	28.4%	16.5%	20.5%	17.4%	17.2%
29. There is a god that personally watches over each Person	SLO over 18	31.2%	10.4%	15.1%	17.0%	26.3%
	SLO 18-65	32.2%	11.2%	15.4%	16.8%	24.3%
	7 count. 18-65	24.8%	12.6%	19.4%	18.2%	25.0%

There are significant differences between three samples. In Slovenia 'belief in god' lags behind the general level found in the seven countries, due in particular to the low level of congruence with the first three statements (Q23, 25, 28).

Method of constructing the 'belief in god' dimension. The correlations between eight statements (Q22–Q29) covering the value space of Promethean activism, fatalism, understanding of the concept of god and god's omnipresence, were examined (factor analysis of the Slovenian and each of ten national samples). The responses to the statements were found to link up into three factors, namely, 'belief in god', 'activism', and 'fatalism'. In all ten countries it was confirmed that statements representing attitude towards god join together in a single factor 'belief in god', with the highest intensity.

11 The values of the new dimension were recoded: 0 – non-religious; 1 – low religiosity; 2–3 medium religiosity; 4 – full religiosity.

The applicability of this new dimension was tested by cluster analysis.¹² A cluster analysis of the four variables examined, shown in Table 1, was done using the Quick Cluster method to test for two, three and four clusters. The procedures employed are not detailed here, rather the features of the particular divisions are described.

Table 12.2: New variable: Belief in God – frequency distribution

		None	A little	Medium	Very much
	Database	(1)	(2)	(3)	(4)
Belief in God	SLO over 18	47.9%	17.3%	21.9%	13.0%
	SLO 18-65	50.2%	17.8%	21.3%	10.7%
	7 count. 18-65	42.6%	14.7%	26.2%	16.5%

Distribution into *two clusters* roughly divides the population into halves: 49% of respondents come in the first cluster, which affirms most of the four statements, while the second, slightly larger group (51%) rejects most of them. Application of the new dimension shows that the latter includes respondents from the ‘no incidence’ group or the ‘low religious’ group. Distribution into three clusters clarifies the relationship with an intermediate group (35%) which inclines more towards a low than a high ranking for belief in god and comes between the two polar groups, namely those expressing belief in god (25%) and those who do not (40%).

The results of the cluster analysis and the test of congruence of classification into groups with distribution to the new dimension indicate that the new dimension, in its four-part variant, may be employed further in the analysis. All the foregoing tests were carried out on the seven-country sample and gave the same classifications, but with significant differences in the distribution of the population. With the Slovenian sample, classification into 2 and then 4 clusters produced a drop in share of respondents expressing high belief in god and a rise in the share of non-believers (Table 3).

The data for Slovenia and the seven countries combined are presented in Table 3. In both cases cluster analysis gives clues for understanding the ‘belief in god’ dimension. Differences in the shares of the two polar clusters stand out. Affirming or rejecting various expressions of belief in god is not strictly ‘standardized’. Thus sorting into four clusters unambiguously classifies a solid half

12 See Ferligoj, 1989.

(61%) of the Slovenian respondents (21% affirming all tenets; 40% rejecting all). The corresponding proportion in the seven-country sample is significantly lower (57%) with significantly more (32%) affirming the tenets than rejecting them (21%). The remaining respondents in both samples affirm some and reject other tenets. The share of these ‘casual believers’ is greater in the seven-country sample than in the Slovenian although this difference may be attributed to the substantially higher share of Slovenian respondents that reject all the tenets.

Table 12.3: Sorting into 2–4 clusters (Quick Cluster); share of respondents in polar clusters (religious/non-religious)

Number of Clusters	Affirm – in %		Reject – in %	
	Slovenia	7-country	Slovenia	7-country
2	49	57	51	44
3	25	35	40	30
4	21	32	40	25

The foregoing supports further reliance on the new ‘belief in god’ dimension.

Profound Religiosity – Belief in Life After Death

Belief in posthumous life or resurrection is closely associated with belief in god and as such is at the center of Christian religion. The Bible also attributes a central significance to resurrection.

As an important component of Christian religion, resurrection was operationalized in two ways in this study: by direct questions about belief in life after death in the framework of the Christian universe of belief (which is discussed below), and by means of certain statements from the Zulehner Value Scale¹³ of twenty-four statements. Factor analysis of all responses, in both the Slovenian and the seven-country sample, unambiguously confirmed that the statements relating to the concept of profound religiosity form a new entity. This includes four statements, as shown in Table 4. Three statements are equivalent in meaning (Q230 to Q232) while the fourth (Q233) corresponds more conceptually to the ‘belief in god’ dimension. The fourth was not excluded from the analysis of the concept of profound religiosity because of the strong association between the statements relating to the two concepts. Table 4 presents

13 P. Zulehner constructed the value scale employed in the *Aufbruch* project which includes twenty-four statements relating to different value concepts, four of which relate to *Auferstehung*.

the distribution of responses to the four statements and shows the acceptance of the concept of resurrection, or profound religiosity, at the descriptive level in the Slovenian sample. The concept is most strongly affirmed with the statement about ‘the existence of life after death’ (agree, fully agree = 46%) and rejected most firmly by the statement ‘death is the end of everything’ (agree, fully agree = 52.2%).

Table 12.4: *Profound religiosity (4 variables) – frequency distribution*

		Do not agree at all	Mostly do not agree	Do not agree nor disagree	Mostly agree	Fully agree
	Database	(1)	(2)	(3)	(4)	(5)
230. Death is the end of everything	SLO over 18	21.2%	10.0%	13.7%	9.6%	45.6%
	SLO 18-65	21.9%	11.0%	13.7%	9.8%	43.6%
	7 count. 18-65	23.1%	15.4%	16.2%	13.6%	31.7%
231. I hope there is life after death	SLO over 18	31.0%	8.1%	14.9%	12.6%	33.4%
	SLO 18-65	31.1%	8.1%	15.5%	12.4%	32.9%
	7 count. 18-65	23.2%	10.6%	16.8%	18.6%	30.8%
232. People with rise from the dead with body and soul	SLO over 18	52.1%	9.9%	16.6%	6.9%	14.3%
	SLO 18-65	52.8%	10.2%	16.8%	7.1%	12.9%
	7 count. 18-65	36.5%	13.9%	18.7%	13.1%	17.8%
233. Life only has meaning because there is a god	SLO over 18	40.4%	12.4%	17.5%	11.2%	18.5%
	SLO 18-65	42.2%	13.6%	18.1%	10.9%	15.2%
	7 count. 18-65	26.7%	11.4%	20.6%	17.8%	23.6%

The analysis confirms significant correlation’s between responses to all four statements and moreover in the expected direction. A new dimension was consequently constructed from predominant or full agreement with statements Q231–Q233 and partial or full disagreement with statement Q230. Each respondent was rated 0 to 4 points.¹⁴ The frequency distributions of the new dimension, labeled ‘profound religiosity’, for the Slovenian and the seven-country samples are presented in Table 5. The difference between the two samples is significant. ‘Profound religiosity’ in Slovenia lags appreciably behind the general level in the seven Central and Eastern European countries due in particular to the exceptionally high agreement with the statement ‘death is the end of everything’.

14 The values on the new ‘profound religiosity’ dimension were recoded: 0 points (1) not present to 4 points (5) full agreement with statement.

Table 12.5: New variable: Profound religiosity – frequency distribution

		None	Low	Medium	High	Very high
	Database	(1)	(2)	(3)	(4)	(5)
Profound	SLO over 18	32.5%	23.1%	16.5%	15.6%	12.3%
Religiosity	SLO 18-65	32.1%	25.0%	16.6%	14.9%	11.3%
	7 Count. 18-65	24.6%	17.7%	18.1%	20.1%	19.5%

The new ‘profound religiosity’ dimension was also tested by means of cluster analysis. Tests for two, three and four clusters were carried out with the four variables shown in Table 4. Sorting into *two clusters* roughly divided the Slovenian sample 44%(1): 56%(2) with the first group predominantly affirming and the second predominantly or fully rejecting the tenet of resurrection. The first group encompasses all cases of medium, high or very high rating for ‘profound religiosity’ and the second all cases of rejection or low affirmation. Sorting into *three clusters* shows that rejection of the tenet remains most marked in cluster (2) – (comprising about 38% of respondents). It is noteworthy that cluster (1) (about 31%) affirms resurrection at a low to medium level, and hence is a kind of transitional cluster, whereas cluster (3) (about 30%) affirms it at a high to very high level. Sorting into *four clusters* clarifies the situation with the resurrection statement. Thus cluster (1) is marked by high affirmation of statements V232 and V233 and high rejection of statement V230. This ‘pro-resurrection’ cluster encompasses around 20% of respondents. Standing in contrast to this is cluster (3), which is characterized by high affirmation of the statement ‘death is the end of everything’ and high rejection of all the other statements. A special understanding of ‘resurrection’ is revealed in cluster (2) which makes up about 25% of respondents and is marked by high agreement with the statement about ‘death as the end’ and at the same time ‘hope that there is life after death’ and affirmation of ‘god as giving meaning to life’. Cluster 4 gathers those expressing greater hope in life after death while mostly rejecting all the other statements or showing reserve towards them. This cluster accounts for about 21% of respondents. The test of the new ‘profound religiosity’ dimension shows that cluster (1) affirms resurrection strongly, cluster (2) affirms it at a low to medium level, cluster (3) rejects it, and finally, that cluster (4) affirms it at only a low to medium level.

