

Original Scholarship

Effects of the COVID-19 Emergency and
National Lockdown on Italian Citizens'
Economic Concerns, Government Trust, and
Health Engagement: Evidence From a
Two-Wave Panel Study

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Policy Points:

- Preventive measures such as the national lockdown in Italy have been effective in slowing the spread of COVID-19. However, they also had psychological and economic impacts on people's lives, which should not be neglected as they may reduce citizens' trust and compliance with future health mandates.
- Engaging citizens in their own health management and in the collaboration with health care professionals and authorities via the adoption of a collaborative approach to health policy development is fundamental to fostering such measures' effectiveness.
- Psychosocial analysis of citizens' concerns and emotional reactions to preventive policies is important in order to plan personalized health communication campaigns.

Context: Because of the COVID-19 pandemic, between February 23 and March 8, 2020, some areas of Italy were declared "red zones," with citizens asked to stay home and avoid unnecessary interpersonal contacts. Such measures were then

extended, between March 10 and May 4, 2020, to the whole country. However, compliance with such behaviors had an important impact on citizens' personal, psychological, and economic well-being. This could result in reduced trust in authorities and lowered compliance. Keeping citizens engaged in their own health and in preventive behaviors is thus a key strategy for the success of such measures. This paper presents the results from a study conducted in Italy to monitor levels of people's health engagement, sentiment, trust in authorities, and perception of risk at two different time points.

Methods: Two independent samples ($n = 968$ and $n = 1,004$), weighted to be representative of the adult Italian population, were recruited in two waves corresponding to crucial moments of the Italian COVID-19 epidemic: between February 28 and March 4 (beginning of "phase 1," after the first regional lockdowns), and between May 12 and May 18 (beginning of "phase 2," after the national lockdown was partially dismissed). Respondents were asked to complete an online survey with a series of both validated measures and ad hoc items. A series of *t*-tests, general linear models, and contingency tables were carried out to assess if and how our measures changed over time in different social groups.

Findings: Although sense of self and social responsibility increased between the two waves, and trust toward authorities remained substantially the same, trust in science, consumer sentiment, and health engagement decreased. Our results showed that while both the level of general concern for the emergency and the perceived risk of infection increased between the two waves, in the second wave our participants reported being more concerned for the economic consequences of the pandemic than the health risk.

Conclusions: The potentially disruptive psychological impact of lockdown may hamper citizens' compliance with, and hence the effectiveness of, behavioral preventive measures. This suggests that preventive measures should be accompanied by collaborative educational plans aimed at promoting people's health engagement by making citizens feel they are partners in the health preventive endeavor and involved in the development of health policies.

Keywords: COVID-19, health engagement, trust, lockdown, consumer sentiment, patient engagement, PHE model, PHE scale.

ON FEBRUARY 20, 2020, THE FIRST CASE OF COVID-19 was detected in Italy. In the following days, the contagion quickly spread in the northern areas of the country, forcing the government to opt for quarantine and lockdown measures starting from March 10, 2020. Italian citizens were asked to stay home and avoid

unnecessary travel, movement, and interpersonal contact, with the only possible exceptions being going out for groceries, work, and special medical requirements. Roadblocks were established to check people's self-certification of their motives for movement. In the absence of medical treatment and other preventive measures for COVID-19, behavioral measures (i.e., maintaining a physical distance with other people, wearing masks and gloves) were considered the only possible strategy to contain the epidemic, to slow the outbreak of the disease, and consequently to reduce the burden on the health care system. Despite their demonstrated effectiveness in reducing the spread of the disease and in easing the burden on the health care system,^{1,2} these measures had an important impact also on the social and economic well-being of the population,³⁻⁵ as they required people to deeply reconfigure their daily life habits, undermining their sense of freedom and self-determination.^{6,7} Together with the widely demonstrated impact of the COVID-19 pandemic on mental health,⁸⁻¹⁰ lockdown measures combined to emphasize the traumatic psychological impact of the COVID-19 emergency in terms of anxiety, depression, and even suicidal behaviors.¹¹⁻¹³ Moreover, home quarantine and lockdown measures increased people's sense of sadness, worry, anger, loneliness, and pessimism for the future,^{14,15} with an impact on the general quality of life of the population. Other studies have demonstrated the impact of the lockdown on citizens' economic well-being and consumers' attitudes.¹⁶

Furthermore, as already happened in the case of past epidemics, imposed preventive measures like the COVID-19 lockdown may have a negative impact on the level of citizens' trust toward institutions and governmental authorities.¹⁷ This is a potentially dangerous aspect of public health policy and preventive measures, which should be carefully regarded and which implies a behavioral change in the population; mistrust in science or in health care authorities may undermine the effectiveness of a preventive plan in the population.¹⁸ In particular, compliance with preventive norms such as home quarantine also requires a strong bond of collaboration, trust, and partnership between health authorities and citizens for its success,¹⁹ since the health message implied in the lockdown consists of a call for citizens to renounce personal freedom and priorities for the sake of individual and collective health. However, to guarantee the correct understanding of this health message and positive adherence to this preventive measure is not an easy task.

