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Knowledge and Irony: Binomial of the Post-Truth Era

Introduction

John Dewey stated (1929, p. 294) that: "Knowledge falters when imagination clips its wings or fears to use them. Every great advance in science has issued from a new audacity of the imagination." This assertion is reinforced when we look at the theoretical-application research field encompassing the communication of science. We consider science communication as the social conversation around science (Bucchi & Trench, 2021), and the science of science communication (Fischhoff & Scheufele, 2013) as how people deal with science and research. Combining the sociological perspective of the field of research and the imaginative dimension, it is useful to summon Cate Watson's suggestion (2015, p. 416) that "an eye for irony can […] be considered a requisite for the sociological imagination".

In the last few years, there has been a substantial growth in social media activity concerning science, although there are many disparate practices within that growth that are difficult to systematise (Davies et al., 2021). These include the private initiative of accredited or unaccredited science disseminators (Looi & Ho, 2023) and, at the same time, the interesting phenomenon of increased user searches for scientific content on social media (Hargittai et al., 2018). In this sense, it is precisely the disintermediation fostered by the Internet that allows for increased curiosity about researchers and research on the part of users, and the increased potential for direct interaction between the parties (Bucchi & Saracino, 2016).

As Liliana Gonçalves and Lìdia Oliveira (2021) pointed out in their systematic literature review on digital platforms, knowledge sharing and the flow of scientific relevance is informal and apomediate. Apomediation is a particular type of disintermediation which was defined by Gunther Eysenbach (2008) as an information-seeking strategy in which people rely less on experts and authorities, once considered "gatekeepers", and prefer to be "directed" by subjects that guide users to high-quality information and services albeit with limited individual power to modify or sift the information being exchanged. Therefore, apomediation consists of making use of intermediaries who facilitate access to accurate resources by directing searches in an effort to avoid unreliable and/or irrelevant sources.

In their study, Liliana Gonçalves and Lìdia Oliveira identify five knowledge sharing factors: social capital, network ties, perception, context, and individuals. In online participatory processes, communities, the interactions within and among them, the sense of belonging felt by individuals, personal expectations, and the perception of greater or lesser trust all seem to play a fundamental role. Equally relevant is the range of stakeholders that belong to three major categories: promoters/producers (government or local/national authorities or scientists), mediators (journalists, filmmakers, YouTubers) and the public (individuals, communities).

Promoters/producers are primarily involved in collaborative-based projects, mediators in citizen science projects. The third category, the public, is the main focus of this study. The public is the category that enables the sharing of knowledge between different groups, ideally the research world and non-experts. Our study analyses the public contribution offered in connection to the films *Don't Look Up* (2021), *Borat's American Lockdown* (2021), *Debunking Borat – Season 1* (2021), and *Barbascura X* and *Cartoni Morti's* YouTube channels videos about the climate crisis and the COVID-19 pandemic. These contributions represent samples of science-related content analyses that are multimodal in nature, including textual, visual and other elements that are systematically under-researched (Kessler & Schäfer, 2022).

In the peculiar context of the global pandemic, we believe that science experienced the same generalisation as politics (Beck, 1997). As a topic of attention shared by a multiplicity of actors and platforms (Scheufele, 2022), science has been attributed a higher agency than political actors, with consequent repercussions on the quality of the public discourse and trust in the health and democratic system. This process was particularly noteworthy in Italy (Belardinelli & Gili, 2020), evidenced by the 62% of Italians who in October 2020 believed that scientific experts gave too many different opinions (as compared to 48% in April 2020), and by the 26% of the population who were not sure about vaccinating or were totally against it (Observa, 2020). Within the already confusing regime of post-truth and the hybrid media system (Lorusso, 2018; Chadwick, 2013), the COVID-19 pandemic highlighted a deeper crisis: the critical nature of knowledge structuring as a process of coherent

analysis and the decoding of reality (Doctorow, 2017). In deep mediatisation, the public sphere becomes fragmented and reconfigured into the individual truths of affective publics (Bentivegna & Boccia Artieri, 2021; Papacharissi, 2016), and this informational disorder was often combined with the pattern of marked hostility towards knowledge (Nichols, 2017). Indeed, common sense often reinforces confirmation bias and prevents understanding, and both reality as a negotiation between interpretations and social reality constituted by and through communicative processes becomes problematised (Shutz, 1971; Eco, 2006; Luhmann in Maddalena & Gili, 2017).