Once again the cluster analysis test and confirmation of group membership by classification on the new dimension indicate that the ‘profound religiosity’ dimension may be used in further analysis. All the foregoing tests were also carried out on the combined seven-country sample and yielded similar clas-

sifications but with significant differences in the distribution of respondents. allocation is more pronounced with higher affirmation of the resurrection tenet.

Orthodoxy

The third concept examined in the analysis of inner (Christian) religiosity concerns the so-called ‘expressions of Christian belief’, orthodoxy. It concerns the attitude towards the basic tenets of the faith such as belief in god, heaven, the soul, resurrection, hell, the devil, miracles, in foretelling the future, and healing by the laying of hands (Q187 to Q195).

Table 12.6: Orthodoxy (7 variables) – frequency distribution

	Database	I believe	I do not believe
187. I believe in ...the devil	SLO over 18	21.1%	78.9%
	SLO 18-65	19.9%	80.1%
	7 Count. 18-65	25.6%	74.4%
188. I believe in ... hell	SLO over 18	29.0%	71.0%
	SLO 18-65	27.6%	72.4%
	7 Count. 18-65	32.7%	67.3%
189. I believe in... heaven	SLO over 18	46.9%	53.1%
	SLO 18-65	45.3%	54.7%
	7 Count. 18-65	56.0%	44.0%
190. I believe in... god	SLO over 18	66.3%	33.7%
	SLO 18-65	65.1%	34.9%
	7 Count. 18-65	73.3%	26.7%
191. I believe in... the soul	SLO over 18	75.7%	24.3%
	SLO 18-65	75.7%	24.3%
	7 Count. 18-65	77.6%	22.4%
192. I believe in... life after death	SLO over 18	38.2%	61.8%
	SLO 18-65	36.7%	63.3%
	7 Count. 18-65	48.6%	51.4%
193. I believe in... miracles	SLO over 18	54.8%	45.2%
	SLO 18-65	57.1%	42.9%
	7 Count. 18-65	49.6%	50.4%

This concept obviously overlaps in connotation with the first two and supplements them. After factor analysis the first seven tenets were retained for further analysis and the last two were left for subsequent study.

Since these are fundamental components of Christian religiosity this concept is labeled orthodoxy, which is in line with the literature.

The descriptive features of the variables are presented in Table 6. It may be seen that there are wide and statistically significant differences in affirmation of the particular tenets of faith. Three groupings of statements may be made on the basis of these differences. The first group includes: belief in god and belief in the soul, with the highest affirmation. The second: belief in heaven, miracles and resurrection – at roughly a medium level of affirmation. Finally, the third group includes belief in hell and the devil, with the lowest level of affirmation. Besides belief in god, belief in the soul is a generally-accepted human value, and belief in miracles is also at the heart of Slovenian religiosity. This is confirmed as a whole on the seven-country sample as well. Belief in heaven ranks alongside belief in miracles, and belief in resurrection comes just slightly behind that. Finally, belief in hell and in the devil follow with by far the lowest level of affirmation. Plainly, the negative and repressive components of Christian faith lag behind the positive, permissive and optimistic components in the personal set of beliefs of the individual. This applies as much for the Slovenian as for the combined sample. The individualization of choice, nonbinding doctrines and personal affinities come into play here even more than with the two foregoing concepts ('belief in god' and 'resurrection'). With the exception of belief in god, both believers and non-believers feel quite free about accepting particular tenets or not, which besides reflecting – perhaps not even predominantly – the longtime restrictions on religious culture and practice in the Central and Eastern European countries, also reflects global cultural changes in the developed world and the secularization associated with them.

A new 'orthodoxy' dimension was constructed by counting each expression of belief as one point and then converting the points to a ranking of (1) to (4).¹⁵ The results for this dimension on the Slovenian and seven-country samples are shown in Table 7. In the Slovenian sample, 16.7% and 15.7% of respondents respectively are ranked as highly orthodox compared to 21.8% in the seven-country sample.

To confirm the applicability of the orthodoxy dimension a cluster analysis of the data was done for the seven expressions of faith, with testing for two, three and four clusters.

15 Rank (1) 'not present' includes all instances of 0-1 points; rank (2) 'low level' includes all instances of 2 and 3 points; rank (3) 'medium high' includes instances of 4 and 5 points; and rank (4) 'very high, full' includes instances with 6-7 points.

The sorting into *two clusters* is rough; the Slovenian sample breaks roughly into halves. In the first cluster are respondents affirming ‘belief in god’, ‘the soul’ and ‘heaven’ as well as ‘resurrection’ and ‘miracles’ and to a substantially lesser degree ‘belief in hell’ and ‘the devil’. Placed in the other cluster are unorthodox respondents expressing a lower level of ‘belief in the soul’, ‘in god’ and ‘miracles’. A similar breakdown is found in the seven-country sample, roughly into halves with belief in the devil, hell and miracles somewhat pronounced in the unorthodox cluster. Sorting into *three clusters* divides the Slovenian sample roughly into thirds: the first cluster is highly orthodox, as confirmed by affirmation of all seven statements; the second (around 35%) is low in orthodoxy and characterized by partial belief in god and miracles; the third however is characterized by individualized choice of positive and permissive statements. The clusters found with the seven-country sample are similar to those obtained with the Slovenian sample. Sorting into *four clusters* sharpened the orthodoxy dimension on the Slovenian sample. It yielded a cluster of highly orthodox encompassing a good third of respondents, a somewhat smaller cluster of unorthodox (around 29%), followed by two transitional clusters of about 17% of respondents each. The first of these tends more towards belief in the soul and miracles, and the other towards belief in god, the soul and heaven. The seven-country sample yields similar results with the unorthodox making up about 29%, highly orthodox the same, followed by a cluster (around 27%) affirming belief in god, the soul and heaven, and finally a cluster (around 17%) affirming belief in the soul and to some extent in god.

Table 12.7: New variable: Orthodoxy – frequency distribution

		None	Low	Medium	High
	Database	(1)	(2)	(3)	(4)
Orthodoxy	SLO over 18	39.9%	24.2%	19.2%	16.7%
	SLO 18-65	40.4%	25.1%	18.8%	15.7%
	7 Count. 18-65	34.0%	22.7%	21.6%	21.8%

Correlation of the Three Dimensions of Religiosity

The analysis thus far has confirmed the applicability of all three concepts that enter the space of ‘inner religiosity’ namely, ‘belief in god’, ‘belief in life after death’ and ‘orthodoxy’. Each dimension has been shown to contribute to an explanation of the phenomenon of inner religiosity. This contribution is however rather uniform, it even might be said monotonous considering the

replication and confirmation of basic findings obtained by analysis of each of them.

Table 12.8: Correlation between the dimensions of inner religiosity and selected independent variables

Dimension	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) belief in God	--	.529	.638	.554	.131	- .198	- .297
		.000	.000	.000	.000	.000	.000
(2) profound religiosity	-	--	.505	.482	.060	- .163	- .223
			.000	.000	.059	.000	.000
(3) Orthodoxy			--	.610	.085	- .043	- .191
				.000	.007	.319	.000
(4) Affirmation of faith				--	.126	- .112	- .295
					.000	.009	.000
(5) Gender					--	- .017	- .082
						.690	.009
(6) Age						--	- .017
							.690
(7) Education							--

Aufbruch. Slovenia. N=1011 over 18 years of age

Examination of the relationships amongst the three new dimensions and amongst them and selected independent variables indicates that in effect they comprise one and the same complex dimension which broadly covers the concept of inner religiosity. This is confirmed by the correlations presented in Table 8. The correlations between the three dimensions are high and significant. The correlations with other selected independent variables, presented in earlier sections, merely reconfirm these conclusions.

This supports proceeding to a further step in the analysis; namely, on the assumption that a single complex dimension is involved, to construct and test this dimension.

Step Two: Constructing the New Complex Dimension of Inner Religiosity

The *Aufbruch* (1997) study seems to have resolved the research problem on both the conceptual and operational planes. Without entering into detailed argumentation of the concept, which has been presented by Tomka and Zulehner (1998), in connection with inner religiosity it may be noted that the questionnaire is thoroughly operationalized by means of fifteen statements covering dimensions of belief in god (4 statements), belief in an after life (4

statements), and orthodoxy (7 modalities), which are documented in Tables 1, 4 and 6. The question arises whether the fifteen indicators, covering the three different concepts shown in the foregoing analysis to be inter-correlated, may be used as a basis for constructing a new complex index: inner religiosity?

At the outset a factor analysis was done of the fifteen indicators on the seven-country sample, the seven national samples separately, as well as the Slovenian sample. In the great majority of cases two factors were found, the first of which is dominant in all cases (explaining 46% of variance and more). It may be concluded that it is permitted to construct a single dimension of inner religiosity from the fifteen indicators. Factor values (Factor 1 – unrotated) are employed further in the analysis.

The resulting condensed data (factor values of the units observed on the first factor) does not however satisfy our research aim. It was decided to proceed to a further step. This did not draw on earlier models and theoretical directions, rather it involved the method of cluster analysis, as in the preceding step. It is an opportunity to test assumptions about the typologies of religiosity. An examination was made of how the units array in relation to typical configurations of responses to the fifteen questions. Since the dimension of inner religiosity is being measured, the analysis shows the number of typical groups the population forms and whether these groups are meaningful and explicable. Four successive tests were made with two, three and four clusters. The tests were carried out on the combined seven-country sample, the separate national samples, and the Slovenian sample. The results were as follows.