As a consequence, a high level of citizens' health engagement and partnership with the health care system appears crucial in the case of an epidemic such as COVID-19, as it is a necessary premise to guarantee the effectiveness of lockdown and other preventive measures.²⁰ However, from a psychological perspective, the economic and social consequences of lockdown may lessen individuals' proactivity in health management and foster distrust and faithlessness toward health authorities.

To sum up, although scientific evidence in favor of preventive measures such as lockdowns is fairly robust at the moment, ethical concerns regarding the impact of these measures on the psychological and social life of individuals and on their communities deserve further consideration.²

To cast some light on the complex dynamics between health and economic concerns related to the COVID-19 pandemic and associated lockdown, we conducted two subsequent surveys on two representative samples of the Italian population recruited during two crucial phases of this health emergency in Italy: five days after the first COVID-19 patient detection and five days after the conclusion of the lockdown phase in Italy. The study compares and tracks changes in the Italians' attitudes toward COVID-19 risk, engagement in health prevention, and the household economic situation in these two crucial moments.

Methods

Sampling

This study is part of a broader project ("Italian Citizens' Food Habits Monitoring From a Consumer Psychology Perspective") aimed at monitoring Italian citizens' habits. The current study compares data from two cross-sectional studies and was conducted through repeated computer-assisted web interview surveys on samples of about 1,000 citizens, weighted to be representative of the Italian population. The study was intended to track changes in people's orientations in relation to the evolving health and economic situation of the country.

The first wave was carried out between February 28 and March 4, 2020, during the first days of the Italian lockdown for some areas, the so-called red zones (phase 1); some of the results are described by Graffigna and colleagues.²⁰ A second wave was then carried out between May 12

and May 18, 2020, during the first few days after reopening (phase 2). Some early results from this second wave are also described in a previous paper.¹⁸

A professional panel provider, Norstat s.r.l. (<https://norstat.it/>), was in charge of the participants' selection through stratified random sampling for both waves. Respondents were rewarded through the Norstat system. The first sample was composed of 1,000 Italians, from which 32 were excluded because the demographic data provided by those respondents and those provided by the panel were inconsistent (there were discrepancies between reported and known gender and/or age). The second sample was composed of 1,004 participants. Both samples were weighted to be representative of the Italian population for gender, age, employment, geographic area, and dimension of urban center of residence. Because of this characteristic, the two samples were statistically comparable, though independent. To be included in the survey, participants needed to be over 18 years old, be able to read and understand Italian, and live in Italy. The percentages relating to the Italian population were retrieved from the website of ISTAT (<https://www.istat.it/>). All analyses were carried out with IBM SPSS 23 (release 23.0.0.0).

Study Measures

In both waves, participants were asked to complete an online survey comprising a series of questions answered on Likert-type scales. Specifically, the survey included:

- Five statements regarding trust in scientific research and in the authorities' capability of managing the health emergency in an effective way. Participants were asked to state their agreement with the statements on a five-point Likert scale.
- Three statements regarding the participants' relationship with the health care system and workers, particularly focused on cooperation. Again, participants were asked to rate their agreement on a five-point Likert scale.
- Five statements regarding health self-management and sense of responsibility, rated on a five-point Likert scale.
- One question about perceived vulnerability (risk of being infected, rated from 1, low, to 5, high) and one question regarding general concern for the emergency (from 1, low, to 10, high); only

for the second wave, we also asked about perceived vulnerability and concerns for the financial consequences of COVID-19.

We adopted the revised version of the Patient Health Engagement Scale (PHE-s) as used in a previous study reporting early results of the project²⁰ to measure participants' health engagement. This measure, developed according to the Patient Health Engagement (PHE) model,²¹ assesses the citizens' health engagement level, defined as "people's psychological readiness and sense of mastery to become active players in their own health management and health risk prevention." According to the score obtained, each respondent resulted in one of the four positions of health engagement, which, as described in the PHE model, describe people with growing levels of health engagement: blackout (people shocked by the event), arousal (people in an anxious state, constantly looking for signs of alarm), adhesion (people who have started accepting the situation), or eudaimonic project (people who have adapted to the situation).

Two questions asked participants to rate their perceived personal and national current financial situation, stating whether they feel it is "better," "equal," or "worse" than one year earlier; we also asked them two questions about the future financial situation.

