

Mimetic Representations of the COVID-19 Pandemic: An Analysis of Objectification, Anchoring, and Identification Processes in Coronavirus Memes

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This study examines meaning-making in and through coronavirus memes, as part of broader representations of the pandemic circulating online. It also aims to make a broader conceptual contribution by advancing a theory of mimetic representation that considers memes to be cultural meaning units and, building on social representations theory, proposes objectification, anchoring, and identification as their 3 main constitutive processes. A content analysis that focuses on these processes was conducted on a systematically generated sample of 1,544 memes posted on Reddit's r/CoronavirusMemes between January and May 2020. We found that the pandemic is objectified most often in terms of protective measures (e.g., quarantine, social distancing) and transmission (e.g., coughing, traveling when sick); that it is anchored in popular media themes, followed by geography, politics, and history; and that, in terms of identification, most memes portrayed the self and/or in-group. Although, over time, memes displayed more objectification and less identification, the ones that did make reference to in- and out-groups were more commented on. These results suggest that analyses guided by the theory of mimetic representation can shed light on the dynamic nature of meaning-making processes on social media and the importance of memes in terms of framing wider societal debates as well as creating new identities, online and offline.

Public Policy Relevance Statement

Making sense of the COVID-19 pandemic is challenging, due to the unprecedented nature of this event and its multiple personal, social, economic, and political implications. Yet, at the same time, the meanings we assign to the virus and to preventative measures around it have a significant impact on our daily life. Here, we analyze online memes about COVID-19 as a window into social thinking about the pandemic. This analysis helps us understand the range of meanings associated with the pandemic by social media users, the processes by which these meanings are created, their transformation over time, and their contribution to wider social representations and discourses of COVID-19.

Keywords: memes, social representations, COVID-19, Reddit, social media

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The COVID-19 pandemic and its impact—on a personal, social, economic, and political level—are unprecedented. Under these exceptional circumstances, making sense of the pandemic becomes

both imperative and challenging because of the lack of historical references. Yet, meaning-making processes are ongoing, in the case of both individuals and groups, and they have important consequences. The meanings we assign to the novel coronavirus and to the measures taken to contain it have a significant impact on mental health, resilience, and the likelihood of people respecting lockdown rules, among other areas of impact (see Milman et al., 2022; Yang, 2020). Perhaps now more than ever, given social distancing measures in place worldwide, much of this meaning-making happens online, where (mis)information and representations of the virus and its effects are produced, circulated and transformed in various forms, from articles to social media comments to infographics to videos to, significantly, memes. As we will argue here, coronavirus memes in particular offer us a unique window into social thinking about the pandemic, as they express a point of view, address others, and are meant to be spread and responded to. In summary, they both

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Table 1
Coding Frame

Objectification
Virus: Image or name of the virus; Same name; Virus origin: Man-made; Virus origin: Natural; Virus origin: China.
Protection and transmission: Protective equipment; Protective measures; Transmission and symptoms; Spread of the virus; Infected people.
Testing and treatment: Testing; Treatment.
Impact on everyday life: Changing habit; Changing appearances; Shopping and stockpiling; Socializing online; Family dynamic; Personal finances and work situation.
Other
Anchoring
General domains: Medicine; Politics; Economics; Religion; Geography; History; Psychology; News and celebrities; Popular media; Nature.
Specific issues: Gender; Ethnicity; Apocalypse; Other diseases; Recent past; The future; Vaccine debate and alternative treatments.
Other
Identification
Reference to in-group: Meme-makers and redditors; Making fun of oneself or one's group.
Reference to the out-group: Medical workers; Asian/Chinese people; People not respecting measure; Others (Viewed positively / Viewed negatively)
Other
Aim of the meme
Be funny
Social critique
Give advice
Give information: Potential misinformation; Parodied misinformation.
Be supportive
Other

construct and reflect “mimetic” representations of social realities (Nissenbaum & Shifman, 2018; Shifman, 2014).

With a significant body of work on the intersection between COVID-19 and social media emerging, early research has focused almost exclusively on social media’s informational role vis-à-vis the pandemic. For example, studies done in the Chinese context illustrated the significance of social media as a key source of situational information (Li et al., 2020), and paid attention to governmental strategies of using social media content to spread awareness about the virus (Chen et al., 2020). A significant research focus has been the sharing of mis- and disinformation about the disease (e.g., Kouzy et al., 2020; Nguyen & Catalan-Matamoros, 2020), noting the adverse effects of social media on prevention efforts and health outcomes (Tasnim et al., 2020). Further reflecting these negative effects, another key area of concern is the exacerbation of social divisions as a result of antagonistic social media discourse around COVID-19—in particular, fueling anti-Chinese sentiment (Budhwani & Sun, 2020) and deepening ageism and generational tensions (Meisner, 2021). However, with a few notable exceptions (e.g., see Abd-Alrazaq et al., 2020; large-scale global study of coronavirus-related topics on Twitter in February–March 2020), we know much less about the content of coronavirus representations circulated online and their role in meaning-making and in the social representation of this unprecedented moment.

The present article examines meaning-making processes embedded in coronavirus memes in an interdisciplinary manner, bringing together psychological theories of meaning and representation with communication research on the nature, structure and function of memes on social media. In particular, it advances a theory of mimetic representation (TMR) that positions memes as cultural meaning units constituted through the interrelated processes of

objectification, anchoring, and identification. Illustrating this approach in a timely empirical context, we examine coronavirus memes through a TMR lens, combining both quantitative and qualitative forms of analysis. The data were collected from a dedicated coronavirus memes community on the social media platform Reddit (r/CoronavirusMemes) between 23rd of January and 17th of May 2020—a data set that initially included 34,867 memes. A stratified random sampling procedure allowed us to create a subset of 1,544 memes, which formed the corpus for quantitative and qualitative content analysis. This theoretical and methodological approach allowed us to raise questions about (a) the range of meanings associated with the pandemic by social media users; (b) the processes by which these meanings are created; (c) their transformation over time; and (d) their contribution to wider social representations and discourses of COVID-19.

Meaning-Making and Mimetic Representations

Representations as cultural units of meaning are an important topic for psychologists, especially those working in the social and cultural tradition. From this perspective, attributing meaning to an event cannot be reduced to individual-level information processing (Lindsay & Norman, 2013) but requires social exchanges that are mediated by cultural signs and tools (Vygotsky, 1978). Typically, meanings are organized into narratives (Bruner, 1991) that help individuals and communities make sense of those people, things and events that are unexpected, unfamiliar, or create a rupture in their experience of the world (Zittoun, 2006). This makes socio-cultural theories of representation and meaning-making all the more relevant for understanding the current pandemic, given its deep unfamiliarity and the severe ruptures it has generated in the lives of millions of individuals around the world. In addition, by