With the *two cluster* test one cluster pulled together respondents affirming all fifteen statements, that is all those expressing high inner religiosity while the other collected all the non-religious and those whose religiosity is limited more or less to belief in god and in the soul. Sorting into *three clusters* produced a cluster of the least religious (only some belief in the soul expressed), a second cluster of respondents scoring high on all fifteen statements, and finally a third cluster of those falling around the mean and characterized by full affirmation of some statements (such as belief in god, the soul, and in heaven, etc) but rejection of negative and repressive beliefs and wavering between finality and hope in an after life. Sorting into *four clusters* was the next step towards internal clarification, with the first cluster obtained characterized by the absence of any religiosity (except for some belief in the soul), the second by the highest expressions of religiosity on the full range of fifteen indicators, the third showing a strong emphasis on belief in god (the concept of belief

in god and orthodoxy, which relates to god, the soul and resurrection). The fourth cluster is characterized by free selection of belief in god, the soul, resurrection or miracles from the full range of the three concepts.

Typology of Inner Religiosity

A new 'inner religiosity' dimension¹⁶ was next introduced on the basis of the results of the factor and cluster analyses and the units sorted into three clusters or types. It was found that this break-down of the dimension was sufficiently clear, distinct and simple. The three clusters illustrate three basic variants of inner religiosity.

Table 12.9: New variable: Typology of inner religiosity – frequency distribution

	Database	Type A (non-religious)	Type B (independ. religious)	Type C (devoutly religious)
Inner Religiosity	SLO 18-65	60.1%	21.2%	18.7%
	7 Count. 18-65	49.1%	24.2%	26.7%

Type A: This group is marked by a bottom or very low position throughout the fifteen indicators. A religious vacuum is the principal feature; low level belief in the soul, god and resurrection. Thus, type A, non-religious (Table 9).

Type B: This group may be designated secularly or individualistically religious. There is a tendency to select particular religious tenets such as belief in god, in the after life, and orthodoxy, with a marked inclination towards positive, permissive and optimistic elements of the Christian universe. It includes individualistic religious concepts that deviate from church teachings which however cannot be considered non-religious. This group is labeled: type B, independently religious.

Type C: This group features high religiosity which is affirmed throughout the fifteen indicators. It may be described as devout or strict, in accordance with church teachings, orthodox, dogmatically religious. However, it also harbors certain deviations and variations in the expression of individual religiosity, though these are less pronounced and few in number. This group is labeled: type C, devoutly religious.

¹⁶ Each of the fifteen indicators was recoded such that affirmation of a statement (agree, agree fully) was scored 1 and all other responses were scored 0.

The three-part typology was imposed by the model and satisfies initial expectations. The observed units were ordered into three types or relatively large groups suitable for further analysis. The typology corresponds to the customary view of religiosity which tends to see some as religious, others as non-religious and yet others as somewhere between. Besides clear distinctions and consistent sorting of units in the two extreme types, it also yields a distinguishable intervening group that partly adopts and affirms expressions of Catholic belief but focuses mainly on belief in god and the soul. Since inner religiosity is a multi-layered phenomenon no entirely simple types or groups were anticipated rather it was expected that they would cross over each other. The sorting procedure determined the position of each unit on the criteria and pushed it into the nearest appropriate type. A check of four and a five cluster sorting showed that the two extreme types, types A and C only slightly changed in outline, while the units clustered in type B were scattered into a number of sub-clusters which could be labeled according to the particular groupings of expressions of religiosity but were too fragmented to follow easily in further statistical analysis.

Inner Religiosity Dimension: Test of Sorting into Three Clusters

The applicability of the inner religiosity dimension and its breakdown into three clusters may be demonstrated in a number of ways.

The first way is by means of factor analysis (factor 1- unrotated) and presentation of the mean values of each cluster separately. The applicability of the three-part division is confirmed on the seven-country sample and the Slovenian sample separately (Table 10).

The shares of the three types of inner religiosity in the seven-country and Slovenian samples are shown in the next step (Table 11).

The inner religiosity dimension was applied once again in the seven Central and East European countries: a poor half of all respondents (49.1%) sort into type A (non-religious), a good quarter (26.7%) in type C (devoutly religious), and a poor quarter (24.2%) in type B (independently religious). Of course the situation with Slovenia is of interest here because it typically deviates from these seven countries. The share of type A is markedly greater, the share of type C markedly smaller. Slovenia positioning amongst these countries on this dimension is dealt with in the conclusions.

Table 12.10: Inner Religiosity dimension (types A, B, C – averages)

Type	Slovenia (average)	7-country (average)
Type A (non-religious)	-0.86	-0.89
Type B (independ. religious)	0.25	0.34
Type C (devoutly religious)	1.24	1.32

Table 12.11: Inner religiosity – shares of types in the Slovenian and the seven-country samples

Type	Slovenia (in %)	7-country (in %)
Type A (non-religious)	60.1	49.1
Type B (independ. religious)	21.2	24.2
Type C (devoutly religious)	18.7	24.7
Aufbruch	100 %	100 %
	(N=1000)	

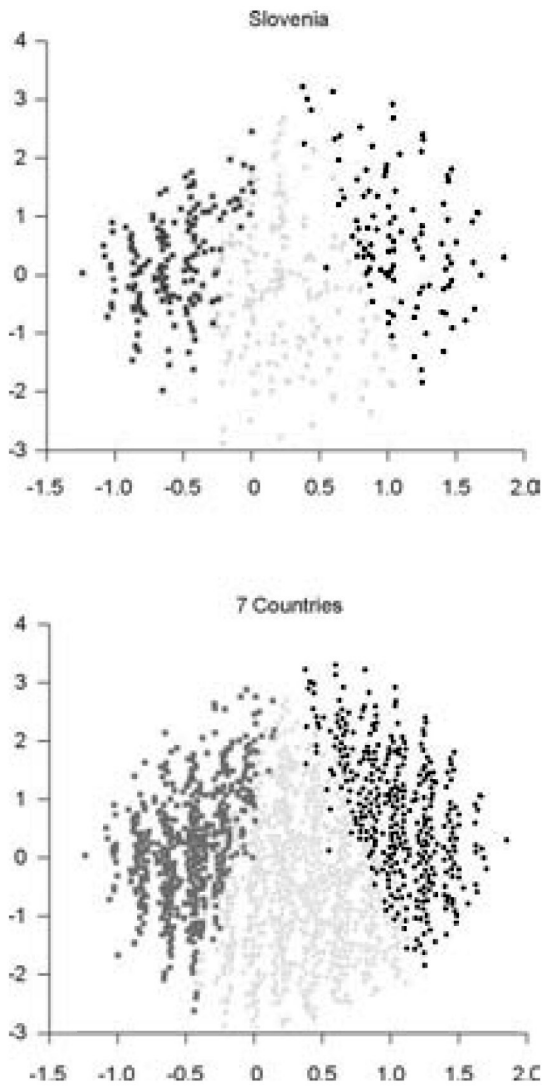
Before turning to a discussion of the meaning of position on the tripartite inner religiosity dimension, the applicability of the dimension has to be confirmed and established. This may be done by reference to socio-demographic variables, adding more religious variables, or by testing certain value concepts. The first two directions are only sketched out in this report; the last is left to subsequent examination. Although the analyses and presentations encompass seven countries, the phenomenon of religiosity is described more or less only in Slovenia at this point.

Inner Religiosity – Correlations with Gender, Age and Education

Gender. The expected correlation between location in the three clusters of inner religiosity and gender is confirmed in the seven-country sample (Table 16.12/A). Amongst the non-believers (type A) the share of males is significantly higher (54.7%) than that of females (45/3%); the share of females is much higher (58.3%) than that of males (41.7%) amongst the devoutly religious.

This difference is also confirmed on all seven national samples although to varying degrees and at varying levels. For example, in Poland both males and females rank high on religiosity while in Czech, Hungary and Slovenia they rank somewhat lower, however in all cases the females rank higher on this dimension.

Figure 12.1: Distribution of units (Slovenia, seven countries) over the three-part typology (A – non-religious, B – independently religious, C – devoutly religious) in the region of factor 1 and factor 2 produced by the 15 variables (belief in god, profound religiosity and orthodoxy) employed in the analysis



Age. Membership in the three groups is not influenced by age in a pronounced or uniform way. Clearly the distribution of the different age groups is partly influenced by earlier and partly by recent socialization concepts.

