Psychopathy and COVID-19: Triarchic model traits as predictors of disease-risk perceptions and emotional well-being during a global pandemic[☆]

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ABSTRACT

This study extended recent research showing that perceptions of disease risk are associated with emotional well-being during COVID-19 by examining how psychopathic traits of boldness, meanness, and disinhibition influence these perceptions and psychological outcomes. During the Italian national lockdown, a large community sample (M_{age} = 31.3 years) completed online questionnaire measures of the triarchic psychopathic traits, perceptions of disease susceptibility and danger, and recent well-being. Path analyses revealed differing roles for the triarchic traits: boldness and meanness predicted greater well-being (lower stress, higher positive affect) and disinhibition predicted lower well-being. Further, boldness and meanness were linked to well-being through distinct indirect pathways of low perceived susceptibility to infection (boldness) and low perceived dangerousness of COVID-19 (boldness and meanness). Findings speak to the triarchic model's utility in explaining socioemotional phenomena during times of crisis and support the distinct biobehavioral conceptualizations of boldness as low threat sensitivity, meanness as low affiliative capacity, and disinhibition as deficient affective and behavioral control.

1. Introduction

The enormous threat of COVID-19 prompted governments around the world to implement unprecedented quarantine measures in Spring 2020. Evidence from previous epidemics suggests that quarantine-related social isolation can have major psychological impacts, including increased stress and decreased emotional well-being (i.e., more negative and less positive emotionality) (Brooks et al., 2020). The mental health impact of the COVID-19 pandemic may be moderated by individual factors, such as perceived likelihood of contracting COVID-19 and surviving an infection (Wang, Pan, Wan, Tan, et al., 2020a).

Psychopathic traits may represent additional characteristics that influence psychological responses to COVID-19. Psychopathy is characterized by affective (i.e., callousness, lack of empathy), interpersonal (manipulativeness, social dominance), and behavioral features (impulsivity, sensation-seeking) (Cooke & Michie, 2001; Hare, 2006; Lilienfeld et al., 2015). Although only 1% of the population would be considered clinically psychopathic (Hare, 1996), the component traits vary substantially in the general population and can provide insight into other psychological phenomena. For example, distinct psychopathy facets are differentially associated with distress-related symptomatology; affective and interpersonal features are protective whereas behavioral aspects are associated with greater distress (Latzman et al., 2019; Latzman et al., 2020). This study investigated the roles of psychopathic traits and

perceptions of COVID-19-related risks in predicting stress and positive affect during the pandemic.

1.1. The triarchic model of psychopathy

The triarchic model of psychopathy (Patrick et al., 2009) was formulated to address ongoing debates about the defining features of psychopathy, facilitate the linking of psychopathy studies to personality and psychopathology research, and provide more effective targets for biological studies of psychopathy (Patrick & Drislane, 2015). The model posits that alternative measures of psychopathy reflect common constructs of boldness, meanness, and disinhibition. Importantly, the triarchic traits show transdiagnostic relevance beyond psychopathy, exhibiting distinct and robust patterns of associations with clinical problems as well as physiological and task-behavioral variables (Patrick et al., 2013; Yancey et al., 2016). Given this theoretical and empirical foundation, here and elsewhere (Latzman et al., 2020) we use a biobehavioral lens to situate findings within the triarchic traits' multi-modal nomological network.[2]

Boldness encompasses social dominance, stress resilience, and fearless risk-taking and shows consistent negative relations with self-report (Brislin et al., 2017; Latzman et al., 2019; Latzman et al., 2020; Sica et al., 2015) and physiological (Benning et al., 2005; Dvorak-Bertsch et al., 2009; Yancey et al., 2016) measures of fearfulness and anxiety. Boldness has also been linked to lab-based measures of risk-taking and performance under threat, suggesting a resilient, approach-oriented affective-behavioral style (Snowden et al., 2017; Yancey et al., 2019). *Meanness* encompasses emotional insensitivity, deficient empathy, and lack of close attachments; it is theorized to reflect impairments in processing affiliative social cues (Brislin et al., 2018; Brislin & Patrick, 2019; Patrick et al., 2012; Viding & McCrory, 2019). Despite positive links to antisocial behavior (Patrick et al., 2009), the paucity of emotions inherent in meanness may be protective against distress-related internalizing problems (Latzman et al., 2019; Latzman et al., 2020). The third trait, *disinhibition*, entails a propensity toward impulse control problems (including antisocial behavior, substance use, and attention-deficit/hyperactivity disorder), an insistence on immediate gratification, and impaired regulation of affect and urges. Disinhibition is associated with heightened susceptibility to distress (Brislin et al., 2017; Latzman et al., 2019; Latzman et al., 2020; Sica et al., 2015) and deficient "top-down" control, reflected in emotion regulation, executive function, and brain-response measures (Perkins et al., 2019; Venables et al., 2018; Young et al., 2009).

