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4 **Psychological well-being and lockdown:**
5 **a study on an Italian sample during the first COVID-19 wave**
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24 In February and March 2020, the Italian government decided to provide guidelines in order to
25 counter the spreading of Coronavirus disease (COVID-19). Several studies have shown that the
26 first Lockdown deeply affected the psychological well-being of the individuals, but the role of
27 possible protective variables is currently not known. In the present study we aimed to investigate
28 the impact of several psychological variables on individuals' mental states and emotions
29 experienced during the first Lockdown in Italy. Participants were 172 Italian adults and they were
30 asked to answer several questions regarding the intensity of mental states and emotions
31 experienced, the perceived usefulness of lockdown, the feeling of living a normal life, and the
32 coping strategies implemented to face the pandemic. Results showed that, during the first wave of
33 COVID-19 in Italy, only the perceived usefulness of lockdown positively affected people's
34 emotions. This result suggests that a better communication of the experimental findings supporting
35 the political decisions made, and behavioral measures shaped to increase people's commitment to
36 the proposed rules are crucial in order to enhance people's wellbeing. While this result is limited
37 to the first wave and the first lockdown, future research should assess the role of rule acceptance
38 and coping strategies in subsequent waves of COVID-19, and consequent partial or total
39 lockdowns.

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41 **Keywords:** COVID-19; Emotions; Perceived usefulness; Psychological well-being

43 On February 17th, 2020, the first Italian citizen infected by the Coronavirus disease (SARS-CoV-2
44 or COVID-19) was discovered in Codogno, Lombardy. After the emergence of several cases in the
45 following days across the whole Italian territory, the government decided on March 9th to forbid
46 unnecessary and unmotivated travels, to close schools and universities and to suspend all the in-
47 person events in order to limit social contact. This period, generally labeled as the first Lockdown
48 or the first wave of COVID-19, lasted approximately three months, until the end of May 2020.
49 Similar decisions have been made across a large number of Western countries to prevent the spread
50 of the infection. This period of time deeply affected the psychological well-being of the population,
51 as it interfered with their daily functioning (Groarke et al., 2020) for months, in addition to
52 impacting the physical health for those who contracted the virus.

53 A very large number of studies have been conducted around the world on the impact of lockdown,
54 because of its potential major impact on many everyday life aspects and activities, from the effects
55 on the economy to the potential negative influence on social and psychological well-being. Starting
56 from the first lockdown measures, the literature recorded a general increase in stress, depression,
57 anxiety and obsessive behaviors, and a worsening of sleep quality in individuals who felt the burden
58 of worry about infecting and being infected by COVID-19 (Abba-Aji et al., 2020; Asmundson &
59 Taylor, 2020).

60 Fear and anxiety about COVID-19 became a major problem, to the point of being considered a
61 form of Post Traumatic Stress Disorder (PTSD) (Torales et al., 2020; Tagliabue et al., 2021).
62 Interestingly, Tambelli et al (2021) looked at the role of psychological variables that can mediate
63 the severity of pandemic-related PTSD symptomatology, confirming how fear of infection directly
64 affects the symptoms.

65 Emotional dysregulation has been observed in the population, with both externalizing (e.g.,
66 irritability, inability to relax) and internalizing (e.g., sense of loneliness, boredom, poor
67 concentration) behavior disorders and symptoms in children, as well as an increase in anxiety
68 disorders in teenagers (Orgilés, Morales, Delvecchio, Mazzeschi, & Espada, 2020). In addition,
69 Shigemura and colleagues (2020) found that in adults the fear of the unknown lead to the
70 development of mental disorders such as stress, anxiety, depression and increased alcohol and
71 tobacco addiction. Finally, other studies highlighted the elements that can lead to specific distress,
72 such as: prolonged separation from those we love, loss of freedom, uncertainty about the progress
73 of the pandemic, and feeling of worthlessness (Cao et al., 2020; Li & Wang, 2020).