This paper aims to investigate whether and how irony can contribute to the reconstruction of information and knowledge as science has become more popularised. We believe that irony has the potential to merge the aesthetic instance of entertainment and the information provided by the platformed society (Maffesoli 1996; Mazzoleni & Sfardini 2009; van Dijck et al., 2019) as the narrative logic of post-truth requires episodic exaggerations of frames and privileges emotional processing (Lorusso, 2018; Fischer, 2021). As content, irony provides the perfect symbolic fabric to highlight sudden transformations in the binary oppositions that structure social life in the constellation of small-world-platforms (Vicari & Murru, 2020).

Science communication, irony, and humour: an overview of relevant studies

The range of studies that have experimentally investigated the potential of transmitting content (not only of a scientific nature) through humour and irony is varied but numerically limited. Among these studies, the critical contribution of Hauke Riesch (2015) highlighted the power of persuasion exerted by humour and the consequent need to employ it in science communication. In the increasingly complex digital public sphere, information regarding social and scientific issues is increasingly accessed through social media platforms such as Facebook (Brossard, 2013; Hargittai, 2018; Mueller-Herbst et al. 2020) and YouTube (Dubovi & Tabak, 2021). These platforms are structures that not only enable the production, distribution, and sharing of content, but also determine narrative styles. It is not insignificant that online engagement through

humour has become prevalent, and therefore we need "to look closely at the interface between human being and technological mediation" (Weitz, 2017, p. 2).

It is crucial to consider the complexity of today's digital society in which the deficit model in scientific communication needs to be overcome by looking at persistent social inequalities (Scheufele, 2022). It would be possible to reformulate the very idea of post-truth into poly-truth, i.e. fierce public battles about truth by individual users (Harambam et al., 2022). In this way, we problematise knowledge construction crises related to communicative processes that are phases of construction and co-construction of reality, which is in turn a negotiation between interpretations and social reality. Over the last ten years, several studies have highlighted the cognitive and emotional potential of information collected online and the link between humorous entertainment and increased awareness, both regarding climate change and health. For example, stand-up comedy makes science more appealing and breaks stereotypes about scientists (Pinto et al., 2015), and humour has the potential to increase engagement in climate activism and social action (Yuan & Lu 2022). An important part of this process is that information that comes in a humorous message may initially be dismissed as a joke but remains in viewers' minds and therefore has the potential to influence their attitudes at a later time (Nabi et al., 2007). In this regard, it has been established that online scientific content arouses considerable interest, and that emotional and cognitive engagement with science on social media are interrelated (Dubovi & Tabak, 2021). Content that evokes emotional responses prompts users to comment more and thus to engage in a one-on-one exchange through which they share personal meanings about science with other users. In addition, humour appears to be positively related to users' perceived sympathy and trust toward the communicator (Looi & Ho, 2023), and gives a positive impression of the communicator's level of competence (Yeo et al., 2020). However, users' engagement with subtler forms of humour (Yeo et al., 2021), such as irony, remains largely unexplored.

Toward an operational-theoretical definition of irony as a vehicle of knowledge

Looking at studies of ironic humour in social media reinforces the idea that irony is a boundary work that, on the one hand, is able to consolidate group identity and, on the other hand, is able to exclude others who do not share the same symbolic frames, linguistic codes, and values (Gal, 2019). This view can be traced back to the three following established theories of humour: incongruity, superiority, and relief.

Briefly, the first theory concerns the sudden perception of incongruity between a concept and the real objects, and laughter represents the intuition of the coexistence of a sense of reality and its negation. The second theory indicates the social and cultural constraints that humanity imposes on itself (Watson, 2015) by assuming that what induces laughter is the possibility of asserting one's own superiority at the expense of others. The third theory explains how laughter is a reassuring emotional or psychic release valve connected to the saving of cognitive energy.

