Dysfunctional personality features, non-scientifically supported causal beliefs, and emotional problems during the first month of the COVID-19 pandemic in Italy

Antonella Somma[a], Giulia Gialdi[a], Robert F. Krueger[b], Kristian E. Markon[c], Claudia Frau[d], Silvia Lovallo[a], Andrea Fossati[a],*

[a] *Vita-Salute San Raffaele University, Milan, Italy*
[b] *University of Minnesota, Minneapolis, MN, USA*
[c] *University of Iowa, Iowa City, IA, USA*
[d] *ISIPSÉ Institute, Rome, Italy*

ARTICLE INFO

ABSTRACT

The present study aimed at assessing the impact of demographic characteristics, maladaptive personality traits and causal beliefs about COVID-19 on perceived emotional problems in a sample of Italian community-dwelling adults ($N = 1043$) in the first month of the social distancing period due to the COVID-19 pandemic in Italy. Hierarchical logistic regression analysis results showed that dysfunctional personality domains and non-scientifically supported causal beliefs explained all the variance that was originally explained by demographic variables (i.e., age and gender). In particular, negative affectivity and detachment represented relevant risk factors for reduced emotional well-being in our sample. A significant positive association was observed also between emotional problems and supernatural causal beliefs on the COVID-19 infection. Our data supported the importance of considering the impact of quarantine measures on psychological well-being, while suggesting possible risk factors related to individual differences in personality and causal beliefs.

1. Introduction

At the start of 2020, the 2019 coronavirus disease (COVID-19), originating from Wuhan in Hubei province, started to spread throughout China (Liu, Yang, Zhang, et al., 2020) and is now causing a pandemic (WHO, 2020). There have been 4,735,622 confirmed cases of COVID-19, and 316,289 deaths (updated 19 May 2020; WHO, 2020). In response to the COVID-19 outbreak, the Italian Government has ordered a nationwide school closure as an emergency measure to prevent spreading of the infection, strongly discouraging public activities (Tuite, Ng, Rees, et al., 2020).

In line with other countries, the Italian government decided to introduce norms to reduce the risk of spreading the infection, involving the separation and restriction of movement of all people meeting the standard for quarantine (Centers for Disease Control and Prevention, 2017). A recent meta-analysis (Brooks et al., 2020) suggested that the psychological impact of quarantine may be wide-ranging, substantial, and long lasting, including a wide array of symptoms which may range from post-traumatic stress disorder features to anger outbursts.

Notably, Brooks et al. (2020) stressed that data on the psychological impact of quarantine measures are sparse, suggesting the need for further studies (Greenbaum, 2020), particularly as to the effect of participant characteristics, demographics, and personality features (Brooks et al., 2020).

Further increasing the complexity of the emotional response to the current COVID-19 pandemic, social media platforms remain saturated with nonscientific and conspiratorial claims (Garrett, 2020). Among them, conspiracy theories suggesting that COVID-19 does not have a natural origin have emerged (Calisher, Carroll, Colwell, Corley, & Gorbalenya, 2020), as well as other supernatural conspiracy theories (e.g., COVID-19 as a divine punishment). Unfortunately, misinformation may be related to fear and prejudice, which in turn may undermine the subject's willingness to implement the correct practices to prevent the COVID-19, thus putting at risk his/her own lives, as well as others' lives (Calisher et al., 2020).

Against this background, we designed the present study in order to evaluate the impact of demographic characteristics, maladaptive personality traits and causal beliefs about COVID-19 on perceived

emotional problems among Italian community-dwelling adults in the first month of the social distancing period due to the COVID-19 pandemic in Italy. To address this issue, we administered a measure of emotional problems to large online sample of adult participants. In particular, we administered the Strengths and Difficulties Questionnaire Emotional Problems scale because it assesses anxiety, somatic complains, fear, and depressive features. Interestingly, the Emotional Problems Scale total score yields a well-characterized cut off score to identify people with clinically relevant emotional problems (Findon et al., 2016; Goodman, 1997). Identifying people with clinically relevant distress may be useful in treatment planning. We relied on the emotional problem construct because reactions to quarantine may include a range of negative emotions rather than have a single, specific form. Moreover, participants were administered also self-report measures of *DSM-5* Alternative Model of Personality Disorders (American Psychiatric Association, 2013) domains and COVID-19 related causal beliefs, respectively.

