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Resilience matters: Explaining the association between personality and psychological functioning during the COVID-19 pandemic

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Resilience;
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Abstract
Background/Objective: The objective of the study was to elucidate the underlying mechanism through which basic personality dimensions predict indicators of psychological functioning during the COVID-19 pandemic, including subjective well-being and perceived stress. As a personality characteristic highly contextualized in stressful circumstances, resilience was expected to have a mediating role in this relationship. Method: A sample of 2,722 Slovene adults, aged from 18 to 82 years filled in the Big Five Inventory, the Connor-Davidson Resilience Scale, the Perceived Stress Scale, and the Mental Health Continuum. A path analysis with the Bootstrap estimation procedure was performed to evaluate the mediating effect of resilience in the relationship between personality and psychological functioning. Results: Resilience fully or partially mediated the relationships between all the Big Five but extraversion with subjective well-being and stress experienced at the beginning of the COVID-19 outburst. Neuroticism was the strongest predictor of less adaptive psychological functioning both directly and through diminished resilience. Conclusions: Resilience may be a major protective factor required for an adaptive response of an individual in stressful situations such as pandemic and the associated lockdown.

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PALABRAS CLAVE
Resiliencia;
Cinco Grandes;
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Pandemia de COVID-19;
Estudio ex post facto

La resiliencia importa: explicación de la asociación entre personalidad y funcionamiento psicológico durante la pandemia de COVID-19

Resumen
Antecedentes/Objetivo: El objetivo fue dilucidar el mecanismo subyacente a través del cual las dimensiones básicas de la personalidad predicen indicadores del funcionamiento psicológico durante la pandemia de COVID-19, incluido el bienestar subjetivo y el estrés percibido. Como característica de la personalidad altamente contextualizada en circunstancias estresantes, se esperaba que la resiliencia tuviera un papel mediador en esta relación.
Método: Una muestra de 2.722 adultos eslovenos (18-82 años), completó el Big Five Inventory, la Connor-Davidson Resilience Scale, la Perceived Stress Scale y el Mental Health Continuum. Se realizó un análisis de ruta con el procedimiento de estimación Bootstrap para evaluar el efecto mediador de la resiliencia en la relación entre la personalidad y el funcionamiento psicológico.
Resultados: La resiliencia medió total o parcialmente las relaciones entre los Cinco Grandes, y la extraversión con bienestar subjetivo y el estrés experimentado, al comienzo del estallido de COVID-19. El neuroticismo fue el predictor más fuerte de un funcionamiento psicológico menos adaptativo, tanto directamente como a través de la disminución de la capacidad de resiliencia.
Conclusiones: La resiliencia puede ser un factor de protección importante y requerido para una respuesta adaptativa de un individuo en situaciones estresantes como la pandemia y el confinamiento asociado.

The COVID-19 pandemic found most world populations unprepared, not only in terms of the health threat and demands on the medical system, but also in terms of individuals coping with social distancing measures that disrupted daily routines, limited interpersonal communication, and restricted the availability of social support (Brailovskaia & Margraf, 2020; Brooks et al., 2020; Li et al., 2020). Compared to highly structured situations eliciting similar responses in individuals with diverse personality characteristics, this unprecedented and exceptionally uncertain situation may bring about stronger spontaneous reactions of the individual reflecting their enduring dispositional characteristics (Judge & Zapata, 2015). Research investigating personal factors of stress process predominantly focused on coping styles and other characteristic adaptations, such as motivation, self-efficacy, and resilience, which are considered context-specific and thus directly related to stress (Waaktaar & Torgersen, 2010), while dispositional personality traits have been somewhat less extensively examined (but see for example, Carver & Connor-Smith, 2010; Leger et al., 2016; Penley & Tomaka, 2002). To supplement existing knowledge, the present study aimed to investigate the role of broad personality traits and the underlying mechanism through which these traits affect individual's psychological functioning during the COVID-19 pandemic. Resilience was expected to play a key role in this relationship.

The psychological consequences of an epidemic, related to health threat, quarantine, unemployment, and uncertainty about the future have been partially examined during previous virus outbreaks. For example, individuals who were in quarantine for more than 10 days during the SARS epidemic reported significantly higher post-traumatic stress symptoms compared to individuals who were in quarantine for fewer days (Hawryluck et al., 2004). In a recent rapid review of the psychological effects of quarantine, negative effects such as posttraumatic stress symptoms, confusion, fear, anger, and emotional exhaustion were reported (Brooks et al., 2020).

The individual's experience and response to a stress situation is a complex result of the interaction between various factors, including the personal's characteristics, available resources, social support, and cultural features (Biggs et al., 2017). With regard to personal characteristics, resilience has become increasingly popular in studies that examine individual differences in response to stressful events. Resilience could be characterized as a capacity, which helps individual to effectively adapt to stressful situations (Fletcher & Sarkar, 2013). Contemporary measures operationalize resilience in terms of one's own competence, determination to cope with difficult situations, and healthy patterns of self-regulation (Grossman, 2017). A meta-analysis (Hu et al., 2015) comprising 60 studies reported that resilience was negatively associated with negative indicators of psychological functioning such as depression, anxiety, and negative emotional experience (mean *r* effect size = -0.36), and positively related to positive indicators of psychological functioning such as mental health, life satisfaction, and positive emotional experience (mean *r* effect size = 0.50). A differentiated treatment of positive and negative indicators is essential to capture all aspects of the individual's psychological functioning and surpass the long-standing simplified view of mental health as the absence of mental illness and disability (Suldo & Shaffer, 2008).