As core dispositions influencing emotional reactivity and interpersonal behavior, the triarchic traits were expected to relate to disease-risk perceptions and emotional well-being during the COVID-19 pandemic.

1.2. COVID-19 in Italy

In December 2019, the Wuhan Municipal Health Commission in China announced the local occurrence of pneumonia of unknown etiology, later termed COVID-19, which then spread quickly around the world. By the end of February 2020, the numbers of cases and consequent deaths in Italy were escalating rapidly (Remuzzi & Remuzzi, 2020). A national decree on March 8 mandated a containment zone encompassing the most affected areas of Italy, followed by increasingly strict measures for the entire country. On March 10, Italy became the

first democratic country since World War II to impose a nationwide lockdown. Nonetheless, the regional Italian outbreak grew to a national crisis in a matter of days.

Since March 2020, COVID-19 has caused major personal and economic losses, sharply reduced face-to-face social interaction, and significant psychological distress around the world (Mukhtar, 2020). Following two months of nationwide lockdown in Italy and another month of progressive relaxation of restrictions, most mobility bans were removed on June 3, 2020. By that time, the World Health Organization (World Health Organization, 2020) had reported 6,194,533 confirmed cases worldwide and 376,320 deaths, with 233,515 cases and 33,530 deaths within Italy (Italian Ministry of Health, 2020). As noted below, data for this study were collected during the period of maximum governmental restrictions in Italy (March 10 to June 2, 2020).

1.3. Psychological effects of COVID-19

COVID-19, like other major disease outbreaks, has had substantial and deleterious mental health effects. Quarantine and isolation are known to be associated with emotional distress, including anxiety, depression, and quarantine-related post-traumatic stress (Brooks et al., 2020; Serafini et al., 2020), as well as decreased experience of positive emotions (Reynolds et al., 2008). In quarantine, the sense of confinement, disruption of typical routines, and reduction in social and physical interpersonal contact can cause marked distress (Brooks et al., 2020; Serafini et al., 2020).

Because of the unprecedented ubiquity of restrictions, this pandemic may pose an even greater psychological threat than other recent outbreaks (Brooks et al., 2020). In a very large COVID-19 study, almost 35% of quarantined Chinese participants reported psychological distress (Qiu et al., 2020). Specifically, across published studies to date, approximately 32% of the general public experienced anxiety, 27% depression, and 32% insomnia during COVID-19 quarantines (Luo et al., 2020). Loneliness and low social support during lengthy, restrictive quarantines contribute to worsening mental health (Brooks et al., 2020). Importantly, *perceptions* of the pandemic are also associated with symptomatology: Greater reported fear of COVID-19 is associated with greater anxiety and depression and lower well-being (Fitzpatrick et al., 2020; Satici et al., 2020). Additionally, higher perceived likelihood of contracting and/or perishing from COVID-19 (i.e., perceived susceptibility and/or dangerousness) is associated with higher anxiety and stress (Wang, Pan, Wan, Tan, et al., 2020a; Wang, Pan, Wan, Tan, et al., 2020b). Interestingly, higher perceived COVID-19 susceptibility is related to higher compliance with protective health measures (Harper et al., 2020; Lee & You, 2020).