Starting from these considerations, we expected that participants with clinically relevant emotional problems may be efficiently discriminated by negative affectivity and detachment domains, as well as by non-scientifically supported causal beliefs. Indeed, previous findings showed that Negative Affectivity and Detachment were negatively associated with emotional well-being (e.g., Góngora & Castro Solano, 2017). Recently, Lai et al.' (2020) showed in a sample of 1257 health care workers that women experienced more psychological burden than male participants. Thus, we also expected that female gender may act as a possible risk factor for clinically relevant emotional problems.

2. Method

2.1. Participants

Participants responded to advertisements requesting potential volunteers for psychological research on the web (e.g., newsgroups, universities web) from March 16, 2020 to March 21, 2020. As a whole, 1049 Italian community-dwelling adult participants volunteered to take part in the study receiving no economic incentive or academic credit for their participation. However, 6 (0.57%) participants were removed from the final sample because they completed the measures in < 10 min ($n = 1$) and because they provided questionable responses ($n = 5$; e.g., repeating the same answer numerous times). Thus, the final sample included 1043 participants; 1003 (18.5%) participants were male and 850 (81.5%) were female; participants' mean age was 32.84 years, $SD = 12.66$ years (range: 18–78 years). Fifty-seven participants (5.57%) had a junior high school degree, 488 (46.79%) had a high school degree, 464 (37.36%) had a university degree, and four participants (0.38%) refused to report their educational level. On average, participants received 15.37 years of education, $SD = 3.37$ years. Six hundred fifteen participants (59.0%) were unmarried, 376 (36.0%) were married, 40 (3.8%) were divorced, and 11 (1.1%) were widow/widower, whereas one participant (0.1%) refused to disclose his/her civil status.

Institutional Review Board approval was obtained. To be included in the sample, participants had to document that they were of adult age (i.e., 18 years of age or older), and to agree to online written informed consent in which the study was extensively described. All questionnaires were scored by an independent group of trainee psychologists who were blind to the aim of the study.

2.2. Measures

2.2.1. Strengths and Difficulties Questionnaire Emotional Problems scale (SDQ EPS; Goodman, Meltzer, & Bailey, 1998)

The SDQ is a brief, 25-item self-report questionnaire which has been translated and validated in Italy (e.g., Tobia & Marzocchi, 2018). In line with previous studies (e.g., Findon et al., 2016), it has been adapted for

use in adults with minor alteration of some items. For the purpose of the present study, we administered the Emotional Problems scale of the SDQ in order to assess common areas of emotional and behavioral difficulties. In the full sample ($N = 1043$), the one-factor model of the five Emotional Problems Scale items showed adequate fit in weighted least square mean and variance adjusted confirmatory factor analysis, $\chi^2 (5) = 19.91$, $p < .01$, root mean square error of approximation $= 0.053$, 95% confidence interval $= 0.030, 0.079$, Tucker-Lewis index $= 0.98$, comparative fit index $= 0.99$, standardized root mean square residual $= 0.02$. In our study, the mean comparison curve fit index value (Ruscio, Carney, Dever, Pliskin, & Wang, 2018), averaged across mean-above-minus-mean-below-a-cut (MAMBAC), maximum eigenvalue analysis (MAXEIG), and latent-mode (L-mode) analysis analyses, was 0.37, suggesting that the latent structure of the five Emotional Problems Scale items was dimensional in nature (Ruscio et al., 2018). In our study, we relied on the published cut-off value (i.e., SDQ EP ≥ 7; Goodman, 1997; Findon et al., 2016) for the SDQ Emotional Problems (EP) in order to identify participants who were perceiving themselves as experiencing clinically relevant emotional problems. Indeed, clinically relevant cut-off scores may be useful for clinical decision making when adopting an empirically based dimensional approach (e.g., Widiger & Simonsen, 2005).

2.2.2. Personality inventory for DSM-5 short-form (PID-5-SF; Maples et al., 2015)

The PID-5-SF is a 100-item questionnaire with a 4-point response scale, which was explicitly designed to measure the proposed *DSM-5* traits and domains. It has been developed by Maples et al. (2015) through item response theory methods, and validated in its Italian translation (Somma, Krueger, Markon, Borroni, & Fossati, 2019). For the purpose of the present study, we relied on the five PID-5-SF domain scales. In the full sample, Cronbach's α values were 0.90, 0.90, 0.90, 0.86, and 0.86 for Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism domain scales, respectively.