While resilience was studied predominantly in research focusing on specific samples of participants in specific (often health or work related) stress situations, the pre-

dictive validity of dispositional personality traits was more often examined in the general population under everyday circumstances. However, personality traits may be good candidates for explaining individual differences in stress reactions, including subjective well-being and perceived stress. More than one hundred years of research led to the consensus on the structure and content of the basic personality traits with the Big Five −extraversion, agreeableness, conscientiousness, neuroticism, and openness− representing the major dimensions of personality (Widiger, 2017). Among the Big Five, extraversion −a predisposition to experience positive affect, usually has the highest correlations with measures of well-being, while neuroticism −a predisposition to experience negative affect, typically has the highest correlations with negative indicators of psychological functioning (Anglim et al., 2020). It is assumed that these correlations can be explained, at least in part, by a temperamental path (Heidemeier & Göritz, 2016), whereby the individual's proneness to positive or negative affectivity influences the initial cognitive assessment of the situation and thus has a direct influence on the positive and negative indicators of psychological functioning. Conscientiousness, agreeableness, and openness are positively associated with subjective well-being, but to a much lesser extent (Anglim et al., 2020). Their associations with negative indicators of psychological functioning are less consistent. While some studies have suggested that conscientiousness, agreeableness, and openness predict lower perceived stress, other studies have not associated these personality traits with stress (Ebstrup et al., 2011; Kim et al., 2016; Şahin & Çetin, 2017).

Studies generally report medium correlations between resilience and the Big Five, with absolute values ranging from 0.31 for agreeableness to 0.46 for neuroticism (Oshio et al., 2018). Furthermore, studies carried out with secondary school and undergraduate students report a joint contribution of all five traits to the resilience with the proportion of variance explained ranging from 27% to 37% (Backmann et al., 2019; Ercan, 2017; Fayombo, 2010; Friborg et al., 2005; Iimura & Taku, 2018), while one study reports that the Big Five explain 76% of variance in resilience (Campbell-Sills et al., 2006). These results indicate that though resilience is fairly well represented in the space of the Big Five personality factors, it also taps into more specific aspects of personality that are particularly relevant for adapting to the challenges of an ever-changing environment. Moreover, the Big Five represent broad and decontextualized dispositional traits that describe a person in general and his or her behavior in many different contexts across time, whereas resilience can be seen as a characteristic adaptation, i.e., an aspect of personality that is contextualized within a specific situation (McAdams, 1996). In the case of resilience, such situation is a stressful one (Fletcher & Sarkar, 2013). Accordingly, resilience may represent a mechanism that explains the relationship between personality and psychological functioning under stress conditions, such as the coronavirus pandemic. For example, conscientiousness can affect the well-being of an individual through better self-regulation, agreeableness and extraversion through better access to social support, and openness through more flexible coping with the situation, all elements of high resilience.

In line with this notion are the results of the studies that examined resilience as a mediator in the association between the Big Five and various aspects of psychological functioning. More specifically, resilience mediated the associations of all the Big Five with depressive symptoms in Chinese adolescents (Gong et al., 2019); the associations of agreeableness, conscientiousness, and openness with anxiety symptoms among Chinese medical students (Shi et al., 2015); the association of extraversion and neuroticism with happiness of Chinese college students (Lü et al., 2014); and the relationship between personality and quality of life in Spanish patients with a drainage enterostomy (Temprado et al., 2019).

This study complements existing literature on personal factors of stress responses by focusing on the role of personality in psychological functioning during very specific circumstances related to a pervasive unfavorable situation of the COVID-19 pandemic. The objective was to elucidate the role of resilience as a characteristic adaptation in the relationship between the Big Five and psychological functioning employing a heterogeneous sample of Slovene adults. Psychological functioning was examined comprehensively, including subjective well-being and perceived stress. It was expected that resilience would mediate the relationship between the Big Five and psychological functioning during the novel coronavirus pandemic. In addition, at least for some personality traits, particularly extraversion and neuroticism, direct associations with subjective well-being and perceived stress were expected.

Method

Participants

The study included 2,722 participants, aged from 18 to 82 years with mean age 36.40 years (*SD* = 13.10 years). Women represented 74.90% of the sample and 25.10% of the participants were male. Approximately a third of the participants (32.20%) attained a high school or lower education and 67.80% had a post-secondary education or graduate degree.

Instruments

The Big Five Inventory−Short Version (BFI-K; Rammstedt & John, 2005) was used as a self-report measure of the five basic personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness. The BFI-K includes 21 items, rated along a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The inventory shows satisfactory reliability and construct validity. In the present study, alpha coefficients of internal consistency ranged from .62 to .82.

The 10-item Connor-Davidson Resilience Scale (CD-RISC-10; Campbell-Sills & Stein, 2007) is a self-report measure of individuals' ability to thrive despite adversity. It consists of 10 items that are rated on a 5-point scale ranging from 0 (*not true*) to 4 (*true nearly all of the time*). In the present study, we asked the participants to assess their resilience for the past week. The CD-RISC-10 was shown to be a highly reliable unidimensional scale with sound construct validity. Alpha coefficient with our sample was .94.

The Perceived Stress Scale (PSS; Cohen & Williamson, 1988) was used to measure the degree to which participants perceive the situations in their lives as stressful. The scale has 10 items that are rated along a 5-point scale ranging from 0 (*never*) to 4 (*very often*). The PSS was shown to have good internal consistency, test-retest reliability, and criterion validity (Lee, 2012). In our study, the participants assessed their perceived stress during the last week and the alpha coefficient was .89.

