

The Impact of Neuroticism on Well-Being During the
COVID-19 Outbreak in a Dutch Sample

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Abstract

The global health crisis caused by the COVID-19 outbreak in 2020 led governments all over the world to impose a range of measures, such as quarantines and lockdowns, to control the spread of the virus. Looking at the Netherlands, in the spring of 2020, the government decided to impose measures such as the closure of schools, workplaces, shopping areas, curfew, virus-testing and other limits to civil liberties. Evidence from previous pandemics is pointing towards the major psychological consequences of such situations on an individual's well-being (Brooks et al., 2020). Especially neurotic individuals and individuals that perceive increased negative affect are prone to experience impairments in emotional, social and psychological well-being. This study investigated how neuroticism (trait measure) and negative affect (state measure) influenced levels of emotional, social and psychological well-being in a Dutch sample (N=636) during the COVID-19 pandemic, specifically looking into present mediation effects of negative affect. The data was retrieved from the Longitudinal Internet Studies for the Social Sciences Panel (LISS-Panel) in 2019 and 2020. The International Personality Item Pool (IPIP) was used to assess neuroticism in both years as well as make inferences about the impact of neuroticism and negative affect on the three components of well-being. Negative affect was measured with the Positive and Negative Affect Scale (PANAS) and well-being was assessed using a revised Dutch version of the Mental Health Continuum-Short Form (MHC-SF). To obtain the results, the relations were analysed using Pearson correlation. Regarding the hypothesized mediation Hayes's model was used to compare the direct and indirect effects. The results indicate that neuroticism is significantly positive correlated to negative affect and significantly negative to the three dimensions of well-being, with the strongest correlation towards emotional well-being. Negative affect also showed significant negative correlations towards the three components of well-being. Regarding mediation effects, this study could confirm that there is an indirect effect of neuroticism on emotional and psychological well-being through negative affect, but only partially as the direct effect remains significant. Considering social well-being, no mediating effects of negative affect could be observed. Neuroticism is therefore an important variable to consider when looking at the challenges that evolve out of the pandemic regarding emotional and psychological dimensions of well-being. Looking at social well-being, no visible mediating effects were found.

INTRODUCTION

The unpredicted nature of the COVID-19 virus and many other negative effects that the pandemic might bring along, may impair levels of well-being in a substantial proportion of the population (World Health Organization, 2020). The present research aims to evaluate how neuroticism impacts well-being on all its dimensions, namely emotional, social, and psychological while taking negative affect into account. More specifically, this study is looking into the relation of neuroticism and well-being during the COVID-19 pandemic, as well as the role of negative affect, in a Dutch sample.

Previous studies have investigated the psychological consequences of the COVID-19 pandemic on people's lives. It has been shown that restrictions and governmental measurements caused a substantial proportion of people around the world to experience more symptoms of psychopathology. Data from the Office of National Statistics (ONS) reports that around 72% of the UK population are worried about the impact of COVID-19 on their lives, with 32% experiencing an increase in anxiety, 43% indicating a reduction in subjective well-being, and 23% experiencing elevated levels of loneliness (Dawson & Moghaddam, 2020). In a Chinese study, Wang et al. (2020) found that half of their respondents indicated a moderate to severe psychological impact of COVID-19 on their well-being, with approximately one-third experiencing severe levels of anxiety. Looking at America, many people use prescription drugs to cope with stress and adversity and it is worth noticing that the demands for anti-anxiety medication have increased 34.1% from February to March in the year 2020 (Lee, Jobe, Mathis & Gibbons, 2020). Anxiety and other affective related disorders result from maladaptive responses to individually difficult perceived situations, causing emotional distress (Keough, Riccardi, Timpano, Mitchell, & Schmidt, 2010). Research studies investigated the global prevalence rate of anxiety disorders and estimated an average score of 7.3% in the population that was found to be three times higher during the COVID-19 pandemic (Mary-Krause et. al, 2021). It is therefore expected that these consequences will have a negative impact on people's well-being.

Yet, it is notable that individuals displayed a variety of responses to the COVID-19 pandemic and the induced changes in their daily lives, impacting the level of well-being in a substantial proportion of the population (World Health Organization, 2020). According to Tett and Guterman (2020), individual differences should be studied during environmentally challenging times, as novel and uncertain situations are most likely to reveal them. Dynamic theories of personality affirm that individual differences in personality become forefront in situations that activate the traits (Tett & Guterman, 2000), such as the challenging situation the majority is experiencing due to COVID-19 and the imposed measures by the government (World Health Organization, 2020).