74 The need to reduce social contacts to prevent the spread of COVID-19 and to preserve physical
75 health, has deeply affected basic social needs. Besides the high level of stress and increase of mental

76 disorders related to the pandemic, a more general poorer psychological well-being has been
77 associated with social isolation and the poor quality of the relationships, in addition to the need to
78 adapt to daily changes. A poor network of social contacts was found to exacerbate the effect of
79 COVID-19 on psychological well-being (Birditt, Turkelson, Fingerman, Polenick, & Oya, 2020).
80 Indeed, Brooks and colleagues (2020) described the current pandemic as a new, complex and
81 multifaceted form of psychosocial stressor and found that this extended period of social distancing
82 interfered with experiencing empathy towards others, increasing the depersonalization of
83 relationships or forced virtual empathy (Saladino et al., 2020).

84 However, recent evidence has highlighted that several protective factors have allowed the
85 development of coping strategies to face psychological stress, such as social support, humor, sport,
86 and sharing thoughts and feelings about COVID-19 with others, (Armor, McGlinchey, Butter,
87 McAloney-Kocaman, & McPherson, 2020; Golemis et al., 2021). Moreover, it is interesting to note
88 that the use of social media was also fundamental in helping to deal with the problems created by
89 lockdown, as shown by the increase in favorable attitudes and opinions (Cecalupo, Scarci, Marini
90 & Livi, 2020) following the press conferences in which new guidelines or restrictions were decreed
91 to decrease the development of COVID-19.

92 Coping strategies aiming to reduce the level of stress are widely studied in literature, but their
93 application in a pandemic scenario is still poorly understood (Ornell, Schuch, Sordi, & Kessler,
94 2020) even if their role might be crucial.

95 Here, we aimed to investigate the impact of several psychological variables, such as the perceived
96 usefulness of lockdown, the feeling of living a normal life, and various coping strategies
97 implemented to face the pandemic, on individuals' mental states and emotions experienced during
98 the first Lockdown in Italy. The main goal of this study was thus to extend the research on the
99 effect of COVID-19 pandemic on elements that might protect people's psychological health (i.e.,
100 mental states and emotions experienced during this period).

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Methods

103 Participants

104 The present research was conducted on a group of 172 Italian adults (55M). 72 were under 25 years
105 of age, 30 were between 26 and 35 years, 41 were between 36 and 50 years and 29 were over 51,
106 Table 1 shows the distribution of the individuals by gender and age groups. Table 2 represents the
107 distribution of level of education. Forty five percent of the sample were students, six percent were
108 unemployed, five percent were retired, and forty-two percent were actively employed. The

109 participants' distribution across different parts of the country was as follows: 16,3% were from
 110 Northern Italy, 62,8% from Central Italy, and 20,9% from Southern Italy.

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Tab. 1. Distribution of participants by age group and gender

		Age				Total
		<25	26-35	36-50	>51	
Gender	Women	52	22	26	17	117
	Men	20	8	15	12	55
Total		72	30	41	29	172

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Tab. 2. Distribution of participants by education

	Total (N= 172)
<i>Education, n (%)</i>	
Until Middle School	11 (6,4)
High School	49 (27,3)
Bachelor degree	51 (29,7)
Master degree	54 (31,4)
PhD	7 (4,1)

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118 **Procedure**

119 Participants were contacted and tested during the first Italian lockdown between March and May
 120 2020. The survey was developed on Google Forms and the recruitment was conducted through
 121 social media.

122 The study was approved by the Department Ethics Committee of La Sapienza University of Rome.
 123 After providing informed consent and demographic information, participants were asked to answer
 124 several questions regarding: i) the intensity of the mental states and the emotions experienced, ii)
 125 the perceived usefulness of lockdown, iii) the feeling of living a normal life, and iv) the coping
 126 strategies implemented to face the pandemic.

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128 **Instruments**

129 The questionnaire measuring the intensity of the mental states and the emotions experienced was
 130 based on two existing scales, the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 2001)
 131 and the Brunel Mood Scale (BRUMS; Terry, Lane, & Fogarty, 2003).