The short form of the Mental Health Continuum (MHC-SF; Keyes, 2002) was employed as a self-report measure of subjective well-being. It consists of 14 items, tapping aspects of subjective emotional, psychological, and social well-being. Respondents rated the items on a 6-point scale ranging from 0 (*never*) to 5 (*every day during the past week*). The scale has shown good internal consistency, satisfactory test-retest reliability and sound construct, convergent, and divergent validity (Lamers et al., 2010). In the present study, the alpha coefficient for the overall score was .91.

Procedure

The study took place within five days after Slovenia declared the COVID-19 epidemics. During this time, all sales and service facilities (except grocery stores and pharmacies), schools and kindergartens were closed, public transportation was stopped, and public gatherings prohibited. Moreover, COVID-19 claimed its first victim in Slovenia. The data was collected on-line using a survey platform. We distributed the link via social networks and advertised it on Facebook for three days. Furthermore, the link was promoted on the National radio and television's website in a form of a short news announcement. This website is one of the most often visited Internet pages in Slovenia and was accessed by over 60% of all IP addresses in Slovenia in March 2020, when the survey was conducted (MOSS, 2020). Before starting the survey, the participants were informed about the aims of the study and the protection of personal data. They were asked to confirm their informed consent to participate. The study was approved by the University of Ljubljana, Faculty of Arts Human Research Ethics Committee. The online survey was closed after three days to ensure that the circumstances regarding the pandemic were as comparable as possible for all respondents and that all respondents reported on their psychological functioning within the first days of the lockdown.

Data analysis

First, we eliminated data for the respondents under the age of 18 years, those who did not finish the entire survey and those who showed straight lining behavior. As all the items were set as obligatory, the final database had no missing data. Descriptive statistics were first examined and Pearson correlations between the main variables were computed. Independent samples *t*-tests were used to examine how sex and educational groups differ with respect to resilience, subjective well-being, and stress. The statistical tests were supplemented with estimates of effects sizes. Following Cohen's (1988) recommendation, correlation coefficients below .30 were interpreted as low, between .30 and .50 as medium and those above .50 as large. *T*-tests were complemented by computing Cohen's *d* reflecting effect size with values up to .50 suggesting small effect, between .50 and .80 medium effect, and above 0.80 large effect.

To evaluate the mediating effect of resilience in the relationship between the Big Five and psychological functioning during the COVID-19 pandemic, a path analysis was performed in M*plus* version 8.4 (Muthén & Muthén, 1998/2019) using a maximum likelihood estimator. The Big Five were modelled as exogenous variables with both direct and indirect effects on subjective well-being and stress, while resilience was modelled as a mediating variable. In order to statistically control for possible effects of background variables on subjective well-being and stress, participants' sex (male vs. female), age (continuous by age) and education (high school or lower vs. post-secondary education or graduate degree) were also added as predictors of these outcome variables in the model. The criteria suggested by Hu and Bentler (1999) were used to evaluate the fit of the model: the fit was considered acceptable if CFI was above .90, SRMR was below .10, and RMSEA was below .08. The significance of the mediating effect of resilience was tested using the Bootstrap estimation procedure with 2,000 bootstrap samples randomly selected from the full dataset.

Results

Descriptive statistics and correlations between variables

Descriptive statistics and Pearson correlations between all the variables are presented in Table 1. As can be seen, there was a negative correlation of medium effect size between subjective well-being and stress. Resilience had large correlations with subjective well-being and stress in opposite directions. Among the Big Five, extraversion, agreeableness, conscientiousness, and openness had low to medium positive correlations with subjective well-being and resilience, and low negative correlations with stress. Conversely, neuroticism demonstrated large negative correlations with subjective well-being and resilience, and a large positive correlation with stress.

A significant correlation of low effect size was observed between age and both indicators of psychological functioning; with the increasing age of the participants, subjective well-being increased (r = .21, p < .001) and stress decreased (r = -.21, p < .001). There was no difference between men and women in the level of subjective well-being (t(2, 720) = 1.37, p = .170; d = 0.06), however women reported higher levels of stress compared to men (t(1, 306.7) = -11.71, p = < .001; d = -0.49). Also, highly educated participants reported higher subjective well-being (t(1, 620) = -4.15, p = < .001; d = -0.17) and lower stress (t(2, 720) = 3.59, p < .001; d = 0.15) compared to those with lower education.

Path analysis and the mediating effect of resilience

The results of the path analysis examining the mediating role of resilience in the associations between the Big Five and psychological functioning indicated acceptable fit of

Table 1 Descriptive statistics and correlations between subjective well-being, stress, resilience and the Big Five.

	M	*SD*	1		2		3		4		5		6		7	
1 Subjective well-being	45.55	12.55														
2 Stress	17.75	6.90	-.58	***												
3 Resilience	27.28	7.34	.68	***	-.74	***										
4 Extraversion	13.32	2.98	.34	***	-.14	***	.19	***								
5 Agreeableness	14.07	2.82	.32	***	-.18	***	.16	***	.31	***						
6 Conscientiousness	15.02	2.61	.33	***	-.21	***	.28	***	.19	***	.21	***				
7 Neuroticism	11.25	3.57	-.56	***	.64	***	-.63	***	-.27	***	-.38	***	-.26	***		
8 Openness	19.46	3.18	.16	***	-.06	**	.18	***	.20	***	.02		.12	***	-.06	**

Note. ** $p < .01$, *** $p < .001$.

