Title: Funny but aversive: A large-scale survey on the emotional response to Covid-19 humor in the Italian population during the lockdown

Short title: *Emotional response to Covid-19 humor*

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Abstract:

In tragic circumstances, it is not uncommon to see an upsurge in the generation of disaster jokes, which humorously depict the macabre aspects of ongoing crises. Many of such jokes appeared also at the time of the Coronavirus disease 2019 (Covid-19) outbreak, often becoming viral. However, little is known about the emotional response to disaster jokes, let alone Covid-19 ones. With a large-scale survey completed during Italy's nationwide lockdown, we studied the appreciation, i.e., funniness and aversiveness, of Covid-19 humor. Using a mixed models approach, we also analyzed the role of personality factors and psychological distance. Results showed that Covid-19 humor is associated with a mark of aversiveness, greater than for non-pandemic humor. Individuals more inclined to use humor to cope with uneasy circumstances perceived Covid-19 humor as funnier and less aversive. Furthermore, the perceived risk of being infected with SARS-CoV-2 amplified Covid-19 humor aversiveness, while greater spatial distance from the Italian epicenter of the contagion allowed to deeper enjoy humor both related and not-related to Covid-19. These findings should raise awareness on the emotional correlates to Covid-19 humor, of possible support in deciding whether and with whom to joke on the pandemic in social and political communication.

Keywords:

Humor; Covid-19 Humor; Humor Appreciation; Coping; Psychological Distance;

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Abstract

In tragic circumstances, it is not uncommon to see an upsurge in the generation of disaster jokes, which humorously depict the macabre aspects of ongoing crises. Many of such jokes appeared also at the time of the Coronavirus disease 2019 (Covid-19) outbreak, often becoming viral. However, little is known about the emotional response to disaster jokes, let alone Covid-19 ones. With a large-scale survey completed during Italy's nationwide lockdown, we studied the appreciation, i.e., funniness and aversiveness, of Covid-19 humor. Using a mixed models approach, we also analyzed the role of personality factors and psychological distance. Results showed that Covid-19 humor is associated with a mark of aversiveness, greater than for non-pandemic humor. Individuals more inclined to use humor to cope with uneasy circumstances perceived Covid-19 humor as funnier and less aversive. Furthermore, the perceived risk of being infected with SARS-CoV-2 amplified Covid-19 humor aversiveness, while greater spatial distance from the Italian epicenter of the contagion allowed to deeper enjoy humor both related and not-related to Covid-19. These findings should raise awareness on the emotional correlates to Covid-19 humor, of possible support in deciding whether and with whom to joke on the pandemic in social and political communication.

Introduction

Soon after the beginning of the Coronavirus disease 2019 (Covid-19) outbreak, humorous materials related to the pandemic have started to massively circulate on social media (amounting to 25% of viral tweets mentioning Covid-19, based on Thelwall & Thelwall, 2020). Some of them lightheartedly make fun of different facets of the pandemic experience such as life in quarantine, others ironically criticize harmful behaviors or contain pungent remarks on how politicians deal with the pandemic. The creativity that characterizes Covid-19 humor is expressed in verbal jokes, but also in multimodal fashions, such as through memes, cartoon strips, and clips.

The rise of humor on Covid-19 takes place within the boundaries of disaster jokes, i.e., the kind of jokes that stems from difficult situations depicting tragedies and concomitant or background crises in a playful way (Ellis, 2001; Kuipers, 2002), as happened for the AIDS outbreak or after 9/11 terrorist attacks (Dundes, 1987; Ellis, 2001; Kuipers, 2002, 2005), or even in earlier times, such as after the sinking of the Titanic (Chovanec, 2019). In exploiting an incongruity between innocuous and macabre scripts (Attardo & Raskin, 1991; Kuipers, 2002), disaster jokes often shares features with black humor, i.e., humor that touches upon contents such as death and diseases (Maxwell, 2003; Willinger et al., 2017). In terms of functions, while humor, in general, is classically described as the "highest of […] defensive processes" (Freud, 1960), disaster jokes are deemed to operate as a "collective mental hygienic defense mechanism" to cope with tragedies (Dundes, 1987), and to reflect the desire to speak about such events (Ellis, 2001) or to rebel against media discourse (Chovanec, 2019; Oring, 1987).

The emotional response to humor, i.e., appreciation, is largely affected by its specific content, both in the positive dimension of funniness (the degree to which one considers the humor to be funny) and in the negative dimension of aversiveness (the degree to which one considers the humor to be disturbing) (Ruch, 1992). Specifically, black humor is perceived as more aversive and less enjoyable than non-black one (Carretero-Dios & Ruch, 2010; Herzog & Karafa, 1998). Looking at

individual differences, black humor is judged as less funny by females and by older adults, rated as less aversive by males, and its enjoyment increases with higher levels of education (Aillaud & Piolat, 2012; Carretero-Dios & Ruch, 2010; Willinger et al., 2017). Also personality factors play a role: for instance, the degree to which one uses humor to cope with stressful situations is associated with higher perceived funniness of sick jokes (Saroglou & Anciaux, 2004). However, this literature has rarely investigated disaster jokes specifically, and has rarely considered both funniness and aversiveness and their relationships with other individual factors.

In this study, we focused on a tragically new topic for disaster jokes, i.e., Covid-19 humor. We tested its appreciation (funniness and aversiveness) through a large-scale online survey conducted during the worst phase of the outbreak in one of the most affected countries, Italy. The historical moment and geographical coordinates in which the survey took place allow us to investigate not only the role of content and personality factors, but also the effects of psychological distance (Trope & Liberman, 2010), i.e., how perceived risk, spatial and social distance from the epidemic affect how people laugh at misfortunes and terrifying events. The novelty of this study, thus, lies not only in the Covid-19 humor topic, but also in its consideration of the concurrent role of different layers of individual variation in the appreciation of disaster humor.