Statistical Analyses

To investigate changes in variables' averages across the two samples, a series of independent sample *t*-tests was carried out. Cohen's *d* was also computed as a measure of effect size. Whenever the difference between waves was found to be significant, a general linear model (GLM) was computed with the specific dependent variable (DV) to assess whether this change was specific for some groups of interest. The GLMs had, as independent variables (IVs), wave, gender, age group (defined by the 33rd and 66th percentiles—namely, 38 and 52 years old), and whether the participant was a resident in one of the four regions with higher numbers of cases in the period of the second point of measurement, generally considered the hardest hit regions in Italy and often referred to as "red regions" (Lombardia, Veneto, Emilia-Romagna, and Piemonte).²² The computed factorial model was not full, as not every interaction was deemed interesting for our purposes; only interactions with the IV wave

(gender*wave, age group*wave, region*wave) were assessed. Main effects were also considered.

For health engagement groups and for the items regarding the financial situation, since they only allowed categorical answers, Pearson's χ^2 was computed to test the hypothesis that the distributions were equal across groups. Whenever the χ^2 result was significant, column percentages were confronted as post hoc with a z -test (corrected with Bonferroni method), as suggested by Sharpe.²³

Results

Sample Characteristics

Table 1 shows weighted sample characteristics in wave 1, wave 2, and the Italian population. Both samples were adequately representative of the Italian population and thus were comparable.

Trust in Authorities

Results showed that while trust toward institutions and the National Healthcare System (NHS) remained stable, trust toward scientific research actually decreased ($t_{(1969)} = 4.947$; $p < 0.001$). Conversely, perception of government effectiveness in dealing with the COVID-19 pandemic slightly increased in wave 2 ($t_{(1969)} = -2.611$; $p = 0.009$), while perceived effectiveness of the NHS remained stable.

Table 2 reports in detail all the t -test results with means (M), standard deviations (SD), and effect sizes for both groups.

The GLM with trust toward scientific research as the DV confirmed the main effect of wave ($F_{1, 2166} = 29.658$; $p < 0.001$; $\eta_p^2 = 0.014$). Moreover, a main effect of gender was also found ($F_{1, 2166} = 4.658$; $p = 0.031$; $\eta_p^2 = 0.002$; males: $M = 4.02$, $SD = 0.89$; females: $M = 3.96$, $SD = 0.91$). Finally, a main effect of age group was found statistically significant ($F_{2, 2166} = 7.428$; $p < 0.001$; $\eta_p^2 = 0.009$). Bonferroni post hoc tests showed that the third age group ($M = 4.10$, $SD = 0.82$) had significantly higher levels of trust in research when compared with the first group ($M = 3.9$, $SD = 0.96$; $p = 0.002$) and with the second group ($M = 3.9$, $SD = 0.96$; $p < 0.001$). No difference was found between the

Table 1. Sample Characteristics

	Wave 1	Wave 2	Italian Population
	N (%)	N (%)	%
Gender			
Male	473 (48.9)	493 (49.1)	49.3
Female	495 (51.1)	511 (50.9)	50.7
Education			
Middle school or lower	142 (14.6)	126 (12.5)	—
High school	586 (60.6)	602 (60.0)	—
College degree	240 (24.8)	276 (27.5)	—
Employment			
Entrepreneur/freelancer	119 (12.3)	124 (12.4)	12.4
Manager/official/middle manager	36 (3.7)	38 (3.8)	3.8
Employee/teacher/military	170 (17.6)	193 (19.2)	19.2
Worker/shop assistant/apprentice	202 (20.9)	211 (21.0)	21.0
Homemaker	146 (15.1)	151 (15.0)	15.0
Student	54 (5.5)	53 (5.3)	5.3
Retired	77 (7.9)	79 (7.9)	7.9
Unemployed	147 (15.2)	155 (15.4)	15.4
Other	17 (1.8)	—	—
Age Group			
18-24	98 (10.1)	101 (10.1)	10.0
25-34	156 (16.1)	164 (16.3)	16.3
35-44	209 (21.6)	215 (21.4)	21.5
45-54	215 (22.2)	228 (22.7)	22.7
55-59	106 (11.0)	109 (10.8)	10.8
60-70	183 (19.0)	188 (18.7)	18.8
Geographical Area			
Northwest	251 (26)	264 (26.3)	26.3
Northeast	177 (18.3)	187 (18.6)	18.6
Central	191 (19.7)	198 (19.7)	19.7
South and islands	348 (36)	355 (35.4)	35.5
Resident in regions with the highest COVID-19 numbers (“red regions”)			
Yes (Lombardia, Emilia-Romagna, Veneto, Piemonte)	375 (38.7)	389 (38.8)	39.5
No	593 (61.3)	615 (61.2)	60.5

Continued

Table 1. (Continued)

	Wave 1	Wave 2	Italian Population
	N (%)	N (%)	%
Urban center size			
Up to 10,000 inhabitants	313 (32.3)	314 (31.3)	32.1
10,001-100,000 inhabitants	430 (44.4)	443 (44.1)	44.0
100,001-500,000 inhabitants	102 (10.6)	109 (10.9)	10.9
More than 500,000 inhabitants	117 (12.1)	130 (12.9)	12.9
Missing	6 (0.6)	8 (0.8)	—

first and second groups. No main effect of “red regions” was found, nor any interactions between IVs.