Table 12.12: Inner religiosity and socio-demographic variables

	Database	Type A (nonreligious)	Type B (independ. religious)	Type C (devoutly religious)	Total
A) Gender Male	SLO over 18	52.6%	27.2%	20.2%	460=100%
	SLO 18-65	53.5%	27.0%	19.5%	441=100%
	7 Count. 18-65	55.0%	22.3%	22.8%	3423=100%
Female	SLO over 18	43.7%	29.4%	26.9%	551=100%
	SLO 18-65	45.4%	30.7%	23.9%	456=100%
	7 Count. 18-65	43.6%	25.9%	30.5%	3577=100%
B) Age 18-29	SLO over 18	50.9%	30.3%	18.9%	228=100%
	7 Count. 18-65	53.3%	21.1%	25.7%	1964=100%
30-44	SLO over 18	53.1%	26.4%	20.5%	292=100%
	7 Count. 18-65	50.5%	23.3%	26.2%	2469=100%
45-54	SLO over 18	48.0%	27.4%	24.6%	175=100%
	7 Count. 18-65	49.9%	25.2%	24.9%	1304=100%
55-65	SLO over 18	41.9%	33.1%	25.0%	172=100%
	7 Count. 18-65	39.3%	29.6%	31.1%	1262=100%
66 +	SLO over 18	37.1%	25.7%	37.1%	140=100%
	7 Count. 18-65	--	--	--	--
C) Education Primary school or less	SLO over 18	28.2%	35.6%	36.3%	284=100%
	SLO 18-65	33.3%	36.8%	29.9%	204=100%
	7 Count. 18-65	32.4%	33.1%	34.4%	1261=100%
Vocational training	SLO over 18	45.9%	32.5%	21.6%	255=100%
	SLO 18-65	43.6%	34.7%	21.8%	225=100%
	7 Count. 18-65	55.0%	22.5%	22.5%	1936=100%
Secondary school	SLO over 18	59.6%	23.4%	17.1%	334=100%
	SLO 18-65	59.2%	23.6%	17.2%	314=100%
	7 Count. 18-65	51.0%	22.4%	26.6%	2576=100%
Tertiary	SLO over 18	59.8%	19.7%	20.5%	127=100%
	SLO 18-65	58.1%	20.5%	21.4%	117=100%
	7 Count. 18-65	52.7%	21.5%	25.8%	1211=100%
Total	SLO over 18	47.2%	28.7%	24.1%	
	SLO 18-65	48.8%	29.2%	22.0%	
	7 Count. 18-65	49.1%	24.2%	26.7%	

The share of devoutly religious (type C) in the youngest age group is below the average but not substantially so (Table 12/B).

The effects of age on expressing religiosity were also analyzed on the basis of factor values (factor 1 – unrotated; Å for age group – Table 13).

Table 12.13: *Expressing religiosity by age group (factor 1; age group average)*

Age group	(average)	
	Slovenia	7-country
– 18 to 29 years	- .28	- .06
– 30 to 44 years	- .29	- .03
– 45 to 54 years	- .20	- .04
– 55 to 65 years	- .13	.21
Total	- .24	.00

It may be observed that a negative correlation between religiosity and age still prevails in the combined seven-country sample although it is not pronounced. This holds more or less for all the national samples.

Education. Table 12/C shows that the correlation between location in the three groups of inner religiosity and education group is expected and confirmed. Respondents with elementary school education more often fall in the religious (types C and B) than in the non-religious group (type A); conversely, respondents with higher education more often fall in the nonreligious than the religious groups. A test with mean values confirms that position on the inner religiosity dimension falls significantly with rising level of education. This holds for the seven-country sample and for all national samples separately. The Slovenian sample shows a significant shift between groups with elementary education and vocational training on the one side and those with vocational training and secondary education, while there is no difference between groups with secondary and tertiary education.

Testing Inner Religiosity Dimension against Other Indicators of Religiosity

Testing against alternative indicators of religiosity is an important test in confirming the concept of inner religiosity. As noted at the beginning, the *Aufbruch* (1997) study covered a series of useful indicators of religiosity. Here only two are used:

- a) statement about religiosity (Q198)
- b) religious practice – participation in religious rites (Q197).

The foregoing are alternative variables within the one broad concept, namely religiosity in all its breadth and multi-layers. Testing the new dimension of inner religiosity with these variables proceeds on the assumption that what is happening is the accumulation of parallel data. Undoubtedly this helps to expand and deepen the study of the phenomenon of religiosity. The expected

correlations between the new variables and the inner religiosity dimension are dealt with separately.

a) Statement about belief, religious self-ranking: The respondents in 10 countries were asked to rank themselves on a scale that measured the degree of religiosity (Table 14). They were asked 'No matter whether or not you go to church, would you say you are...?' The results for Slovenia and the seven-country sample are presented in Table 15.

Table 12.14: Inner religiosity and statements about belief (Q198)

	Database	Type A	Type B	Type C	Total
Strongly non-religious	SLO over 18	97.0%	3.0%		101=100%
	SLO 18-65	96.6%	3.4%		88=100%
	7-Count. 18-65	82.1%	8.1%	9.8%	990=100%
More non-religious	SLO over 18	93.6%	4.8%	1.6%	125=100%
	SLO 18-65	93.0%	5.2%	1.7%	115=100%
	7-Count. 18-65	75.9%	16.5%	7.6%	834=100%
Neither religious nor non-religious	SLO over 18	68.6%	25.7%	5.7%	261=100%
	SLO 18-65	69.6%	25.7%	4.8%	230=100%
	7-Count. 18-65	74.6%	18.0%	7.4%	1288=100%
Quite religious	SLO over 18	17.4%	44.3%	38.3%	447=100%
	SLO 18-65	17.2%	46.2%	36.6%	377=100%
	7-Count. 18-65	26.0%	37.1%	36.9%	2738=100%
Very religious	SLO over 18	1.6%	15.9%	82.5%	63=100%
	SLO 18-65	2.3%	13.6%	84.1%	44=100%
	7-Count. 18-65	22.9%	19.6%	57.5%	1035=100%
Total	SLO over 18	47.4%	28.5%	24.1%	997=100%
	SLO 18-65	48.9%	29.0%	22.0%	854=100%
	7-Count. 18-65	48.7%	24.3%	27.0%	6885=100%

It follows from Table 15 that on average for the ten countries a good quarter of all respondents (25%) considered themselves non-religious and a good half (55%) as somewhat religious or very strongly religious (latter 12%); a poor fifth were undecided. Croatia stands out, followed by Poland and Lithuania, with above average high shares of religious while at the other end the former-East Germany and Czech have a predominating share of non-religious; Slovenia and Hungary fall somewhere in the middle of the extremes.

Table 12.15: (Personal) religious self-ranking in ten countries (in %)

	Strongly or more non- religious	Not religious nor non- religious	Quite religious	Very religious	Mean value
	(1,2)	(3)	(4)	(5)	
East Germany	55	19	23	2	2.34
Croatia	11	13	43	34	3.92
Lithuania	8	25	61	6	3.62
Poland	6	20	54	20	3.85
Romania	18	19	51	12	3.53
Slovakia	27	19	14	11	3.14
Slovenia	23	27	44	5	3.20
Czech Republic	56	17	21	6	2.40
Ukraine	26	16	50	7	3.18
Hungary	34	12	37	17	3.15
Total 10 countries	7	18	43	12	3.26

As far as Slovenia in particular is concerned, its share of very strongly religious (5%) places it near former-East Germany (2%) Czech Republic, Ukraine and Lithuania (6–7%), in the bottom part of the scale. Croatia (34%) and Poland (20%) stand well in front, followed by Hungary (17%). In Slovenia, the most outstanding ranking is ‘quite religious’ (44%), the most striking in relation to all other countries is the response ‘neither religious nor non-religious’ (27%). The remaining respondents (23%) rank themselves as either ‘strongly non-religious’ (10%) or ‘more non-religious’ (13%).

Comparison with the inner religiosity typology (type A, B, C) reveals the extent of the inconsistency. Most respondents who accept the majority of Christian beliefs may be expected to consider themselves ‘very strongly religious’ or ‘quite religious’. It is quite probable too that most respondents who subjectively see themselves as such do accept most Christian beliefs – although not all. Deviations will be more or less significant and particularly pronounced with respondents in medial positions. Once again the assumption of a positive correlation with inner religiosity holds: respondents ranking themselves as non-religious (at all) fall predominantly in type A, and those self-ranked as very religious fall predominantly in type C. The analysis showed a significant difference in the seven-country sample because almost a quarter of the very religious were classed in type A (non-religious) and even a twelfth or more of the non-religious (at all) in types B and C. In the Slovenian sample deviations were not significant and were merely exceptions. In the main in this case the applicability of the three-part inner religiosity typology was confirmed. This

is well illustrated by the transitional self-ranked group of 'neither religious nor non-religious'. More than two-thirds of this group was classed in type A, a quarter in type B, while only a small share (5%) were classed in type C.

b) Religious practice – participation in religious rites. Tomka and Zulehner (1999, 2000) describe personal inner religiosity by means of two dimensions: personal religiosity or faith, and religious practice. The latter refers to personal religious behavior, participation in events in the religious community and above all attending religious rites. Different churches have different rules regarding participation in rites and in the Catholic Church these rules are particularly clearly stated: namely it is strictly required to attend Sunday church services. Significant differences may be expected between Catholics on the one side and Protestants and Orthodox on the other. The latter two do not prescribe attendance at Sunday services so strictly. Responses to the question: 'Without counting weddings, funerals and christenings, how often do you go to religious services in the church?' show that in the seven-country sample, about one-fifth (19.8%) regularly or frequently attends rites. Further, a weak seventh (13.8%) attends at least once a month, a quarter (24.7%) several times a year, on major feast days, a sixth (16.5%) attends seldom, and a quarter (25.1%) not at all.

In view of the norms for attending religious rites in Christian religious communities and the differences between them, significant differences between the seven countries observed may be expected.

Thus, the highest share of regular attendance (weekly or more often) is found in Poland (53.3%), followed by Slovakia (33.3%), and Croatia (25%), then Slovenia (20.3%), Hungary (13.6%), Lithuania (10.5%), and lastly by Czech (8.9%). Amongst the ten countries observed, the Ukraine (7.9%) and finally former East Germany (3.1%) come after Czech. Although it is predominantly Orthodox, Romania has a significantly higher share of regular attendance (25.3%). The share of abstainers (never attend, attend more seldom than major feasts) is consistent with this. Amongst the seven countries, Czech leads with three-thirds abstaining (74.4%), followed at a distance by Hungary with a solid half (54.6%), then Slovakia (39.2) and Slovenia with about two-fifths (38.8%), Croatia (28.1%) and Lithuania (27.7%), while in Poland a weak twelfth (7.9%) abstains.