1.4. The current study

Given growing evidence that COVID-19 risk perceptions are related to distress, this study investigated the role of psychopathic traits in these associations. Two previous articles examined psychopathy-related constructs during COVID-19. One of these (Nowak et al., 2020) was limited by using an omnibus psychopathy measure that did not differentiate between traits likely to predict lesser distress (boldness, meanness) as opposed to greater emotional/behavioral dysregulation (disinhibition). The other (Zajenkowski et al., 2020) examined associations for the two subscales of Levenson's Self-Report Psychopathy inventory and found that its Primary scale — which includes aspects of meanness and, to a lesser extent, boldness — was associated with greater endorsement of positive aspects of COVID-19 (e.g., "The situation is pleasant"), lower endorsement of negative aspects, and lower compliance with protective orders. In contrast, the Secondary scale — primarily assessing disinhibition — was uncorrelated with affective perceptions or reported compliance. The affective-interpersonal features of psychopathy may be associated with more benign perceptions of COVID-19 and reduced inclination toward precautions. However, this study did not test for

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[2] Notably, the term "biobehavioral trait" refers to the pattern of observed associations of specific traits with certain physiological and task-behavioral measures. Our use of this term does not suggest the trait has strictly biological (i.e., heritable and brain-based) origins; indeed, the triarchic traits have been shown to be shaped by both nature- and nurture-related factors (Tuvblad et al., 2019). Observed associations among biological and experiential-report variables do not themselves imply causal relationships.

differentiable relations for boldness, which involves personal resilience to stress, versus meanness, which involves low empathy and lack of social regard — nor did it investigate the influences of these perceptions on emotional well-being.

The triarchic traits have well-established ties to transdiagnostic socioemotional constructs but have not been examined in relation to COVID-19. In this study, we used path analysis to examine direct and indirect relations among triarchic traits, perceptions of personal susceptibility to disease and COVID-19 dangerousness, and stress and positive affect during the Italian national lockdown. Current study hypotheses, based on the preceding review of the literature, were as follows:

1. Boldness was expected to relate to perceptions of both low personal susceptibility to disease and low dangerousness of COVID-19 (i.e., low likelihood and severity of infection), due to the trait's inherent fearlessness, self-efficacy, and stress resilience.
2. Meanness was hypothesized to specifically relate to perceptions that COVID-19 is not very dangerous, as emotional insensitivity, low empathy, and social detachment would be expected to dampen recognition of the severe impact COVID-19 has had on others.
3. Both boldness and meanness were expected to relate negatively to stress and positively to positive affect during COVID-19, consistent with prior findings regarding protection from distress-related psychopathology. We anticipated that these effects would also operate indirectly through perceptions of low disease susceptibility (boldness) and low dangerousness of COVID-19 (boldness and meanness).
4. Disinhibition was hypothesized to relate positively to perceptions of COVID-19 dangerousness due to deficient top-down emotional control. Similarly, given prior evidence regarding distress symptomatology, disinhibition was expected to relate indirectly to stress (positively) and positive affect (negatively) via perceived dangerousness.

2. Method

2.1. Participants and procedure

Given the unique circumstances of a national lockdown, we recruited as many participants in Italy as possible in the period from March 10 to June 2, 2020. An online battery of questionnaires was administered through social media platforms (Facebook, Twitter, and Instagram). The final sample consisted of 619 adults; the online Supplement (Method A section) contains further information regarding participant demographics and outlier exclusion. A post-hoc sensitivity analysis indicated that this N of 619 provided 80% power to detect a minimum R^2 of 0.0014 (far below the observed R^2; see below) in a model with 5 predictors.

Ethical approval was obtained from the Institutional Board of the University of Firenze, in conformity with the principles of the Declaration of Helsinki. All participants were advised of the study's aims and provided informed consent before completing the survey.

2.2. Measures

Please see the online Supplement (Method B section and Supplemental Table 1) for detailed descriptions of each measure, and Table 1 for descriptive statistics and internal consistency reliabilities (Cronbach's αs) for all study variables.

The Italian-language translation of the Triarchic Psychopathy Measure (TriPM) (Patrick, 2010; Sica et al., 2015) was used to operationalize the three triarchic constructs: boldness, meanness, and disinhibition. Participants responded to each item on a 4-point Likert scale ranging from 1 (false) to 4 (true). Reliability in this sample was acceptable to good, αs = 0.75–0.81.

The Perceived Vulnerability to Disease Questionnaire (PVDQ)

(Duncan et al., 2009) was translated into Italian for the purposes of the current study (see Supplemental Method B). Each item was rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). The PVDQ's 7-item Perceived Infectability scale was used to assess beliefs about one's own susceptibility to infectious diseases in general (e.g., "If an illness is 'going around,' I will get it"). In the current work, this scale is termed "Personal Susceptibility" to clarify its distinctiveness from the Perceived Dangerousness of Infection scale (described next), which is specific to concerns about the seriousness of COVID-19 infection. Reliability of the Personal Susceptibility scale was good, α = 0.82.