2.2.3. COVID-19 Causal Belief Questionnaire (CBQ; Somma, Gialdi, Frau, Barranca, & Fossati, 2020)

The COVID-19 CBS is a 16-item, Likert-type self-report questionnaire that was explicitly designed to assess the degree of agreement with some possible theories about the origin of the virus and its associated disease (Somma et al., 2020). It was developed relying on independent online searches; firstly, possible origin theories for the virus were identified; then, these theories were assigned to one of the following theme: (a) supernatural beliefs; (b) conspiracy beliefs; and (c) scientifically supported beliefs. Accordingly, 16 items listing causal beliefs for the COVID-19 were selected. Each COVID-19 CBQ item was measured on a *0* (*Never*) to *10* (*Always*) scale. COVID-19 CBQ item scores are summed to yield three scales, namely, the Supernatural Belief Scale (5 items), Conspiracy Belief Scale (9 items), and the Scientifically Supported Belief Scale (2 items). In a previous study on Italian community-dwelling adults (Somma et al., 2020), full-information confirmatory factor analysis findings suggested the adequacy of a three-factor model for the COVID-19 CBQ items (comparative fit index $= 0.96$). In the full sample, item response theory-based reliability coefficient values (e.g., Sharp, Steinberg, Temple, & Newlin, 2014), were 0.95, 0.98, and 0.78 for the Supernatural Belief, Conspiracy Belief, and Scientifically Supported Belief Scales, respectively.

2.3. Data analysis

Hierarchical logistic regression analysis was used to evaluate the individual contribution of the independent variables in the multivariate context (i.e., taking into account their mutual overlap). Model selection was based on Akaike information criterion (AIC) minimization and the significance of the difference between omnibus likelihood ratio χ^2 test. McFadden pseudo-R^2 was used as effect size measure in hierarchical

Table 1

Demographic variables: Participants with perceived clinically relevant emotional problems (n = 138) and with no perceived clinically relevant emotional problem (n = 905), respectively.

	Emotional problem group (n = 138)		No emotional problem group (n = 905)			
	N/M	$\%/SD$	N/M	$\%/SD$	$\chi^2(df)/t(df)$	Effect Size
Gender						
Male	13	9.4	180	19.9	8.70(1) **	0.09 [1]
Female	125	90.6	725	80.1		
Civil Status [#]						
Unmarried	96	69.6 [b]	519	57.4 [a]	10.49(3) *	0.10 [2]
Married	41	29.7 [a]	335	37.1 [a]		
Divorced	1	0.7 [b]	39	4.3 [a]		
Widow/-er	0	0.0 [a]	11	1.2 [a]		
Occupation [§]						
Student	78	56.5 [b]	292	32.4 [a]	47.19(9) ***	0.21 [2]
Blue collar	11	8.0 [a]	43	4.8 [a]		
White collar	24	17.4 [b]	271	30.1 [a]		
Free-lance worker	7	5.1 [b]	94	10.4 [a]		
Retailer	1	0.7 [a]	31	3.4 [a]		
Salesperson	1	0.7 [a]	20	2.2 [a]		
Manager	0	0.0 [a]	18	2.0 [a]		
Housekeeper	2	1.4 [a]	36	4.0 [a]		
Unemployed	14	10.1 [a]	65	7.2 [a]		
Retired	0	0.0 [a]	30	3.3 [a]		
Education (years)	14.72	3.37	15.47	3.36	− 2.45(1041) *	− 0.15 [3]
Age (years)	26.93	7.46	33.74	13.04	− 8.77(277.62) ***	0.66 [4]

Note. #: One (0.1%) participant refused to disclose his/her civil status (N = 1042); §: Five (0.5%) participants refused to disclose their occupation; df: Degrees of freedom. Percentages with different superscripts were Bonferroni-significant in post-hoc multiple comparisons. 1: Phi coefficient; 2: Cramer's V coefficient; 3: Cohen's d coefficient; 4: Common language effect size.
* p < .05; ** p < .01; *** p < .001.

logistic regression analysis. Based on our sample size, Cohen's d values of 0.20 and odds ratio values of 1.68 (both indicating small effects) could be detected with power > 0.95 even for p < .001.