Table 12.16: *Inner religiosity and religious attendance (Q197)*

	Database	Type A	Type B	Type C	Total
Never	SLO over 18	86.0%	10.7%	3.3%	243=100%
	SLO 18-65	85.9%	11.3%	2.8%	213=100%
	7-Count.18-65	89.6%	7.9%	2.5%	1669=100%
Rarely	SLO over 18	66.9%	26.1%	7.0%	142=100%
	SLO 18-65	69.1%	26.0%	4.9%	123=100%
	7-Count.18-65	71.5%	18.5%	10.0%	1028=100%
Several times a year on major feast days	SLO over 18	49.3%	38.0%	12.8%	274=100%
	SLO 18-65	49.6%	37.6%	12.8%	242=100%
	7-Count.18-65	50.6%	30.6%	18.8%	1651=100%
At least once a month	SLO over 18	23.8%	41.0%	35.2%	122=100%
	SLO 18-65	24.1%	41.1%	34.8%	112=100%
	7-Count.18-65	21.4%	39.5%	39.2%	983=100%
Once or more a week	SLO over 18	5.8%	31.1%	63.1%	225=100%
	SLO 18-65	6.3%	33.1%	60.6%	175=100%
	7-Count.18-65	9.1%	28.9%	62.0%	1593=100%
Once or more times a day	SLO over 18			100.0%	3=100%
	SLO 18-65			100.0%	1=100%
	7-Count.18-65		18.8%	81.3%	48=100%
Total	SLO over 18	47.7%	28.4%	23.9%	1009=100%
	SLO 18-65	49.2%	29.0%	21.8%	866=100%
	7-Count.18-65	49.1%	24.2%	26.8%	6972=100%

A significant correlation was found between inner religiosity and attendance at church or religious rites (Table 16). The devoutly religious strongly predominate amongst those attending every week, and the strongly nonreligious are the most outstanding amongst the abstainers. In line with their independent religiosity, type B respondents come predominantly amongst occasional participants of church rites (several times a year, once a month).

It is striking that part of the devoutly religious (type C) do not attend rites regularly every week but more seldom, only occasionally, as well as the finding that part of the non-religious – a rather substantial part – attends on major feasts or occasionally. This further confirms the conclusion that the trait of non-religiosity is multifaceted, transitional, and strongly determined by social and cultural factors, whilst some of the religious are shedding church obligations and making their own choices from the Christian universe of beliefs, creating their own religious concepts. Similarly striking is the finding that some of the non-religious actually enter the religious and cultural space of the church and attend church rites for a variety of reasons.

The correlation between the variable inner religiosity, and the alternative religiosity variables is demonstrated on the basis of both Slovenian samples and the combined seven-country sample. The correlations found are significant. However they are not always consistent in specific cases and often they are contradictory.

After evaluation of which of these religiosity variables to attribute greater weight to, the individual dimensions or the new complex dimension of inner religiosity, the latter was chosen. Certain questions nevertheless arise: What leads a respondent who does not accept the basic tenets of Christian belief to assert he is more or less religious in response to a direct question? What leads another who asserts belief in god or that he attends rites to not accept some of the basic tenets at the same time? Or conversely, although it is much less common, to accept most or even all the tenets yet assert that he is not at all religious, does not believe in god, and the like? Is it largely a matter of contradictions in the very nature of religious consciousness or do other, external factors, play a part in this? Unquestionably it is both at the same time. However one part of the contradictions observed derive from the methodology of the research itself.

Nevertheless, in the main, in all countries the respondents sort correctly on the inner religiosity dimension with regard to the alternative religiosity variables. All tests confirm, as already noted, that the correlations between inner religiosity and the alternative variables are intensive, that confirmations are accumulating and that the correlations are marked and significant. The applicability of the inner religiosity dimension is thereby confirmed.

Religiosity in Slovenia and Six Central and Eastern European Countries – Trial of the New Typology

Following all the analyses, the state of religiosity in the Central and East European countries may now be described using the new inner religiosity dimension.

The dimension consists of three basic types of religiosity, namely type A – non-religious, type B – independently religious (or transitional type), and type C – devoutly religious. How Slovenia ranks on this dimension in comparison with the other countries has already been presented above. It deviates significantly from the Central and Eastern European average with a higher share of non-religious and significantly lower share of both types of religious.

Table 17 presents the distribution of religiosity for each of the seven countries separately.

Table 12.17: New variable: inner religiosity in the seven Central and East European countries

Country	Type A	Type B	Type C
Croatia	30.6%	29.8%	39.6%
Lithuania	40.9%	29.2%	29.9%
Poland	21.3%	34.1%	44.6%
Slovakia	48.7%	23.3%	28.0%
Slovenia	60.1%	21.2%	18.7%
Czech Republic	76.8%	11.9%	11.3%
Hungary	65.5%	19.7%	14.9%
Total	49.1%	24.2%	26.7%

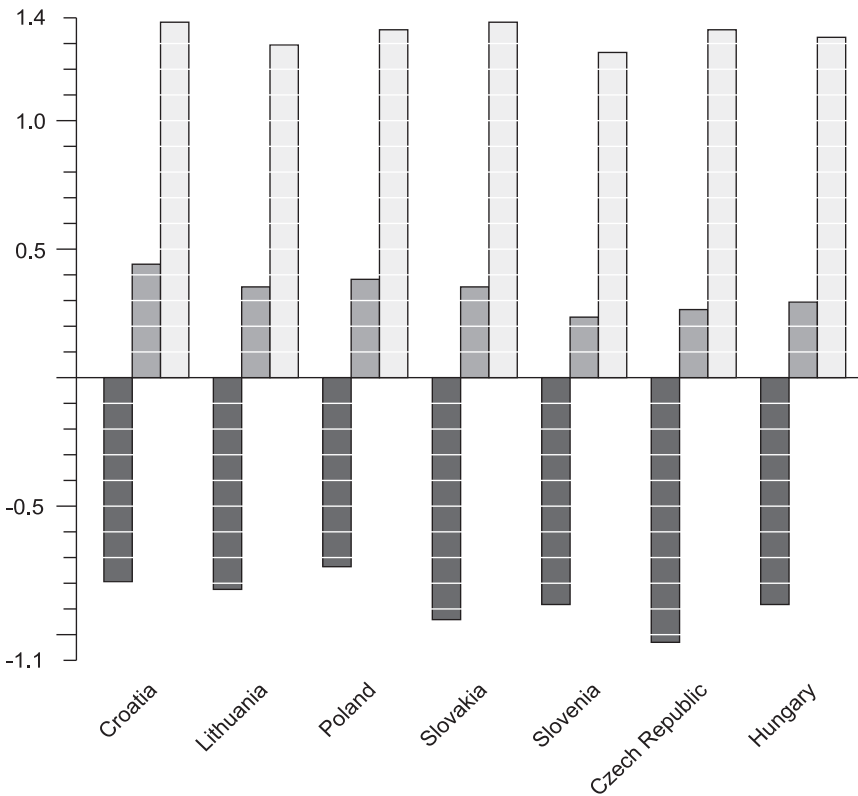
It will be seen that along with Czech and Hungary, Slovenia falls in the group with a low level of devoutly religious. Standing at the other end are Poland and Croatia with high shares of devoutly religious. In between come Slovakia and Lithuania.

The new inner religiosity dimension was tested again and confirmed at this level. For each of the seven countries and all of them combined (Figure 2) the consistency of the classification of units into the A-C types with the distribution of the mean values of the clusters was checked (factor 1- unrotated; 15 statements covering three concepts). The findings presented in Table 18 show high consistency (for each of the seven countries) between the type classification and the mean values (factor 1) for types A-C. It may be seen that in some countries the differences are greater, particularly in the Czech Republic.

Tomka and Zulehner (1999) obtained similar results in an analysis of religiosity using the same research material at the level of all ten countries observed. By a procedure of reducing the empirical data they constructed twelve new dimensions covering the entire subject-matter. A factor analysis of these produced two factors, two new integral dimensions. The first was labeled ‘socio-religiosity’ and the second ‘effects of religion’. The former is much broader in connotation than the religiosity dimension used in the present study since it includes religious practices, all kinds of contacts with religion, religious experience, etc. in addition to all the tenets of belief. What is relevant in evaluating the applicability of the new religiosity dimension and its three-part typology, is the allocation of units, that is determining the dimensions of the

phenomenon. Distribution on the ‘socio-religiosity’ index gave the following results: very weak 15%; weak 27%; strong 48%; very strong 10%.

Figure 12.2: Inner religiosity – confirmation of the typology (A, B, C) using mean values of factor 1 by country



The findings are not directly comparable to the distribution on the inner religiosity dimension (types A, B, C) because Tomka and Zulehner include former East Germany, Romania and Ukraine in their analysis, namely one country with a markedly low and two with markedly high religious status. They found strongly and very strongly religious respondents made up 58% and low to very low religious the remaining 42% in the ten-country sample.