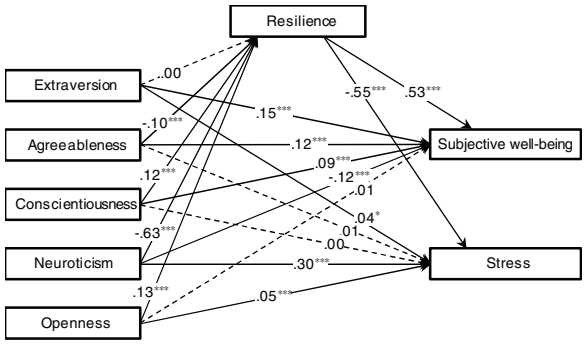

Fig. 1 Path diagram and direct effect estimates between the Big Five, resilience, subjective well-being and stress. Solid lines indicate significant effects (*$p < .05$, **$p < .01$, ***$p < .001$), whereas dotted lines indicate insignificant effects ($p > .05$). Control variables predicting subjective well-being and stress (i.e. age, gender, and education) are not presented for simplicity reasons.

the hypothesized model to the data, with the following fit indices: $\chi^2(3) = 38.45$ ($p < .001$), RMSEA = .066 (95% CI = .048, .085), CFI = .994, SRMR = .019. The model explained 43.7% of the variance in resilience, and 55% and 60.20% of the variances in subjective well-being and stress, respectively. Figure 1 depicts standardized path coefficients for the model tested. Among the Big Five, all but openness predicted subjective well-being, and extraversion, neuroticism, and openness predicted stress. Extraversion was the only personality dimension with an insignificant effect on resilience. In line with the expectations, significant path coefficients were observed between resilience and subjective well-being and stress.

Bootstrapping was used to test the significance of the mediation effects of resilience on the associations between the Big Five and psychological functioning during COVID-19 pandemic. The results are presented in Table 2. Confidence intervals not containing zero indicate significant ($p < .05$) total, direct, and indirect effects. According to the results obtained, extraversion had a direct positive effect on subjective well-being and stress, but no indirect effect through resilience. Direct positive effects on subjective well-being were also observed for agreeableness and conscientiousness, and direct negative effects were observed for neuroticism and openness. In addition, agreeableness and neuroticism exerted an indirect negative effect on subjective well-being through resilience, and conscientiousness exerted an indirect positive effect on subjective well-being through resilience. Furthermore, indirect positive effects on stress were observed for neuroticism and agreeableness and indirect negative effects were observed for conscientiousness and openness. Neuroticism and openness also had direct positive effects on stress.

Discussion

This study sought to examine the role of resilience in the relationship between basic personality traits and psychological functioning under pervasive stressful circumstances related to the COVID-19 outburst, using a large and heterogeneous sample of Slovene adults. As a characteristic adaptation (McAdams, 1996) contextualized in adverse situations (Connor & Davidson, 2003; Fletcher & Sarkar, 2013), resilience was expected to mediate the relationship of broad and decontextualized dispositional traits (the Big Five) with individual's subjective well-being and perceived stress during the novel coronavirus pandemic. Overall, our results confirmed these expectations, as resilience fully or partially mediated the relationship of all the Big Five traits but extraversion with psychological functioning. These findings are in line with scarce previous studies on the mediating role of resilience between personality and psychological functioning conducted on adolescent, student, or patient samples (Gong et al., 2019; Lü et al., 2014; Shi et al., 2015; Temprado et al., 2019).

Consistent with a recent meta-analysis (Oshio et al., 2018), the present study showed low to moderate positive correlations of resilience with extraversion, conscientiousness, agreeableness, and openness, and a strong negative correlation with neuroticism. When all of the Big Five were considered simultaneously in the path model, neuroticism emerged as by far the strongest predictor of reduced resilience. However, extraversion was not a significant predictor of resilience and agreeableness contributed negatively to resilience. These findings could at least partially reflect the particularities of the period during which the resilience was assessed, i.e. the pandemic and the associated lockdown, as positive adaptations may vary across contexts and time (Fletcher & Sarkar, 2013). Specifically, individuals low in agreeableness who are less concerned with the welfare of others could be somewhat better equipped

Table 2 Total, indirect, and direct effects of the Big Five on subjective well-being and stress through resilience, and 95% bootstrap confidence intervals.

	Standardized total effect		Standardized indirect effect		Standardized direct effect		Result
	Point estimate	95 % CI	Point estimate	95 % CI	Point estimate	95 % CI	
Effect on subjective well-being							
Extraversion	.15	[.11, .18]	.00	[-.02, .02]	.15	[.12, .17]	Direct effect only
Agreeableness	.06	[.03, .10]	-.05	[-.07, -.04]	.12	[.09, .15]	Partial mediation
Conscientiousness	.15	[.12, .19]	.06	[.05, .08]	.09	[.06, .12]	Partial mediation
Neuroticism	-.46	[-.49, -.43]	-.33	[-.36, -.31]	-.12	[-.16, -.08]	Partial mediation
Openness	.08	[.05, .11]	.07	[.05, .09]	.01	[-.02, .04]	Full mediation
Effect on stress							
Extraversion	.03	[.00, .07]	.00	[-.02, .02]	.04	[.01, .06]	Direct effect only
Agreeableness	.07	[.03, .10]	.06	[.04, .08]	.01	[-.02, .04]	Full mediation
Conscientiousness	-.06	[-.10, -.03]	-.07	[-.09, -.05]	.00	[-.02, .03]	Full mediation
Neuroticism	.64	[.61, .67]	.35	[.32, .37]	.30	[.26, .33]	Partial mediation
Openness	-.02	[-.05, .01]	-.07	[-.09, -.05]	.05	[.02, .07]	Partial mediation

Note. CI = confidence interval. Bootstrapping sample size = 2,000.

to adjust psychologically to the measures of social distancing and a serious danger to health or even life of their family members and friends imposed by the virus. As for the extraversion, the lack of its predictive association with resilience could be due to possibly different role of its facets (e.g., activity, excitement seeking vs. warmth, positive emotions) in resilient functioning during this unprecedented situation.