132 The BMIS is a mood scale consisting of 16 mood-adjectives to which a person responds (e.g., Are
133 you happy?). The scale can provide measures of overall pleasant-unpleasant mood (Cronbach's α
134 = .83), arousal-calm mood (Cronbach's α = .58), and it can also be scored according to positive-
135 tired (Cronbach's α = .77) and negative-calm mood (Cronbach's α = .76). The 16 items are: Happy,
136 Lively, Drowsy, Grouchy, Sad, Peppy, Tired, Nervous, Caring, Calm, Content, Loving, Gloomy,
137 Fed up, Jittery, Active.

138 The BRUMS is composed by 24 items presenting 24 mood adjectives.

139 The items are arranged into six subscales:

140 • Anger: annoyed, bitter, angry, bad-tempered (Cronbach's α = .72);

141 • Confusion: confused, muddled, mixed-up, uncertain (Cronbach's α = .77);

142 • Depression: depressed, downhearted, unhappy, miserable (Cronbach's α = .74);

143 • Fatigue: worn out, exhausted, sleepy, tired (Cronbach's α = .70);

144 • Tension: panicky, anxious, worried, nervous (Cronbach's α = .71);

145 • Vigor: lively, energetic, active, alert (Cronbach's α = .70).

146 Each adjective represents the answer to a question such as "How do you feel now?", "How have
147 you been feeling in the past week, including today?", or "How have you been feeling?".

148 The participant has to select the intensity of mood (through items/adjectives) selecting an option
149 from a rating scale from 0 to 4 (0 = Not at all, 4 = Extremely). The BRUMS has demonstrated
150 satisfactory predictive, concurrent, criterion, and factorial validity as well as appropriate test-retest
151 reliability (Terry et al., 1999; 2003). The results of the Italian validation indicated very good
152 internal consistency of the factors and excellent factorial validity (Quartiroli, Terry, e Fogarty,
153 2017).

154 In the questionnaire, the intensity of the mental states and the emotions experienced was
155 investigated asking participants their mood by rating the intensity of twenty-seven emotions taken
156 from the BMIS and the BRUMS scales (see below Data analysis and results for the complete list
157 of emotions). The answers were provided on a 4-level Likert scale, ranging from 0 to 3 (0 = Never,
158 3 = Always).

159 The perceived usefulness of lockdown was measured by asking participants the following
160 questions: "Is staying at home useful for you?", "Are you experiencing something new?". The
161 answers were on a 5-level Likert scale, they ranged from 0 to 4 (0 = Not at all, 4 = Extremely).

162 The feeling of living a normal life was investigated asking participants the following questions:
163 "Can you stay focused?", "Do you study/work easily?" "Is it easy to keep old social relationships?",
164 "Is it easy to develop new social relationships?", "Do you feel deprived of your freedom?". The
165 answers were on a 5-level Likert scale, ranging from 0 to 4 (0 = Not at all, 4 = Extremely).

166 Finally, the coping strategies implemented were investigated by asking participants to indicate
167 which of the following coping strategies they put into practice to face the pandemic: “talking with
168 friends”, “playing on electronics”, “singing/playing instruments”, “doing physical
169 activities/sports”, “reading”, “watching television/movies”, “cooking/baking”. The answers were
170 on a 5-level Likert scale, they ranged from 0 to 4 (0 = Never, 4 = Always).

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Data analysis and results

173 All the analyses were performed using R-Studio (RStudio Team, 2015). Data were analyzed
174 through a mixed-effects approach, which incorporates both fixed-effects and random-effects
175 (associated to participants and task stimuli) and allows for the specification of predictors at both
176 participants and/or item level. Cumulative link mixed models (CLMMs) were run using the *ordinal*
177 package (Christensen, 2019).

178 Our main dependent variable was the intensity of the mental states and the emotions experienced
179 by the participants. The three continuous predictors in our statistical model were i) perceived
180 usefulness of lockdown, ii) feeling of living a normal life iii) coping strategies implemented to face
181 the pandemic.