As for the government’s perceived effectiveness, the GLM analysis confirmed the main effect of wave, although it was only marginally significant ($F_{1, 2166} = 4.275; p = 0.039; \eta_p^2 = 0.002$). A main effect of red regions was also found statistically significant ($F_{1, 2166} = 29.665; p < 0.001; \eta_p^2 = 0.011$), with regions more heavily struck by the contagion having a lower level (red region: $M = 3.11, SD = 1.12$; nonred region: $M = 3.33, SD = 1.08$). Finally, a significant main effect of age groups was also found ($F_{2, 2166} = 7.875; p = 0.001; \eta_p^2 = 0.006$). Bonferroni post hoc tests showed that there was a significant difference between the first ($M = 3.16, SD = 1.09$) and third groups ($M = 3.34, SD = 1.11$) with $p = 0.0001$. No other main effect or interaction was found significant.

Relationship With Health Care System and Operators

Regarding the relationship with the health care system and health care workers, our results showed that even though the general belief that cooperating with health care professionals is important remained stable, the relationship with the general practitioner declined, though only slightly. In particular, in the second wave, participants reported being

Table 2. *T*-Test Comparisons Between Wave 1 and Wave 2^a

	Mean (SD) Wave 1	Mean (SD) Wave 2	t (df)	<i>P</i> -Value	Cohen's <i>d</i>
Trust in authorities					
I fully trust the NHS	3.66 (0.93)	3.60 (0.95)	1.342 (1969)	n.s.	—
I fully trust scientific research	4.09 (0.87)	3.89 (0.91)	4.947 (1969)	<0.001	0.22
I fully trust institutions	2.99 (1.05)	2.96 (1.10)	0.624 (1969)	n.s.	—
The government and the authorities are managing effectively the diffusion of COVID-19 in Italy	3.18 (1.09)	3.31 (1.12)	-2.611 (1969)	.009	0.12
The NHS is acting in the best possible way to reduce the diffusion of COVID-19	3.67 (0.98)	3.66 (0.96)	0.133 (1969)	n.s.	—
Relationship with health care system/operators					
It's important to cooperate with health care workers in defining how to manage my own health	4.06 (0.73)	4.07 (0.78)	-0.352 (1969)	n.s.	—
I usually share with my general practitioner the concerns about my own health	3.31 (1.00)	3.17 (1.07)	2.865 (1969)	0.004	.14
I usually tell my general practitioner unusual symptoms	3.47 (0.96)	3.38 (1.05)	2.028 (1969)	0.043	.09

Continued

Table 2. (Continued)

	Mean (SD) Wave 1	Mean (SD) Wave 2	t (df)	P-Value	Cohen's d
Health management					
I am the first responsible in the prevention of COVID-19 for myself	3.74 (0.92)	4.14 (0.83)	-10.171 (1969)	<0.001	0.46
Preventive behaviors against COVID-19 are an act of social responsibility	4.16 (0.86)	4.35 (0.82)	-4.995 (1969)	<0.001	0.23
I can manage my own health effectively	3.77 (0.72)	3.83 (0.72)	-1.862 (1969)	n.s.	—
I spend a lot of time getting informed about health	3.45 (0.85)	3.52 (0.76)	-1.824 (1969)	n.s.	—
I can manage my own health even under stress	3.76 (0.76)	3.80 (0.76)	-1.068 (1969)	n.s.	—
Worries and concerns for health					
How concerned are you about the COVID-19 emergency?	6.04 (2.49)	7.51 (2.06)	-14.331 (1969)	<0.001	0.64
How much do you feel at risk of being infected by COVID-19?	2.96 (1.05)	3.08 (0.96)	-2.674 (1969)	0.008	0.12

Abbreviations: n.s., not significant; SD, standard deviation; df, degrees of freedom; NHS, National Healthcare System.
 a Responses to questions in the categories of trust in authorities, relationship with health care system/operators, and health management were given on a five-point Likert scale, where 1 = definitely not agree and 5 = definitely agree. Responses to questions about worries and concerns for health were given on a ten-point scale, where 1 = not at all and 10 = a lot.

less prone to share with their general practitioners (GPs) concerns about their own health ($t_{(1969)} = 2.865$; $p = 0.004$) and to tell the doctors unusual symptoms ($t_{(1969)} = 2.028$; $p = 0.043$).