In order to arrive at a more precise definition of the object of our investigation, we first identify irony as a constitutive property of all contemporary practices of the imaginary (Chouliaraki, 2014, p. 175) and also as a post-narrative tool as it is not moralising and does not have universal intent. Arguably, it is both overused and misunderstood as a resource for exploring contradictions and uncertainties, especially in science communication. As Linda Hutcheon (1994) argues, irony corresponds to the intersectional dimensions that constitute a person's identity. Therefore, it does not build communities per se, but is based on the multiple and coexisting discursive communities that a person may know, belong to, and interact with. In this sense, it is linked to the concept of reflexivity, seen as universes of choices (Giddens, 1994) and interpretations. In our view, irony can bridge the hypothetical and contested distance between the expert and the users through a relational dynamic, according to which:

Ironic meaning comes into being as the consequence of a relationship, a dynamic, performative bringing together of different meaning-makers, but also of different meanings, first, in order to create something new (…) Irony isn't irony until it is interpreted as such – at least by the

intending ironist, if not the intended receiver. Someone attributes irony; someone makes irony happen (Hutcheon, 1994, p. 4–11).

This contrasts with studies on ironic humour in digital environments, according to which irony is based on imitation and social affiliation (Gal et al., 2022). However, the relational dynamic has also been analysed as a performative dialectical function that can be understood and corresponded to (with a correct decoding of the message or not) in which case the relationship breaks down. In general, this rupture has been traced back to the elitist potential for irony, and tends toward reinforcing the boundaries between ingroup and outgroup. In an open and polysemantic digital context, there is a flourishing of forms in which irony can be expressed and explained (Dynel, 2017), and indeed attracts attention as it represents an overt clash of content (Garmendia, 2018, p. 123). The clash however only concerns the way in which content is presented, while the individual's possibility of approach pertains to the discursive communities they refer to and which are therefore multiple.

It is important to point out that a relationship between humour, irony, and sarcasm exists, as irony is a slippery concept, and though inked to the other two, has a tendency to assume a negative or controversial position and to shift meanings in unexpected ways. Irony, however obvious it may be, is not immediate but requires cognitive effort on the part of the receiver. Therefore, it can also be seen as an analytical tool (Watson, 2015), especially in the field of communication. But an analytical tool is nothing but a heuristic resource, like the frame. The most accepted definition of frames is: "organizing principles that are socially shared and persistent over time, that work symbolically to meaningfully structure the social world" (Reese, 2001, p. 11). Indeed, the authors believe that irony is a device very close to the frame in that it concerns tone before content and draws on shared cultural resonances (for a review see Bruno, 2014) and the potential of resignification in digital contexts (Vicari & Murru, 2020). This paper intends to answer the following research question:

RQ1: Can irony play a role in the construction and dissemination of information and scientific knowledge?

RQ2: If so, what kind of role does irony play, and through which forms, devices, and tools?

Research design

This study intends to test the following hypothesis: irony can be a tool for deconstructing the information disorder, and a rhetorical strategy for promoting awareness, merging the aesthetic instance of entertainment and information in the platform society with the emotional and episodic instance proper to the narrative logic of post-truth. The research design is structured on two levels of analysis. The top-down level concerns the analysis of twenty-four media products produced and published between 2020 and 2021 with an ironic/humorous slant that deal with the topic of knowledge science as applied to the COVID-19 pandemic, vaccination, and the climate crisis, and disseminated by leading streaming platforms such as Netflix Italy, Amazon Prime Video and YouTube (Starri, 2021). They include: Sasha Baron Cohen's miniseries *Borat American Lockdown* and *Debunking Borat*, the film *Don't Look Up*, and selected videos of *Barbascura X* and *Cartoni Morti*.

Despite their heterogeneity, the abovementioned content was selected because they are mainstream products in the international and Italian media (particularly the first two) and popular in terms of user-generated content capable of reaching and influencing many viewers. (The second two are among the most famous Italian YouTubers of popular content.) The target audiences of the four products are in fact randomly or non-homogeneously present (Greco, 2008; Brundidge, 2010; Zuiderveen Borgesius et al., 2016; Gal et al., 2022), whether on mainstream streaming platforms or social media platforms.

To consider the variety of the expression, presence, and effectiveness of irony across platforms, the present study, in keeping with its exploratory nature, adopted as broad and diverse a multi-platform perspective as possible. The bottom-up level focuses on the analysis of a random sample of 2,200 comments extracted by the free Export comments software from the posts or videos of content relaunches on Facebook, Twitter, Instagram, and YouTube from the official profiles of: Baron Cohen, Netflix Italy, and the YouTube channels of *Barbascura X* and *Cartoni Morti*.