3. Results

In our full sample, the Emotional Problems Scale total score ranged from 0.00 to 10.00, M = 3.62, Mdn = 3.00, SD = 2.37, Cronbach's α = 0.79; 138 (13.2%) participants scored 7 or greater on the Emotional Problems Scale total score, which would suggest clinically relevant emotional difficulties. In contrast, no clinically relevant emotional problems were reported by 905 (86.8%) participants.

The comparisons between participants with perceived clinically relevant emotional problems (PCREP) and with no perceived clinically relevant emotional problems (NO-PCREP) on demographic variables are summarized in Table 1. For multinomial variables, percentages with different superscripts were Bonferroni-significant in post-hoc multiple comparisons. Logistic regression analysis showed that demographic variables were significant predictors of PCREP in our sample, omnibus likelihood-ratio LR) $\chi^2(15)$ = 72.66, p < .001, McFadden pseudo-R^2 = 0.14. However, in the multivariate logistic regression model, only participant's age, Wald $\chi^2(1)$ = 6.45, p < .05, and gender, Wald $\chi^2(1)$ = 5.79, p < .05, remained significant predictors of PCREP; rather, the effects of participant's civil status, Wald $\chi^2(3)$ = 4.57, p > .20, occupation, Wald $\chi^2(9)$ = 12.39, p > .10, and years of education, Wald $\chi^2(1)$ = 2.73, p > .05, became non-significant.

Mean comparisons between PCREP and NO-PCREP groups on the PID-5-SF personality domain scales and COVID-19 CBQ scales are summarized in Table 2. It should be observed that in our sample the

PID-5-SF domain scales were significantly and positively inter-related, with Pearson r values ranging from 0.31 to 0.53, median r value = 0.43, all ps < 0.001. Similarly, the COVID-19 CBQ Supernatural Belief and Conspiracy Belief Scale scores were significantly inter-related, r = 0.56, p < .001. The COVID-19 CBQ Scientifically Supported Belief Scale scores were negatively associated with both Supernatural Belief Scale, r = − 0.11, p < .001, and Conspiracy Belief Scale scores, r = − 0.26, p < .001.

Interestingly, modest, albeit significant correlations were observed between the COVID-19 CBQ Supernatural Causal Belief Scale scores, and the PID-5-SF Negative Affectivity, r = 0.18, p < .001, Detachment, r = 0.14, p < .001, and Psychoticism, r = 0.19, p < .001, scale scores. The COVID-19 CBQ Conspiracy Belief Scale scores showed r values of 0.11, 0.11, and 0.21, all ps < 0.001, with the PID-5-SF Antagonism, Disinhibition, and Psychoticism domain scale scores, respectively. No significant correlation was observed in our sample between the COVID-19 CBQ Scientifically Supported Belief Scale scores and the PID-5-SF domain scale scores.

Based on this complex pattern of relationships, a hierarchical logistic regression model was carried out to evaluate the unique contribution of each PID-5-SF and COVID-19 CBQ scale in significantly differentiating PCREP participants from NO-PCREP participants, over and above the effect of participant's gender and age. Hierarchical logistic regression model selection results are summarized in Table 3.

4. Discussion

To the best of our knowledge, this study represents the first attempt at assessing the perceived emotional problems among Italian community-dwelling adults in the first month of the social distancing period due to the COVID-19 pandemic in Italy. Although we had no pre-COVID-19 assessment of our participants' psychological health, the average Emotional Problems Scale total score in our sample suggested that emotional problems were not spreading among Italian community-dwelling adult, and that the vast majority of our participants were endorsing relative emotional wellbeing. In our opinion, this finding may point to population-level resilience. Indeed, it should be observed that a substantial minority of our participants (13.2%) reported emotional difficulties of potential clinical relevance, at least according to the Emotional Problem Scale cut-off scores that were reported in the literature (i.e., SDQ EP ≥ 7; Goodman, 1997; Findon et al., 2016). In our opinion, this finding was somewhat consistent with the available literature (e.g., Brooks et al., 2020) on the impact of the SARS/COVID-19 epidemic on mental health, and highlights the importance of identifying the risk factors for perceiving clinically relevant emotional difficulties among subjects exposed to the COVID-19 epidemic. The cross-sectional design of our study did not allow to evaluate if the proportion of Italian community-dwelling adults experiencing clinically relevant emotional problems was likely to represent a stable phenomenon, or if it should be expected to increase – or to vary – with the progression of the epidemic, as well as of the COVID-19 related social distancing interventions.