Low neuroticism emerged as the strongest protective factor against low resilience, suggesting that emotionally stable individuals may be best able to adjust to the uncertain, rapidly changing and adverse circumstances of the epidemic. The associations obtained between the Big Five and resilience indicate that individuals who had low levels of negative emotions (low neuroticism), tended to have high self-control (high conscientiousness), high preference for complex cognitive stimuli (high openness) and low motivation to maintain good relationships with others (low agreeableness), showed higher levels of resilience during the COVID-19 lockdown, i.e. were able to face challenges and obstacles, felt strong, focused and in control when coping with adversities, and generally adapted well to the situation. Furthermore, over half of the variance in resilience remained unexplained by the Big Five, suggesting that while resilience substantially overlaps with the Big Five it nevertheless taps specific personal characteristics that seem to have additional value for psychological functioning over the Big Five.

As expected, our results revealed that resilience predicted higher subjective well-being and lower stress during the first week after the COVID-19 epidemic was declared in Slovenia, with path coefficients of a similar size, suggesting equal contribution of resilience to positive and negative aspects of psychological functioning (Ryff & Singer, 1996). In other words, resilience may buffer against detrimental effects of adverse situations and, at the same time, improve subjective well-being of individuals. These findings support the notion that resilience promotes personal assets within adverse contexts and protects an individual from the potentially detrimental effect of stressors (Fletcher & Sarkar, 2013).

Path analysis results further demonstrated that among the Big Five all but openness directly predicted subjective well-being at the beginning of the COVID-19 epidemic in the expected direction, with extraversion exerting the strongest direct effect. Previous studies revealed openness as the weakest predictor of well-being indicators (Anglim et al., 2020), whereas our results suggest that openness exerts an indirect effect on subjective well-being through greater resilience, probably due to more flexible coping with change and uncertainty of the situation. On the other hand, extraversion was typically found to be the strongest predictor of well-being (Anglim et al., 2020). According to our findings, extraversion had only a direct effect on subjective well-being, which could be attributed to a higher temperamental susceptibility and stronger positive reactions of individuals high in extraversion to potential rewards in different situations and thus to more frequent experiences of positive emotions that represent an important component of subjective well-being (Heidemeier & Göritz, 2016). However, extraversion may also influence subjective well-being through other possible mediators, not investigated in the present study (e.g., coping strategies; Xu et al., 2017). Overall, the strongest total effect on subjective well-being was observed for neuroticism, with direct and indirect negative effects both significant. Individuals high in neuroticism are more attentive to negative stimuli and experience elevated negative emotionality in adverse situations (Tackett & Lahey, 2017), which decreases their subjective well-being and, at the same time, their capacity to successfully adjust to adverse situation, further diminishing subjective well-being. Furthermore, resilience partially mediated the associations of conscientiousness and agreeableness with subjective well-being. For conscientiousness, both direct and indirect effects were positive, whereas for agreeableness the direct effect was positive and the indirect effect was negative. The later finding suggests that specific facets of agreeableness (e.g., compliance vs. altruism) could

play different roles in individual's psychological functioning during adverse situations such as the coronavirus pandemic.

In line with the expectations and previous research (Ebstrup et al., 2011; Kim et al., 2016; Şahin & Çetin, 2017), neuroticism had the strongest direct effect on stress at the outburst of the COVID-19 among the Big Five. This effect could be attributed to an increased propensity of individuals high in neuroticism to assess situations less favorably, and experience and express negative emotions more often. Besides directly affecting individual's level of stress, neuroticism exerted an indirect effect on stress of a similar size through diminished resilience. Hence, individuals high in neuroticism might be less able to adjust psychologically to the uncertain and rapidly changing circumstances (i.e., are less resilient), further aggravating their stress level. Besides neuroticism, extraversion and openness had weaker yet significant positive direct effects on stress. Although at first sight counterintuitive, these findings gain meaning within a broader context of the exceptional circumstances of the pandemic and the stringent measures imposed as part of the lockdown. Individuals high in extraversion, who are typically outgoing and sociable, could have experienced the measures of social distancing as much more stressful compared to more introverted individuals, whereas highly open individuals could have gained more information and a deeper understanding of the all-encompassing consequences of the pandemic, again leading to higher levels of perceived stress. Nevertheless, openness also exhibited an indirect negative effect on stress through higher resilience, suggesting that individuals high in openness might also find more resources to adaptively respond to the adverse situation. The effects of conscientiousness and agreeableness on stress were fully mediated by resilience, with conscientiousness exerting negative indirect effect and agreeableness exerting positive indirect effect. The later finding is consistent with previously discussed negative indirect effect of agreeableness on subjective well-being.