The Perceived Dangerousness of Infection Questionnaire (PDIQ) was developed for the current study to assess participants' perceptions of the dangerousness of COVID-19 infection (see Supplemental Method B). It comprises 9 items such as "I don't understand why people care so much about Coronavirus" (reverse-scored) and "When I think of Coronavirus, I feel much more nervous than usual." Participants responded on a 5-point scale ranging from 1 (I do not agree at all) to 4 (I fully agree). Reliability was acceptable, α = 0.70.

The Stress scale of the Depression Anxiety Stress Scale – 21-Item Version (DASS-21) (Bottesi et al., 2015; Lovibond & Lovibond, 1995) is a 7-item measure assessing irritability, impatience, tension, and persistent arousal over the previous week. Items are rated on a 4-point scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much). Reliability was high, α = 0.90.

The Scale of Positive and Negative Experience (SPANE) Positive Experience scale (Diener et al., 2010; Giuntoli et al., 2017) was used to evaluate participants' recent experience of positive affect. The 6 items of this scale consist of affective words (e.g., "good," "happy"), which participants rated on a 5-point scale ranging from 1 (very rarely or never) to 5 (very often or always) according to their affective experience over the last four weeks. Reliability was high, α = 0.91.

2.3. Analytic strategy

Normality of all study variables was assessed using skewness and kurtosis statistics, and linearity was established by plotting the unstandardized residuals (observed vs. predicted values) for each outcome variable across the range of each predictor. Next, simple correlations (Pearson's rs) were computed to examine the strength and directionality of bivariate relations among all study variables. Next, guided by both theory and observed bivariate correlations, the lavaan package (Version 0.6–5) (Rosseel, 2012) of the R statistical environment (version 3.6.3) (R Core Team, 2020) was used to fit two full path models in which the three triarchic traits, personal susceptibility, and COVID-19 dangerousness explained variation in either recent stress or recent positive affect. Standardized coefficients and 95% confidence intervals (CIs) were estimated for all a priori hypothesized paths. Relative model fit was assessed using the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI), for which values ≥0.95 indicate good fit, and absolute fit was assessed using the Root Mean Square Error of Approximation (RMSEA; values <0.06 considered good), Standardized Root Mean Square Residual (SRMR; values <0.08 considered good), and chi-square (nonsignificant values considered good) (Hu & Bentler, 1999; Schreiber et al., 2006). Conclusions regarding model fit relied less on the chi-square index as it was expected to be inflated in a sample of this size. After fitting full path models, in the service of parsimony and to facilitate interpretation of observed effects, non-significant ($p > .10$) paths were

Table 1
Zero-order Pearson correlations and descriptive statistics.

	1.	2.	3.	4.	5.	6.	7.
1. TriPM boldness	–						
2. TriPM meanness	0.29***	–					
3. TriPM disinhibition	0.06	0.51***	–				
4. PVDQ personal susceptibility	−0.16***	0.01	0.05	–			
5. PDIQ	−0.17***	−0.22***	−0.09*	0.22***	–		
6. DASS-21 stress	−0.21***	0.02	0.22***	0.09*	0.14***	–	
7. SPANE positive experience	0.31***	0.08†	−0.14**	−0.07†	−0.20***	−0.36***	–
Mean	45.07	29.23	32.90	22.32	28.24	9.20	18.89
SD	7.99	6.38	6.00	7.93	3.99	5.02	4.79
Range	26–68	19–54	22–56	7–45	16–36	0–21	7–30
Cronbach's α	0.81	0.80	0.75	0.82	0.70	0.90	0.91
Skewness	0.11	0.84	0.66	0.24	−0.61	0.24	0.03
Kurtosis	−0.25	0.66	0.24	−0.45	0.05	−0.47	−0.65

Note. $N = 619$. TriPM, Triarchic Psychopathy Measure; PVDQ, Perceived Vulnerability to Disease Questionnaire (Perceived Infectability scale referred to as Personal Susceptibility scale for clarity throughout); PDIQ, Perceived Dangerousness of Infection Questionnaire; DASS-21, Depression Anxiety Stress Scale – 21-Item Version; SPANE, Scale of Positive and Negative Experience.

* $p < .05$.
** $p < .01$.
*** $p < .001$.
† $p < .10$.

dropped from the model and indirect paths were estimated.