We expected Covid-19 humor to be more aversive than humor on more benign topics. In addition, we anticipated a complex interplay of personality factors and psychological distance factors, above and beyond demographic aspects: specifically, we hypothesized that humor coping and optimism would be linked to an increment of funniness and a reduction of aversiveness. Moreover, we expected that the different facets of the distance from the risk would greatly affect Covid-19 humor perception, either in the positive or negative dimension.

This research will provide a better understanding of disaster humor and its emotional correlates, both positive and negative ones, allowing for real-time estimation of these effects during the emergency from a nationwide perspective. On a more practical level, this study will offer indications on the benefits and disadvantages of using disaster humor uses, accounting for audience

heterogeneity, of possible relevance in guiding hereafter social communication practices, as well as media discourse during the SARS-CoV-2 pandemic.

Method

Materials

We extracted "Internet jokes" (Shifman, 2007) from humor hubs, namely Facebook pages posting entertaining contents (>10k followers), and humorous strips. Items were either related to Covid-19 or not. Covid-19 humor were divided into three types: Covid Verbal (n=12), Covid Meme (n=6), and Covid Strip (n=6). Each type involved heterogeneous contents, from innocuous to quarantine-related to dark themes. Covid Strip items portrayed the virus as a face-shaped object joking on pandemic mishaps or outcomes in bitter and black tones (see Ebola-chan in Marcus & Singer, 2017). NonCovid Verbal (n=12) served as baseline and included miscellaneous themes, generally softer and benign. See Figure 1 for examples.

We gathered information on items virality in terms of "likeability" (the number of likes) and "sharability" (the number of shares) (Mills, 2012). Adjusted values (divided by hubs' followers) were similar to those derived from Taecharungroj & Nueangjmnong (2015), i.e., 1.4% for likeability and 0.3% for sharability.

Personality assessment

We assessed participants on two personality traits, namely the use of humor in coping with stressful situations, assessed with the Coping Humor Scale (CHS) (Martin & Lefcourt, 1983), and dispositional optimism, assessed with the Life Orientation Test – Revised (LOTR) (Scheier, Carver, & Bridges, 1994; Italian version: Giannini, Schuldberg, Di Fabio, & Gargaro, 2008).

Psychological Distance

We focused on three forms of psychological distance (McGraw & Warren, 2010; Trope & Liberman, 2010): perceived risk of being infected by Covid-19 (on a 1-10 scale); spatial distance, calculated as the geodesic distance (in kilometers) between the epicenter of the Italian outbreak (Codogno) and the municipality where each participant completed the questionnaire; social distance, i.e., the number of known Covid-19 cases among friends and relatives.

Participants

A total of 1903 participants completed the survey (Table 1 for Demographics). They were recruited via social media, with posts on authors' personal and institutional social media profiles, targeted advertising on Facebook, public communication, and by email. Results are based on 1751 native speakers of Italian (556 M, 1195 F), living in Italy (126 participants completed it from abroad), and aged above 18. Participants were informed that upon completion of a second part of the survey at the end of the Covid-19 emergency, they will partake to a prize draw of fifty 10€ prizes. The study was approved by the Ethics Committee of the Department of Brain and Behavioral Sciences of the University of Pavia (protocol 44/2020).

Procedure

We designed a web-based survey on LimeSurvey® (https://limesurvey.org). The study was launched during the most dramatic stages of the Covid-19 outbreak, between March 18 and March 30, 2020 – soon after the nationwide lockdown issued by the Italian Government with the Prime Ministerial Decree signed on March 8, 2020. After providing informed consent and demographics (Age, Gender and Provenance), participants completed a section with psychological distance questions, the personality assessment, and then they were asked to rate each item for funniness and aversiveness on two 7-point scales ranging from 0 (not at all funny/disturbing) to 6 (very funny/disturbing) (Ruch, 1992). The median time of completion was 13 minutes.

Statistical Analysis

We tested the relationship between Type of humor, Demographic factors (Age, Gender, and Education), Personality measures (CHS and LOTR scores), and Psychological Distance (Perceived risk, Spatial distance, and Social distance) on the two dependent variables (Funniness and Aversiveness), with a "hierarchical" approach (e.g. Cohen, 2013): four models (for each dependent variable) of increasing complexity were built and compared in terms of goodness of fit. We used Linear Mixed Models (Pinheiro & Bates, 2000; *lme4* package, Bates, Mächler, Bolker, & Walker, 2015) in R (R Core Team, 2020) with crossed random effects for Participants, Items, and Province of completion. We expected that Personality factors would capture data variance over and above that accounted for by Demographic factors, and that Psychological Distance would further explain data variance, over and above that accounted for by Demographic and Personality factors. While the impact of Demographic factors on jokes and black humor perception has been previously reported (Aillaud & Piolat, 2012; Bischetti, Ceccato, Lecce, Cavallini, & Bambini, 2019; Carretero-Dios & Ruch, 2010; Willinger et al., 2017), here these factors will have limited interest and will not be described in detail.

The baseline model tested the effect of Type of humor, for which three specific contrasts were set (Schad, Vasishth, Hohenstein, & Kliegl, 2020): Covid Verbal *vs.* NonCovid Verbal, Meme *vs.* Covid Verbal, and Strip *vs.* Covid Verbal. Dependent variables ranged from 0 to 6, while all continuous predictors were z-centered.