As a whole, our data seemed to suggest that several individual characteristics may represent significant risk factors for perceiving clinically relevant emotional distress among Italian community-dwelling adults, at least when they were assessed using self-reports based on a web survey. For instance, bivariate analyses showed that several demographic variables – namely, female gender, being unmarried, being a university student, being on average lower than 30 years of age, and having on average < 15 years of education - were significantly, albeit modestly effective in differentiating participants who reported clinically relevant emotional problems from participants who experienced no clinically relevant emotional problem. However, multivariate analysis results documented that only participant's (female) gender and age showed a significant unique contribution among demographic variables in differentiating participants who reported

Table 2

Personality Inventory for *DSM-5*-Short Form domain scales and COVID-19 Causal Belief Questionnaire scales: Mean comparisons between participants with perceived clinically relevant emotional problems (n = 138) and with no perceived clinically relevant emotional problem (n = 905), respectively.

	Emotional problem group (n = 138)			No emotional problem group (n = 905)				
	M	SD	r_{kk}	M	SD	r_{kk}	$t(1041)$	d
PID-5-SF domain scales								
Negative Affectivity (28 items)	1.76	0.34	0.80 [a]	1.06	0.40	0.88 [a]	19.02 ***	1.18
Detachment (20 items)	1.07	0.56	0.90 [a]	0.53	0.41	0.88 [a]	13.32 ***	0.83
Antagonism (20 items)	0.65	0.49	0.91 [a]	0.43	0.39	0.90 [a]	5.71 ***	0.35
Disinhibition (20 items)	0.94	0.41	0.84 [a]	0.88	0.33	0.85 [a]	1.88	0.12
Psychoticism (12 items)	0.79	0.54	0.83 [a]	0.43	0.45	0.85 [a]	8.41 ***	0.52
COVID-19 CBQ								
Supernatural (5 items)	1.43	1.83	0.95 [b]	0.82	1.33	0.95 [b]	4.75 ***	0.29
Conspiracy (9 items)	1.14	1.64	0.98 [b]	1.33	1.83	0.98 [b]	−1.15	−0.07
Scientifically Supported (2 items)	7.56	2.35	0.71 [b]	7.29	2.57	0.80 [b]	1.15	0.07

Note. PID-5-SF: Personality Inventory for *DSM-5* Short Form; COVID-19 CBQ: COVID-19 Causal Belief Questionnaire; r_{kk}: Internal consistency reliability estimate; a: Cronbach's α: coefficient; b: reliability estimate based on item response theory; *d*: Cohen's *d* coefficient.

*** p < .001.

clinically relevant emotional problems from participants who were not experiencing emotional problems.

Noticeably, in our study individual differences in dysfunctional personality domains, at least as they were operationalized in the PID-5-SF, and non-scientifically supported causal beliefs on the COVID-19 pandemic were significantly associated with perceived clinically relevant emotional problems. In particular, hierarchical logistic regression results documented that entering the five *DSM-5* Alternative Model of Personality Disorder dysfunctional domain measures in the equation dramatically improved the model efficacy in predicting the presence of clinically relevant emotional problems. In particular, participant's inclinations towards experiencing negative emotionality and emotional lability (i.e., high scores on the PID-5-SF Negative Affectivity scale) represented the strongest predictor of clinically relevant emotional problems, stressing further the role of Neuroticism in predicting a wide range of emotional and social problems (Cuijpers et al., 2010). Disposition towards avoidance of socio-emotional experience (i.e., high scores on the PID-5-SF Detachment scale), and lack of orientation towards immediate gratification and impulsive behavior (i.e., low scores on the PID-5-SF Disinhibition scale) were also significantly and

uniquely associated with the presence of clinically relevant emotional problems. Interestingly, these dysfunctional personality variables seemed to explain also all the significant information that was originally conveyed by participant's age and gender. From a clinical perspective, we feel that our data are largely consistent with recent considerations emphasizing the role of addressing fears in the treatment of COVID-19 related psychological maladjustment (Schimmenti, Billieux, & Starcevic, 2020), as well as with psychological models stressing the need for early and systematic assessment of emotional distress during the COVID-19 pandemic (Orrù, Ciacchini, Gemignani, & Conversano, 2020).