Table 2
Inter-Coder Reliability Scores

Code	Matthews correlation coefficient	Frequency in double coded subsample (%)	Frequency overall (%)
Objectification			
Virus origin: Manmade	0.71	0.46	0.78
Virus origin: Natural	0.87	2.45	2.46
Virus origin: China	0.53	5.68	6.99
Protective equipment	0.69	12.27	12.82
Protective measures	0.57	27.30	25.00
Transmission and symptoms	0.45	7.52	8.87
Spread of virus	0.50	9.51	9.97
Infected people	0.42	6.14	8.42
Changing appearances	0.71	0.92	1.36
Shopping and stockpiling	0.76	6.75	10.23
Socializing online	0.66	1.84	1.36
Family dynamic	0.68	3.22	2.59
Testing	0.61	1.99	1.88
Treatment	0.74	6.90	5.51
Anchoring			
Religion	0.92	1.99	1.68
Geography	0.52	15.49	14.57
News and celebrities	0.57	5.68	5.57
Other diseases	0.88	6.56	5.25
The future	0.87	3.53	2.27
Sport	0.58	0.61	0.84
Communication	0.41	1.07	1.04
Art & culture	0.58	0.61	0.71
Death	0.50	0.77	1.04
Education	0.85	3.22	2.91
Identification			
Medical workers	0.66	1.84	1.55
Asian/Chinese people	0.47	4.45	6.93
People not respecting measures	0.53	3.99	4.79
Aims			
Give advice	0.45	3.99	4.47
Parodied misinformation	0.44	2.76	2.85

Note. +.70 or higher: very strong positive relationship; +.40 to +.69: strong positive relationship.

pointing to the role of culture, the approach followed here makes us sensitive to the fact that different people will use different resources to make sense of the same reality, and also the fact that 'internalizing' widespread meanings in society actively participates to their transformation (Valsiner, 2007).

Social representations theory (SRT) captures the interactive aspects of meaning-making within and between social groups

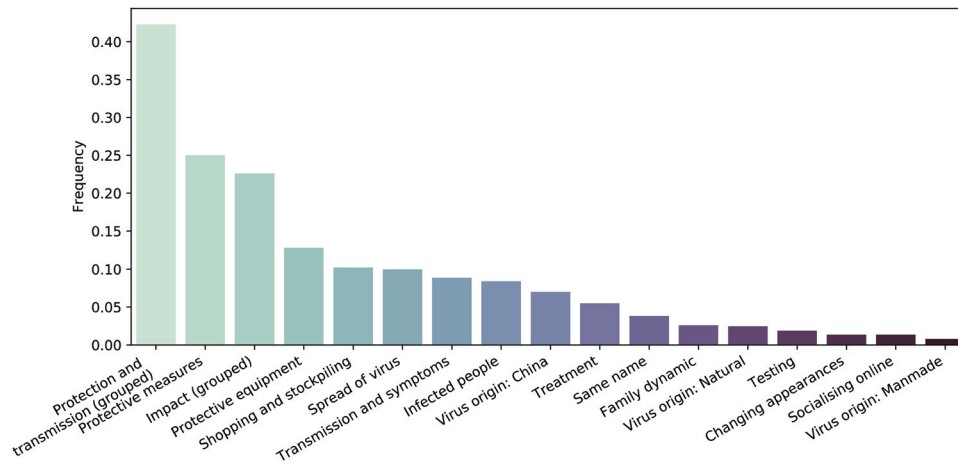
(Bauer & Gaskell, 2008; Jovchelovitch, 2007). As a theory of social knowledge, SRT is concerned with how representations are built and circulate within the public sphere. Social representations are, thus, clusters of meanings about new social objects and the way they 'travel' within society. According to Moscovici (1984), the processes leading to the formation of social representations are anchoring and objectification. The first one relates the new object

Table 3
Composite Scores That Achieved Acceptable Reliability Scores

Name	Mcc	Frequency subsample	Frequency overall	Group
Media	0.48	28.37	28.95	Social media, Popular media, Sport, Porn, News & celebrities
Ingroup	0.49	42.03	40.22	Reference to the ingroup, Meme makers and redditors, Self-humor
Impact	0.74	19.02	22.60	Impact on everyday life, Changing habits, Changing appearances, Shopping and stockpiling, Socializing online, Family dynamic, Personal finances and work
History	0.82	7.82	6.80	History, Other diseases
Protection & transmission	0.67	43.41	42.29	Protective equipment, Protective measures, Transmission and symptoms

Note. +.70 or higher: very strong positive relationship; +.40 to +.69: strong positive relationship.

Figure 1
Frequencies for Objectification



Note: See the online article for the color version of this figure.

to existing systems of meaning. In the case of COVID-19, the pandemic could be anchored in past diseases (e.g., SARS, Spanish flu, the plague) and its economic consequences likened to the Great Depression. The aim is to familiarize the unfamiliar in ways that make it understandable and easier to discuss or think about. The latter also requires the process of objectification which generates materialized depictions of the new social object. In the case of the pandemic, its name and image are examples of objectification; at the same time, growing a long beard or hair are objectifications of another aspect of the pandemic—sheltering-in-place at home.

As notable from this example, there can be multiple social representations of COVID-19 and each one of them includes a variety of meanings related to the different facets of the pandemic (e.g., origin of the virus, treatment, economic impact). Important from an SRT perspective, these meanings and the representations they contribute to reflect the concerns and interests of the groups that construct them and, as they “move” between groups through exchanges and communication, they mix and clash with other—sometimes competing—social representations. This dynamic is well illustrated by discussions about the pandemic on social media, including the creation and circulation of coronavirus memes, themselves products of both anchoring and objectification processes¹. In fact, as we discuss in the following, a growing body of research (e.g., Nissenbaum & Shifman, 2018; Shifman, 2014, 2019) has addressed the function of Internet memes as reflectors of wider representations, discourses and values circulating within society. Despite the fact that SRT has been suggested as a useful framework for media research (Höjjer, 2011), and occasionally used to study social media (e.g., Sarrica et al., 2018), there is little theoretical elaboration when it comes to the processes leading to mimetic representations. Our TMR builds on the SRT legacy of viewing representations as social and cultural constructions. Similar to social representations, it argues that memes are constituted through anchoring and objectification, but in addition, we stress that memes display various forms of identification that are crucial to their functioning (DeCook, 2018; Glăveanu et al., 2018), in allowing Internet users to connect meanings back to themselves