A parsimonious random structure of the models was selected on grounds of feasibility and results are based on fully identified models (Bates, Kliegl, Vasishth, & Baayen, 2015): for each random factor, a varying intercept was estimated. Moreover, within-participants slope adjustments for Type of humor, and item level adjustments for Age were allowed.

Data availability

The material used in the current study, as well as the dataset and the R script for the analyses, are available in the Open Science Framework repository (https://osf.io/gj52h/).

Results

Likelihood ratio tests showed that variance in Funniness and Aversiveness ratings was best explained by the models including Demographic, Personality, and Psychological Distance (Table 2).

Funniness

No differences in Funniness were found (t<1) between NonCovid Verbal (M=2.94) and Covid Verbal (M=2.86), while, compared to Covid Verbal, Covid Meme (M=3.45) resulted funnier (t=+2.73, p<.01), and Covid Strip (M=1.89) less funny (t=-4.43, p<.001). All Demographic and Personality variables modulated the differences between humor types. Interestingly, the effect of both CHS (β=+0.23, t=+7.89, p<.001) and LOTR (β=+0.08, t=+2.84, p<.01) had a positive direction (Figure 2B-C). Larger CHS scores were associated with higher funniness ratings, but critically, planned contrasts showed that this relation was stronger ($\Delta\beta$=+0.07, t=+3.86, p<.001) for Covid Verbal (β=+0.24) as compared to NonCovid Verbal (β=+0.17). A stronger involvement ($\Delta\beta$=+0.07, t=+3.40, p<.001) of LOTR was instead observed between Covid Meme (β=+0.14) as compared to with Covid Verbal (β=+0.07).

As for Psychological Distance, the model showed a significant and positive contribution of the quadratic term of Spatial distance (β=+0.12, t=+2.44, p<.05), while the linear term was only numerically positive (β=+0.06, t<1): ratings increased as function of distance, after an initial fall, and especially at longer distances (Figure 2D and Figure 3 for a representation on the Italian map).

Aversiveness

Differences in Aversiveness were found (+0.39, t=+2.26, p<.05) between Covid Verbal (M=0.87) and NonCovid Verbal (M=0.48). Moreover, Covid Strip (M=1.42) were judged as more aversive (+0.54, t=+2.53, p<.05) than Covid Verbal materials. If Demographic variables (Gender and Education) showed an effect dependent on the different humor types, Personality factors further explained data variance. CHS (but not LOTR) was a reliable predictor of Aversiveness (Figure 4B): the overall effect of CHS on Aversiveness was negative (β=-0.17, t=-8.14, p<.001). The planned contrasts further revealed that the effect was graded, with more negative slopes ($\Delta\beta$=-0.10, t=-6.76, p<.001) for Covid Verbal (β=-0.19) as compared to NonCovid Verbal (β=-0.09); CHS effect on Meme (β=-0.16) was slightly less negative ($\Delta\beta$=+0.03, t=+2.01, p<.05) than on Covid Verbal; CHS effect on Covid Strip (β=-0.28) was more negative than on Covid Verbal ($\Delta\beta$=-0.09, t=-3.75, p<.001).

As for Psychological Distance factors, a positive effect of risk perception (β=+0.04, t=+1.74, p<.10) emerged and was modulated by Type of Humor (Figure 4C): the effect was stronger ($\Delta\beta$=+0.05, t=+3.03, p<.01) in Covid Verbal (β=+0.04) as compared to NonCovid Verbal (β=+0.00), and that it was even stronger ($\Delta\beta$=+0.05, t=+2.28, p<.05) and different from zero for Covid Strip (β=+0.09) compared to Covid Verbal.

Inspection of by-item variability

The investigation of random effects distribution revealed that the difference between the mean aversiveness value of all materials and the “adjusted” Conditional Modes of each joke described our data beyond the fixed effects included in the model. The inspection of the random effects (Figure 5) suggests a role of joke content: the least funny and most aversive items are the jokes associated with death, contagion, or infection, while the least aversive items are the jokes associated with quarantine mishaps and change of habits.

Discussion

In this study, we showed that the appreciation of Covid-19 humor is concurrently explained by joke features, personality traits, and psychological distance measures. Starting with the role of joke content, which was analyzed in the first step of the analysis, findings indicated that Covid-19 humor lacks a "signature" of funniness: no differences emerged between Covid and NonCovid Verbal jokes. Moreover, among all Covid-19 jokes, funniness ratings were highly heterogeneous, with memes being funnier than verbal and strips being less funny. We argue that the joke format might have interacted with pandemic-related contents in shaping funniness ratings: while memes elicited a greater enjoyment (for theoretical support see (Dynel, 2016; Yus, 2019), strips were rated less funny than other formats, probably due to the bitter and macabre contents (for previous examples (Aillaud & Piolat, 2012; Carretero-Dios & Ruch, 2010; Herzog & Bush, 1994; Saroglou & Anciaux, 2004). Overall, thus, disaster jokes seem to lack specificity for the dimension of enjoyment.

On the contrary, Covid-19 humor appears characterized by a clear mark of aversiveness, with increasing values from memes to verbal jokes and strips. This finding suggests that disaster jokes approximate other forms of black humor in the negative dimension of appreciation (Carretero-Dios & Ruch, 2010). This is also confirmed by the qualitative inspection of by-item variability, which further indicated that the most aversive jokes about Covid-19 dealt with dark themes, such as the spread of the contagion to grandparents (see Fig. 1 panel D) or the unpleasant conclusion that Covid-19 might be a solution for the prospective issue of Italian pensions.