Considering participant's causal beliefs about the COVID-19 pandemic seemed to add a significant, albeit small amount of further information in the hierarchical logistic regression model in correctly identifying participants with perceived clinically relevant emotional difficulties. In particular, supernatural causal beliefs on the COVID-19 pandemic were significant risk factor for perceiving clinically relevant emotional problems, particularly in the presence of poor tendency towards considering the COVID-19 epidemic as the consequence of a political conspiracy. Interestingly, scientifically supported causal beliefs

Table 3

Multivariate relationships between participant's age and gender, Personality Inventory for *DSM-5*-Short Form domain scale scores, and COVID-19 Causal Belief Scale scores, and perceived clinically relevant emotional problems: Hierarchical regression model results.

	Dependent variable: Perceived clinically relevant emotional problems (n = 138)							
	Model 1 (Intercept only)		Model 2		Model 3		Model 4	
Independent variables	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender	–	–	1.82	0.98, 3.35	1.44	0.67, 3.11	1.31	0.60, 2.85
Age	–	–	0.95	0.92, 0.97	0.98	0.95, 1.01	0.98	0.95, 1.01
PID-5-SF Negative Affectivity	–	–	–	–	72.02	29.33, 176.86	56.82	22.90, 140.91
PID-5-SF Detachment	–	–	–	–	3.10	1.72, 5.58	3.47	1.91, 6.32
PID-5-SF Antagonism	–	–	–	–	0.59	0.29, 1.21	0.69	0.33, 1.47
PID-5-SF Disinhibition	–	–	–	–	0.25	0.12, 0.53	0.25	0.12, 0.54
PID-5-SF Psychoticism	–	–	–	–	0.90	0.49, 1.63	0.89	0.48, 1.66
COVID-19 CBQ Supernatural	–	–	–	–	–	–	1.39	1.12, 1.73
COVID-19 CBQ Conspiracy	–	–	–	–	–	–	0.78	0.62, 0.97
COVID-19 CBQ Scientific	–	–	–	–	–	–	1.06	0.95, 1.18
Akaike information criterion	691.94		659.93		422.03		416.82	
Omnibus χ^2 (*df*)	–		36.01(2) ***		283.92(7) ***		295.12(10) ***	
Difference in omnibus χ^2 (*df*)			–		247.91(5) ***		11.20(3) *	
McFadden pseudo-R^2	–		0.05		0.41		0.43	
Difference in pseudo-R^2	–		–		0.36		0.02	
Goodness-of-fit χ^2 (*df*)	–		826.26 (846)		602.99 (841)		556.41 (838)	

Note. PID-5-SF: Personality Inventory for *DSM-5*-Short Form; COVID-19 CBQ: COVID-19 Causal Belief Questionnaire; OR: Odds ratio; CI: Confidence interval; df: Degrees of freedom; − -: Statistic not computed.

* p < .05; *** p < .001.

on the COVID-19, at least as they were assessed online using the COVID-19 CBQ, had no significant risk or protective role towards experiencing clinically relevant emotional problems. Our findings were consistent with the hypothesis that conspiratorial beliefs may represent an attempt of those in high emotional distress at making sense of the world, thus allaying distress (e.g., Douglas, Sutton, & Cichocka, 2017). Treating emotional distress underlying conspiracy theories rather than directly confronting them with scientific evidence may represent a helpful strategy in shifting these beliefs.

Finally, we would like to stress that our findings suggest that considering the combination of selected demographic variables (i.e., participant's age and gender), dysfunctional personality domains – mostly, Negative affectivity (+), Detachment (+), and Disinhibition (−) – and supernatural (+)/conspiracy (−) causal beliefs on the COVID-19 pandemic may have a substantial role in shaping preventive interventions on perceiving emotional problems, at least among Italian community-dwelling adults. In our study, the McFadden pseudo-R^2 value for the final model was 0.43; beside suggesting excellent model fit (Domencich & McFadden, 1975), this finding seemed to indicate that taking into account these predictors may produce a 43% improvement over chance of the possibility to correctly identify subjects experiencing clinically relevant emotional problems. Indeed, simulation data suggest that McFadden pseudo-R^2 values in the .40s are likely to correspond to R^2 values in the 0.70–0.80 range (Domencich & McFadden, 1975).