The aims of our research are: 1) to identify the experimental narrative frames/strategies, and; 2) to classify and analyse users' reactions

and comments, noting the degree of agreement/contrast and possible modes of resignification. Methodologically, the research relied on content analysis in previous studies (Berger, 1976; Berger, 1993; Hutcheon, 1994; Buijzen & Valkenburg, 2004; Juckel et al., 2016; Garmendia, 2018). The goal is to contribute to the theory of irony and humour studies as applied to digital science popularisation content. More specifically, we will consider the four categories identified by Berger (1976; 1993) for mechanisms of laughter: language, logic, identity, and action. This will be complemented by studies on television products (Buijzen & Valkenburg, 2004; Lieberman et al., 2009; Juckel et al., 2016). In addition, the social functions model of irony was applied to each content, which is defined by Hutcheon (1994) as follows:

Figure 1: The functions of irony (Hutcheon, 1994, p. 45)

The model proposes a non-hierarchical organisation of the functions historically recognised as irony in the field of semiotics. Thus, it represents a continuum, from bottom to top, of a more benevolent function in both tone and intention (reinforcing, complicating, ludic), a more critical intermediate zone (distancing, self-protective, provisional), and a more controversial zone in which irony becomes a strategy of provocation and polemic (oppositional, assailing, aggregative). The intensity of the affective charge involved in each level distinguishes the functions.

In the first level, the benevolent employment of irony has ambivalent implications. For instance, irony can be used to reinforce an argument, being perceived as emphatic or redundant. It can complicate communication, enriching the argument with ambiguities that can help clarify understanding or make it more tortuous. Finally, its ludic function may amuse or trivialise. In the second level, irony involves a distancing that also requires a greater affective charge on the part of the audience, either an opening of perspective or reduction to indifference. The self-protective function indicates the possibility of arrogant or strategic self-defence. The provisional function implies the ability to be changeable, thus demystifying or evasive. In the third level, the oppositional function expresses subversive or offensive contrast, the assailing function is directly satirical or destructive, and finally the aggregative function allows identification and membership or exclusion from discourse.

The further analysis of categories considers the presence of sources, tone of voice, visual elements (i.e. use of images, memes, emoji, collage), the types of structure of the narrative unit, the presence of testimonial, victim/target, and political criticism. We carried out a contextual qualitative-quantitative analysis of the comments considering the following: a) degree of agreement/understanding of the ironic content; b) presence of irony/humour devices; c) possible target of attack, and; d) manifested intentionality. The lexicometric analysis was integrated through R packages and the Iramuteq software, although the comment corpora are heterogeneous, cluster analysis returns the set of topics proposed by the users and consequently their proximity or remoteness from the content. This type of cross-analysis with qualitative analysis provides a deeper overview.

The coding phase was conducted by both authors separately, then discussed and shared, resolving ambiguities and excluding redundant categories. Adopting the Grounded theory approach (Strauss & Corbin, 1990, p. 9), we pursued the goal of building a theoretical explanation considering the action/interactions that give rise to phenomena and their consequences. The process of open coding was interpretive to break down data analytically and to investigate standard ways of thinking. Through a repeated comparison analysis, categories emerged "inductively from the corpus" on our two levels. We grouped the results into clusters, which can be traced back to the type of content and author, thus configuring four types of science dissemination linked to irony as a strategic resource.

Findings

Our analysis identifies four different narrative strategies of using irony: critical and civic activation, paroxysmal denunciation of the social system, satirical cartooning of the pandemic society, and pedagogical comedy.

The first strategy is provocative and assertive with the intention of inducing a reaction in the audience. It employs the grotesque, the awkwardness of surreal scenes, the use of specific objects, and rhetorical questions to emphasise the ironic message. Emphasis is never redundant but surreal to the point of complicating the content. This makes more evident the strategic use of irony as a signaller of the need to go beyond the commonplace. The critical capacity that is intended to be triggered is the possibility of a deeper understanding of the scientific content discussed in the media product. In fact, irony creates a distance that does not mock the protagonists or viewers but allows for a sense of temporary estrangement from the unfounded theory under discussion. The possibility of direct demystification (with an expert) or indirect demystification (by staging surreal assumptions) creates the margin of existence for doubt. This precedes understanding and becomes a tool for dissemination.