Table 12.18: Inner religiosity in 7 countries – confirmation of typology (A, B, C) using mean values of factor 1 by country

Country	Inner Religiosity	Mean value	Standard deviation	N
Croatia	Type A	-.78	.35	306
	Type B	.44	.38	298
	Type C	1.36	.33	396
	Total	.43	.96	1000
Lithuania	Type A	-.81	.35	409
	Type B	.34	.37	292
	Type C	1.28	.35	299
	Total	.15	.95	1000
Poland	Type A	-.72	.37	213
	Type B	.39	.38	341
	Type C	1.32	.33	446
	Total	.57	.86	1000
Slovakia	Type A	-.92	.33	487
	Type B	.34	.38	233
	Type C	1.35	.35	280
	Total	.01	1.03	1000
Slovenia	Type A	-.86	.32	601
	Type B	.25	.34	212
	Type C	1.24	.37	187
	Total	-.24	.90	1000
Czech Republic	Type A	-1.02	.27	768
	Type B	.26	.33	119
	Type C	1.33	.38	113
	Total	-.60	.86	1000
Hungary	Type A	-.87	.32	655
	Type B	.27	.37	197
	Type C	1.31	.37	149
	Total	-.32	.88	1000
Total	Type A	-.89	.33	3439
	Type B	.34	.37	1692
	Type C	1.32	.35	1870
	Total	.00	1.00	7000

In the present study the inner religiosity typology yielded a ratio of 51:49 with the seven-country samples when all the units classified as type C (devoutly religious) and type B (independently religious) were combined. Tomka and Zulehner found the following rankings on the socio-religiosity index: Poland ranks highest, followed by Croatia, then Lithuania and Slovakia, followed by Slovenia, Hungary and Czech. This is exactly the same as the ranking obtained with the inner religiosity typology. Similarly, the ranking for share of nonreli-

gious (Type A) was the same. These findings by Tomka and Zulehner simply additionally confirm the applicability of the inner religiosity dimension.

It may be observed that with the inner religiosity dimension the respondents in the seven countries break down roughly half-and-half into religious and non-religious.

The non-religious are a rather compact group characterized by low acceptance of Christian beliefs, with the exception, however, of belief in god and belief in the soul, which are present in the group although negligibly. The religious group visibly breaks down into two subgroups, roughly equal, with slightly more (26.7%) in the devoutly religious category (type C) than in the independently religious category (type B) (24.2%). There are significant differences between countries that are mainly in line with expectations. Accordingly, Poland stands at the top of the religiosity scale with 44.6% devoutly religious, followed rather surprisingly by Croatia¹⁷, and only next by Lithuania and Slovakia, while Slovenia, Hungary and Czech, with a predominance of non-religious (type A) ranging from 60% to 77%, stand at the bottom part of the scale.

Two neighboring countries represent the extremes, namely Poland with almost 79% religious and Czech with almost 77% non-religious residents.

The wide differences in degree of religiosity in the seven countries observed, which are completely confirmed by testing against alternative dimensions of religiosity, raise the question of their causes. The limitations to objective research of the phenomenon of religiosity are evident. They are reflected in part by the way the phenomenon was 'dimensioned' in the research. At the same time there is no doubt that the findings obtained are conceptually significant, that they quite faithfully present the phenomenon. The differences in degree of religiosity between the countries are so great that they can only be explained in terms of different social, political and cultural-religious situations and the development of these societies. All seven countries belong in the group of 'Central and East European Countries', that is they have a communist Background; in the last half century they had the same type of political and socio-economic order; four of them have in common the fact that they lived in a conjoined country, the Czech Republic and Slovakia in Czechoslovakia and Slovenia and Croatia in Yugoslavia; further, all of these countries lived

17 Considering data on the state of religiosity in Croatia in the mid-1980s and prior to that, when Croatia lagged markedly behind Slovenia in relation to personal religiosity and was ahead of it in relation to civil religiosity.

under more or less pronounced ideological repression with restricted freedom to express faith; most of them belonged to the 'East bloc' which was tightly closed to the West, and so forth. Despite all of this these seven countries have pronounced differences and idiosyncrasies in their cultural-historical and political development – and are markedly different countries. This is also the case with their religious traditions,¹⁸ which differ strongly, such as between Slovenia and Croatia and especially Czech and Poland as extremes.

Was not the uniform political-systemic context – an authoritarian, one-party, communist system – the common factor that shaped or blocked the expression of religious belief in these countries? The answer is not simple even though it is mostly negative. Obviously the fifty years of communist rule in Eastern Europe did not erase the cultural traces, models, traditions and values that are being fully expressed again just a decade after it collapsed. The system was not just undemocratic and economically unsuccessful it was obviously also ideologically unsuccessful, or rather its 'success' varied greatly in different countries and under different socio-cultural and political conditions. In view of the findings of the comparative study of religiosity in Western European countries it may be surmised that a joint examination of Western and Eastern European countries on the inner religiosity dimension would show that Western countries are not essentially different from the Eastern, namely they are differentiated. It would probably confirm that a country's ranking is determined above all by its entrenched socio-cultural structures on the one hand and the dynamics of socio-developmental processes and globalization in them on the other. The Christian religious communities are coping with the same civilizational-cultural problems in both the west and the east of Europe better than might be thought.

18 See Smrke, 1996.

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Authors: A Story of Research Companionship

A list of “Research Companions” in alphabetical order along with brief descriptions, where available.

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University of Ljubljana. He had a significant influence on the process of Slovenia's independence and social transition. Currently, he is a member and the chair of the Human Rights committee of the Slovenian Academy of Sciences and Arts. In the mid-1970s, he was stripped of his rights as a university lecturer due to political criticism. In 2008, he was awarded the Golden Order of Merit of the Republic of Slovenia by the country's president. His bibliography includes over 500 references, including 27 books.

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Zdravko Mlinar, professor emeritus, is a leading Slovenian sociologist and professor at the Faculty of Social Sciences, University of Ljubljana. He is also: one of the pioneers of post-war sociology in Slovenia; head of the Center for the Study of Local Communities and Work Organizations, later known as the Center for Spatial Sociology; and dean of the Faculty of Social Sciences. His work focuses on socio-spatial development, sociological aspects of the development of new towns (e.g., Velenje, Nova Gorica), globalization processes, and both the theoretical and empirical dimensions of civic research. He has been: continuously active nationally and internationally; a co-founder of the Slovenian Sociological Association and president of the Yugoslav Sociological Association; and a member and chair of a research committee within the International Sociological Association (ISA). He is the author of a large number of internationally recognized books and scientific articles, and a member of the Slovenian and Croatian Academies of Science and the Arts, among others.

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First Publications

All chapters from 1 to 12 are texts that were previously published as articles in journals or as chapters in books. The original publications are listed below.

1. "Towards New Cognitive Foundations for Survey Research", (2010), in: *Teorija in Praksa*, Ljubljana. Interdisciplinary Journal of Social Sciences Vol. 47, No. 3, 1316–1339 (ISSN 0040-3598).
2. "New Cognitive Environments for Survey Research in the Age of Science II (2012)", in: *Društvena Istraživanja, Zagreb. Journal for General Social Issues*, Vol. 21, No. 2, 315–340 (ISSN 1330-0288).
3. "The Third Road to Comparative Research: Morphological Designs" (2009) in: Toš, N., Müller, K. H. et al. (2009) (eds.), *Three Roads to Comparative Research: Analytical, Visual and Morphological*. Wien: edition echoräum, 423–457. Co-authors: Bischof, C., Miheljak, V.
4. "Towards New Frontiers in Comparative Survey Research" (2009), in: N. Toš, N., Müller, K. H. et al. (eds.), *Three Roads to Comparative Research: Analytical, Visual and Morphological*. Wien: edition echoräum, 461–505.
5. "The RISC-Program: An Experiment in Trans-Disciplinary Knowledge Production at the University of Ljubljana" (2010), in: Kajfež-Bogataj, L., Müller, K. H., Svetlik, I., Toš, N. (eds.), *Modern RISC-Societies. Towards a New Paradigm for Societal Evolution*. Wien: edition echoräum, 25–42 (ISBN 978-3-901941-23-8). Co-author: Svetlik, I.
6. "RISC- Processes and Societal Coevlution: Towards A Common Framework" (2010), in: Kajfež-Bogataj, L., Müller, K. H., Svetlik, I., Toš, N. (eds.), *Modern RISC-Societies. Towards a New Paradigm for Societal Evolution*. Wien: edition echoräum, 63–113 (ISBN 978-3-901941-23-8).
7. "Micro-Foundations of Risk Societies in Slovenia and Europe I: Basic Concepts and New Inequality Scales" (2005), in: Toš, N., Müller K. H. (eds.), *Political Faces of Slovenia. Political Orientations and Values at the End of the Century – Outlines Based on Slovenian Public Opinion Surveys*. Wien: edition echoräum, 315–346. Co-author: Nemeth, G.

8. "Micro-Foundations of Risk Societies in Slovenia and Europe II: Towards High Theory" (2005), in: Toš, N., Müller, K. H. (eds.), *Political Faces of Slovenia. Political Orientations and Values at the End of the Century – Outlines Based on Slovenian Public Opinion Surveys*. Wien: edition echoräum, 347–366. Co-author: Ringler, D.
9. "Living Conditions, Socio-economic Risks, Inequality and Health. Establishing New Theoretical Foundations and Closer Empirical Linkages" (2004), in: *e-WISDOM*, Vol. 1, No. 1, 53–89 (ISSN 1013-977x). Co-author: Nemeth, G.
10. "The Organization of Modern Societies: Core-Periphery or Vertically Stratified?" (2012), in: *Teorija in Praksa*. Interdisciplinary Journal of Social Science. Vol. 49, No. 3, 566–587 (ISSN 0040-3598).
11. "Trust in Institutions of System – in Slovenia and Eastern European Countries" (2009), in: Toš, N., Müller, K. H. (eds.), *Three Roads to Comparative Research: Analytical, Visual and Morphological*. Wien: edition echoräum, 221–267.
12. "Comparative Analysis of Religiosity - in Slovenia and Central and Eastern European Countries" (2005), in: Toš, N., Müller, K. H. (eds.), in: *Political Faces of Slovenia*. Wien: edition echoräum, 385–417.