4.1. Limitations

Of course, our findings should be considered in the light of several limitations. Our sample was composed of highly educated participants (years of education $M = 15.37$, $SD = 3.37$), mainly of female gender; these characteristics inherently limit the generalizability of our findings. However, the high rate of female participants that was observed in our study was consistent with extant research documenting a relative overabundance of women subjects participating in online studies (e.g., Paolacci, Chandler, & Ipeirotis, 2010). Of course, this limitation suggests that care should be used in generalizing our findings to the Italian general population.

We had no opportunity to assess the pre-COVID-19 mental health of our participants. Thus, we cannot rule out that the 13.2% of participants who reported having clinically relevant emotional problems had these struggles also before the COVID-19 pandemic. The cross-sectional nature of our study prevented us from making any causal inference; future longitudinal studies on this topic are needed. We relied exclusively on self-report questionnaire. Further studies based on different methods of assessment are badly need before accepting our findings; however, during Italy lockdown, web-based survey based on self-report questionnaires seemed to represent the most effective strategy to get preliminary, albeit potentially useful data on emotional problems, dysfunctional personality domains and causal beliefs among Italian community-dwelling adults.

In the attempt to facilitate subjects' participation in our on-line survey, we had to rely on short measures and to limit the number of demographic variables that were assessed in the present study. For instance, we assessed emotional problems relying on the Emotional Problem Scale of the SDQ which is a short, albeit well validated (e.g., Findon et al., 2016), self-report measure of emotional difficulties. Although we relied on a validated empirical cut-off (e.g., Findon et al., 2016) to assign participants to the emotional problem group, this method choice was not meant to suggest that emotional problems have a latent categorical structure. Actually, the results of taxometric analyses clearly showed the dimensional nature of emotional problems. Our decision was indeed related to the fact that in applied settings (e.g., clinical assessment), it may be important to identify participants with clinically relevant problems for treatment planning. Moreover, we decided to rely on the Emotional Problem Scale because it has no item content overlap with the PID-5-SF. Of course, it should be observed that

relying on different measures to assess the same constructs may lead to different findings. Further studies including an extended set of sources of information/demographic variable, and a fine-grained assessment of their use should be carried out before accepting our conclusions.

5. Conclusion

Even keeping the limitations of our study in mind, we feel that our study provided useful information on the relationships between emotional problems, and dysfunctional personality domains and COVID-19 causal beliefs, at least as they were assessed among Italian community-dwelling adults during the COVID-19 pandemic. In line with Brooks et al.' (2020) meta-analytic results, our findings suggested that depriving people of their liberty for the wider public good, while representing an effective life-saving measure, is often fraught and needs to be handled carefully.

CRediT authorship contribution statement

Antonella Somma: Conceptualization, Methodology, Writing - original draft, Supervision. **Giulia Gialdi:** Investigation, Data curation. **Robert F. Krueger:** Writing - review & editing. **Kristian E. Markon:** Writing - review & editing. **Claudia Frau:** Investigation, Data curation. **Silvia Lovallo:** Data curation. **Andrea Fossati:** Conceptualization, Methodology, Writing - original draft, Supervision.

References

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Publishing.

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet.* https://doi.org/10.1016/S0140-6736(20)30460-8.

Calisher, C., Carroll, D., Colwell, R., Corley, R. B., ... Gorbalenya, A. (2020). Statement in support of the scientists, public health professionals, and medical professionals of China combatting COVID-19. *The Lancet, 395*(10226), e42–e43.

Centers for Disease Control and Prevention (2017). Quarantine and isolation. https://www.cdc.gov/quarantine/index.html, Accessed date: 27 March 2020.

Cuijpers, P., Smit, F., Penninx, B. W., de Graaf, R., ten Have, M., & Beekman, A. T. (2010). Economic costs of neuroticism: A population-based study. *Archives of General Psychiatry, 67*, 1086–1093.