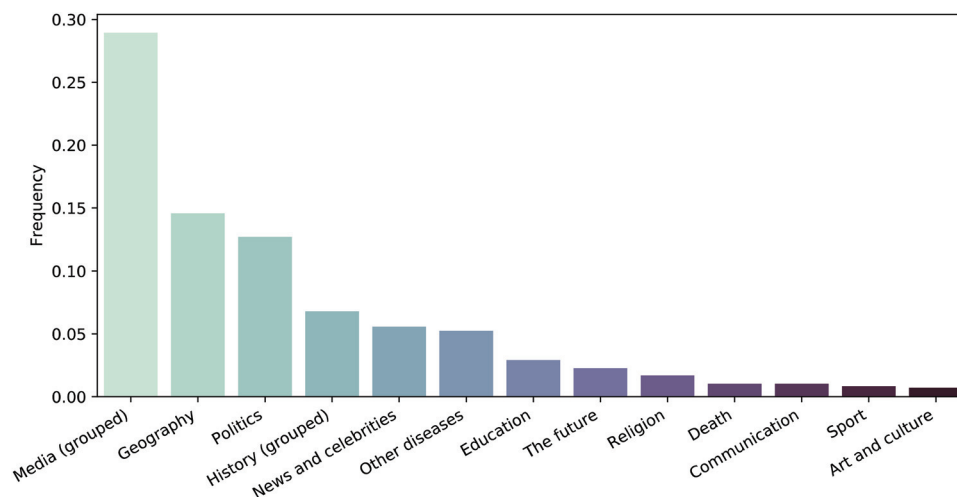
and to others. Indeed, as Dynel (2021) writes, memes rely on a set of nested and multimodal “voices,” and, as such, it becomes important to examine who is speaking about whom and in what terms. Traditionally in SRT, processes of identification are considered at the start of the research and used to segment the social field into groups that are then studied in terms of the content of their representations (i.e., resulting from anchoring and objectification, mainly). This is difficult to do in online environments, given that the identities of different online communities are much more fluid and layered; furthermore, it is methodologically unfeasible to accurately capture such self-identification processes in large-scale studies based on content analysis, like the present study, since personal information about individual online users and their particular self-identification is not available. Second, the current pandemic is a new social-biological phenomenon, and more time is needed to solidify the group projects concerning it (Sammur et al., 2015). Moreover, we aim here to advance SRT by pointing to the fact that identifications both preexist representations *and* are constituted through them. In the case of coronavirus memes, new social categories emerge that, as we will show later in the paper, depend on accumulated (mimetic) representation for their existence. Overall, the goal is to use an empirically rigorous methodological approach to illuminate how anchoring, objectification and identification operate in the construction and circulation of mimetic representations, within the context of the current COVID-19 pandemic.

The Functions of Memes Within and Beyond the COVID-19 Pandemic

Although memetic media can refer to a broad array of content and genres, Shifman (2014, p. 41) defines Internet memes as “(a) a

¹We should note, however, that for Moscovici the medium of communication was equally important as the source of the message in shaping its content; as such, while we can expect considerable overlap between social representations of COVID-19 circulating in society and in online spaces, each will also have elements of uniqueness due to their context.

Figure 2
Frequencies for Anchoring



Note: See the online article for the color version of this figure.

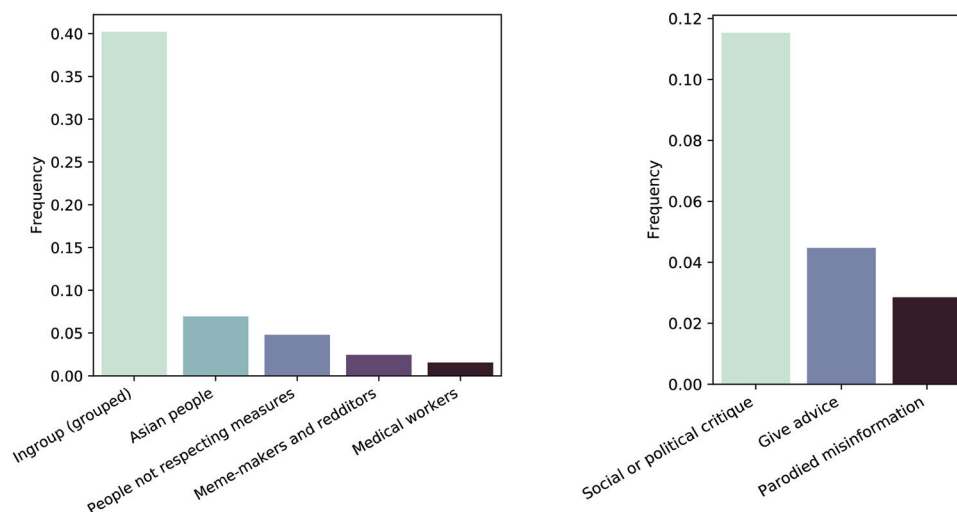
group of digital items sharing common characteristics of content, form, and/or stance, which (b) were created with awareness of each other, and (c) were circulated, imitated, and/or transformed via the Internet by many users.” As quintessential examples of everyday digital culture (Humphreys, 2018) and online creativity (Vásquez, 2019), memes reflect broader societal values (Humphreys, 2018; Shifman, 2019), and “both represent and construct social perceptions” (Nissenbaum & Shifman, 2018, p. 294). In this way, mimetic representations objectify and anchor meanings, and thus shape the circulation and transformation of social representations online.

Beyond just “visual-verbal jokes” (Dynel, 2016), memes—and even “digital memetic nonsense” (Katz & Shifman, 2017)—fulfill important emotional and psychological functions at both

the individual and collective level. Emotional resonance is vital to the personal- and social-level success of memes (Milner, 2016). In a cross-cultural study that addressed the emotional valence of global memes, Nissenbaum and Shifman (2018) found that, across cultural contexts, memes tend to skew toward the negative, with anger as a predominant anchoring sentiment and happiness often expressed ironically. Particularly relevant to the current pandemic context, memes have been shown to function as a humor-based coping mechanism (Bischetti, Canal & Bambini, 2021; Denisova, 2019; Flecha Ortiz, Santos Corrada, Lopez & Dones, 2021).

At the collective level, memes “facilitate communal arenas of affect-based discourse” (Nissenbaum & Shifman, 2018, p. 297) and are a significant vehicle for the construction or reinforcement

Figure 3
Frequencies for Identification (Left) and Aims of the Meme (Right)



Note: See the online article for the color version of this figure.