The GLM confirmed the main effect of wave on the propensity of participants to share concerns with their GPs ($F_{1, 2166} = 9.572$; $p = 0.003$; $\eta_p^2 = 0.004$). A main effect of age group was also found significant ($F_{2, 2166} = 19.992$; $p < 0.001$; $\eta_p^2 = 0.018$). Bonferroni post hoc tests showed that the third group ($M = 3.43$, $SD = 0.94$) had a higher mean than both the first ($M = 3.09$, $SD = 1.10$; $p < 0.001$) and the second groups ($M = 3.23$, $SD = 1.05$; $p = 0.001$). Moreover, the second group was found significantly higher than the first with $p = 0.028$. No other main effect or interaction was found significant for this DV.

Concerning the GLM with propensity to share unusual symptoms with the GP as DV, the analyses confirmed a marginal main effect of wave ($F_{1, 2166} = 4.705$; $p = 0.030$; $\eta_p^2 = 0.002$). Again, a main effect of age group was found significant ($F_{2, 2166} = 24.128$; $p < 0.001$; $\eta_p^2 = 0.022$). Bonferroni post hoc tests showed that the third group ($M = 3.63$, $SD = 0.87$) had a higher average than both the first group ($M = 3.27$, $SD = 1.07$; $p < 0.001$) and the second group ($M = 3.39$, $SD = 1.02$; $p < 0.001$). The difference between the first and the second group was marginally significant, with $p = 0.049$.

Health Prevention Attitudes, Self-Management, and Health Engagement

Regarding the sense of self and social responsibility in preventing COVID-19, in the second wave of data collection participants reported feeling more responsible in preventing the contagion ($t_{(1969)} = -10.171$; $p < 0.001$) and more socially responsible ($t_{(1969)} = -4.995$; $p < 0.001$). However, their perceived capacity of actual self-management (normally and under stress) in health prevention remained stable, as did the amount of time they reported spending to get informed about health-related issues.

The GLM with participants' feelings of self-responsibility as DV confirmed the significant main effect of wave ($F_{1, 2166} = 99.226$; $p < 0.001$; $\eta_p^2 = 0.044$). Moreover, a main effect of the IV gender was also found significant ($F_{1, 2166} = 10.757$; $p = 0.001$; $\eta_p^2 = 0.004$). In particular, the average of the male group was significantly lower than that of the

female group ($M = 3.89$, $SD = 0.90$ vs. $M = 4.01$, $SD = 0.88$ for men and women, respectively). No other main effect or interaction was significant.

As for social responsibility, the GLM confirmed the significant main effect of wave ($F_{1, 2166} = 29.282$; $p < 0.001$; $\eta_p^2 = 0.013$). Moreover, significant main effects of gender ($F_{1, 2166} = 36.307$; $p < 0.001$; $\eta_p^2 = .017$) and age group ($F_{1, 2166} = 10.368$; $p < 0.001$; $\eta_p^2 = 0.010$) were found. In particular, our results showed that the male group had a lower mean when compared with the female group ($M = 4.15$, $SD = 0.87$ vs. $M = 4.36$, $SD = 0.81$, respectively). As for age groups, Bonferroni post hoc tests showed that the first group ($M = 4.15$, $SD = 0.92$) had a lower average than both the second group ($M = 4.28$, $SD = 0.83$; $p = 0.043$) and the third group ($M = 4.36$, $SD = 0.75$; $p = 0.044$).

Regarding health engagement levels, the frequencies of the four positions appeared to change between the first and second waves, as confirmed by a significant χ^2 test ($\chi^2_{(3)} = 79.403$; $p < 0.001$): indeed, in the first wave 16% of our sample resulted in eudaimonic project (i.e., the higher, more balanced level of health engagement); during the second wave, only 5.6% of the sample was in eudaimonic project. The percentage difference was statistically significant at 5%. This trend is confirmed when looking at the differences in percentages between the first and second waves in the blackout group (from 1.1% to 2.8%, which is more than double) and in the arousal group (from 21.4% to 32.4%). Table 3 shows the contingency table with observed cases and column percentages.

Worries and Concerns

Results showed that although perceived vulnerability increased only by a slight, though significant, amount between wave 1 and wave 2 ($t_{(1969)} = -2.674$; $p = 0.008$), the participants' general concern for the emergency increased by a greater amount ($t_{(1969)} = -14.331$; $p < 0.001$).