Domencich, T. A., & McFadden, D. (1975). *Urban travel demand-a behavioral analysis (no. monograph).* Amsterdam: North-Holland Publishing Co.

Douglas, K. M., Sutton, R. M., & Cichocka, A. (2017). The psychology of conspiracy theories. *Current Directions in Psychological Science, 26*(6), 538–542. https://doi.org/10.1177/0963721417718261.

Findon, J., Cadman, T., Stewart, C. S., Woodhouse, E., Eklund, H., Hayward, H., ... Murphy, D. (2016). Screening for co-occurring conditions in adults with autism spectrum disorder using the strengths and difficulties questionnaire: A pilot study. *Autism Research, 9*, 1353–1363.

Garrett, L. (2020). COVID-19: The medium is the message. *The Lancet.* https://doi.org/10.1016/S0140-6736(20)30600-0.

Góngora, V. C., & Castro Solano, A. (2017). Pathological personality traits (*DSM-5*), risk factors, and mental health. *SAGE Open, 7*(3), 1–17.

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*(5), 581–586.

Goodman, R., Meltzer, H., & Bailey, V. (1998). The strengths and difficulties questionnaire: A pilot study on the validity of the self-report version. *European Child & Adolescent Psychiatry, 7*(3), 125–130.

Lai, J., Ma, S., Wang, Y., ... Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA, 3*, e203976.

Liu, S., Yang, L., Zhang, C., ... Zhang, B. (2020). Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry.* https://doi.org/10.1016/S2215-0366(20)30077-8.

Maples, J. L., Carter, N. T., Few, L. R., Crego, C., Gore, W. L., Samuel, D. B., ... Krueger, R. F. (2015). Testing whether the *DSM-5* personality disorder trait model can be measured with a reduced set of items: An item response theory investigation of the personality inventory for *DSM-5*. *Psychological Assessment, 27*, 1195–1210.

Orrù, G., Ciacchini, R., Gemignani, A., & Conversano, C. (2020). Psychological intervention measures during the COVID-19 pandemic. *Clinical Neuropsychiatry, 17*, 76–79.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on Amazon Mechanical Turk. *Judgment and Decision making, 5*, 411–419.

Ruscio, J., Carney, L. M., Dever, L., Pliskin, M., & Wang, S. B. (2018). Using the comparison curve fix index (CCFI) in taxometric analyses: Averaging curves, standard

errors, and CCFI profiles. *Psychological Assessment, 30,* 744–754.

Schimmenti, A., Billieux, J., & Starcevic, V. (2020). The four horsemen of fear: An integrated model of understanding fear experiences during the COVID-19 pandemic. *Clinical Neuropsychiatry, 17,* 41–45.

Sharp, C., Steinberg, L., Temple, J., & Newlin, E. (2014). An 11-item measure to assess borderline traits in adolescents: Refinement of the BPFSC using IRT. *Personality Disorders, Theory, Research, and Treatment, 5,* 70–78.

Somma, A., Gialdi, G., Frau, C., Barranca, M., & Fossati, A. (2020). *COVID-19 pandemic scientifically supported and non-scientifically supported preventive behaviors and causal beliefs among Italian community dwelling adults: Reciprocal associations, and relationships with demographic variables and sources of information.* (Manuscript submitted for publication).

Somma, A., Krueger, R. F., Markon, K. E., Borroni, S., & Fossati, A. (2019). Item response

theory analyses, factor structure, and external correlates of the Italian translation of the personality inventory for *DSM-5* short form in community-dwelling adults and clinical adults. *Assessment, 26,* 839–852.

Tobia, V., & Marzocchi, G. M. (2018). The strengths and difficulties questionnaire-parents for Italian school-aged children: Psychometric properties and norms. *Child Psychiatry & Human Development, 49,* 1–8.

Tuite, A., Ng, V., Rees, E., et al. (2020). Estimation of COVID-19 outbreak size in Italy. *The Lancet Infectious Diseases.* https://doi.org/10.1016/S1473-3099(20)30227-9.

Widiger, T. A., & Simonsen, E. (2005). Alternative dimensional models of personality disorder: Finding a common ground. *Journal of Personality Disorders, 19*(2), 110–130.

World Health Organization (2020). Coronavirus disease 2019. Available at www.who.int/emergencies/diseases/novel-coronavirus-2019, Accessed date: 27 March 2020.