Table 4*Overlap Between Categories Using the Jaccard Similarity Coefficient*

	Virus origin: Manmade	Virus origin: Natural	Virus origin: China	Protective equipment	Protective measures	Transmission and symptoms	Spread of virus	Infected people	Changing appearances	Shopping and stockpiling	Socialising online	Family dynamic	Testing	Treatment	Politics	Geography	News and celebrities	Other diseases	Meme-makers and redditors	Asian/Chinese people	People not respecting measures	Social/political critique	Give advice	Sport	Education	Grouped media	Grouped ingroup	Grouped impact	Grouped history
Virus origin: China	0.07	0.15																											
Protective measures	0.00	0.01	0.02	0.08																									
Spread of virus	0.00	0.00	0.06	0.03	0.03	0.03																							
Infected people	0.00	0.00	0.03	0.01	0.03	0.07	0.07																						
Shopping stockpiling	0.00	0.00	0.00	0.07	0.05	0.02	0.00	0.01	0.00																				
Testing	0.00	0.00	0.01	0.00	0.01	0.01	0.02	0.05	0.00	0.00	0.00	0.00																	
Politics	0.02	0.00	0.07	0.03	0.11	0.03	0.09	0.08	0.00	0.01	0.01	0.01	0.04																
Geography	0.03	0.03	0.17	0.06	0.07	0.06	0.20	0.07	0.00	0.03	0.00	0.00	0.02	0.03															
Other diseases	0.00	0.03	0.05	0.03	0.01	0.02	0.06	0.05	0.00	0.00	0.00	0.01	0.03	0.00	0.01	0.06	0.04												
Medical workers	0.00	0.02	0.02	0.02	0.01	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.06	0.07	0.01	0.01	0.02	0.01	0.00										
Asian/Chinese people	0.04	0.10	0.30	0.05	0.02	0.10	0.04	0.03	0.00	0.02	0.01	0.01	0.02	0.02	0.07	0.13	0.01	0.03	0.01	0.02									
Not respecting measures	0.00	0.01	0.01	0.03	0.09	0.06	0.03	0.10	0.00	0.00	0.00	0.02	0.01	0.00	0.04	0.05	0.01	0.01	0.00	0.00	0.02								
Social/political critique	0.01	0.01	0.04	0.04	0.11	0.02	0.09	0.07	0.00	0.04	0.01	0.02	0.06	0.06	0.37	0.11	0.06	0.02	0.00	0.04	0.09	0.02							
Give advice	0.00	0.00	0.01	0.04	0.12	0.03	0.01	0.00	0.02	0.02	0.01	0.01	0.00	0.00	0.02	0.02	0.01	0.00	0.00	0.00	0.08	0.02	0.02						
Parodied misinformation	0.06	0.03	0.05	0.01	0.01	0.01	0.01	0.02	0.00	0.02	0.00	0.01	0.00	0.00	0.05	0.02	0.04	0.01	0.00	0.04	0.02	0.02	0.02						
Grouped media	0.01	0.03	0.06	0.07	0.15	0.04	0.09	0.08	0.01	0.05	0.01	0.01	0.01	0.04	0.07	0.09	0.04	0.04	0.06	0.04	0.03	0.05	0.04						
Grouped ingroup	0.00	0.01	0.04	0.11	0.22	0.11	0.06	0.07	0.03	0.09	0.02	0.04	0.03	0.06	0.05	0.07	0.04	0.03	0.03	0.02	0.04	0.04	0.04	0.01					
Grouped impact	0.00	0.00	0.01	0.07	0.15	0.03	0.01	0.02					0.00	0.01	0.04	0.04	0.02	0.01	0.01	0.02	0.01	0.06	0.04	0.01	0.07				
Grouped history	0.00	0.03	0.05	0.03	0.03	0.02	0.07	0.04	0.01	0.01	0.00	0.01	0.02	0.01	0.02	0.07	0.04	0.00	0.04	0.02	0.02	0.02	0.01	0.01	0.05	0.04	0.02		
Grouped protection and transmission	0.00	0.00	0.04				0.03	0.04	0.02	0.06	0.01	0.02	0.01	0.03	0.10	0.10	0.03	0.02	0.02	0.06	0.08	0.09	0.08	0.01	0.03	0.17	0.32	0.15	0.03

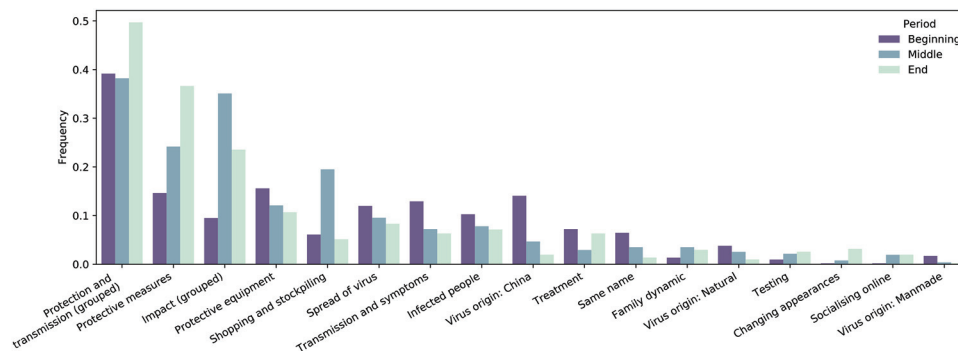
Note. +.70 or higher: very strong positive relationship; +.40 to +.69: strong positive relationship.

of collective identity (Literat & van den Berg, 2019), though not always in a positive sense (see, e.g., DeCook, 2018). Importantly, memes produce in-groups and out-groups (MacDonald, 2021), which can simultaneously strengthen communities in meaningful ways and create exclusionary environments that can verge on toxicity (Literat & van den Berg, 2019). A growing body of research is also documenting the significant political functions of memes—though, again, these include both more empowering, productive political uses of memes (e.g., in activist or dissident contexts, see Moreno-Almeida, 2021), and more toxic, disparaging, often racist or sexist, uses (Tuters & Hagen, 2020). Humor is a quintessential aspect of memes (Dynel, 2016) and helps facilitate these processes of identification and inclusion/exclusion: for instance, research has shown how meme-based humor reveals insider and outsider

perspectives (Dynel & Messerli, 2020) and fosters a sense of solidarity among members of online communities (Dynel, 2021). The fact that memes contribute to the creation and maintenance of communities online further demonstrates their resemblance to social representations and their contribution to building community identities (Howarth, 2011).

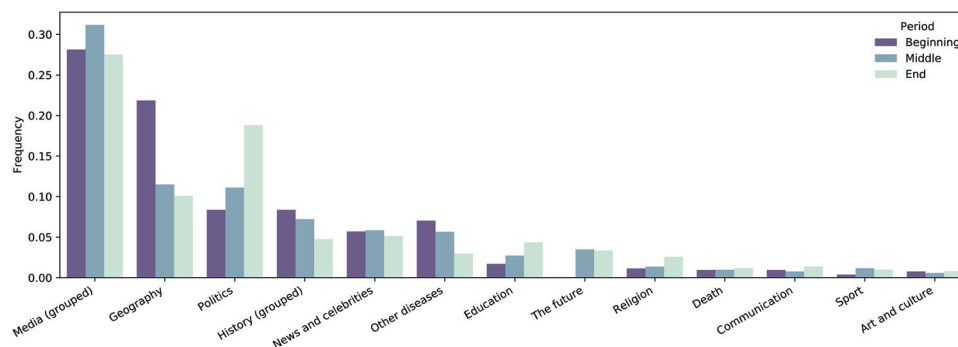
The global COVID-19 pandemic has seen a proliferation of meme activity (see, e.g., Barnes et al., 2021; Blair, 2020); indeed, memes have functioned as important cultural resources in the context of previous health emergencies as well, such as the Ebola epidemic (see Marcus & Singer, 2017). Although memes “often focus on the everyday [and] the absurd,” coronavirus memes are especially suited for exploring “the everyday absurd” (MacDonald, 2021). Within the COVID-19 context, early studies have

Figure 4
Temporal Distribution of Objectification Codes



Note. See the online article for the color version of this figure.

Figure 5
Temporal Distribution of Anchoring Codes



Note. See the online article for the color version of this figure.

explored memes as a form of coping and connection. Based on a study of Black Twitter, [Outley et al. \(2021\)](#) found that Twitter users' expressions of humor, including memes, during the pandemic "serve as a form of resistance to injustices and inequalities, while simultaneously adopting coping strategies to reclaim power and control" (n.p.); in doing so, they help establish and foster both individual and collective identity. [MacDonald's \(2021\)](#) research similarly found COVID-19 memes to have a strong collective dimension, enabling generations to find common ground in "sites of trauma" from their own childhoods as reference points for making sense of the current pandemic. Research in an Italian context is finding that, among all types of COVID-19 humor, memes were perceived as the funniest ([Bischetti et al., 2021](#)); at the same time, a small-scale preliminary research study ([Mohamad, 2020](#)) problematizes the impact of humorous COVID-19 memes, noting that humor may undersell the gravity of the situation and therefore decrease the perceived risk.