Going to the next step of the analysis, results indicated that personality factors were significant predictors of Covid-19 humor appreciation and explained variance beyond demographics. Specifically, the measure of humor coping exerted a significant effect on both funniness and aversiveness, for humor in general and in particular for Covid Verbal jokes. In other words, our findings illustrate that adopting a humorous perspective in uneasy circumstances has an effect on the two dimensions of jokes appreciation, boosting the positive dimension of funniness and shrinking the aversiveness response. Although we did not directly test the therapeutic value of

Covid-19 humor in facing the pandemic, we follow previous evidence on the benefits of humor in handling negative emotions (Martin & Lefcourt, 1983; Perchtold et al., 2019) and we argue that the emotional processing of Covid-19 humor could contribute to down-regulate the negative feelings and mitigate the stress induced by the Covid-19 outbreak, especially in the individuals inclined to use humor to deal with uneasy circumstances. In these individuals, Covid-19 humor may be a way to bypass the more worrying and fearsome aspects of the pandemic, as attested by the graded effect on aversiveness ratings.

To complete the discussion on personality factors, our results showed that, in addition to the effects of coping, the positive attitude towards life, as measured with dispositional optimism, broadly influenced funniness ratings (especially in more enjoyable forms such as Covid Meme), expanding previous literature on the relationships between humor practices and optimism (Ford, Lappi, & Holden, 2016; Yue, Hao, & Goldmann, 2010).

On top of the differences associated with joke features and the effect of personality, results highlighted the importance of the different facets of psychological distance. Participants who perceived higher risk of contagion also gave higher ratings of aversiveness for Covid as compared to Non-Covid materials, and especially when judging the most bitter strips. This relationship between risk perception and aversiveness for Covid-19 humor resonates with a wealth of research showing that risk perception is tied to emotions and negative feelings typically associated with avoidance (Loewenstein, Webber, Hsee, & Welch, 2001). The more aversive ratings for strips given by those who perceived a higher risk of contagion reflect the difficulty in avoiding discomfort when a tragedy is psychologically close (Doré, Ort, Braverman, & Ochsner, 2015), and this effect does not simply depend on spatial proximity. In showing that psychological distance is needed to appreciate disaster jokes, our findings expand previous evidence by showing that distance affects not only the positive dimension of enjoyment (McGraw & Warren, 2010; McGraw, Warren, Williams, & Leonard, 2012), but also the aversiveness ratings. While the higher subjective distance from the risk suppresses the disturbing connotation of Covid-19 humor, the greater objective

geographical distance allows to deeper enjoy the bright side of all humor, including Covid-19 jokes. Indeed, we observed a mild effect of spatial distance on perceived funniness. Participants living far from the epicenter of the pandemic tended to judge humorous materials as globally funnier, as if more distant participants had a generally more positive disposition towards humor.

The high individual variation emerging from our findings draw implications for the uses of humor based on Covid-19 in political and media communication. First, subjects that exercise public functions, such as politicians or heads of health-related agencies, should carefully ponder the choice of sharing posts with Covid-19 humor on their social media accounts or rebut with gallows remarks. Second, content creators, both in traditional and social media, might profit from analytics to correctly calibrate the delivery of Covid-19 humor, aware of the emotional consequences that shared contents might trigger in their followers or viewers. Indeed, Covid-19 humor is likely to be as funny or even funnier than the average Internet joke, but it has a high chance of being perceived as disturbing or aversive by many.

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Tables

Table 1

Geographic Area	Age Range	%	Education level	%	Gender	%	Total
NORTH WEST	*18-29*	38.81%					
	30-39	22.87%	*Lower Secondary*	3.06%	*Male*	34.30%	
	40-49	10.47%	*Upper Secondary*	28.34%	*Female*	65.38%	32.98%
	50-59	16.10%	*Bachelor's degree*	17.55%	*Other*	0.32%	
	60-69	9.34%	*Master's degree*	39.94%			
	70+	2.42%	*PhD*	11.11%			
NORTH EAST	*18-29*	33.33%					
	30-39	27.06%	*Lower Secondary*	5.69%	*Male*	33.92%	
	40-49	14.71%	*Upper Secondary*	34.90%	*Female*	65.88%	27.12%
	50-59	12.94%	*Bachelor's degree*	15.49%	*Other*	0.20%	
	60-69	10.39%	*Master's degree*	36.27%			
	70+	1.57%	*PhD*	7.65%			
CENTRAL	*18-29*	32.44%					
	30-39	17.33%	*Lower Secondary*	4%	*Male*	34.22%	
	40-49	15.11%	*Upper Secondary*	27.56%	*Female*	65.33%	11.88%
	50-59	15.11%	*Bachelor's degree*	16.89%	*Other*	0.44%	
	60-69	15.11%	*Master's degree*	35.56%			
	70+	4.89%	*PhD*	16%			
SOUTH	*18-29*	34.12%					
	30-39	12.32%	*Lower Secondary*	0.47%	*Male*	24.64%	
	40-49	20.38%	*Upper Secondary*	48.82%	*Female*	75.35%	11.13%
	50-59	17.06%	*Bachelor's degree*	9.48%	*Other*	0%	
	60-69	13.27%	*Master's degree*	34.12%			
	70+	2.84%	*PhD*	7.11%			
ISLANDS	*18-29*	77.49%					
	30-39	8.38%	*Lower Secondary*	0.52%	*Male*	21.47%	
	40-49	4.71%	*Upper Secondary*	73.82%	*Female*	78.53%	10.18%
	50-59	3.14%	*Bachelor's degree*	10.99%	*Other*	0%	
	60-69	5.24%	*Master's degree*	9.95%			
	70+	1.05%	*PhD*	4.71%			
ABROAD	*18-29*	30.95%					
	30-39	47.62%	*Lower Secondary*	0.00%	*Male*	33.33%	
	40-49	14.29%	*Upper Secondary*	3.97%	*Female*	65.08%	6.71%
	50-59	3.97%	*Bachelor's degree*	11.90%	*Other*	1.59%	
	60-69	3.17%	*Master's degree*	38.89%			
	70+	0.00%	*PhD*	45.24%			