This study is not without limitations. Although a large and heterogeneous sample of Slovene adults was included, data collection took place at an on-line survey platform with a limited reach to older participants who do not use internet. Also, female participants predominated in the sample. The effect of sex was statistically controlled in the present study to counterbalance for the unequal representation of men and women in the sample. Nevertheless, future studies could delve more deeply into the role of gender in various aspects of resilient functioning. Furthermore, although measures of resilience and psychological functioning have been temporally framed focusing on the previous week and hence potentially able to reflect the onset of the COVID lockdown, the present study included no specific measures related to the epidemic as such. In addition, the lack of comparable data before the COVID-19 outbreak limits its conclusions about the specific effect of the epidemic on psychological functioning. Due to a cross-sectional research design, any causal interpretations are precluded. Stemming from the conceptualization of personality traits as rather stable predispositions shaping individuals' experiences and responses to a variety of situations (e.g., Caspi et al., 2005), we examined the role of the Big Five and resilience in psychological functioning. However, the direction of the associations could be reversed – low levels of stress experienced and favorable well-being could facilitate resilient capabilities. For example, a recent German study showed that stress symptoms and positive mental health reported prior to the COVID-19 pandemic predicted experiences of the pandemic restrictions (Brailovskaia & Margraf, 2020). In line with the proposed 'corresponsive principle' (Roberts et al., 2003), we can expect that people with certain personality traits tend to perceive, experience and respond to specific situations in a certain way, and these experiences in turn accentuate the same personal characteristics that led to their experiences in the first place. Longitudinal studies are needed to test these expectations. Indeed, participants of our study were asked to continue taking part in the study and the follow-up data collection would hopefully enable us to gain a more comprehensive insight into dynamic processes of psychological functioning in the months following the COVID-19 outburst. The field would also benefit from a more detailed examination of the associations of various Big Five facets with resilience, subjective well-being and stress. In addition, the question whether specific personality profiles activate different aspects of resilient responding remains open for prospective studies. Finally, future research is needed to examine other potential mediators of the relationship between personality traits and psychological functioning in adverse situations, such as cognitive flexibility or coping strategies (e.g., Odacı & Cikrikci, 2019; Xu et al., 2017).

Altogether, our findings confirmed that resilience could represent an underlying mechanism explaining how basic personality traits contribute to psychological functioning during the COVID-19 pandemic. In other words, as broad, decontextualized and stable dispositional behavioral, emotional and cognitive tendencies the Big Five 'translate' to the characteristic adaptation contextualized to the stressful situation, i.e., resilience, which shapes individual's psychological functioning. Specifically, higher conscientiousness, higher openness, lower agreeableness, and, above all, lower neuroticism seemed to predispose participating adults to see themselves as competent, be determined to cope with the adversities brought on by the COVID-19 pandemic, and perceive the adversities as manageable, thus contributing to reduced stress and increased well-being. As a characteristic adaptation particularly prominent in adverse situations such as pandemic and social isolation, resilience may be a major protective factor required for a flexible and adaptive response of an individual, leading to higher subjective well-being and lower stress. In particular, resilience fully or partially mediated the relationship between all the Big Five but extraversion with subjective well-being and stress. In line with previous findings, neuroticism was by far the strongest predictor (with the total effects larger as the sum of the effects of other four personality dimensions) contributing to less adaptive psychological functioning both directly and through diminished resilience.

Given the relative stability (Bleidorn & Hopwood, 2019) and possible yet usually slow and rather small purposeful changes in basic personality dimensions (Baranski et al., 2020), building individuals' resilience would seem a meaningful strategy to improve the psychological functioning of individuals under stressful circumstances. Specifically, various evidence-based intervention programs have been developed aimed at fostering resilience (e.g., Chmitorz

et al., 2018), some particularly suitable in the pandemic context (Folkman & Greer, 2000). Such interventions could be integrated within community outreach programs supported by policy-related initiatives (Fletcher & Sarkar, 2013). Enhancing resilience might prevent diminished psychological functioning and promote successful adaptation of individuals in adverse situations such as the coronavirus pandemic accompanied with the strict measures and lockdown regulations. Special focus should be paid to individuals high in neuroticism who are most vulnerable to negative psychological outcomes.

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References

Anglim, J., Horwood, S., Smillie, L. D., Marrero, R. J., & Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: A meta-analysis. *Psychological Bulletin*, *146*, 279–323. http://dx.doi.org/10.1037/bul0000226

Backmann, J., Weiss, M., Schippers, M. C., & Hoegl, M. (2019). Personality factors, student resiliency, and the moderating role of achievement values in study progress. *Learning and Individual Differences*, *72*, 39–48. http://dx.doi.org/10.1016/j.lindif.2019.04.004

Baranski, E., Gray, J., Morse, P., & Dunlop, W. (2020). From desire to development? A multi-sample, idiographic examination of volitional personality change. *Journal of Research in Personality*, *85*, 103910–103922. http://dx.doi.org/10.1016/j.jrp.2019.103910

Biggs, A., Brough, P., & Drummond, S. (2017). Lazarus and Folkman's psychological stress and coping theory. In C. L. Cooper, & J. C. Quick (Eds.), *The handbook of stress and health: A guide to research and practice* (pp. 351–364). Wiley-Blackwell.

Bleidorn, W., & Hopwood, C. J. (2019). Stability and change in personality traits over the lifespan. In D. P. McAdams, R. L. Shiner, & J. L. Tackett (Eds.), *Handbook of personality development* (pp. 237–252). The Guilford Press.