In this complex context, we need to examine further the ways in which mimetic representations contribute to individual and collective processes of meaning-making about the pandemic. In this study, following TMR and focusing on coronavirus memes from a dedicated Reddit community, we were guided by the following

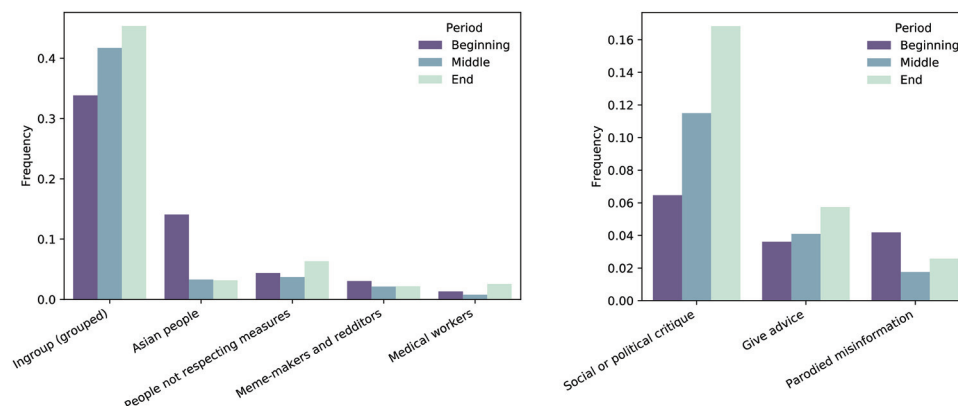
research questions: (1) What kinds of anchoring, objectification and identification processes are showcased within coronavirus memes? (2) What patterns of meaning emerge from the association between these three key processes? (3) How do these processes and patterns vary across time? (4) Which of these processes helps a meme become more "successful" online in terms of scores and user comments?

Method

Data Collection and Sampling

Launched in 2005, Reddit is a social network centered around posting news, links, images, discussion topics and more, which are discussed and upvoted or downvoted by other members of the site. Reddit is made up of more than a million communities known as "subreddits" covering different topics. One such community is the CoronavirusMemes subreddit (denoted as r/CoronavirusMemes), which was created on January 22, 2020, with the stated aim of "[g]etting a laugh out of the Coronavirus while we still can, and spreading happiness in a time of distress." At the time of writing, r/CoronavirusMemes had 93,686 members (i.e., subscribers),

Figure 6
Temporal Distribution of Identification (Left) and Aims (Right) Codes



Note. See the online article for the color version of this figure.

Table 5

Comparison of the M Publication Dates for Memes With and Without a Specific Code⁶

Code	N of days since the first post		
	Mean date with code	Mean date without code	Delta mean days
Virus origin: China	33.93	55.20	-21.27***
Asian / Chinese people	34.91	55.12	-20.21***
Same name	39.10	54.30	-15.20***
Transmission and symptoms	45.55	54.51	-8.96***
Geography	46.19	55.00	-8.81***
Social / political critique	64.35	52.33	12.02***
Protective measures	61.70	51.05	10.65***
Politics	62.66	52.41	10.25***
Impact	58.66	52.27	6.39***
Protection and transmission	56.48	51.69	4.79***

Note. The mean dates are calculated by averaging the number of days when a meme was submitted since the creation of the subreddit. This simplified the statistical testing, compared to using the categorical variable “period”, and allowed us to greatly reduce the number of tests to run. This decreases the risk of false positives, but does slightly increase the risk of false negatives. Corrected *p* values.

* *p* < .05. ** *p* < .01. *** *p* < .001.

although all content posted on the subreddit is visible to any online visitor, including those without Reddit accounts.

The initial data set, downloaded by using the Reddit API and Python, included all the memes posted on r/CoronavirusMemes between 23rd of January and 17th of May 2020, when the number of posts had stabilized at a lower value for 2 weeks in a row (less than 15% of the peak; see Section A), which amounted to 34,867 artifacts. For technical and analytical reasons, this included only images, while a minority of memes in the subreddit took the form of videos and gifs. The data collection period has been chosen to cover roughly the time between the imposition of lockdown or social distancing measures in most countries to the time when the measures started relaxing worldwide; given the international nature of the subreddit, it was not feasible to follow exact lockdown imposition or lifting dates for any specific country. After collecting the memes, we split them into three time periods, according to the amount of activity in the community: the first period, from January 23rd to March 9th, saw a slow increase of activity on the subreddit from about 100 memes a week to more than 1,000; the second period, until March 23rd, saw the community suddenly become very popular, with about 4,000 memes posted a week; finally, during the last the posts trickled down, from about 2,500 posts a week to 600.

The data was also split into four categories, depending on how successful a meme was. We separated the memes according to the

number of upvotes they obtained, in proportion to the number of upvotes awarded that week (in order to account for the fact that the popularity of the subreddit varied from week to week). In doing so, we decided to overrepresent successful memes: unsuccessful memes are numerous—more than half of the memes posted received less than 10 upvotes—and often difficult to understand. More fundamentally, their lack of success means that they resonated less with the community, and are thus less relevant to study in terms of widespread mimetic representations. As a result, we grouped memes falling in the following percentiles: 0 to 49, 50 to 74, 75 to 94, and more than 95.

The data sample used for content analysis was then randomly selected with Python to equally represent each time period and category of success, to avoid having samples dominated by low-ranking memes posted during the very active middle period. In total, 276 memes were selected for the first phase (developing the coding frame, see details below), and 1,560 for the final samples (16 memes were later removed either because they were found unrelated to COVID-19 or could not be understood by the coders).

Coding Process

The coding frame was derived from a first round of thematic coding by the three authors. Guided by the TMR categories of anchoring, objectification and identification (i.e., of in- and out-groups) derived from SRT and from research on the function of memes, the three coders analyzed qualitatively three data sets, totaling 276 memes, with a 50% overlap (created using the sampling criteria above), a number considered sufficient to reach thematic saturation. The initial coding frame was then refined through discussion of the categories, with a view toward achieving a good balance between specificity and generality. In this sense, the final coding frame was primarily data-driven, with consideration for the theoretical grouping of categories. Table 1 includes the organization of codes. The coding frame is included as Section B in the [online supplemental materials](#).

Either none or multiple categories could be selected from the main groups of codes (Objectification, Anchoring, Identification, Aim). To provide an example, a health care policy supported by Democrat or Republican officials in the United States would be coded as Protection and transmission → Protective measures under Objectification (especially if the policy in question involves a lockdown measure) and as Politics under Anchoring, given the ‘source’ of the measure (i.e., a politician or political group). Depending on who is addressed in the meme, references can be made to the in-group (e.g., talking about the effects of the measures on people like “you”) or the out-group (e.g., about the politicians in question) and the ‘aim’ of the meme might be to criticize

Table 6

Average Proportion of Weekly Upvotes for the Memes With and Without a Given Code

Code	Average score (in proportion to number of upvotes that week)			
	Mean score with code	Mean score without code	p-value	Corrected p-value
Meme makers and redditors	0.031	0.01	<.001	<.001

Note. The mean dates are calculated by averaging the number of days when a meme was submitted since the creation of the subreddit. This simplified the statistical testing, compared to using the categorical variable “period”, and allowed us to greatly reduce the number of tests to run. This decreases the risk of false positives, but does slightly increase the risk of false negatives. Corrected *p* values.