182 Firstly, we performed an exploratory factor analysis to investigate how the twenty-seven selected
183 emotions aggregated. Extraction method was set as minimum residuals and rotation was set as
184 oblimin, the number of factors was based on parallel analysis and the threshold for factor loadings
185 was set as .40 (Stevens, 1992). Using these parameters we identified four factors, specifically:

- 186 ▪ A negative-external one, comprising: Lack of affection, Feeling withdrawn, Disgust,
187 Detachment, Contempt, Disregard, Oppression, Hostility, Anger, Vengeance.
- 188 ▪ A negative-internal one, comprising: Isolation, Vulnerability, Fear, Anxiety, Loneliness.
- 189 ▪ A positive-internal one, comprising: Optimism, Hope, Resilience, Determination.
- 190 ▪ A positive-external one, comprising: Compassion, Curiosity, Empathy, Sense of justice.

191 While the following emotions were found not to belong to a specified factor: Acceptance, Pride,
192 Solidarity, Surprise.

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194 For each of the four factors we estimated a CLMM including all possible interactions between fixed
195 effects. Participants and type of emotion were set as random intercepts.

196 In particular, in the lme4 syntax (Bates, Maechler, Bolker, & Walker, 2015), the model tested was:

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198 *Intensity of emotions ~ Perceived usefulness of lockdown*

199 *× Feeling of living a normal life × Coping strategies + (1|Participant)*
 200 *+ (1|Emotion)*

201

202 For each of the four models, we then performed a model selection using the *MuMIn* R package,
 203 with the *dredge* function (Bartoń, 2020). This procedure selects the best fitting model (i.e., the one
 204 with lowest Akaike information criterion, which returns an estimation of the quality of the model,
 205 AIC, Akaike, 1973) fitting all possible combinations of the fixed effects included.

206 For the factors: negative-external, negative-internal and positive-external, the model selection
 207 dropped all the fixed effects predictors, as the random-effect models were the ones with the lowest
 208 AIC.

209 Conversely, for the positive-internal factor, the best model identified by the model selection
 210 included the effect of the perceived usefulness of lockdown and the effect of the coping strategies
 211 implemented to face the pandemic. The best model outperformed the random-effect model of 6
 212 AIC points, $p = .005$, *McFadden's Pseudo- $R^2 = .06$.*

213 Specifically, the effects of both predictors were significant, $z = 2.14$, $p = .03$, $b = .48$, and , $z = 2.42$,
 214 $p = .01$, $b = .62$, respectively, meaning that for both predictors the higher their value, the higher
 215 participants' positive-internal emotions intensity (Figure 1).

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218 Figure 1. Results of the model selection. For emotions belonging to the positive-internal factor
 219 (i.e., Optimism, Hope, Resilience, Determination), the higher participants' perceived usefulness
 220 of lockdown and coping strategies, the higher their intensity. Please note that for graphical
 221 reasons, in the plot we reported only the slopes of high intensity responses, the full plot is reported
 222 as Supplementary Material.

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Discussion

225 In the present study we investigated in an Italian sample how several psychological variables
226 affected the intensity of the mental states and the emotions experienced by participants during the
227 first Lockdown. Using a model selection procedure, we identified the best model explaining the
228 data collected; the best model included the perceived usefulness of lockdown (e.g., “Is staying at
229 home useful for you?”, “Are you experiencing something new?”), as well as the presence of coping
230 strategies, while all other potential predictors were excluded. More specifically, it was found that
231 the higher the participants’ perceived usefulness of lockdown, the higher the perceived intensity of
232 emotions with positive valence. Similarly, a greater the engagement in activities that helped
233 maintain social contact (speaking with friends), physical exercise, or play (both socially and
234 individually) predicted more intense positive internal emotions.

235 The first finding suggests that perceiving the lockdown as a necessary and correct measure to
236 counter the spread of the infection can serve as a protective psychological factor during stressful
237 times. Consistent with this, previous findings showed that the belief that taking health precautions
238 is effective for avoiding COVID-19 positively predicted voluntary health compliance behavior
239 (Clark et al., 2020).