Table 1. ***Demographic information.*** *A total of 1903 participants completed the survey. After applying exclusion criteria, age ranged from 18 to 81 years [M=37.67; SD=15.24], with 1283 females and 594 males. Distribution of the sample within age ranges, education levels, and gender is given, for the participants living in the five Italian macro-regions (N=1751) and for the sample completing the survey from abroad (N=126).*

Table 2

Dependent Variable	Models' Fixed Effects	df	AIC	BIC	Log likelihood	χ^2	p value
Funniness	Type	16	231245	231389	-115606		
	Type*(Demographics)	40	231139	231501	-115529	153.62	<.001
	Type*(Demographics + Personality)	48	231042	231477	-115473	112.58	<.001
	Type*(Demographics + Personality + Psychological Distance)	64	231025	231604	-115448	49.37	<.001
Aversiveness	Type	14	196870	196997	-98421		
	Type*(Demographics)	38	196828	197172	-98376	90.17	<.001
	Type*(Demographics + Personality)	46	196742	197158	-98325	101.78	<.001
	Type*(Demographics + Personality + Psychological Distance)	62	196740	197301	-98308	33.98	<.01

Table 2. ***Likelihood Ratio Tests on Funniness and Aversiveness.*** *The table shows the results of the comparison of measures of goodness of fit between the four models of increasing complexity, following the hierarchical procedure of the analysis. Demographics includes Age, Gender, and Education; Personality includes Coping Humor Scale (CHS) and Life Orientation Test Revised (LOTR) scores; Psychological Distance includes Perceived risk, Spatial distance, and Social distance.*

Figures

Figure 1. Stimuli examples. *Examples of the experimental materials in the NonCovid Verbal (A), Covid Verbal (B), Covid Meme (C), and Covid Strip (D) conditions. Translations in English: A - "Have you ever thought that when you are entranced by the scent of a person in the 95% of cases you took a crush on their fabric softener?"; B - "After the lockdown three categories will face a rapid recovery... The nutritionist, the psychologist, and the divorce lawyer"; C - "I'll go get some bread and I'll be right back"; D - "Without schools it is not that bad – All day long in bed – With grandfather and grandchildren". Covid Strips are courtesy of Davide Toffolo and can be found at www.instagram.com/davideltofo.*

Figure 2. Funniness results. *A) Histogram depicting estimated Funniness as function of Type of humor. B) Estimated Funniness as function of Type of humor and Coping Humor Scale (CHS) scores. Participants are binned within five equally populated intervals (quantiles from q1 to q5) of CHS scores. C) Estimated Funniness as function of Type of humor and Life Orientation Test – Revised (LOTR) scores. Participants are binned within five equally populated intervals (quantiles from q1 to q5) of LOTR scores. Error bars of A), B), and C) depict 95% confidence intervals. D) Partial effect of Spatial Distance from Codogno (binned within fourteen quantiles) on average Funniness scores. The height of the bubbles represents the average estimated Funniness of all municipalities within a single province. The size of the bubble represents the sample size of each province (the label of the province is printed when the sample was above thirty participants). The color of the bubble represents the average number of Covid-19 cases for each province measured in the day in which each participant completed the questionnaire. The regression line represents the partial effect of Spatial Distance from the outbreak epicenter.*

Figure 3. Map of Funniness. *Partial effect of Spatial Distance from Codogno on average Funniness scores, represented within the Italian geographic borders. The position of each square represents the geographic coordinates assigned to each province where at least one questionnaire was completed. The size of each square displays the size of the sample in the province, while the color represents the average Funniness ratings (of all humor types). Tiny empty dots represent all municipalities where data were acquired.*

Figure 4. Aversiveness results. *A) Histogram depicting estimated Aversiveness as function of Type of humor. B) Estimated Aversiveness as function of Type of humor and Coping Humor Scale (CHS) scores. Participants are binned within five equally populated intervals (quantiles from q1 to q5) of CHS scores. C) Estimated Aversiveness as function of Type of humor and Perceived risk. Participants are binned within five equally populated intervals (quantiles from q1 to q5) of Perceived risk values. Error bars depict 95% confidence intervals.*

Figure 5. Plot of by-item variability. *Conditional Modes of Aversiveness (left panel) and Funniness (right panel) associated with each experimental item. Single items are sorted (on the y-axis) for the Conditional Modes of Aversiveness (topmost items are those with the highest aversiveness ratings). Conditional Modes are given in z-points (x-axis), with the average Aversiveness or Funniness scores being zero.*

A

Ci pensate mai che quando siete lì inebriati dall'odore di una persona nel 95% dei casi siete invaghiti del suo ammorbidente

B

Dopo la quarantena tre saranno le categorie in rapida ripresa...
Il dietologo, lo psicologo e l'avvocato divorzista.