Well-being

Keyes (2003, 2005, 2007) pictures mental health and mental disorders as two separate but related dimensions of functioning. Hereby, the dimension of mental disorder gives insight into the extent an individual is experiencing psychopathology, whereas the dimension of mental health indicates whether well-being is present or absent. According to Keyes (2003, 2005, 2007) positive mental health, or flourishing, is operationalized as a combination of emotional well-being, social well-being, and psychological well-being.

Keyes based his idea of emotional well-being on the work of Diener (Diener, Suh, Lucas, & Smith, 1999), assessing this component through the presence of positive affect and life satisfaction. It is described as individuals' perceived feelings toward and emotional reactions to their lives.

Considering the second component, social well-being, it is operationalized as the quality of one's connection with others, including positive views of others and believing that one is contributing to society (Keyes, 1998). According to Keyes (2002), it captures an individual's perception of their own living conditions and functioning in society (Keyes, 2002). Indicating if and to what extent individuals are functioning in their social environment, is done based on five distinctive factors: (a) social integration, (b) social contribution, (c) social acceptance, (d) social actualization, and (e) social coherence (Petrillo, Capone, Caso, & Keyes, 2015).

The third component, psychological well-being, is based on the work of Ryff (1989) and emphasizes a positive self-evaluation, meaning individuals to be satisfied with their achievements, with their view of themselves as well as perceiving a purpose in life and experiencing growth as an individual. The assessment consists of six distinctive factors that determine a person's potential to be realized: (a) positive attitude towards oneself (self-acceptance), (b) positive interpersonal relations, (c) sense of independence and self-determination (autonomy), (d) sense of competence (environmental mastery), (e) purpose in life, (f) feeling of personally developing (personal growth) (Ryff & Keyes, 1995; Petrillo, Capone, Caso, & Keyes, 2015).

According to Keyes and Annas (2009), the three dimensions of well-being are overlapping and not mutually exclusive but are also not redundant conceptually or empirically. Therefore, the emotional, social, and psychological aspects taken together are giving a good indication of people's overall level of well-being (Keyes & Annas, 2009). Well-being is a good indicator for a variety of important life outcomes and therefore a good measurement for how individuals face the COVID-19 induced changes (Gale, Booth, Mottus, Kuh & Deary, 2013).

Challenges and negative consequences of COVID-19 on individuals' well-being

Looking at the dimension of **emotional well-being** it becomes forefront that the Coronavirus and the imposed measures evoke psychological reactions in a substantial proportion of the population, causing emotional distress. Due to the pandemic induced changes, it is expected to see that individuals report less happiness, interest, and satisfaction with life, however, so far little research has investigated this relation. Individual reactions towards emotional distress during the pandemic were found to range from fear or insomnia to severe chronic psychopathology (Margetic, Peraica, Stojanovic, & Ivanec, 2021), which is negatively affecting an individual's well-being (Hamilton et al., 2007; Steger, 2012). Moreover, an individual's emotional well-being is challenged by governmental measures such as lockdowns, stimulating social isolation and increasing experienced psychological distress, as well as reducing one's life satisfaction (Yang & Ma, 2020).

Looking at previous studies on the impact of pandemics on individuals' mental health, it was found that restrictive measures such as a long duration of quarantine, lockdowns or curfew and the accompanied social isolation were not only affecting peoples' routines and daily activities but also impairing the quality of their livelihoods (World Health Organization, 2020), affecting their level of **social well-being** (Rubin, 2020; Brooks et al., 2020; Taylor, 2020). Social isolation is a challenge for our social well-being and especially our social coherence is interrupted due to the pandemic induced changes in societal living. Moreover, the imposed measures reduce individual freedom as they restrict the amount of social contact and in cases of the curfew measures, also the timeframe of physical social contact. Social well-being is based on a sense of self-actualization and positive relations with others, which are both impaired through the pandemic induced measures. The changes in people's lives can be experienced as stressors that stimulate anxiety and fear. According to Rubin & Wessley (2020) individuals' social behaviour is negatively affected by their response to fear and feelings of uncertainty. This view on social well-being places individuals' social functioning

into the spotlight and reasons that positive and healthy well-being is fostered by feelings of social value and positive social connectedness (Petrillo, Capone, Caso, & Keyes, 2015). Due to the pandemic induced restrictions people had to face more challenges to fulfil this need, leading to a possible shortcoming in social connections. The impact becomes forefront when looking at the decrease in well-being found by various studies (Dawson & Moghaddam, 2020; World Health Organization, 2020).