Table 7*Average Proportion of Weekly Comments for the Memes With and Without a Given Code*

Code	Average comments (in proportion to that week)			
	Mean score with code	Mean score without code	<i>p</i> value	Corrected <i>p</i> value
Politics	0.02	0.01	<.001	<.001
Meme makers and redditors	0.032	0.01	<.001	<.001
Social / political critique	0.018	0.01	0.001	0.035

Note. The mean dates are calculated by averaging the number of days when a meme was submitted since the creation of the subreddit. This simplified the statistical testing, compared to using the categorical variable “period”, and allowed us to greatly reduce the number of tests to run. This decreases the risk of false positives, but does slightly increase the risk of false negatives. Corrected *p* values.

or make fun of the politicians or the health care measure itself. Coders were advised to take the title of the meme into account when coding and also to code conservatively, opting to record instances that were visibly present in the meme instead of relying on overinterpretation.

The coding of the data was facilitated by an app created by Constance de Saint Laurent (see Section C in the [online supplemental materials](#)) in order to ease the activity of four coders—namely the second and third author, plus two other coders trained for the task—for a total of 1544 memes out of which 1224 were coded by a single coder and 320, or 20.73% of the data, by two coders (in order to assess intercoder reliability). The coding overlaps between any two coders are best understood following a concrete example: coder A coded 466 memes, out of which 306 were coded only by coder A and 53 were also coded by coder B, 54 by coder C and 53 by coder D. The overall Matthews Correlation Coefficient for intercoder reliability was .66, with individual coder scores being .68, .66, .61 and .67, respectively. This kind of content analysis (Bauer, 2000) is based on identifying the different categories and subcategories as present (or, when not selected, absent) in the meme and depends on achieving good intercoder reliability scores for its validity. In this research we used the Matthews Correlation Coefficient in order to calculate this kind of reliability, as it is a more robust test of intercoder reliability than other alternative scores, such as Cohen’s Kappa and Krippendorff’s Alpha (Delgado & Tibau, 2019; Zhao et al., 2018). The scores for codes that reached an acceptable level are included in Table 2 below. A few code groupings also revealed composite categories with acceptable reliability (Table 3), whereas others (e.g., death) were proposed by the coders in the comments’ boxes in the app and are included below if they reached sufficient agreement between the coders². The analysis of open-ended codes and intercoder reliability scores was all done in Python, using the package sklearn. Only the simple and composite codes that reached sufficient agreement were submitted to analysis.

Quantitative Data Analysis

The data were then analyzed in three steps. First, we compared the time evolution for each code or composite code that reached a sufficient level of agreement (looking at the posting date for memes with and without the code), as well as how many comments and upvotes they obtained (compared to other memes) using the t-tests and corrections for multiple testing provided by the package statmodels in Python. Second, we calculated how many codes per category each meme was coded for (e.g., how many

types of objectifications had been found by the coders for a given meme) and compared, using the same procedures as mentioned earlier, memes with 0 or 1 codes in a category with those with 2 or more. Finally, we examined the correlations between the codes, using the Jaccard package in R to calculate their Jaccard Similarity Coefficients.

Findings

Figures 1, 2 and 3 show the frequency of codes for the main categories under study. We can see, for instance, that the most common objectification marker present in mimetic representations was the composite category of coronavirus protection and transmission and, part of this composite code, the second most common category was that of protective measures. Other common objectifications were, in order: impact of the virus (composite category), protective measures, shopping and stockpiling, spread of the virus, transmission of symptoms, and infected people. Comparatively, fewer memes addressed the origin of the virus, treatment, family dynamic, testing, changing appearances and socializing online.

In terms of anchoring, the most common category was media, which is a composite category including references to social media, popular media, sport, porn, news and celebrities. It was followed by references to geography, politics, history, news and celebrities, and other diseases. Comparatively, fewer memes were anchored in the domain of education, the future, religion, death, communication, sport, and art and culture.

When it comes to identification or in-group and out-group dynamic, the in-group was referenced most, which means that memes often addressed people or groups that viewers could identify with. Lower frequencies were achieved, in order, by Asians, people not respecting measures, meme-makers and redditors, and medical workers.

Finally, in terms of the aims of the meme the most frequent was political critique, namely memes that were critical of society and politics,

² The codes that failed to reach a sufficient are: Image or name of the virus, Changing habit, Personal finances and work situation, Medicine, Economics, History, Psychology, Popular media, Nature, Gender, Ethnicity, Apocalypse, Recent past, Vaccine debate and alternative treatments, Making fun of oneself or one’s group, Others (Viewed positively / Viewed negatively), Be funny, Potential misinformation, Be supportive. Most of these codes were either too rare in the dataset (e.g., gender or ethnicity) or on the contrary so pervasive that coders found it difficult to know when to code for them (e.g., image or name of the virus, be funny).

Table 8*Comparison of the M Publication Dates for Memes Coded More Than Twice or Once and Less in a Category*

Code	N of days since first post			
	Mean date for memes coded once or less	Mean date for memes coded twice or more	p value	Corrected p value
Objectification	51.294	55.507	0.001	0.004
Identification	54.134	39.733	<0.001	<0.001

Note. The mean dates are calculated by averaging the number of days when a meme was submitted since the creation of the subreddit. This simplified the statistical testing, compared to using the categorical variable “period”, and allowed us to greatly reduce the number of tests to run. This decreases the risk of false positives, but does slightly increase the risk of false negatives. Corrected *p* values.

then giving advice and, finally, memes that parodied misinformation. Examples of each one of these codes, highly rated by users, can be found in Section D (in the [online supplemental materials](#)).

A second point of interest was the correlations between these categories and, thus, the patterns of meaning emerging from the dataset. As noted under analytical procedures, we used for this purpose the Jaccard Similarity Coefficient (JSC). The results can be found in [Table 4](#)³, in which all significant scores are in bold ($p < .001$ ⁴). This coefficient gives an indication of how much the distributions of two codes overlap, and it is better suited to compare binary variables than Pearson’s correlation coefficient.

A JSC can be interpreted as a percentage: it represents, of all the times either code occurred, how frequently they occurred together. Thus, a JSC of 0 means that the codes never occurred together, while a score of 1 means that they systematically occurred together. Significance is tested by comparing the JSC with what would happen at random. Hence, very low or high coefficients are not necessarily significant if both codes are either quite rare, or on the contrary very frequent. For instance, the intersection between the codes “Virus Origin: Man-Made” and “Same Name” shows that the codes never occurred together (JSC = 0). Yet, because both are quite infrequent in the data, the JSC is not significant: it could have happened at random. In contrast, the codes “Virus Origin: China” and “Impact” occurred together 1% of the times one of them was present (JSC = .01). In this case, however, both codes were quite frequent in our sample, it is thus more than 99.9% likely that this did not happen at random: memes that referred to one of these themes tended to not refer to the other, and there is thus a dissociation. This interpretation of the JSC is reversed for associations: memes that mentioned the “In-group” or “Protective equipment” referred to both in 11% of the cases (JSC = .11), yet because these codes were quite frequent in the data, this correlation is not significant. The intersection between “Geography” and “Social/Political Critique” yielded a similar result (JSC = .11), but their scarcity in the data makes this association significant, meaning that memes that referred to geography tended to also refer to a social or political critique, and vice-versa. In [Table 4](#), JSC that are significantly higher than what would be expected at random are in light gray, while those that are lower are in dark gray (blackened out cells correspond to the relation between categories and composite codes that include them). In more simple terms, light gray cells indicate significant associations between codes, and dark gray cells indicate significant dissociations.