240 These findings extend the results of recent studies reported in literature, which focused on the
241 adherence to quarantine restrictions and recommendations. Carlucci, D’Ambrosio and Balsamo
242 (2020), for example, found that a large sample of Italian quarantined adults showed very high rates
243 of adherence to the measures proposed by the government, and that their trust in such measures
244 was a crucial factor for adhering to the rules. Conversely, Bicchieri, Dimant and Gächter (2020),
245 showed that a strong predictor of compliance was the degree of trust in science shown by
246 participants, while the trust in decisions taken by the government was not relevant. In this regard,
247 on the political and medical sides, the result of Bicchieri and colleagues (2020) can be explained
248 considering that many contrasting views about the effectiveness of the use of face masks, gloves,
249 and social distance were provided by the media and by the government, possibly affecting people’s
250 perception of the effectiveness of the interventions and the rules established. None of these studies,
251 however, examined the impact of government regulations on participants’ emotions.

252 A recent study by Pezzuti, Figus and Lauriola (2021) showed that the most effective coping
253 strategies to face the pandemic were Avoidance Strategies and Orientation to the Problem. Our
254 results integrate these data, showing that people can cope with a stressful situation also without
255 avoidance-focused coping strategies, and highlight mechanisms which are rather focused on
256 acceptance and positive responses. Lockdown measures and the inability to leave the house has

257 led also to the attribution of new values and meanings to the space people live in, since the house
258 is configured as a multifunctional space in which people can experience new "ways to move" (Primi
259 & Marchioro, 2021). Digital technologies also offered many opportunities to remain involved in
260 economic, cultural and social interactions and relations, creating a growing compensation and
261 integration between real and virtual spaces (Primi & Marchioro, 2021). The help of technology has
262 been essential to maintain the perception of ordinary life, and the possibility to enjoy a long period
263 spent at home in a functional way. Complementary with this, our study shows that the perceived
264 usefulness of lockdown can positively affect people's emotions.

265 Our findings not only integrate previous results, but they also point to the possibility that trusting
266 the decisions made by the government represents a protective factor against stress, anxiety, and
267 other types of negative emotions, even if this does not remove the need for a clearer and more
268 transparent scientific information supporting political decisions (Gross, 2020; Mahase, 2020;
269 Skegg et al., 2021). It has been argued that to cope with COVID-19 governments cannot just *follow*
270 *the science*, but they must take responsibility for their decisions, "rather than relying on science as
271 if it were an apolitical and indisputable tablet of stone" (Stevens, 2020, p.560). Indeed, science
272 end-users are typically not familiar with the probabilistic approach in science, or the scientific
273 process of understanding and reaching conclusions by disconfirming hypotheses (e.g., Popper,
274 1962). Consistent with this, recently it has been argued that the relationship between scientists and
275 science end-users should be improved in order to reach a broader popular acceptance of scientific
276 evidence (Toe, 2021). Greater understanding and acceptance of scientific evidence might enhance
277 the respect of the health rules proposed by the government, a topic which is increasingly important
278 during the current vaccination campaign (Moscadelli et al., 2020).

279 Italy faced two other COVID-19 waves between October 2020 and April 2021, both characterized
280 by different approaches on the political and medical sides, and possibly by different psychological
281 reactions in the population (e.g., Kohút, Kohútová, & Halama, 2021). Here we examined the role
282 of rule acceptance and effectiveness of positive coping strategies on emotional states in the first
283 wave of the pandemic in Italy. Other waves of the pandemic might have different characteristics
284 and elicit different emotions and different coping strategies. Trust in governmental decisions might
285 also differ from one wave to the next, suggesting that the variables affecting participants emotions
286 might depend on the characteristic of each single wave of the pandemic. This topic can be very
287 promising for future research, especially in the case of the occurrence of other COVID-19 waves.

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Conclusion

292 The present study shows that during the first wave of COVID-19 in Italy, between March and May
293 2020, the perceived usefulness of lockdown and the active engagement in positive activities
294 positively affected peoples' emotions. These findings highlight two major aspects. One is the need
295 to have clear guidelines from the governments, possibly supported by a better communication of
296 the scientific findings on which political decisions are taken and behavioral measures shaped to
297 increase people's commitment to the proposed rules. The second is the availability of activities that
298 help maintain a normal level of physical and enjoyable mental activity.

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