C

D

Figure 1

Figure 2

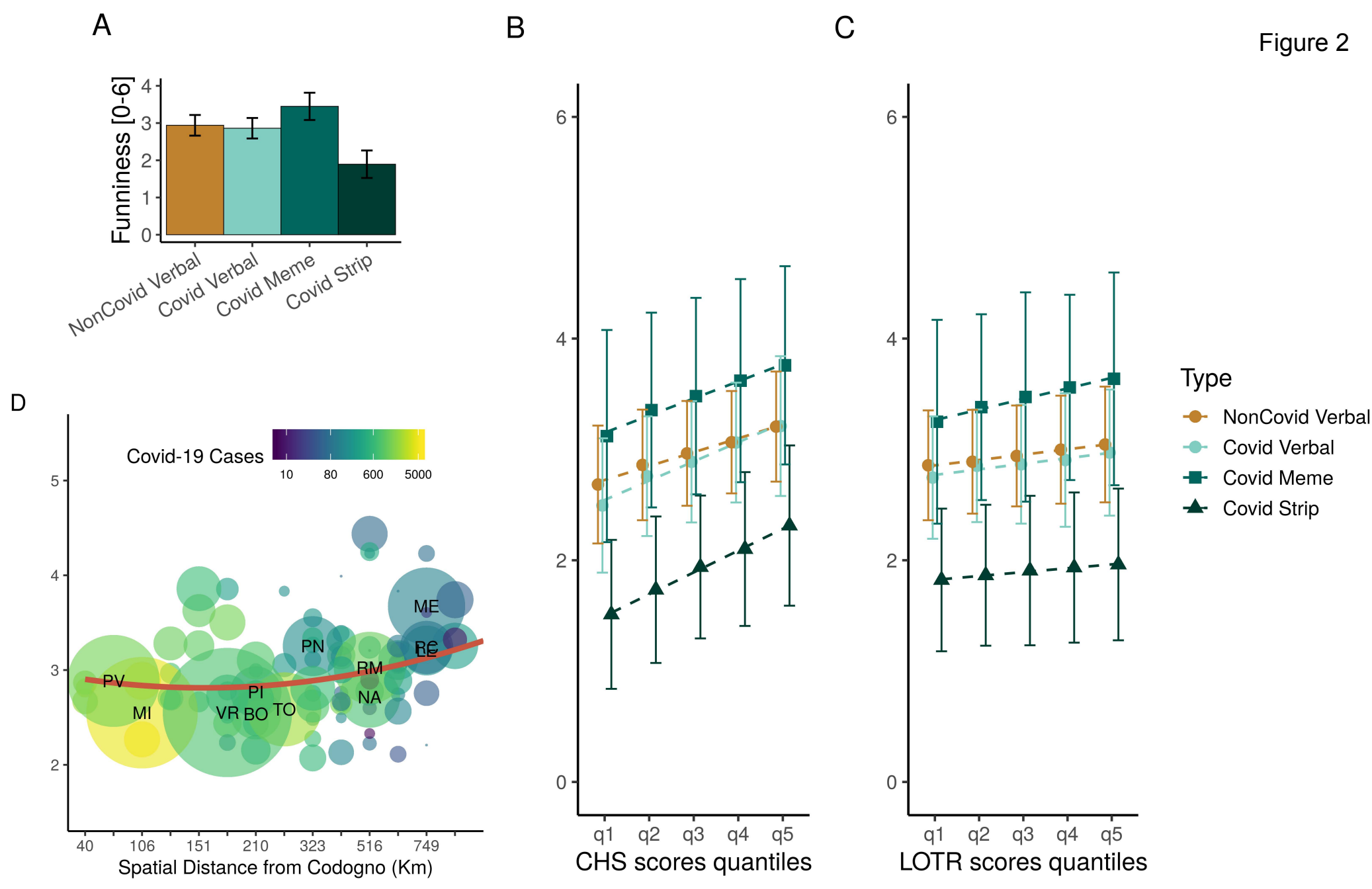

A
Funniness [0-6]
0
1
2
3
4
NonCovid Verbal
Covid Verbal
Covid Meme
Covid Strip
B
C
6
4
2
0
q1
q2
q3
q4
q5
CHS scores quantiles
LOTR scores quantiles
Type
NonCovid Verbal
Covid Verbal
Covid Meme
Covid Strip
D
Covid-19 Cases
10
80
600
5000
5
4
3
2
PV
MI
PI
VR
BO
TO
PN
RM
NA
ME
RC
LE
40
106
151
210
323
516
749
Spatial Distance from Codogno (Km)