Furthermore, job insecurities and health-related worries hold another threat to people's **psychological well-being**, reducing the amount of experienced control over the future in terms of autonomy and environmental mastery (Blustein et al., 2020). According to Helzer & Jayawickreme (2015), well-being can be related to perceived control in people's lives. As a substantial proportion of the population experienced a loss in control and environmental mastery due to the external changes in their work lives as well as in their social environment, their level of well-being is being challenged. Due to the lockdown measures, most of the population had to face changes at their workplaces such as 'home office' or in more severe cases a loss of job (Fadinger & Schymik, 2020). According to Keyes (2003), it is crucial to engage in positive social interaction to maintain a healthy and positive well-being. Measures such as lockdowns challenge the sense of independence and autonomy as well as the need for positive interpersonal relations. Another impact on an individual's psychological well-being can be related to the (mis-) information through social media. People are getting overloaded with rumours due to an almost constant stream of information through media platforms, creating fear and anxiety (Kumar & Nayar, 2020). This is causing a majority to experience an increase in already existing health-related worries, due to the uncontrollable implications for the immediate future (Huremovic, 2019). In terms of psychological well-being, this is a threat as such changes reduce people's perception of their environmental mastery and autonomy as their faith is perceived to be out of their hands (Badahdah, Khamis & Mahyijari, 2020).

Personality (Neuroticism)

Personality is most commonly divided into the Big-5 personality traits, from which neuroticism is the strongest predictor of many psychological and physical health outcomes such as well-being (Lahey, 2009). Neuroticism is conceptualized as emotional instability with anxiety as one of its major facets. Neurotic individuals are characterized as overly anxious and vulnerable, more easily intimidated, tend to get angry more easily and react more negatively to threats and changes (Hannuschke, Gollwitzer, Geukes, Nestler, & Back, 2020). Scientific research supports a biological basis of neuroticism and its consistency over time, considering this trait to be largely heritable, sharing genetic factors that underline a risk for internalising disorders (Luciano et al., 2018; Matthews, Deary, Whiteman, 2004). The following paragraphs will focus on the relation of neuroticism to the three dimensions of well-being: emotional, social, and psychological well-being.

Considering how elevated levels of neuroticism impact individual levels of **emotional well-being**, it was found that this trait caused difficulties in dealing with the pandemic induced distress (Haga, Kraft, & Corby, 2009; Yoon, Maltby, & Joormann, 2013). Previous studies affirm that neurotic individuals report lower levels of happiness and life satisfaction during the pandemic, compared to less neurotic individuals (Kroencke, Geukes, Utesch, Kuper & Back, 2020; Nikcevic, Marino, Kolubinski, Leach & Spada, 2021).

Looking at **social well-being**, numerous studies have demonstrated that high levels of neuroticism affect an individual's social well-being, causing them to experience difficulties in evaluating their public and social life (Petrillo, Capone, Caso, & Keyes, 2015). Considering previous research, it has been proven that neurotic people have a diminished capability to function in society compared to less neurotic individuals. This is fostered by their tendency to report less interest in contributing to their social environment, in contrast to people who score low on the neuroticism scale (Keyes, 2002). Therefore, it can be deduced that during the

COVID-19 pandemic, these individuals are less capable to socially integrate, contribute, and adapt to the changed environmental conditions when interacting with their peers (Petrillo, Capone, Caso, & Keyes, 2015). Even more, it is harder for neurotic individuals to reach social actualization, as well as social coherence, due to dysfunctional cycles of person-situation interactions, causing distortions of self-cognition and leading to an overall decrease in social-well-being (Zuckerman, 1991).

As supported by Okun & George (1984), neuroticism has a strong impact on **psychological well-being**. According to several studies, individuals who score high in neuroticism display a less positive self-image and a lower sense of independence and autonomy. Nonetheless, highly neurotic people intensely struggle to develop positive interpersonal relationships, along with constructive feelings of personal growth, a purpose in life and a personal sense of competence (Ryff & Keyes, 1995; Petrillo, Capone, Caso, & Keyes, 2015). Thus, it can be stated that during the pandemic, government-imposed prohibitions, such as lockdowns and restrictions, had a greater impact on highly neurotic people's psychological well-being, by limiting their individual freedom and restricting their capacity to pursue personal and social goals (Okun & George, 1984).