Brailovskaia, J., & Margraf, J. (2020). Predicting adaptive and maladaptive responses to the Coronavirus (COVID-19) outbreak: A prospective longitudinal study. *International Journal of Clinical and Health Psychology*, http://dx.doi.org/10.1016/j.ijchp.2020.06.002. Advanced online publication

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*, *395*, 912–920. http://dx.doi.org/10.1016/S0140-6736(20)30460-8

Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour Research and Therapy*, *44*, 585–599. http://dx.doi.org/10.1016/j.brat.2005.05.001

Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor-Davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, *20*, 1019–1028. http://dx.doi.org/10.1002/jts.20271

Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual Review of Psychology*, *61*, 679–704. http://dx.doi.org/10.1146/annurev.psych.093008.100352

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, *56*, 453–484. http://dx.doi.org/10.1146/annurev.psych.55.090902.141913

Chmitorz, A., Kunzler, A., Helmreich, I., Tüscher, O., Kalisch, R., Kubiak, T., Wessa, M., & Lieb, K. (2018). Intervention studies to foster resilience–A systematic review and proposal for a resilience framework in future intervention studies. *Clinical Psychology Review*, *59*, 78–100. http://dx.doi.org/10.1016/j.cpr.2017.11.002

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Lawrence Erlbaum Associates.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapam, & S. Oskamp (Eds.), *The Social Psychology of Health: Claremont Symposium on Applied Social Psychology* (pp. 31–67). Newbury Park.

Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and Anxiety*, *18*, 76–82. http://dx.doi.org/10.1002/da.10113

Ebstrup, J. F., Eplov, L. F., Pisinger, C., & Jørgensen, T. (2011). Association between the Five Factor personality traits and perceived stress: Is the effect mediated by general self-efficacy? *Anxiety, Stress, & Coping: An International Journal*, *24*, 407–419. http://dx.doi.org/10.1080/10615806.2010.540012

Ercan, H. (2017). The Relationship between Resilience and the Big Five Personality Traits in Emerging Adulthood. *Eurasian Journal of Educational Research*, *70*, 83–103. http://dx.doi.org/10.14689/ejer.2017.70.5

Fayombo, G. (2010). The relationship between personality traits and psychological resilience among the Caribbean adolescents. *International Journal of Psychological Studies*, *2*, 105–116. http://dx.doi.org/10.5539/ijps.v2n2p105

Fletcher, D., & Sarkar, M. (2013). Psychological resilience: A review and critique of definitions, concepts, and theory. *European Psychologist*, *18*, 12–23. http://dx.doi.org/10.1027/1016-9040/a000124

Folkman, S., & Greer, S. (2000). Promoting psychological well-being in the face of serious illness: When theory, research and practice inform each other. *Psychooncology*, *9*, 11–19. http://dx.doi.org/10.1002/(sici)1099-1611(200001/02)9:1<11::aid-pon424>3.0.co;2-z

Friborg, O., Barlaug, D., Martinussen, M., Rosenvinge, J. H., & Hjemdal, O. (2005). Resilience in relation to personality and intelligence. *International Journal of Methods in Psychiatric Research*, *14*, 29–42. http://dx.doi.org/10.1002/mpr.15

Gong, Y., Shi, J., Ding, H., Zhang, M., Kang, C., Wang, K., Yu, Y., Wei, J., Wang, S., Shao, N., & Han, J. (2019). Personality traits and depressive symptoms: The moderating and mediating effects of resilience in Chinese adolescents. *Journal of Affective Disorders*, *265*, 611–617. http://dx.doi.org/10.1016/j.jad.2019.11.102

Grossman, M. R. (2017). *The Structure of Resilience: An Empirical Examination of Resilience Factors*. Graduate Theses and Dissertations. Retrieved from https://scholarcommons.usf.edu/etd/6851.

Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infectious Diseases journal*, *10*, 1206–1212. http://dx.doi.org/10.3201/eid1102.040760

Heidemeier, H., & Göritz, A. S. (2016). The instrumental role of personality traits: Using mixture structural equation modeling to investigate individual differences in the relationships between the Big Five traits and life satisfaction. *Journal of Happiness Studies*, *17*, 2595–2612. http://dx.doi.org/10.1007/s10902-015-9708-7

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria ver-

sus new alternatives. *Structural Equation Modeling*, *6*, 1–55. http://dx.doi.org/10.1080/10705519909540118

Hu, T., Zhang, D., & Wang, J. (2015). A meta-analysis of the trait resilience and mental health. *Personality and Individual Differences*, *76*, 18–27. http://dx.doi.org/10.1016/j.paid.2014.11.039

Iimura, S., & Taku, K. (2018). Gender differences in relationship between resilience and big five personality traits in Japanese adolescents. *Psychological Reports*, *121*, 920–931. http://dx.doi.org/10.1177/0033294117741654

Judge, T. A., & Zapata, C. P. (2015). The person-situation debate revisited: Effect of situation strength and trait activation on the validity of the big five personality traits in predicting job performance. *Academy of Management Journal*, *58*, 1149–1170. http://dx.doi.org/10.5465/amj.2010.0837

Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behaviour*, *43*, 207–222. http://dx.doi.org/10.2307/3090197

Kim, S. E., Kim, H. N., Cho, J., Kwon, M. J., Chang, Y., Ryu, S., Shin, H., & Kim, H. L. (2016). Direct and Indirect Effects of Five Factor Personality and Gender on Depressive Symptoms Mediated by Perceived Stress. *Plos One*, *11*, Article e0154140 http://dx.doi.org/10.1371/journal.pone.0154140