3. Results

Normality and linearity were observed for all study variables and predictor-outcome associations. Descriptive statistics and zero-order correlations are presented in Table 1.[3] Briefly, boldness, as indexed by the TriPM, was modestly positively correlated with meanness ($r = 0.288$, $p < .001$) and uncorrelated with disinhibition ($r = 0.061$, $p = .129$), and meanness and disinhibition were moderately correlated ($r = 0.505$, $p < .001$). Personal susceptibility and COVID-19 dangerousness ratings (as indexed by the PVDQ and the PDIQ, respectively) were modestly correlated ($r = 0.224$, $p < .001$), and DASS-21 Stress was moderately negatively associated with SPANE Positive Affect ($r = −0.361$, $p < .001$).

As described above, two separate path models were used to test the hypothesized direct relations of triarchic traits with recent experience of stress and positive affect, and their indirect relations with these affective variables through personal susceptibility and COVID-19 dangerousness.

The full path model explaining stress showed a very good fit to the data (see Fig. 1 for diagram and fit statistics) and explained 11.4% of the variance in stress (i.e., $R^2 = 0.114$). Results indicated a significant negative direct effect from triarchic boldness to stress (direct $\beta = −0.196$, $p < .001$), as well as positive direct effects from disinhibition (direct $\beta = 0.256$, $p < .001$) and COVID-19 dangerousness (direct $\beta = 0.121$, $p = .003$) to stress. All nonsignificant paths (represented in Fig. 1 as dotted lines) approached zero and, as described above, were removed prior to the estimation of indirect effects. The path from triarchic boldness to personal susceptibility to COVID-19 dangerousness evidenced a significant indirect effect in the explanation of stress (indirect $\beta = −0.004$, $p = .022$). Further, the path from triarchic meanness to COVID-19 dangerousness in the explanation of stress also emerged as a significant indirect path (indirect $\beta = −0.028$, $p = .007$).

Fig. 2 depicts the path model and model fit statistics for positive affect; fit of the full path model was again very good. The model

explained 15.0% of the variance in positive affect (i.e., $R^2 = 0.150$). Similar to the stress model but in opposing directions, boldness (direct $\beta = 0.280$, $p < .001$), disinhibition (direct $\beta = −0.203$, $p < .001$), and COVID-19 dangerousness (direct $\beta = −0.164$, $p < .001$) evidenced significant direct effects on positive affect. All nonsignificant paths (dotted lines in Fig. 2) approached zero and were removed for estimation of indirect effects. The path from triarchic boldness to personal susceptibility to COVID-19 dangerousness evidenced a significant indirect effect in the explanation of positive affect (indirect $\beta = 0.006$, $p = .010$). The indirect path from triarchic meanness to COVID-19 dangerousness also emerged as significant (indirect $\beta = 0.047$, $p = .001$) in the explanation of positive affect.

4. Discussion

This study used path modeling to elucidate the role of triarchic model traits in the association between perceptions of COVID-19-related risk and two indices of emotional well-being. Although framed initially as biobehavioral dispositions relevant to psychopathy (Patrick et al., 2009), the triarchic model traits relate to psychological problems of other types as well, with boldness and meanness relating negatively to internalizing problems and meanness and disinhibition positively to externalizing (Latzman et al., 2019; Latzman et al., 2020; Patrick & Drislane, 2015). The traits' links to biological systems and affect-related psychological problems provide a context for interpreting their observed patterns of relations with disease perceptions and affective experience.

Consistent with hypotheses, boldness — which has been tied to threat insensitivity and low defensive reactivity — was directly related to lower stress and higher positive affect, as well as indirectly via lower perceptions of personal susceptibility to infection and COVID-19 dangerousness. Meanness, representing the lower extreme of a biobehavioral affiliativeness dimension (Viding & McCrory, 2019), related to lower stress and higher positive affect only indirectly, via lower perceived COVID-19 dangerousness. In contrast, disinhibition — i.e., weak inhibitory control capacity — was related only directly to higher stress and lower positive affect during COVID-19.