The second strategy is characterised by a paroxysmal denunciation of the social system. The use of parody combined with conceptual surprise overturns reality through the exaggeration of certain aspects. This

additional form of meaning approaches the absurd and allows irony to manifest itself concretely in mockery, in the use of irreverent responses to serious statements, and in the exaltation of ignorance. Its specific functions are self-protective, defensive, and self-deprecating, able to simultaneously combine scientific content and popular counter-narratives. Irony makes it possible to equalise this clash of perspectives and make its paradoxicality evident; it is both provisional – evasive and non-dogmatic – and oppositional – subversive and offensive.

The third strategy is related to a cartoonised dimension involving the critical use of stereotypes, marked repetition of visual or verbal elements, and a strong presence of sarcasm. The functions of this strategic form of irony are assailing, and thus corrective and satirical, and also oppositional because it is transgressive in its choice of conveying content sagaciously and in an unfiltered manner. In addition, irony has an exclusive aggregative function in that it induces group recognition at the expense of the group of those who do not wish to understand or reason. The intent, however, is not mockery, but to highlight and deconstruct criticality and contradictions of controversial viewpoints.

The fourth strategy expresses the mainly playful and reinforcing function of irony using metaphors, hyperbole and exaggeration, puns, double meanings, rhetorical questions, and buffoonish attitude. Elements such as eccentricity, peculiar face or music or sound or voice, black humour, self-deprecation and transformations of known idioms are useful in the pedagogical construction of irony as an aggregative and inclusive function. Indeed, the possibility of embracing multiple formal and informal levels of meaning by explicitly but good-naturedly poking fun at popular beliefs about science makes it possible to make disclosure accessible and acceptable to all.

To illustrate each strategy in-depth, the communicators and the media products to which they correspond will be presented in detail below. A further and necessary operational premise is the assumption that irony manifests itself in conjunction with other mechanisms of laughter and is therefore not present in a strictly exclusive manner, especially in the context of the multimodality of digital environments.

It is already possible to trace the propensity for ironic irreverence with Sasha Baron Cohen on Amazon Prime video. In addition to the artistic elements of his work, the British comedian has always expressed a distinct political commitment and stance, especially during the presidency of Donald Trump. The pushback against disinformation and ideas spread by extreme right-wing populist circles materialised on a large scale first with *Borat 2*, and afterwards with the miniseries. The latter provides a close look at the comedian's experience of the 2020 COVID lockdown as the character Borat living at Jim and Jerry's house. The two men are the epitome of Donald Trump supporters. They are homophobic and suspicious of any source of information outside of the QAnon website. Jim and Jerry are convinced, for example, that Hillary Clinton drinks the blood of children, that the corona virus was created in a laboratory, that the vaccine is used by governments to control us by injecting a microchip under the skin. In *Borat 2*, the relationship of Jim and Jerry and the offbeat protagonist sets the stage for the strangeness of the three characters and the initiation of the docile and unsuspecting Borat into conspiracy theories.

The desire to demonstrate the paradoxicality of Jim and Jerry's (post-factual) truths accelerates over the course of the series. In the episodes, they openly confront, for example, an expert in the field of microbiology or virology, and finally even Hilary Clinton herself. The awareness of being filmed and publicly exposed by the two citizens is as much a marker of irony as it is of a willingness to respect people by talking to them. The two citizens do not become the laughing stock of the show but a key to interpreting today's reality, which necessarily includes other readings related to contentious issues. Here it is possible to discern the reinforcing function of the use of irony using both distancing and ambiguity. This is exemplified by a further marker (Figure 2), which appears at the beginning of each episode, but is also evidenced by the sense of explanatory estrangement present in the direct debunking exchanges between the professionals and Jim and Jerry. The use of stereotypes and the absurd represent the attempt to activate a media co-construction of reality, not at the expense, but with the contribution of "typical conspiracists".

Figure 2: Initial Debunking Borat disclaimer

Turning to Netflix's *Don't Look Up*, the film can be credited with being the first to openly recount the climate crisis and its effects. The narrative is developed around a potentially more concrete and immediately comprehensible emergency, the deadly impact of a comet against planet earth. Many critical aspects and strengths of the film have been highlighted within the scientific community. On the one hand, the film echoes the opposition between science, right-wing populism, and lay people aping established stereotypes. On the other hand, it also expresses the objective and dramatic consequences of global inaction in tackling the climate crisis.