Figure 3

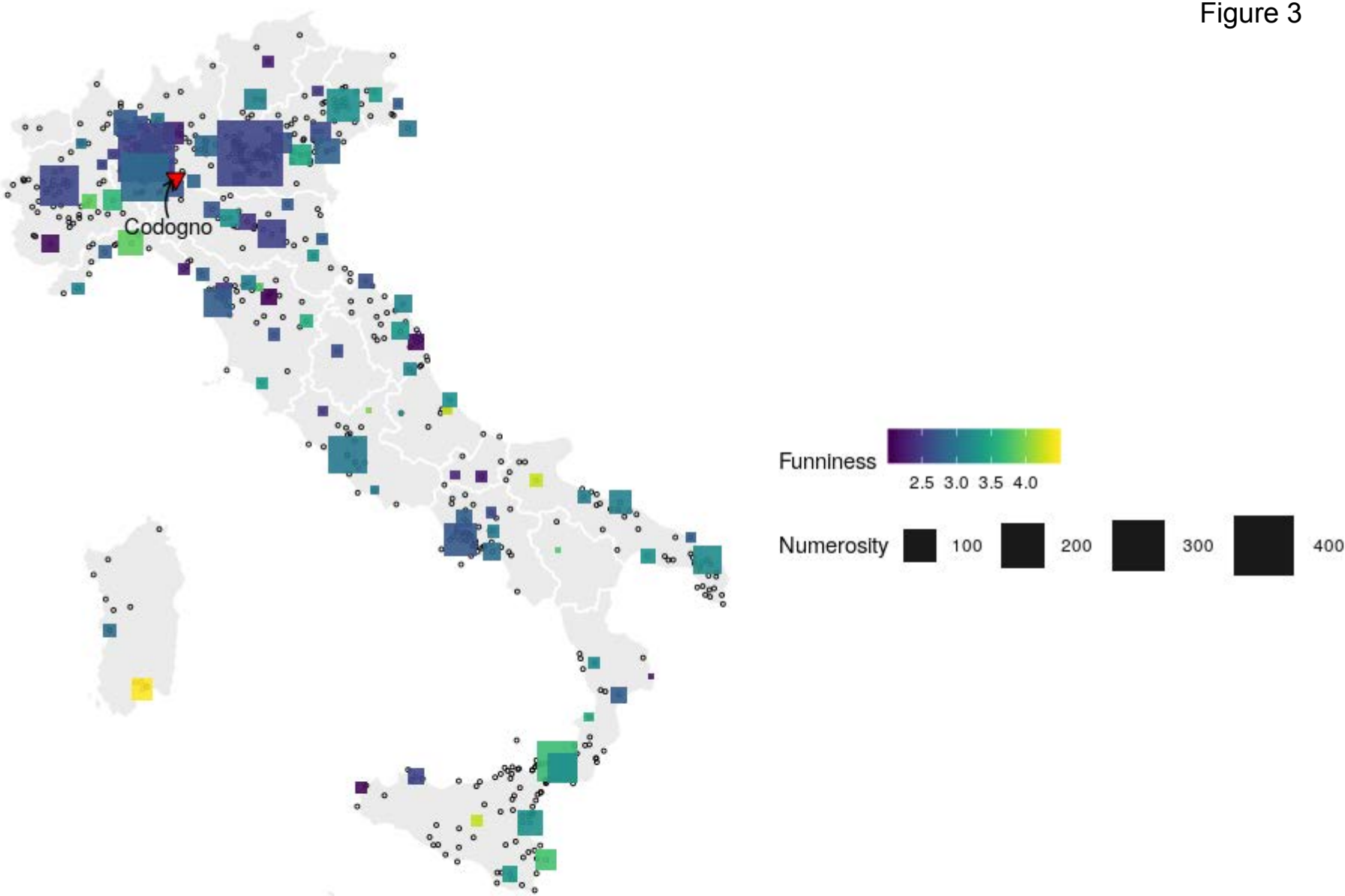
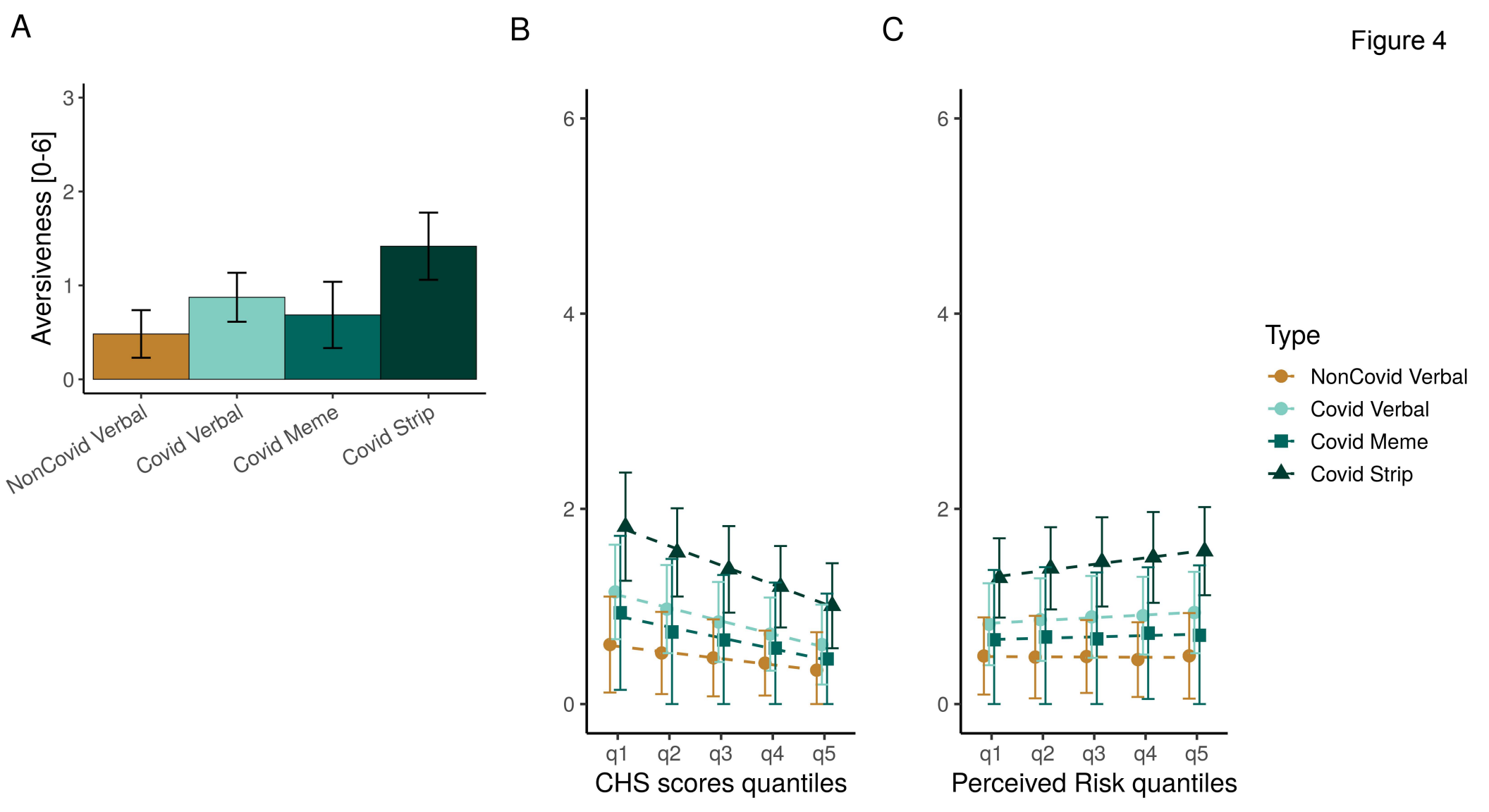