These findings extend scientific understanding of dispositional characteristics related to emotional well-being during crisis. Mandated social isolation has been linked to numerous forms of emotional distress and reductions in positive emotions (Brooks et al., 2020; Reynolds et al., 2008; Serafini et al., 2020). Building on other recent psychopathy studies, our results suggest that biobehavioral traits linked to distinct psychopathic features may play protective or promotive roles in mental

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[3] Demographic variables (age, sex, education, relationship status, region in Italy) were examined for potential associations with study variables. No correlations were found, apart from a small negative correlation between age and perceived dangerousness ($r = −0.09$, $p = .02$). As age and sex were viewed as the most likely to influence results, we reran all study analyses with them included as covariates; no significant changes to results were observed. These alternative results are available upon request.
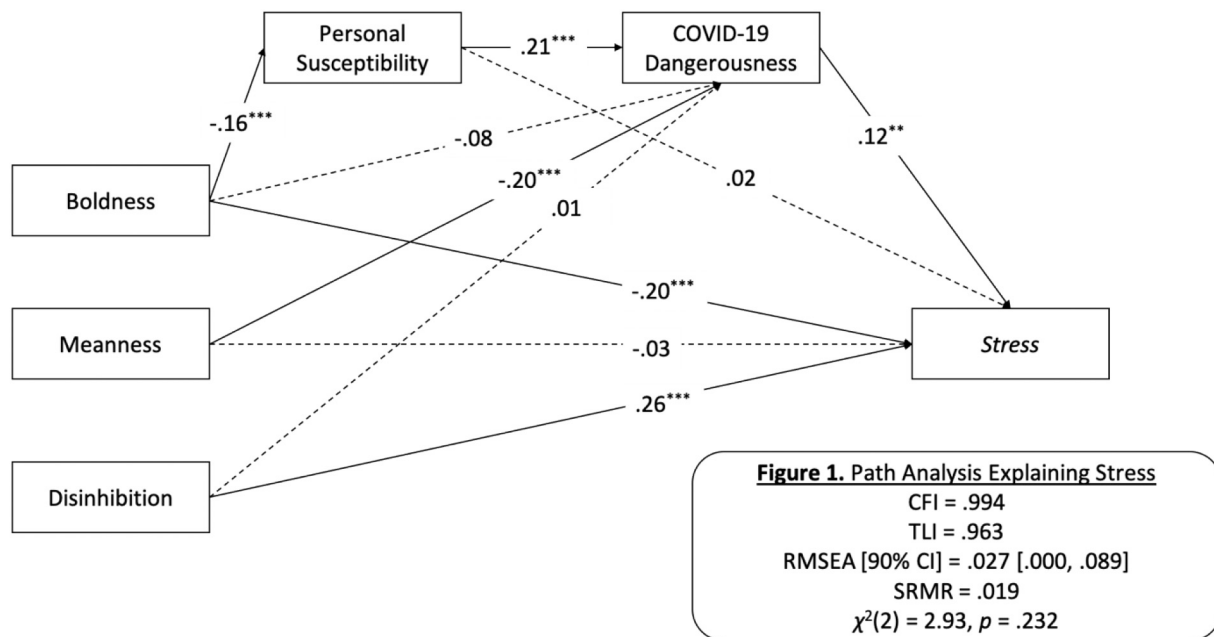
Fig. 1. Path model for the DASS-21 Stress outcome variable. All paths were hypothesized a priori; path coefficients are standardized βs. For ease of interpretation, dotted lines represent nonsignificant paths ($p > .05$; 95% CI includes 0). Indirect path estimates reported in the text are derived from a model in which nonsignificant (dotted) paths shown above were dropped. CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR, Standardized Root Mean Square Residual. ***$p < .001$; **$p < .005$.
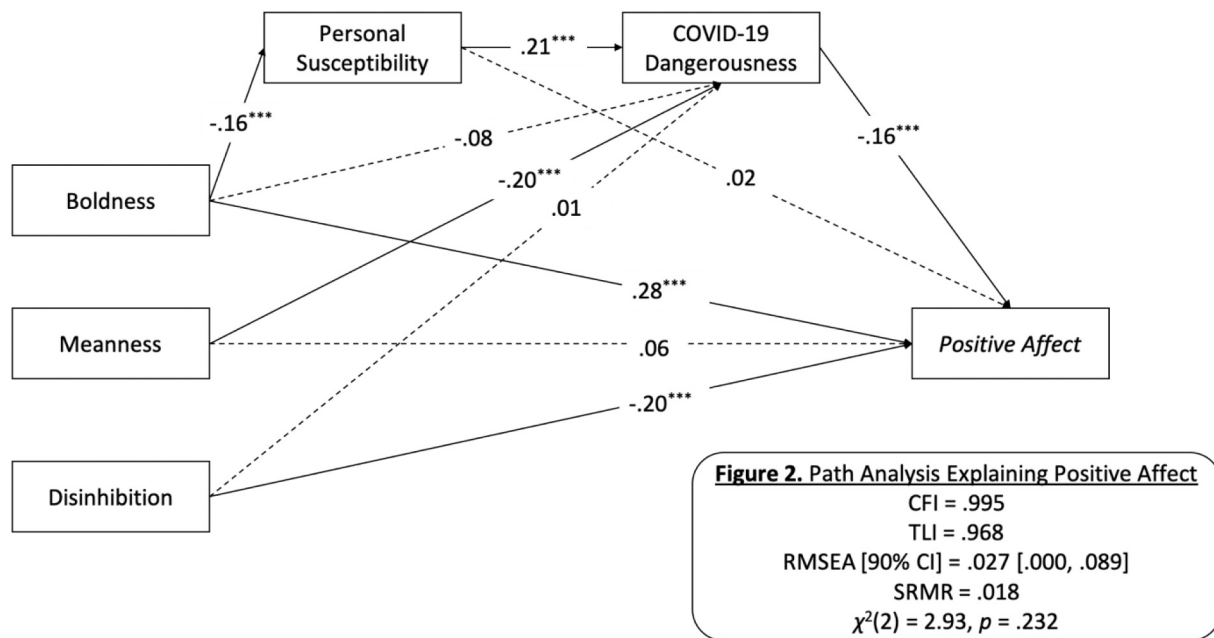