Now we take up the open question of the social efficacy of this representation (Little, 2022, see the contributions in the special monograph issue of *JCOM*), and explore the efficacy of what we have called the paroxysmal denunciation of the social model. The film employs the non-dogmatic and self-protective irony of individual characters. For instance, the irreverent doctoral student is frightened and irritated by the senselessness of the President of the United States and the media system. Resorting to a reversal of reality, this is characterised by the public as parody, grotesque, satire. The film makes use of the paradox with the technique of estrangement and aggression, announcing it with explicit markers. An example of this is provided Figure 3, in which the reference is to a payphone service aimed at providing peace of mind to the public, despite the certainty of the end of the world, in the name of a greater good: the supply of resources (in this case the minerals that compose the comet) are being exploited for the capitalist ends of the multi-billion-dollar private tech company called Bash.

Figure 3: Advertising the emergency service in *Don't Look Up*

Turning to our next example, *Cartoni Morti*'s YouTube channel provides a satirical cartooning of the pandemic society. Social functions of irony here are aggregative and subversive and are employed to criticise and also to encourage awareness. Each animated format proposes a didactic narrative drawing on multiple, often official sources (i.e. WHO, the Ministry of Health, scientific journals), with tone and gestures tailored to the characters.

The channel creators express political and social criticism with an explicitly cynical sarcasm, using parody of stereotypes, repetition, and a complex proposal of absurdity. An effective example of this strategy is the evocation of Mussolini's Fascist dictatorship in a medical and vaccination context in order to highlight the contradiction of the arguments concerning the Italian health dictatorship during the lockdown from March to May 2020. Mimicking the typical gestures of the populist minister Salvini, the central caricature of Mussolini is as reasonable and open to dialogue as Prime Minister Conte. A monologue to a packed and jubilant square culminates with the rephrasing of the famous Fascist motto "Win and we will win!" with "The watchword is heal and we will heal!" (3:24).

The last case is the pedagogical comedy *Barbascura X*. The content creator is himself a researcher with a PhD in organic chemistry. The innovative modality he proposes is the dissemination of "ugly science" on YouTube. All published scientific content is scrupulously researched, openly drawing on the cultural resources of both the researcher and the character *Barbascura X* has created for himself: a pirate of the unexplored and untamed land of science.

The mechanism of laughter merge in a didactic cultural mash-up whereby irony is reinforcing and demystifying, always supported by more than one source. Distinctive features are the use of swear words, fictitious characters, and the transformation of facts into memetic media culture. Emphasis is placed on informal/familiar tones, aimed at reaching as wide an audience as possible and being understood. This aim is also pursued in the constant explanatory commentary, accentuated in particular by the post-production work of the video, which is rich with transitions and sound, voice and visual effects.

In terms of comments, the heterogeneity of the social media platforms analysed make it possible to identify differences in the way audiences interact. The relaunch posts, published by Sasha Baron Cohen and Netflix Italia, show a high level of communication and exchange among users. Instagram and Facebook posts addressed both creators, while Twitter was only used by Sasha Baron Cohen. Although pertaining to different content – basically a cross-media form of irony in the posts (i.e. re-releasing excerpts of the film or miniseries, making hilarious meme jokes, and emphasising the need to question what one thinks one knows) – the first two social media platforms render a coherent understanding of the mechanisms of irony. The cognitive effort involved in decoding irony seems to be present in that there is an openness to confrontation. We found a plurality of levels of interpretation. A recurring object of debate in the comments where there was both poly-truth of opinions and a search for dialogue was the possible space for scientific truth.

The expression of the plurality of levels of interpretation restores the rhetorical effectiveness of irony, which can trigger collective circuits of reflection. In addition, the length and visibility of comments on Facebook and Instagram allow for conversations that are not necessarily polarised between heterogeneous audiences.

Although mediated by the platform, an exchange between users is an example of public conversations on the subject not necessarily directed toward the content producer or director, especially in the case of Netflix where it is not possible for users to link to a particular subject and there is less fandom than just a community of subscribers. What is significant is the explicit manifestation of reflection in the form of a

conversation regarding the meaning attributed to a media product. The irreverence and reversal of reality becomes the subject of discussion and not just of approval or disapproval.