Lamers, S. M. A., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2010). Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF). *Journal of Clinical Psychology*, *67*, 99–110. http://dx.doi.org/10.1002/jclp.20741

Lee, E. H. (2012). Review of the psychometric evidence of the perceived stress scale. *Asian Nursing Research*, *6*, 121–127. http://dx.doi.org/10.1016/j.anr.2012.08.004

Leger, K. A., Charles, S. T., Turiano, N. A., & Almeida, D. M. (2016). Personality and stressor-related affect. *Journal of Personality and Social Psychology*, *111*, 917–928. http://dx.doi.org/10.1037/pspp0000083

Li, W., Yang, Y., Liu, Z. H., Zhao, Y. J., Zhang, Q., Cheung, T., & Xiang, Y. T. (2020). Progression of Mental Health Services during the COVID-19 Outbreak in China. *International Journal of Biological Sciences*, *16*, 1732–1738. http://dx.doi.org/10.7150/ijbs.45120

Lü, W., Wang, Z., Liu, Y., & Zhang, H. (2014). Resilience as a mediator between extraversion, neuroticism and happiness, PA and NA. *Personality and Individual Differences*, *63*, 128–133. http://dx.doi.org/10.1207/s15327965pli0704_1

McAdams, D. P. (1996). Personality, Modernity, and the storied self: A contemporary framework for studying persons. *Psychological Inquiry*, *7*(4), 295–321. http://dx.doi.org/10.1207/s15327965pli0704_1

MOSS. (2020). *Rezultati MOSS: Valutni podatki o obiskanosti spletnih mest. Marec 2020* [MOSS results: Slovenian online media currency. March 2020].

Muthén, L. K., & Muthén, B. O. (1998/2019). *Mplus User's Guide* (8th edition). Muthén & Muthén.

Odacı, H., & Cikrikci, Ö. (2019). Cognitive flexibility mediates the relationship between Big Five personality traits and life satisfaction. *Applied Research in Quality of Life*, *14*, 1229–1246. http://dx.doi.org/10.1007/s11482-018-9651-y

Oshio, A., Taku, K., Hirano, M., & Saeed, G. (2018). Resilience and Big Five personality traits: A meta-analysis. *Personality and Individual Differences*, *127*, 54–60. http://dx.doi.org/10.1016/j.paid.2018.01.048

Penley, J. A., & Tomaka, J. (2002). Associations among the Big Five, emotional responses and coping with acute stress. *Personality and Individual Differences*, *32*, 1215–1228. http://dx.doi.org/10.1016/S0191-8869(01)00087-3

Rammstedt, B., & John, O. (2005). Short version of the Big Five Inventory (BFI-K): Development and validation of an economic inventory for assessment of the five factors of personality. *Diagnostica*, *51*, 195–206. http://dx.doi.org/10.1026/0012-1924.51.4.195

Roberts, B. W., Caspi, A., & Moffitt, T. E. (2003). Work experiences and personality development in young adulthood. *Journal of Personality and Social Psychology*, *84*, 582–593. http://dx.doi.org/10.1037/0022-3514.84.3.582

Ryff, C. D., & Singer, B. (1996). Psychological well-being: Meaning, measurement, and implications for psychotherapy research. *Psychotherapy and Psychosomatics*, *65*, 14–23. http://dx.doi.org/10.1159/000289026

Şahin, F., & Çetin, F. (2017). The Mediating Role of General Self-Efficacy in the Relationship Between the Big Five Personality Traits and Perceived Stress: A Weekly Assessment Study. *Psychological Studies*, *62*, 35–46. http://dx.doi.org/10.1007/s12646-016-0382-6

Shi, M., Liu, L., Wang, Z. Y., & Wang, L. (2015). The Mediating Role of Resilience in the Relationship between Big Five Personality and Anxiety among Chinese Medical Students: A Cross-Sectional Study. *Plos One*, *10*, Article e0119916 http://dx.doi.org/10.1371/journal.pone.0119916

Suldo, S. M., & Shaffer, E. J. (2008). Looking beyond psychopathology: The dual-factor model of mental health in youth. *School Psychology Review*, *37*, 52–68.

Tackett, J. L., & Lahey, B. B. (2017). Neuroticism. In T. A. Widiger (Ed.), *The Oxford handbook of the Five Factor Model* (pp. 39–56). Oxford University Press.

Temprado, M. D., Nieto, G. A., & Boira, E. J. C. (2019). The mediating role of resilience in the relationship between personality and adjustment to disease in patients with a drainage enterostomy. *Journal of Health Psychology*, *24*, 1110–1124. http://dx.doi.org/10.1177/1359105316689142

Waaktaar, T., & Torgersen, S. (2010). How resilient are resilience scales? The Big Five scales outperform resilience scales in predicting adjustment in adolescents. *Scandinavian Journal of Psychology*, *51*, 157–163. http://dx.doi.org/10.1111/j.1467-9450.2009.00757.x

Widiger, T. A. (2017). *The Oxford handbook of the Five Factor Model*. Oxford University Press.

Xu, L., Liu, R. D., Ding, Y., Mou, X., Wang, J., & Liu, Y. (2017). The Mediation Effect of Coping Style on the Relations between Personality and Life Satisfaction in Chinese Adolescents. *Frontiers in Psychology*, *8*, 1076. http://dx.doi.org/10.3389/fpsyg.2017.01076