Fig. 2. Path model for the SPANE Positive Experience outcome variable. All paths were hypothesized a priori; path coefficients are standardized βs. Dotted lines represent nonsignificant paths ($p > .05$; 95% CI includes 0). Indirect path estimates reported in the text are derived from a model in which nonsignificant (dotted) paths shown above were dropped. CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR, Standardized Root Mean Square Residual. ***$p < .001$.

health problems during COVID-19. Regarding protective factors, boldness represents the interpersonal features of psychopathy — social assertiveness, fearlessness, and emotional stability — and has been linked to lower anxiousness and higher positive affect (Latzman et al., 2019; Latzman et al., 2020; Sica et al., 2015), paralleling the direct paths observed in the present study. Further, our models demonstrate for the first time that appraisals of threat may partially mediate these associations. This finding is consistent with the biobehavioral conceptualization of boldness as dispositional imperviousness to threat, reflected in blunted defensive reactivity to threatening stimuli (Benning et al., 2005; Snowden et al., 2017; Yancey et al., 2016; Yancey et al., 2019). Our results provide initial evidence that low perceptions of threat may explain part of boldness's association with positive affect and low stress during COVID-19. Of note, low sensitivity to threat and the affective-interpersonal features of psychopathy also appear to be associated with reduced engagement in protective behaviors (Harper et al.,

2020; Zajenkowski et al., 2020), suggesting that dispositional protection from emotional distress during COVID-19 may not extend to protection from risky disease-related behaviors.

Meanness is typically considered a positive contributor to problems involving aggression, exploitiveness, and disregard for others (Patrick et al., 2009). However, recent research has demonstrated a negative association between meanness and disorders involving salient emotional distress (i.e., major depression, dysthymia, and post-traumatic stress disorder) (Latzman et al., 2020), suggesting the emotional insensitivity aspect of meanness may protect against conditions of this type (Frick et al., 1999). In this study, meanness was uncorrelated with stress and showed only a modest positive association with positive affect. However, consistent with hypotheses, meanness was associated indirectly with these outcomes via lower perceptions of COVID-19 dangerousness. This finding dovetails with evidence that affective-interpersonal features of psychopathy are associated with more positive perceptions of the pandemic (Zajenkowski et al., 2020). Faced with ongoing media reports of COVID-19-related tragedies, individuals high in meanness — i.e., lacking in affiliative capacity — may empathize less with such reports and find them less disturbing, in line with evidence that meanness relates to blunted processing of others' distress (Brislin et al., 2018; Brislin & Patrick, 2019). Such individuals might be less likely to develop a schema of COVID-19 as dangerous. In turn, perceptions of COVID-19 dangerousness have been shown to relate to stress (Wang, Pan, Wan, Tan, et al., 2020a; Wang, Pan, Wan, Tan, et al., 2020b). Our results therefore point to a potential pathway by which meanness — perhaps because of a lack of concern for others — provides protection against COVID-19-related emotional distress.