Negative Affect

Considering Keyes' (2002) conceptualization of well-being, the presence of positive emotions was indicated as crucial. According to Watson and Clark (1984), the stable predisposition of neuroticism which undergoes negative emotions is generally known as the major personality variable, negative affect. Seemingly, individuals who score high on the negative affect scale are more prone to delineate negative mood states throughout time and irrespective of the current circumstances. Moreover, these individuals account for higher levels of psychopathological symptoms, as well as a more distinctive attention bias in the event of finding themselves under threat (Watson & Pennebaker, 1989). Additionally, depression, guilt, anxiety, stress and psychological pressure are highly related to each other, and they all indicate the same broad concept of negative affect (Joiner, Catanzaro, & Laurent, 1996). Therefore, psychological distress is linked to negative affect, indicating to what extent an individual is perceiving life as psychologically distressing (Watson, Clark, & Tellegen, 1988).

Furthermore, it has been found that negative affect is linked to neuroticism, one of the main traits of the Big-5 model of personality since negative affect manifests the tendency to magnify all kinds of threats and by processing information in a negative subjective way. By doing so, individuals are more inclined to experience negative affect that is frequent and disproportional (Staw & Cohen-Charash, 2005; Uziel, 2006; Kootker et al., 2016). In situations where neurotic individuals have to face unpleasant stimuli, increased reactivity to such stimuli could be observed, in comparison to less neurotic individuals (Rusting & Larsen, 1997). Hence, negative affect is appraised as a strong predictor of various psychological and physical health consequences such as well-being.

For instance, during the COVID-19 pandemic, people's pessimistic views on their current state and even on their future had a severe effect on their overall well-being (Bachem, Tsur, Levin, Abu-Raiya, & Maercker, 2020). Although it is possible that perceived control might alleviate COVID-19 related fears, for some individuals, this way of thinking might come at the expense of increased levels of negative affect (Bachem et al., 2020). Additionally, several studies have shown that even though most people express some amount of COVID-19-related panic and worries about contagion and social restrictions, people's reactions to the epidemic differ greatly; while some of them develop psychopathologies, others retain psychological equilibrium and adapt to the circumstances (Bareket-Bojmel, Shahar, & Margalit, 2020). The outbreak not only generates a heightened negative affect level and a tangible sense of despair among individuals, but it also has tremendous economic and social

ramifications that have an unforeseeable impact on different aspects of family life and professional life. Ultimately, this impacts well-being on all its three dimensions, namely, emotional, social and psychological.

How personality and negative affect impact well-being during COVID-19

Overall, only a few studies have investigated the impact of neuroticism on people's well-being during the pandemic, but none in regard to the three components of well-being. So far it is known that neurotic individuals have diminished capacity to down-regulate their negative emotions, are overall more reactive compared to less neurotic individuals and engage in maladaptive strategies more frequently (Harenski, Kim, & Hamann, 2009). Hence, they are more prone to experience negative emotions, impacting their well-being on all three dimensions.

Considering the emotional dimension of well-being, experiencing negative affect was found to reduce an individual's level of happiness and satisfaction with life, leading to lower levels of **emotional well-being** (Extremera & Rey, 2016). Looking at the current pandemic, Kroencke and colleagues (2020) found that high scores on the dimension of neuroticism are associated with higher levels of subjectively perceived threat as well as experiencing negative affect. Additional elements connected to the pandemic's effects, such as not being able to adapt to the new government-imposed regulations, as well as despair, low faith in the societal response to the pandemic, and regular COVID-19-related news, are seen as indicators that may be linked to higher levels of negative affect (Bredemeier, Berenbaum, Most, & Simons, 2011). Therefore, more neurotic individuals tend to experience more negative affect which in turn reduces their levels of emotional well-being, due to less satisfaction with their lives and overall happiness. Notably, the best means to increase emotional well-being was found to be a focus on remediating and managing negative emotions (Larsen, 2009).