Index

A

Abelson, R. 37, 415
 Acham, K. 123, 405
 Adams, J. 59, 126, 177, 181, 405
 Adorno, T. 123, 405
 Aizawa, K. 59, 126, 177, 405
 Ajzen, I. 51, 405, 410
 Aldrich, H. 256, 299, 405
 Allen, C. 218, 405, 411, 420
 Allen, W. 17
 Allum, N. 151, 423
 Alwin, D. 48, 147, 415
 Anderson, S. 157, 265, 405, 411
 Andrews, F. M. 37, 405
 Arthur, W. B. 173, 265, 405
 Aydede, M. 59, 69, 421
 Ayres, R. 193, 405

B

Baecker, D. 223, 281, 309, 405
 Bagozzi, R. 37, 409
 Bak, P. 164, 198, 405
 Ball, P. 164, 405
 Banse, G. 181, 223, 281, 309, 405
 Barenblatt, G. 198, 406
 Basanez, M. 328, 414
 Bechmann, G. 223, 281, 309, 405
 Beck, U. 173, 180, 181, 223, 224,
 225, 227, 228, 233, 234, 270,
 275, 279, 281, 282, 309, 310,
 406
 Beck-Gernsheim, E. 279, 406
 Beinhocker, E. 164, 406

Bell, D. 173, 406
 Bendall, D. 265, 406
 Bernik, I. 13
 Bernstein, P. 181, 281, 406
 Bezjak, S. 27
 Bickerton, D. 33, 127, 228, 407
 Biemer, R. 409, 414, 422
 Bischof, C. 29, 70, 406, 418, 427,
 441
 Bizzi, E. 33, 410
 Black, I. 33, 88, 96, 375, 410
 Blaikie, P. 426
 Blalock, H. 37, 407
 Blane, D. 407
 Blasius, J. 100, 409
 Blau, P. 275, 308, 407
 Bodenhause, G. 59, 126, 407
 Bongard, J. 177, 420
 Bordens, K. 407
 Bourdieu, P. 226, 275, 279, 280,
 281, 307, 308, 407
 Bower, G. 44, 138, 407, 411
 Boyer, R. 35, 54, 120, 165, 407,
 430
 Bradburn, N. 48, 147, 407
 Bradshaw, J. 407
 Bras, Le G. 374, 415
 Breckler, A. 405
 Brooks, D. 265, 407
 Brunner, R. 407
 Buchanan, M. 204, 407

C

Calvert, G. A. 33, 238, 258, 407
 Calvin, W. H. 33, 127, 228, 407
 Campbell, J. 33, 127, 228, 408
 Cannon, T. 426
 Caplan, P. 181, 408
 Carbonell, J. 413
 Carnap, R. 419
 Carroll, G. 256, 299, 408
 Castells, M. 208, 408
 Casti, J. L. 157, 265, 269, 408
 Chaiken, S. 51, 409
 Changeux, J. 408
 Charles, P. 38, 115, 224, 310, 411, 421, 428, 429, 432, 436
 Collins, E. 408, 409, 414
 Cooper, C. 70, 107, 261, 299, 322, 408
 Coveney, P. 157, 408
 Cowan, G. A. 157, 159, 408
 Cronbach, L. 48, 147, 408

D

Damasio, R. A. 33, 127, 228, 234, 290, 408
 Dangschat, J. 100, 409
 Davey, B. A. 283, 409
 Daws, I. W. 426
 Deacon, T. W. 33, 127, 228, 408, 409
 Delhey, J. 241, 253, 284, 409
 Dembo, R. 181, 409
 Dennett, D. C. 33, 127, 149, 150, 151, 228, 234, 265, 290, 409, 412, 413
 Denz, H. 426
 Derby, S. 410

Dessler, A. 215, 409
 Devezas, T. 193, 405, 409
 Diderot, D. 19, 190, 421
 Dillman, D. 38, 114, 415
 Dippo, N. 410, 414
 Donovan, A. 241, 415
 Douglas, M. 181, 231, 409
 Dowd, K. 181, 409
 Drucker, P. F. 173, 409
 Durham, W. 173, 265, 409, 416, 420
 Durlauf, S. 265, 405
 Dynes, R. 174, 421

E

Eagly, A. H. 51, 409
 Edelman, G. M. 33, 409
 Edwards, J. R. 37, 409
 Elsasser, W. M. 57, 409
 Epstein, J. M. 52, 130, 409
 Ereshefsky, M. 265, 409
 Esposito, J. P. 37, 409

F

Fabian, A. C. 265, 410
 Feldman, M. W. 178, 410
 Felgentreff, C. 174, 410
 Ferfila, B. 410
 Ferligoj, A. 165, 379, 410
 Ferreira, V. 418
 Fischhoff, B. 181, 410
 Fishbein, M. 51, 405, 410
 Fishkin, J. 151, 416
 Fiske, S. T. 177, 410
 Flaker, V. 410
 Flam, M. 413
 Flick, U. 113, 410

Florida, R. 173, 410, 423
Foerster, H. V. 34, 39, 40, 41, 58,
62, 63, 67, 68, 105, 106, 124,
126, 127, 129, 136, 160, 258,
259, 260, 410, 417, 418, 425,
434
Freeman, A. 181, 409, 416, 419
Freese, L. 265, 410
French, A. 160, 410

G

Gallhofer, I. 34, 51, 114, 119, 422
Gardner, D. 410
Garling, R. 422
Gazzaniga, M. S. 33, 67, 127, 238,
258, 410
Gear, D. 27, 122, 158, 413, 414,
429
Gibbons, M. 54, 158, 160, 161,
411, 419
Gibbs, R. W. 59, 126, 410
Giddens, A. 173, 215, 223, 226,
227, 275, 279, 307, 308, 309,
406, 411
Glade, T. 174, 410
Glasersfeld, E. W. 67, 105, 258,
411
Glass, A. L. 44, 411
Glatzer, W. 49, 287, 411, 426
Gluck, J. 411
Goguen, J. 62, 129, 411
Goldberg, D. 39, 411
Goodwin, B. 265, 411, 423
Gordon, R. 138, 407, 411, 434
Graham, J. 181, 411
Gray, C. 88, 96, 283, 409
Groves, L. 422
Grusky, D. 279, 307, 411, 423

Gunderson, L. 218, 411

H

Haag, G. 168, 173, 426
Habermas, J. 116, 174, 411, 412
Habich, R. 227, 241, 284, 292,
409, 412
Hafer, C. 72, 109, 263, 302, 323,
419
Hafner-Fink, M. 13
Hage, J. 275, 412, 413, 414
Haken, H. 164, 412
Hand, D. J. 37, 114, 412
Hannan, M. 256, 299, 408
Hanneman, R. 414
Hantrais, L. 412
Hart, P. 421
Hayden, J. 421
Hegel, G. 190, 412
Helferich, C. 113, 412
Henshaw, J. 37, 114, 412
Higgins, E. 419
Highfield, R. 157, 408
Hippler, H. 48, 146, 422
Hodge, R. W. 275, 308, 412
Hodges, S. 47, 146, 426
Hoffmann, W. 194, 413
Hofstadter, D. R. 33, 127, 228,
231, 234, 290, 412, 413
Holland, J. H. 33, 39, 42, 127,
141, 142, 143, 146, 157, 228,
238, 413, 422
Holling, C. 218, 411
Hollingsworth, R. 27, 35, 53, 117,
120, 122, 158, 162, 163, 165,
168, 200, 226, 266, 413, 414,
417, 418, 419, 429, 430, 434
Holyoak, K. 413

Hopf, W. 414
 Horwitz, A. V. 70, 107, 261, 299,
 322, 414
 Hox, J. I. 37, 38, 114, 407, 414,
 415
 Hunter, J. E. 52, 130, 414

I

Inglehart, R. 325, 328, 329, 414
 Inselberg, A. 201, 414

J

Jackson, J. 164, 414
 Japp, K. 223, 281, 309, 414
 Jarausch, K. 420
 Jensen, H. 164, 198, 414
 Jones, S. 265, 414, 416
 Jowell, R. 151, 416, 431
 Jukam, T. 417

K

Kaase, M. 20, 27, 29, 37, 415,
 430
 Kajfež Bogataj, L. 16, 164, 165,
 168, 171, 414, 431, 441
 Kardorff, E. 113, 410
 Karlqvist, A. 265, 408
 Kasperson, R. 181, 420
 Kauffman, S. 129, 157, 265, 267,
 268, 414, 415
 Keeny, R. 410
 Kennedy, P. 160, 410
 Knorr-Cetina, K. 158, 415
 Koch, W. A. 265, 415
 Kondratieff, N. D. 193, 195, 196,
 409, 415, 423
 Kovačič, M. 13

Koza, J. R. 39, 141, 415
 Krause, P. 227, 292, 412
 Krieg, P. 58, 124, 425
 Kriwy, C. 411
 Krosnick, J. A. 37, 38, 48, 115,
 147, 415
 Kuhn, T. 53, 241, 415
 Kurdija, S. 13