Unlike boldness and meanness, disinhibition related positively to stress and negatively to positive affect. This result fits with the biobehavioral conceptualization of disinhibition as involving impairment in neuro-regulatory systems for emotion and action, and with prior evidence for positive associations of disinhibition with distress-related psychopathologies (Brislin et al., 2017; Latzman et al., 2019; Latzman et al., 2020; Sica et al., 2015). Although we expected disinhibition to relate positively to perceptions of COVID-19 dangerousness, it instead showed a small negative association with this variable ($r = -0.089$, $p = .026$), which could reflect a lack of deliberative consideration of the potential adverse impact of infection. Further, in the path models, this association approached zero ($\beta = 0.007$, $p = .879$), contradicting the hypothesized indirect pathway from disinhibition to appraisal of high dangerousness to higher stress and lower positive affect. This result indicates that the well-established association between disinhibition and emotional distress, replicated here in the context of COVID-19, may not depend on specific COVID-19-related risk perceptions.

The present study featured several strengths, including a large sample and the use of path analysis to characterize directional relations among personality, disease-related cognition, and emotional well-being. Further, the data were collected during a calamitous period in global history when participants were experiencing the first national lockdown in recent memory. This context provided valuable insight into psychopathic traits, disease-risk perceptions, and emotional well-being in the context of widespread disease threat and restricted social activity. However, some study limitations also warrant mention. First, our sample consisted of individuals from Italy, raising questions about generalizability to individuals from other countries with differing cultural and ethnic backgrounds, governmental responses, and pandemic-related stressors. Second, some of our measures were developed or newly translated for the current study. Although our preliminary results suggest adequate psychometric properties (see Supplement), more research is needed to validate the PDIQ and the Italian PVDQ. Third, we opted not to collect data about compliance with governmental health regulations out of concern that the financial penalties and legal consequences for lockdown violations could compromise the accuracy of participant reporting. Questions regarding psychopathy's influence on the associations between disease-risk perceptions, compliance with regulations,

and personal protective behaviors will be important to address in follow-up research (Harper et al., 2020; Lee & You, 2020). Given well-documented associations of psychopathic traits with rule-breaking, sensation-seeking, self-centered impulsivity, and disregard for others (Patrick et al., 2009), we expect these characteristics would influence prosocial, protective, and policy-compliant behaviors during a public health crisis.

Notwithstanding these limitations, the present study contributes to the existing literature by demonstrating differential influences of psychopathy-related traits on disease perceptions and emotional well-being during the COVID-19 pandemic. Results support the heuristic value of the triarchic traits as a way of explaining complex socioemotional phenomena, extending prior work focused on unidimensional or two-factor models of psychopathy (Nowak et al., 2020; Zajenkowski et al., 2020). For example, disinhibition evidenced associations opposite to those for boldness and meanness, underscoring the non-unitary nature of psychopathy. Importantly, the triarchic model was designed to bridge across literatures on personality, psychobiology, and psychopathology through a focus on transdiagnostic biobehavioral traits (Patrick & Drislane, 2015). Current study findings serve to illustrate how variations in these basic dispositions may be differentially associated with disease-risk perceptions and emotional well-being under conditions of ongoing disease threat. Efforts to mitigate emotional distress and promote healthy behavior during the COVID-19 pandemic stand to benefit from taking these dispositional factors and their affiliated cognitive styles into account.

CRediT authorship contribution statement

Claudio Sica: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Supervision. **Emily R. Perkins:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Visualization. **Robert D. Latzman:** Conceptualization, Methodology, Formal analysis, Data curation, Writing – review & editing, Visualization. **Corrado Caudek:** Conceptualization, Methodology, Investigation, Supervision, Project administration. **Ilaria Colpizzi:** Conceptualization, Investigation, Project administration. **Gioia Bottesi:** Conceptualization, Investigation, Project administration. **Maria Caruso:** Conceptualization, Investigation, Project administration. **Paolo Giulini:** Conceptualization, Investigation, Project administration. **Silvia Cerea:** Conceptualization, Investigation, Project administration. **Christopher J. Patrick:** Conceptualization, Methodology, Writing – review & editing, Visualization.

Declaration of competing interest

The authors declare no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2021.110770.

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