The case of Twitter differs because elements of moralisation and polarisation are strongly present (for example, in defence of conspiracy theorists and anti-Semites). There is an evident and ambivalent hostility against "Rednecks", "Trumpists", and Hillary Clinton (called the "US government vampire"). Thus, on Twitter, irony becomes the pretext to vent social controversies and take sides in defence or in favour not only of the content but of its creator in both the American and international public spheres. Baron Cohen, as a celebrity who has exposed himself as a person, receives both direct endorsements – both on Twitter and Instagram – and political and anti-Semitic attacks, thus covering the distance from comedy idol to "dirty Jew".

The emergence of this individuality can also be seen in the case of the two YouTubers, *Cartoni Morti* and *Barbascura X* analysed in this paper. Although these only concern the Italian public, the discussion engaged in by users related to these videos reveals how the possibility of direct interaction with the creator allows users to become more active, asking questions, and requesting specific explanations. Users do not seem to be a community of followers, rather individual followers and disparate users who are reached by the popularity of the content, and take time to comment on it. Irony, therefore, does not seem to constitute an elitist boundary beyond which knowledge is placed, rather it becomes the expression of possible cognitive and collective entertainment. It is not only a stylistic feature of the creators' innovation, partly dictated by the engagement standards of the platform, but the key to transferring attractive and apparently simple understanding and knowledge. Users express open appreciation and esteem for the content (Figure 4 in red) and the creator (Figure 5 in light blue), both being considered shareable, ingenious, and effective in terms of style and message.

However, irony also represents a challenge that emerges from the presence of conceptual polarising dynamics. When the irony becomes more pungent, it is possible to detect fractures in its interpretation (Figure 4 in purple and green; Figure 5 in purple and red). Some users tend to adopt the ironic style, others reject the "unspoken" content that con-

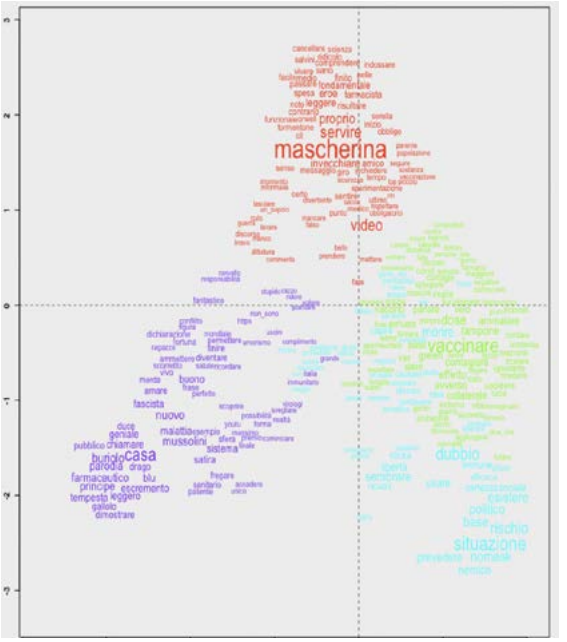

Figure 4: Cluster analysis of Cartoni Morti's comments

tradicts their own beliefs about vaccines, the health system, and social norms. This refusal can be traced back to the specific belonging of users to different "discursive communities", usually communities that are far from the origins of the proposed scientific content and defensive about confrontation. To the extent that irony is rejected and/or not understood, it seems to challenge belonging. And yet, in its non-clarity, it opens a small space for understanding the true meaning of the content. In fact, even just the expression of disapproval or the request for explanation via comment engages the user in a public conversation related to each video. This commentary serves to question what users interpreted through the cognitive filter of belonging, albeit in a limited and mediated way.