The GLM with perceived vulnerability as DV confirmed the main effect of wave ($F_{1, 2155} = 10.524$; $p = 0.001$; $\eta_p^2 = 0.005$). Additionally, a main effect of age group was found ($F_{2, 2155} = 11.930$; $p < 0.001$; $\eta_p^2 = 0.011$). In particular, Bonferroni post hoc tests showed that the second age group ($M = 3.16$, $SD = 1.05$) had a higher perceived risk than both the first ($M = 3.0$, $SD = 1.03$; $p = 0.006$) and the third

Table 3. Health Engagement Positions' Distribution Across the Two Waves

Health Engagement Position	Wave 1	Wave 2	<i>Z-Test</i>
	Observed	Observed	
	Column %	Column %	
Blackout	11 1.1%	28 2.8%	*
Arousal	207 21.4%	325 32.4%	*
Adhesion	595 61.5%	595 59.3%	—
Eudaimonic project	155 16.0%	56 5.6%	*

$\chi^2_{(3)} = 79.403; p < 0.001$.

Asterisks indicate column percentages that were significantly different at 0.05 after a Bonferroni-corrected z-score test.

group ($M = 2.91$, $SD = 0.91$; $p < 0.001$). No other significant main effect was found. However, two marginally significant interactions were found, namely wave*age group ($F_{2, 2155} = 3.787$; $p = 0.023$; $\eta_p^2 = 0.004$) and wave*red regions ($F_{2, 2155} = 3.787$; $p = .023$; $\eta_p^2 = 0.004$).

Following the significant interaction, we were interested in assessing whether the IV wave had a main effect in each of the three age groups. Pairwise comparisons of waves inside the different age groups were computed; results showed that while both the second and third age groups' perceived vulnerability increased between the first and second points of measurement (mean difference of 0.164, with $p = 0.026$, and mean difference of 0.280, with $p < 0.001$, for the second and third groups, respectively), there was no significant difference for the younger group ($p = 0.86$). Following the significant interaction wave*red regions, pairwise comparisons of waves inside the different regions were computed; results showed that although for the nonred regions there was no significant difference between the first and second waves ($p = 0.41$), in the red regions there was a significant difference between means (0.242; $p = 0.001$).

The GLM with general concern as DV showed a main effect of wave ($F_{1, 2163} = 234.753; p < 0.001; \eta_p^2 = 0.098$), hence confirming results from the *t*-tests of gender ($F_{1, 2163} = 34.784; p < 0.001; \eta_p^2 = 0.016$) and of age group ($F_{2, 2163} = 4.526; p = 0.011; \eta_p^2 = 0.004$). In particular, the female group showed a higher concern ($M = 7.08, SD = 2.32$) when compared with the male group ($M = 6.52, SD = 2.43$). Bonferroni post hoc analyses showed that the main effect of age group was determined by the first age group ($M = 6.63, SD = 2.28$) having a lower level of mean concern when compared with the second group ($M = 6.97, SD = 2.46; p = 0.01$). Moreover, the interactions wave*age group and wave*red regions were marginally significant ($F_{2, 2163} = 3.944; p = 0.020; \eta_p^2 = 0.004$ and $F_{1, 2163} = 5.447; p = 0.020; \eta_p^2 = 0.003$, respectively).

To investigate further the wave*age group interaction, pairwise comparisons of waves inside the age groups were computed. Results showed a significant simple main effect of wave for each age group, with $p < 0.001$ (mean differences of 1.14, 1.68, and 1.75 for the first, second, and third age groups, respectively). To investigate why the interaction was significant, pairwise comparisons of age groups inside waves were also computed. Results showed that although in the first wave there were no differences between regions (all *p*-values > 0.64), in the second wave the younger group reported a lower level of concern when compared with the other two groups (difference in means of 0.62 with the second group, with $p < 0.001$, and of 0.47 with the third group, with $p = 0.018$). To further investigate the wave*red regions interaction, pairwise comparisons of waves in the different regions were computed. Results showed for both the red and nonred regions there was a significant simple main effect of wave (difference in means 1.29, with $p < 0.001$, and 1.76, with $p < 0.001$, for nonred and red regions respectively). To investigate why the interaction was significant, pairwise comparisons of red regions inside waves were also computed. Results showed that although in the first wave there was a significant difference between red and nonred regions—difference in means of 0.36, with $p = 0.01$ and, surprisingly, higher concern in nonred areas—more surprisingly, no difference was present as of the second wave ($p = 0.45$).