From this table, we can notice the categories that have more than 10% occurrences in common⁵. In order of strength of the

association: politics & sociopolitical critique (JSC = .37); protection and transmission & in-group identification (JSC = .32); Asian/Chinese people & virus origin: China (JSC = .30); impact & in-group identification (JSC = .25); protective measures & in-group identification (JSC = .22); geography & spread of the virus (JSC = .20); geography & virus origin: China (JSC = .17); virus origin: natural & virus origin: China (JSC = .15); education & socializing online (JSC = .14); education & family dynamic (JSC = .13); geography & sociopolitical critique (JSC = .13); treatment & parodied misinformation (JSC = .13); politics & geography (JSC = .13); geography & Asian/Chinese people (JSC = .13); protective measures & give advice (JSC = .12); transmission and symptoms & in-group identification (JSC = .11); transmission and symptoms & Asian/Chinese people (JSC = .10); Asian/Chinese people & virus origin: natural (JSC = .10). This kind of analysis also shows codes that, although at random should overlap to an extent, in our data set almost never do (1% or less of overlap). These are Virus origin: Natural & In-group identification (JSC = .01); Virus origin: Natural & Protection and Transmission (JSC = .00); Virus Origin: China & Impact (JSC = .01); Protective equipment & infected people (JSC = .01); Protective measures & other diseases (JSC = .01); Spread of the virus & Shopping and stockpiling (JSC = .00); Spread of the virus & Impact (JSC = .01); Shopping and stockpiling & Politics (JSC = .01); Treatment & Impact (JSC = .01); Other diseases & Impact (JSC = .00).

Given that dynamic nature of the situation over the duration of the pandemic, it was expected that its mimetic representation would change across time—a change reflected in the distribution of objectifications, forms of anchoring, identifications, and aims over the three time periods outlined in *Analytical Procedure*, and presented in [Figures 4 to 6](#). To test for the significance of these evolutions across time, we compared the mean date at which a meme referring to a code was posted to the mean date of posting for memes that did not refer to that code with a *t* test and a Holm-Sidak correction for multiple testing. The results are presented in [Table 5](#) and can be understood as follows: memes mentioning China as the place where the virus originated were posted, on

³ All the table of results include only the rows with significant results, for simplification.

⁴ The package Jaccard in R does not provide more precise results, thus a correction for multiple testing could not be applied. As a result, we decided to instead keep only the values below the minimal value outputted by R, namely .001.

⁵ Given that we could not apply a correction for multiple testing, we also decided to consider only the categories where the effect was particularly high or low (>10% for association, <1% for dissociation).

Table 9*Average Proportion of Weekly Upvotes and Comments for Memes Coded More than Twice or Once and Less in a Category*

Code	Average score (in proportion to number of upvotes that week)				Average comments (in proportion to that week)			
	Mean for memes coded once or less	Mean for memes coded twice or more	<i>p</i> -value	Corrected <i>p</i> -value	Mean for memes coded once or less	Mean for memes coded twice or more	<i>p</i> value	Corrected <i>p</i> value
Identification	0.01	0.03	0.0	0.0	0.01	0.032	<.001	<.001

Note. The mean dates are calculated by averaging the number of days when a meme was submitted since the creation of the subreddit. This simplified the statistical testing, compared to using the categorical variable “period”, and allowed us to greatly reduce the number of tests to run. This decreases the risk of false positives, but does slightly increase the risk of false negatives. Corrected *p* values.

average, 21.27 days before those who did not. By contrast, memes including a social or political critique were posted on average 12.02 days after those who did not. Only the results that proved significant are included in Table 5.

We also examined if certain categories made mimetic representations more successful online, in terms of upvotes and comments. In order to account for the fact that some weeks saw a much higher level of activity on the subreddit in terms of both upvotes and comments, we calculated the percentage of upvotes and comments captured by a meme for a given week. For instance, we computed the total number of upvotes and comments for Week 1, and calculated what percentage of these were allocated to each meme that week. We then compared the proportions associated with memes within a category and those outside of it with a *t* test and a Holm-Sidak correction for multiple testing. The significant results are presented in Tables 6 and 7.

Finally, we looked at the number of times memes were coded in each of our main categories: anchoring, objectification, identification, and aims. We then compared whether these patterns evolved in time and affected success; for the latter, we compared the dates, scores, and number of comments of memes coded one time or less within a category with those coded twice or more, using the same procedures as detailed earlier. The results are presented in Tables 8 and 9.

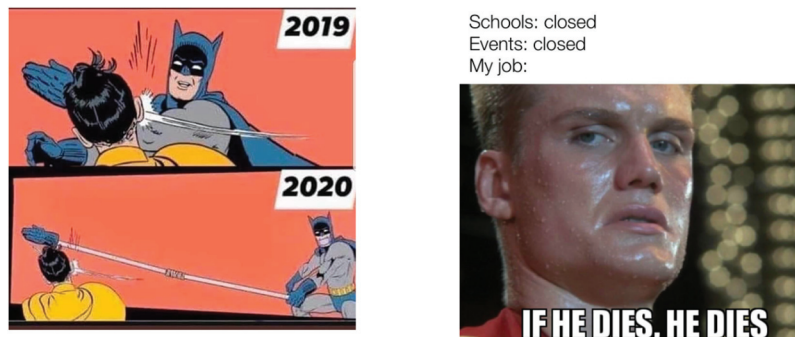
Discussion

The present study explores meaning-making and the construction of mimetic representations of the pandemic through an examination of coronavirus memes. Guided by the TMR, it examined (a) objectification, anchoring, and identification processes; (b) their association within patterns of meaning; (c) their distribution across time; and (d) their contribution to a meme’s success.

When it comes to objectification, we noticed that protection measures and the transmission of the virus were the themes most often depicted in memes. This is a grouped code that includes references to protective equipment (e.g., masks), protective measures (e.g., social distancing), transmission (e.g., via coughing), and symptoms (e.g., having a fever). Understandably, these elements are often featured in memes as a way of materializing or objectifying the virus, its biological basis and the health measures taken to fight it (Figure 7). The second most frequent category was again a composite one, impact, including impact on everyday life, changing habits, changing appearances, shopping and stockpiling, socializing online, family dynamic, and personal finances and work. This concerns the consequences of COVID-19 at a personal, social, educational, and economic level, above and beyond its biological impact (Figure 7). It is, ultimately, expected for an object of representation that is basically invisible to be materialized in images and discourse through its implications and impact on individuals and society (for the

Figure 7

Memos Displaying Protective Measures (Left) and Impact Objectifications (Right)



Note. See the online article for the color version of this figure.