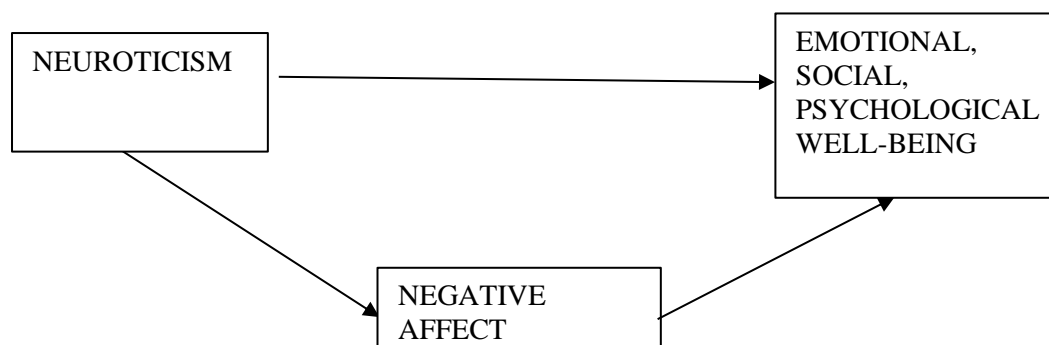
Stadler et al. (2020) looked at how neurotic individuals respond to the pandemic in general and linked higher levels of neuroticism to the possibility of experiencing more negative affect along with lower levels of **social well-being**. Thus, during the COVID-19 outbreak, neurotic individuals who experience elevated levels of negative affect tend to engage more naturally in unhealthy and extreme behaviours, such as jumping to conclusions, being self-centred, blaming other people for inevitable events, experiencing feelings of abandonment, being more likely to withdraw from social interaction and even being excessively defensive (Zuckerman, 1991; Olesen, Thomsen & O'Toole, 2015; Harenski, Kim, & Hamann, 2009). This is also in line with Zuckerman's research (1991), which stated that people impacted by elevated levels of negative affect, who are more prone to certain negative emotional dispositions may exhibit a certain level of antipathy towards others, as well as avoidance. They usually state that their peers are unkind, worthless and they consider the world to be a dangerous, menacing place. The aforementioned unhealthy behaviours negatively impact an individual's social interactions and consequently their social well-being by lowering their social actualization and integration (Harenski, Kim, & Hamann, 2009); Petrillo, Capone, Caso, & Keyes, 2015). Linking this information to well-being, more specifically to social well-being, it can be predicted that this tendency to adhere to governmental regulations leads neurotic individuals to experience the consequences of these regulations more strongly. Other studies affirmed that higher levels of neuroticism lead to greater social distancing in individuals (Abdelrahman, 2020). The pandemic related social distancing and isolation are leading towards a shortcoming of social well-being due to less frequent social interactions. Additionally, social interactions are more likely to be negatively biased through health-related anxiety (Stuart, O'Donnell, O'Donnell, Scott & Barber, 2021). The pandemic and the corresponding regulative measures are predicted to impair general levels of social integration, contribution, acceptance, and coherence, especially in individuals

who score high on the neuroticism and negative affect scale.

Furthermore, while experiencing different, more difficult living conditions during the pandemic, **psychological well-being** is expected to decline in neurotic individuals who score highly on the negative affect scale (World Health Organization, 2020). For instance, individuals' self-acceptance, positive interpersonal relations and sense of competence, independence and self-determination are expected to decline because of less social contact and limited civil freedom due to lockdown and the following social isolation (Sakan, Zuljevic & Rokvic, 2020; Gambin et al., 2021). Besides the trait neuroticism, the state of negative affect is important to consider as well. Individuals that are more prone to experiencing negative affect are possibly more likely to encounter these health-related concerns. Watson & Casillas (2003) state that neuroticism plays a major role in health-related awareness, possibly causing neurotic individuals to experience more psychological pressure during the pandemic. In neurotic individuals, this pressure is more likely to be increased, since they are more prone to experiencing negative affect, causing them to perceive the pandemic induced changes rather negatively (Abbasi, 2011). Therefore, neurotic individuals are predicted to report higher levels of negative affect that is predicted to impact their levels of psychological well-being.

Summing up, studies have shown that neuroticism is linked to lower levels of well-being (Veit & Ware, 1983). Furthermore, neuroticism is associated with an increased experience of negative affect (Harenski, Kim & Hamann, 2009). According to John and Gross (2004), the experience of negative affect is related to increased psychological distress and causes a decline in levels of well-being (John & Gross, 2004). Therefore, it is expected that more neurotic individuals report lower levels of well-being due to their tendency to experience negative affect more frequently, pointing towards a mediating effect of negative affect. The imposed governmental regulations, such as lockdown and curfew, reduce freedom and limit the ability to pursue individual and societal goals. Moreover, it is expected that due to reduced emotion-regulation skills and engagement in maladaptive behaviours a reduction in social, emotional, and psychological well-being can be observed in neurotic individuals as a response to the changed living conditions. Additionally, negative affect was found to be a good indicator for changes in well-being, due to its great magnitude (Larsen, 2009). Due to their increased reactivity and negative affect, neurotic individuals experience more challenges on perceived levels of environmental mastery, self-acceptance and personal growth (Iani, Lauriola, Cafaro, & Didonna, 2016), which predicts a reduction in levels of emotional, social, and psychological well-being (Wang, Shi, & Li, 2009).