L

Lakoff, G. 33, 127, 228, 415
 Lambert, A. 59, 126, 407
 Lamnek, S. 113, 415
 Lane, D. 265, 405
 LaPiere, R. 36, 415
 Lash, S. 223, 309, 406
 Lass, J. 37, 415
 Laudan, R. 241, 415
 Leeuw, C. 38, 114, 409, 414,
 415
 Leube, A. 417
 Levitas, S. 241, 292, 407, 415
 Lewontin, R. 173, 265, 415, 416,
 420
 Lian, A. 44, 411
 Lichtenstein, S. 410
 Limoges, C. 411
 Link, T. 100, 228, 235, 291, 418
 Lloyd, E. 265, 416
 Lord, F. 37, 416
 Luhmann, N. 173, 203, 223, 225,
 226, 227, 228, 234, 265, 270,
 281, 282, 410, 416
 Lumsden, C. J. 265, 416
 Lupton, G. M. 283, 416
 Luskin, R. C. 416
 Lyberg, P. 409, 414, 422

M

Malnar, B. 13, 16, 19, 21, 22, 24,
26, 27, 424, 432
Mandelbrot, B. 164, 416
Mangen, S. 412
Margulis, L. 179, 265, 416
Martin, R. 48, 147, 265, 414,
416, 426
Mason, W. 48, 147, 407
Mathiowetz, S. 422
Matjan, G. 278, 312, 416
Maturana, H. 58, 59, 126, 234,
268, 416
Maynard-Smith, J. 178, 416, 417
Mayntz, R. 35, 120, 417
McCulloch, W. 48, 60, 128, 147,
417
Meltzer, D. 157, 408
Merton, R. K. 190, 417
Michalewicz, Z. 39, 141, 417
Michalski, R. 413
Michod, R. 265, 417
Middleton, C. 407
Miethe, T. D. 37, 417
Miheljak, V. 13, 26, 406, 424,
433, 441
Minsky, M. 33, 127, 228, 234,
290, 417
Mitchell, M. 39, 141, 413, 417
Mlinar, Z. 4, 15, 16, 27, 417, 433,
438
Mohler, P. 424
Monterey, U. S. 428
Moreno, A. 328, 414
Morris, C. 419
Müller, K. H. 1, 3, 4, 7, 9, 11, 12,
13, 15, 16, 18, 19, 20, 21, 22,
24, 26, 27, 29, 35, 50, 53, 56,

58, 63, 64, 67, 69, 95, 100,
105, 117, 118, 120, 122, 124,
127, 149, 151, 158, 160, 163,
164, 186, 187, 194, 218, 228,
232, 233, 235, 253, 256, 260,
291, 299, 313, 406, 410, 413,
414, 417, 418, 419, 421, 424,
430, 434, 441, 442

N

Navickas, A. 424
Nelson, R. 173, 419
Nemeth, N. 13, 24, 29, 313, 418,
441, 442
Neurath, O. 238, 291, 419
Newman, M. 164, 204, 419
Newton, K. 20, 158, 408, 409
Nicolis, G. 419
Nisbett, R. 413
Noe, A. 59, 126, 177, 419
Nohlen, D. 419
Nolan, B. 241, 292, 419
Novick, M. 37, 416
Nowotny, H. 35, 54, 120, 158,
160, 411, 419
Nunez, R. 33, 127, 228, 415

O

Ogle, R. 173, 419
Olson, J. 72, 109, 263, 302, 323,
419
Otte, G. 100, 420
Oyama, S. 173, 265, 416, 420

P

Palombo, S. R. 58, 124, 228, 420
Pantazis, S. 407

Parkin, F. 278, 308, 420
 Parson, E. 215, 409
 Parsons, T. 173, 420
 Payne, P. 407
 Perrow, C. 224, 310, 420
 Petersen, A. T. 283, 420
 Pettigrew, T. 72, 109, 263, 302,
 323, 425
 Pfeffer, T. 52, 130, 420
 Pfeifer, R. 177, 420
 Piatelli-Palmarini, M. 122, 420
 Pidgeon, N. 420
 Pilbeam, D. 265, 414
 Pines, D. 157, 405, 408, 410
 Pinker, S. 33, 127, 228, 420
 Plotkin, H. 33, 127, 228, 420
 Pohl, R. 69, 122, 420
 Pollock, J. S. 33, 127, 228, 420
 Popper, K. 157, 158, 241, 420
 Potočník, J. 12, 13, 424, 434
 Pratkanis, S. 405
 Pred, A. 212, 420
 Price, D. 158, 421
 Prigogine, I. 419
 Pruchno, R. A. 421
 Putnam, R. D. 408, 421

Q

Quarantelli, E. 174, 421

R

Ratey, J. 33, 127, 228, 421
 Rawlins, G. 39, 141, 421
 Raynal, G. 190, 421
 Reason, J. 181, 408, 420, 421
 Reautschnig, A. 50, 418, 421, 435

Rescher, N. 52, 130, 157, 158,
 208, 230, 421
 Richter, R. 100, 421
 Riedl, R. 265, 421
 Ringler, D. 13, 29, 442
 Robbins, P. 59, 69, 126, 421
 Roberts, C. 151, 423
 Rodriguez, H. 174, 421
 Room, G. 241, 292, 421
 Rose, R. 328, 330, 421
 Rosen, M. 57, 265, 421
 Rosenthal, U. 421
 Rostow, W. 170, 195, 421
 Roth, G. 33, 37, 127, 228, 421
 Rothgeb, M. 409
 Rus, V. 16, 27, 327, 359, 422,
 435, 438
 Russell, H. 253, 415, 422
 Ryckman, R. 58, 124, 228, 422

S

Sarafino, E. 70, 107, 261, 299,
 322, 422
 Saris, W. 34, 35, 37, 51, 112, 114,
 116, 119, 131, 149, 415, 422,
 423
 Scheid, T. 70, 107, 261, 299, 322,
 414
 Schmidt, J. 52, 58, 124, 130, 414,
 422
 Schneider, N. 278, 312, 325, 365,
 422
 Schulze, G. 277, 278, 310, 311,
 312, 422
 Schumpeter, J. A. 173, 192, 193,
 196, 199, 207, 422
 Schwartzman, S. 411

Schwarz, N. 48, 146, 147, 410,
414, 422
Schwenk, O. G. 100, 422
Scott, P. 158, 411, 419
Seligson, M. 417
Sigmund, K. 265, 422
Silver, H. 241, 292, 422
Skelton, P. 265, 422
Slovic, P. 181, 410, 420, 422
Smith, J. 178, 179, 265, 416, 417,
437
Smrke, M. 403, 422
Sniderman, P. M. 37, 423
Sober, E. 265, 423
Sole, R. 423
Solomou, S. 203, 423
Sopp, P. 279, 406
Sornette, D. 35, 54, 120, 164,
165, 168, 174, 175, 204, 423
Sorrentino, R. 419
Spellerberg, A. 278, 312, 422, 423
Spence, C. 33, 127, 238, 258, 407
Splichal, S. 9, 11, 15, 16, 27, 437
Stark, B. 217, 423
Stein, D. 33, 127, 157, 168, 238,
258, 407, 413, 423
Steinke, I. 113, 410
Sternberg, R. 33, 423
Sturgis, P. 151, 423
Suppe, F. 157, 423
Svetlik, I. 13, 14, 16, 26, 27, 163,
164, 171, 172, 413, 414, 438,
441

T

Taylor, S. 44, 177, 410, 423
Teune, H. 15, 423
Thagard, P. 413

Therbiault, S. 37, 423
Thom, R. 164, 424
Thurow, L. 173, 424
Tomka, M. 375, 386, 396, 399,
400, 401, 402, 424
Toš, N. 1, 3, 4, 7, 9, 11, 12, 13,
15, 16, 18, 20, 24, 26, 27, 29,
64, 163, 313, 327, 328, 332,
406, 413, 414, 418, 421, 422,
424, 438, 441, 442
Townsend, P. 241, 292, 407, 424
Treiman, D. 278, 308, 425
Trow, M. 411

U

Uhan, S. 13
Ulrich, G. 181, 223, 227, 233,
270, 279, 281, 309, 410
Underwood, G. 44, 425
Utterbeck, J. 34, 112, 425

V

Varela, F. 58, 61, 62, 129, 234,
268, 411, 416, 425
Volf, T. 13

W

Wagner, R. 33, 127, 228, 423
Wallerstein, I. 186, 425
Watts, D. J. 164, 204, 419, 425
Watzlawick, P. 58, 124, 425
Weber, M. 117, 186, 223, 278,
304, 307, 309, 425, 426
Weidlich, W. 173, 426
Weil, F. 426
Weiner, J. 265, 426
Weingart, N. 413

Whelan, C. 241, 253, 292, 419,
422
White, H. 88, 96, 191, 198, 426
Wiener, J. 181, 204, 411, 435
Wiley, E. 265, 405, 406, 407, 408,
409, 410, 414, 419, 420, 422
Wilkinson, R. 275, 283, 284, 407,
426
Wilson, T. 47, 146, 265, 416, 426
Wisner, B. 181, 426
Wright, E. 275, 279, 280, 281,
307, 308, 426

Z

Zapf, W. 241, 284, 287, 298, 409,
411, 412, 426
Zeilinger, A. 37, 114, 426
Zipf, G. 164, 426
Zulehner, P. 27, 375, 380, 396,
399, 400, 401, 402, 424, 426,
440