Figure 8*Memes Displaying Popular Media (Left) and Political Anchoring (Right)*

For the average American the best way to tell if you have covid-19 is to cough in a rich person's face and wait for their test results

8:35 AM · 3/20/20 · Twitter for iPhone

Note. See the online article for the color version of this figure.

example of democracy as an object of representation, see Moodie, Markova & Plichtova, 1995).

Anchoring offers us further details about meaning-making processes by indicating with areas of social life, general or specific, the new social object is related to in order to become more familiar. In this case, the group category media was predominant, including references to social media, popular media, sport, porn, news and celebrities. In a way, this is predictable, given the fact that memes are both part of popular culture and use it as a key resource (see, for instance, the creation and circulation on image macros; Dynel, 2016). On the other hand, it is interesting that everything from the biological and medical to the social and political dimensions of COVID-19 could be so easily anchored in existing references to popular media, news and celebrities (Figure 8) – a testament to the visual and linguistic creativity of online communities (Vásquez, 2019). Geography and politics were the other two common forms of anchoring. Geography makes sense in this context given the global spread of the virus and different country comparisons circulating in the media. Politics is more noteworthy because it shows how measures taken to address a pandemic are, from the start, politicized (Figure 8); in addition, the medium of memes is also

particularly fruitful for social and political critique (Moreno-Almeida, 2021).

Identification was added in TMR, above and beyond SRT, in order to capture the in- and out-group dynamic—fundamental to the inner workings of memes (Literat & van den Berg, 2019; MacDonald, 2021)—that contributes to the creation and circulation of both social and mimetic representations. Ultimately, social representations are meaning structures that build group identities and communicate them to others. Coronavirus memes contained considerable number of references to the self or one's in-group, demonstrating that memes about COVID-19 not only try to construct an understanding of it, but to relate this understanding to the self, to involve the viewer and make the reality of the pandemic 'personal' (Figure 9). The most common out-groups referred to are Asians and people not respecting measures, two categories that often overlap (Figure 9). These references are a way of putting symbolic distance between the self and people associated with the origin of the virus or that contribute to its spread. The danger, certainly, is to foster bigoted discourses that otherize people of Asian descent (Schild et al., 2021).

It is important, in this context, to reflect on emerging meaning patterns captured by the association between different codes. Some

Figure 9*Memes Displaying In-Group (Left) and Out-Group/Asian People Identifications (Right)*

*Gets flu symptoms

normal people: guess I'll stay home

chinese people:



Note. See the online article for the color version of this figure.

Figure 10
Memes Displaying New Coronavirus Identities



Note. See the online article for the color version of this figure.

of these associations were expected, for instance, those between politics and sociopolitical critique, Asian/Chinese people and China as the origin of the virus, geography and spread of the virus, and so forth. Other associations, however, are informative about how memes relate the self and the in-group to central issues such as protection, transmission, and the impact of the pandemic. Media and popular culture references are often used to make sense of these central issues as well, whereas education starts being related both to family dynamic (through homeschooling) and socializing online (through remote teaching). From the list of missing associations, the most surprising are those between protective equipment and infected people or protective measures and spread of the virus, showing that memes do not cover topics that are too different from each other and usually have a single focus (Ferrara et al., 2013).

Temporality adds a lot to our understanding of meaning-making about the pandemic. As events evolve, so do online conversations and the kinds of anchoring and objectification around COVID-19. It is perhaps less surprising to see that, toward the beginning of the period, topics such as the Chinese origin of the virus, transmission and symptoms, geography and references to Asian or Chinese people were more frequent than later on. Notably, there were also more memes about superficial aspects, such as products with the same name (e.g., Corona beer), which can also be linked to the ease of creating puns or phonological jokes based on such superficial resemblances. As time passed and the situation revealed itself as more long-term and certainly more dramatic than many had anticipated, the focus shifted to protective measures and impact. Importantly, politics and sociopolitical critique started featuring more prominently. The fact that, on average, these political memes also received more comments is telling of the fact that social representations of the pandemic are increasingly associated with political actions.

In terms of upvotes, our findings echo those of Barnes et al. (2021), suggesting that references to the pandemic itself did not have a significant effect on the success of the memes; instead, we find that identification processes did. Interestingly, some of the most successful mimetic representations when it comes to both upvotes and comments are those that feature meme-makers and Redditors, bringing further evidence of the fact that memes are often self-referential and this contributes to their enjoyment and online spread (for a broader discussion or Reddit and self-referentiality, see Singer et al., 2014). It also helps illuminate how

humorous references to the in-group might also help deepen a sense of connection and solidarity in meme-based online communities (Dyrel, 2020). Overall, although over time memes displayed more objectification and less identification (or in- and out-group dynamics), the ones that did refer to groups were more commented on. This confirms that making sense of the pandemic also means making sense of one's new position and identity (e.g., as a person who respects measures, even if in a silly or self-ironic way) *vis à vis* the identities of others (e.g., those who blatantly break the rules; Figure 10). This can further relate to other interesting current research on the relationship between use of memes and collective coping with the pandemic (see Flecha Ortiz et al., 2021).

The present research also illuminates the usefulness of TMR for the study of coronavirus memes and memes more generally. By building on the legacy of SRT and, at the same time, recognizing that mimetic representations are a special class of cultural meaning units, one that should be studied in its own right, our paper aims to make a contribution to both communication research (through the development of an TMR-informed coding frame and coding app⁶ suitable for the study of memes) and psychological research (by opening new venues for the research of online text and images). Although the empirical focus here is on meaning-making about the pandemic, the issue of meaning creation in and through memes raises important conceptual and methodological questions for both communities of scholars. The present research brings empirical evidence of how objectification, anchoring, and identification can be identified within Internet memes; this suggests that future research about new or unfamiliar events and their understanding within society can meaningfully focus (also) on mimetic representations in order to reveal the structure and temporal dynamic of social knowledge. Moreover, adding identification as a process, above and beyond SRT research, proved important for uncovering how the content of mimetic representations is related to different groups, and with what consequences for our relation to members of these groups (particularly when they are new social categories, e.g., in our case, "people who respect" and "who do not respect" the lockdown). This research also showed something unique about our understanding of rare, global events like

⁶The code for the app will be made available on GitHub by Constance de Saint Laurent.

the current pandemic: the fact that we tend to make sense of it by using very mundane references (e.g., to popular media) more than historical references (e.g., other diseases). Although these associations could be specific, to a large extent, to social media or to memes, this tendency suggests that, if we want to shape broader social representations of COVID-19 and, for instance, support the implementations of protective measures, it might be easier to reach a wider audience using these kinds of anchoring.

As any study, it is not without its limitations. First of all, it focused on a single subreddit; future research could extend data collection to memes circulating on other social media platforms, especially those popular among non-Western users. It would also be useful to collect data on comments in order to show how meanings are interpreted, accepted or contested by users. Second, there were challenges in the interpretation of codes, especially anchoring ones, many of which didn't reaching acceptable intercoder reliability. Although content analysis is suitable for the identification of concrete elements in a meme (e.g., objectification), more complex meanings require thematic forms of analysis (Glăveanu, de Saint Laurent & Literat, 2018). Future research should complement these preliminary findings with an in-depth, qualitative analysis of coronavirus memes, one that furthers our understanding of how meaning-making operates in the construction and transformation of social and mimetic representations of a global pandemic.

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