Figure 4


A
B
C
Aversiveness [0-6]
0
1
2
3
NonCovid Verbal
Covid Verbal
Covid Meme
Covid Strip
0
2
4
6
q1
q2
q3
q4
q5
CHS scores quantiles
Perceived Risk quantiles
Type
NonCovid Verbal
Covid Verbal
Covid Meme
Covid Strip

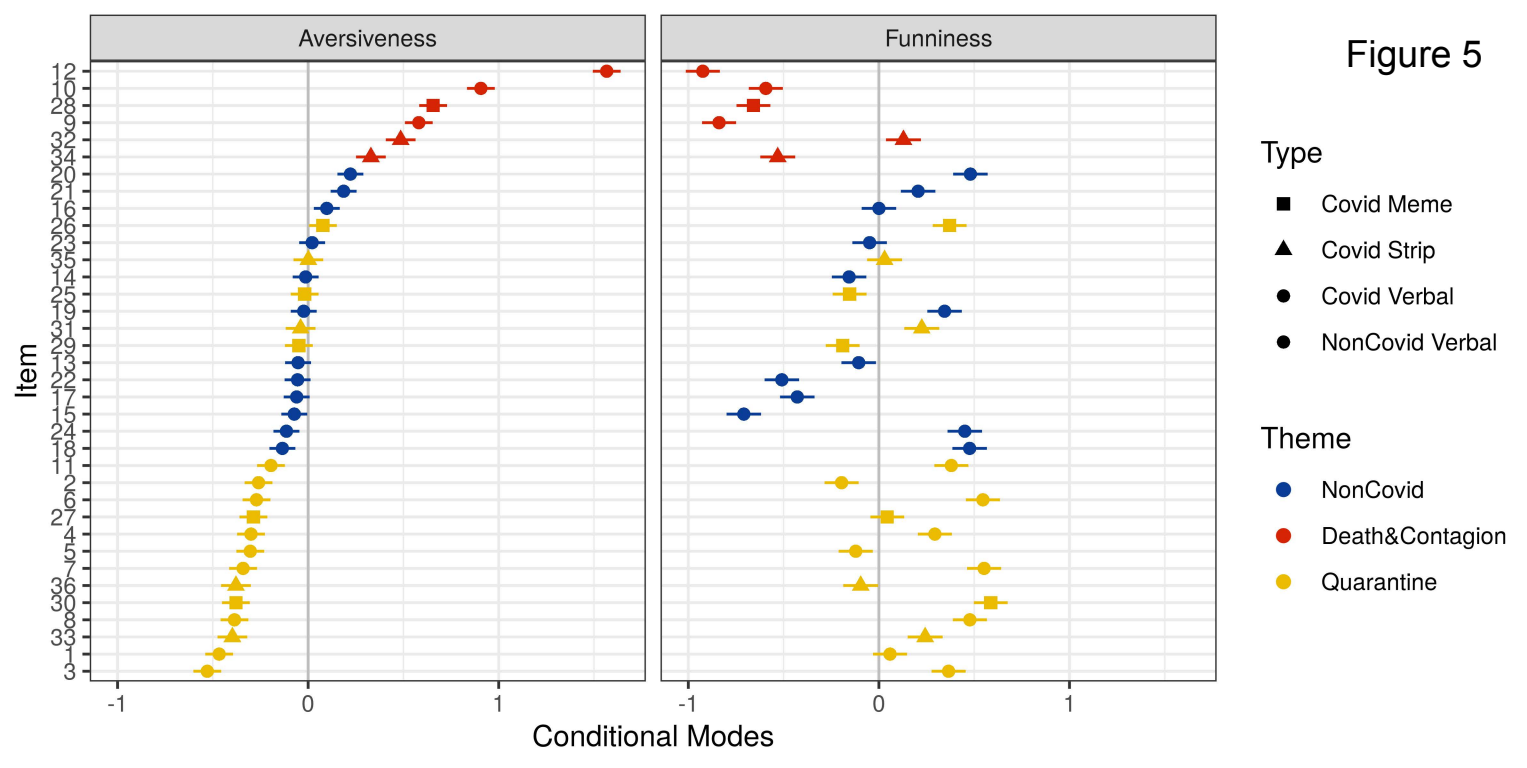

Aversiveness
Funniness
Item
12
10
28
9
32
34
20
21
16
26
23
35
14
25
19
31
29
33
22
17
15
24
18
11
2
6
27
4
5
7
36
30
8
33
1
3
-1
0
1
Conditional Modes
Type
Covid Meme
Covid Strip
Covid Verbal
NonCovid Verbal
Theme
NonCovid
Death&Contagion
Quarantine

Figure 5