Nevertheless, when comparing (in wave 2) perceived vulnerability toward COVID-19 versus perceived vulnerability toward the financial consequences of the pandemic, results showed that in our sample, health vulnerability ($M = 3.08, SD = 0.96$) was higher than financial

vulnerability ($M = 3.66$, $SD = 0.92$) ($t_{(1003)} = -15.896$; $p < 0.001$; $d = 0.62$). The same goes for citizens' concern for the financial situation ($M = 8.45$, $SD = 1.73$), which is higher than the general concern for the pandemic ($M = 7.51$, $SD = 2.06$) ($t_{(1003)} = -13.256$; $p < 0.001$; $d = 0.49$).

This is consistent with the results from the Pearson's χ^2 test on the four items regarding the perceived financial situation ($\chi^2_{(2)} = 105.117$, $p < 0.001$; $\chi^2_{(2)} = 71.936$, $p < 0.001$; $\chi^2_{(2)} = 182.625$, $p < 0.001$; $\chi^2_{(2)} = 54.818$, $p < 0.001$; for personal current situation, personal future situation, national current situation, and national future situation, respectively), which show that the perception of the current situation and the future situation changed between the first and second waves. In particular, post hoc z -tests showed that there was a significant decrease of "better" answers for the personal current financial situation (from 7.8% to 5.2%), the personal future situation (from 15.4% to 12%), and the national current situation (from 6.3% to 4.2%). There was no statistically significant difference between column percentages in the "better" group for the future national situation. Consistently, there was an increase in the percentages of people answering "worse" to the questions regarding their personal current situation (from 21.5% to 43.1%), personal future situation (from 20.0% to 37.4%), national current situation (from 51.5% to 79.9%), and national future situation (from 41.0% to 57.4%). Table 4 reports the contingency tables with observed values, column percentages, and results of the z -test comparisons.

Discussion

Urgent preventive measures such as home quarantine and lockdown have been demonstrated to be effective in slowing the SARS-CoV-2 virus spread in the first months of the pandemic.^{1,2} However, the negative impact of such measures in terms of psychological and socioeconomic burden on the population should not be neglected.⁴ Our study constitutes a unique vantage point on how health engagement and trust in public authorities changed during the first months of the COVID-19 pandemic in Italy, namely, during the lockdown period, which probably exerted an impact on these aspects. In particular, the study results cast light on the dilemmatic interlacements between

Table 4. Citizens' Sentiment Toward Economy and Health Engagement Across Waves

Item (statistics)	Answer	Wave 1	Wave 2	Z-Test
		Observed Column %	Observed Column %	
How is your (or your family's) financial situation compared to one year ago? (Pearson's $\chi^2 = 105.117$; $p < 0.001$)	Better	75 7.8%	52 5.2%	*
	Equal	684 70.7%	519 51.7%	*
	Worse	208 21.5%	433 43.1%	*
In a year, do you think that you and your family will be doing financially better or worse than today? (Pearson's $\chi^2 = 71.936$; $p < 0.001$)	Better	149 15.4%	120 12.0%	*
	Equal	625 64.6%	509 50.7%	*
	Worse	194 20.0%	375 37.4%	*
Considering the Italian financial situation, do you think that, compared to one year ago, it is... (Pearson's $\chi^2 = 182.625$; $p < 0.001$)	Better	61 6.3%	42 4.2%	*
	Equal	408 42.2%	160 15.9%	*
	Worse	498 51.5%	803 79.9%	*
Generally speaking, do you think that in the next 12 months, for the Italian economy, things will go... (Pearson's $\chi^2 = 54.818$; $p < 0.001$)	Better	55 5.7%	51 5.1%	-
	Equal	516 53.4%	376 37.5%	*
	Worse	396 41.0%	576 57.4%	*

Asterisks indicate column percentages that were significantly different at 0.05 after a Bonferroni-corrected z-score test.

economic and health concerns in the Italian citizens' psychological appraisal of the COVID-19 risk. Findings also highlighted the psychological dynamics that may influence the success or failure of a preventive plan.²⁴

The evidence collected shows how general concern for the COVID-19 pandemic increased by a rather large degree between the first and second

waves of data collection. This is consistent with the number of cases and deaths that occurred within that period, but still apparently discordant with the epidemiological situation as of May 2020. At that time, the reduction of the rate of spread of SARS-CoV-2 and of the number of daily new cases in Italy led health care authorities to suspend the lockdown and relax the containment measures. This element confirms that the subjective appraisal of the severity of a health risk is often mediated by psychological meaning-making processes,²⁵ which may be disjointed and even independent of the objective appraisal of the epidemiological evaluation of a health risk condition.