A further aspect concerns the dimension of doubt. As can be seen in Figures 4 and 5, it seems to mingle – especially as regards vaccines – with the positions of the detractors (in green and light blue in Figure 4; in red and green in Figure 5). Anyone can express a position of doubt

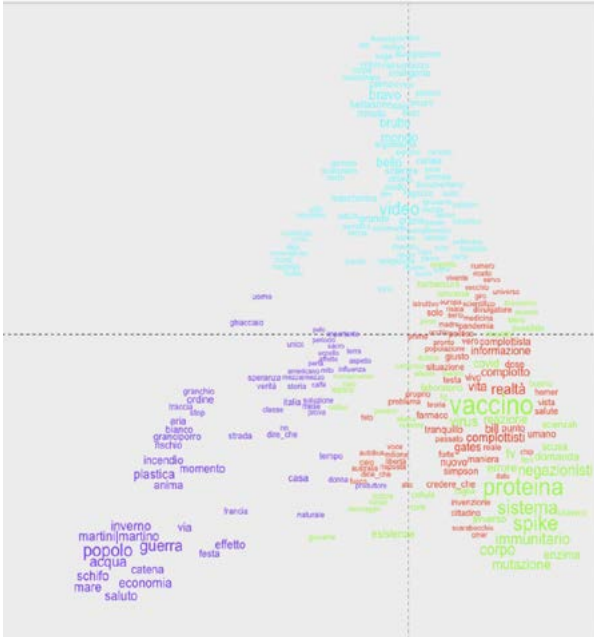

Figure 5: Cluster analysis of Barbascura X's comments

about the specific content and the way in which it is conveyed. Therefore, the irony of the media content can activate doubt in the user and this possibility creates the space to weaken or strengthen individual beliefs. It all depends on the quality of the exchange generated by sharing doubts and participating in the discussion in the comments section. The potential of doubt should be further investigated in order to gain a greater understanding of how much space it grants to the construction of collective knowledge.

Conclusion

In view of the findings presented in this paper, it is possible to conceive of irony as an applicative and revealing lens of inconsistencies in reality, and a gateway to understanding existing universes of meaning including those of the users. We believe that irony can constitute a dynamic practice of heterogeneous digital communities, of provocation and suggestion, which changes as social, cultural, historical, and media

references change. Since each individual belongs to several "discursive communities" (Hutcheon, 1994), irony and its markers concerning scientific communication on social media platforms can be considered a framework of personal references that combines from time to time with the network with which it is confronted. Those who post and write comments position themselves as active participants (Dubovi & Tabak, 2021) and trigger a process that create dialogical spaces of confrontation, open to the sharing of experiences and thoughts on science and the co-construction of knowledge by users.

Universes of meaning (Giddens, 1994) that individuals draw on also collide with the clash over content that irony represents (Garmendia, 2018). The complexity of ironic communication lies precisely in the composition of the following elements: the role of intention and attribution, and its contextual framing and markers. As noted by Linda Hutcheon (1994), the possibility of recognising irony lies in individuals' membership in multiple communities with a range of beliefs, ideologies, and unspoken notions, which are not limited to social status and gender, but concern what orbits the individuals' life universe on a daily basis. In this sense, the permeability of science popularisation is made possible by irony in a hybrid media context involving one-to-one exchanges.

The mechanisms of irony are structured as a discursive strategy that, like frames, places knowledge in a certain form. Frames can be seen as a kind of kaleidoscopic response to poly-truth by the content creators and producers analysed in the present study. Moreover, they are able to express social change and provocation by co-constructing knowledge.

One of the possible risks of irony concerns the perception of derision and exclusion which, for example, assailing and oppositional irony can arouse. However, the responsibility for the ambivalence with which irony is sometimes interpreted lies as much in the intention of the author of the content as in the confirmation biases of those who perceive themselves as being attacked either as a member of an out-group or a public minority (i.e. the case of the anti-vaxxers during COVID-19 pandemic). Irony is not a tool that makes comprehension impossible, but an analytical instrument that works on the transmission of content by requiring the effort of attention. Nevertheless, it leaves room for interpretation and thus doubt and hopefully discussion and the co-con-

struction of knowledge. Its rhetorical and non-exclusive effectiveness lies in its dialogical potential.

In the post-truth era, especially in digital environments, irony can draw out the critical dimension of an unexpressed need for social trust in a cohesive and unique interpretation of reality and scientific truths. This limit returns the problematic nature of a digital sphere composed of the complexity of individual users. Given the exploratory nature of this initial research, we believe further studies could include semi-structured interviews with both creators of content and their audiences regarding engagement and discursive intentionality. Furthermore, in order to define a meaningful pattern of dissemination in digital contexts, it would be important to map other experiences of expertise using irony, particularly as the evidence of its actual and potential use by institutional actors on social media platforms grows (i.e. Instagram and TikTok).

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