Moreover, our results show that the perceived risk of getting the infection, which increased (even though only by a small degree) in the general sample, did not increase nor change significantly for the younger people in the sample. This again underlines the importance of the psychological appraisal of a health risk situation, despite the actual situation of risks. Furthermore, a large corpus of research has demonstrated the bias of invulnerability typically shared by younger generations in the face of a health risk such as an infectious disease.²⁶

Regardless of this, the perceived worsening of the economic situation in Italy as a consequence of the closure of commercial and industrial processes, as suggested by our results (which show that an important percentage of people perceived a worsening in both their own personal and the national financial situations, both current and expected in the future), led the population to become more pessimistic in this regard, to the point that the concerns for the financial consequences of the pandemic overtook, by a large degree, concerns for health. As demonstrated by previous research, worries related to one's own work situation due to the pandemic crisis,²⁷ the loss of purchasing power in families, and the general increase of the national debt are all potential dramatic consequences of lockdown measures²⁸ and, as suggested by our results, may lead to an increase in the individuals' concern and sense of vulnerability.

Collaboration between citizens and health care professionals is also crucial in the case of a health emergency. In particular, citizens' engagement in health prevention is fundamental in order to guarantee the success of behavioral measures to mitigate the COVID-19 pandemic.²⁰ However, citizens' engagement in health management and their attitudes toward preventive measures are functions of the individual's sense of self-efficacy and of their optimism in relation to their ability to cope with the critical event.^{29–31} The interlaced psychological

dynamics between health and economic concerns in emotionally coping with the COVID-19 pandemic may lead to a decrease in trust of health authorities, scientific research, and health professionals.^{17,18} The moderate decrease of trust of science that we observed is discordant with existing literature showing an increase in trust of institutions^{32,33} and could be due to some Italian cultural peculiarities, the heated political debate concerning the management of the emergency, and the implemented countermeasures. Regardless of the causes, which will require future studies, this is a concern that should be noted and addressed, as it could hamper the capability of the government and of the institutions to effectively implement new preventive measures, as their political capital and consent decreases, while citizens' compliance also diminishes.

Our data also show a worrying—although marginal in size—decrease in citizens' trust in their medical doctors and in citizens' willingness to communicate their health symptoms to their general practitioner in a timely manner. This should be seen as an alarm signal: the management of the first period of the COVID-19 emergency in Italy has demonstrated the importance of improving the effectiveness of primary care and of shifting from a “hospital center” model of pandemic management to a “community center” one.³⁴ Moreover, we observed in our samples a significant increase in people reporting low levels of health engagement, which has been demonstrated to be a predictor of maladaptive behaviors such as stockpiling goods from supermarkets.²⁰ In this regard, general practitioners should play a crucial role in the early detection of infected individuals and in the promotion of their health management. However, the success of this model implies the strong partnership between health care professionals and their patients, and the citizens' engagement in all the phases of infection detection and management.

Limitations

This study has some limitations: First, this study was not designed as a longitudinal study with single subjects being tracked over time. Thus, inferences regarding changes over time should be regarded with some caution. Nevertheless, the two samples were designed to be comparable and both representative of the Italian population, hence supporting the reliability and relevance of our data and analyses. Moreover, the

effect sizes of the tested models were most of the time small or modest, and given the sample size and the number of tested hypotheses, the generalizability of results with a significant p -value greater than 0.01 should be regarded with some caution. Finally, assumption evaluation indicated that homogeneity of variance was not completely satisfactory for a few DVs (Levene's test was significant with $p < 0.05$). However, analyses run with Welch's correction on main effects yielded overall similar results, potentially implying a minor effect on the tests' reliability. Moreover, results from Levene's test could also be affected by the large sample size. A few DVs also violated the assumption of normality (skewness or kurtosis $> |1|$), although by a lesser degree. However, the same analyses run on normalized variables (transformed with a $\log_{(10)}$ function) yielded similar results, supporting the robustness of the reported results.

Conclusions

Regardless of the limits of this study, which are shared by most cross-sectional, computer-assisted web interview-based studies, this work is a relevant account of how a pandemic and the necessary countermeasures enacted by the authorities can affect citizens' trust and cohesion with health and health care.

Our results show how lockdown measures, although scientifically effective in containing the spread of COVID-19, may have a disruptive impact on citizens' psychological attitudes toward their health management and on their willingness to collaborate with health care professionals in the effective management of the contagion's spread. This also suggests that lockdown measures, if not accompanied by dedicated educational and counseling plans and mitigated by social-welfare policies dedicated to the population, may undermine citizens' trust in public authorities. Promoting people's health engagement, by making them feel that they are partners in the health preventive endeavor, is a crucial asset to ensure a better psychosocial acceptance of lockdown measures.

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Funding/Support: This work was supported by the Fondazione Cariplo and Regione Lombardia within the CRAFT (Cremona Agri-Food Technologies) project ID 2018/2757.

Conflict of Interest Disclosure: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Data availability: Raw data are available upon request to the corresponding author.

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