Figure 1



RQ: Does negative affect during the COVID-19 pandemic have a mediating role in the relation of neuroticism with emotional, psychological, and social well-being?

Hypothesis:

H1: Higher levels of neuroticism are related to more negative affect

H2: More neurotic individuals report less (emotional, social, psychological) well-being.

H3: Individuals with high levels of negative affect report less (emotional, social, psychological) well-being.

H4: Negative affect is mediating the relation between neuroticism and (emotional, social and psychological) well-being.

Method

Design

This study is set up as a descriptive non-experimental, longitudinal survey study. It examines well-being in relation to negative affect and the trait neuroticism. Further, the data consist of separate modules of which neuroticism was assessed in May 2019 and 2020, negative affect in May 2020 and well-being also in May 2020.

Procedure

This study draws on data on the LISS Panel, an internet panel for longitudinal studies in social science, managed by CentErdata in Tilburg. Participants were randomly selected on the basis of households from the municipal register in the Netherlands and were provided with internet access and a personal computer when necessary. All participants were approached monthly to fill out the online questionnaires.

Participants

In total, a representative sample of the Dutch population was drawn consisting of 5891 responses. After screening for missing values and excluding participants that did not respond to all three questionnaires a final amount of 636 valid responses from individuals aged 15 years or older was used for the final analysis. The large loss of data happened since well-being was measured only in part of the sample and also with different versions, of which this study only considered one. The demographics of the sample were assessed regarding age group and gender (see Table 1). About half of the sample was male, with a mean age of 48 years. Further, half of the participants indicated their highest educational degree with a diploma to be HBO or MBO. To check for possible selection effects in personality, a dataset from 2019 was used to compare the average levels of neuroticism.

Table 1*Demographics (Age, Gender)*

Year	2019		2020	
	<i>LISS Panel</i>		<i>Current Sample</i>	
	N	Percentage	N	Percentage
Gender				
Male	2167	47.0	309	48.6
Female	2438	53.0	327	51.4
Age				
15-24	506	8.8	83	13.1
25-34	613	11.9	114	17.9
35-44	634	12.3	82	12.9
45-54	811	15.7	86	13.5
55-64	900	19.1	120	18.9
65 or above	1651	32.2	151	23.7

Materials

Mental Health Continuum Short Form (MHC-SF)

The 14-item MHC-SF, originally developed by Keyes (2004), investigates the three dimensions of well-being, with five items for social, three items for emotional and six items for psychological well-being. This study used the revised version, which administered four different versions to participants. In the drawn sample a version was used in which the questions have been translated into Dutch, causing the questions to be framed slightly differently than in the original English version. This version was similar to the original one in terms of item formulation and response format and has been previously validated (Lamers, Westerhof, Bohlmeijer, ten Klooster & Keyes, 2011). Respondents were asked to rate the frequency of every feeling in the past month on a 6-point Likert scale (never, once or twice a month, about once a week, two or three times a week, almost every day, every day). A mean score was calculated indicating the overall level of well-being ranging from 1 to 5. The KMO of the principal component analysis with oblique rotation (direct oblimin), examining the scale construct of well-being with 14 items, verified the adequacy of this scale (KMO= .91). Bartlett's test of sphericity $p < .001$ indicates that the correlation structure enables a factor analysis. Three factors emerged with an eigenvalue above Kaiser's criterion of 1, accounting for 62.45% of variance. Therefore, sufficient validity for the dependent scale of well-being is given, comprised of three distinctive factors with the highest value of .77 for the item ('aspects that you liked most about your personality') loading on emotional well-being and the lowest item of .49 ('that you were challenged to grow or become a better person') loading on psychological well-being. Reliability analysis of the scales stated an overall Cronbach's alpha of .81. For the emotional well-being scale Cronbach's alpha was .85, for the social well-being scale it was .78, and for the psychological well-being scale, Cronbach's alpha was .85. This is in line with previous studies that used the MHC-SF reporting strong internal reliability of .89 (Perugini, de la Iglesia, Solano & Keyes, 2017) among adolescents and adults in various cultural contexts including the Netherlands (Lamers et al., 2011). On top, previous studies found the convergent as well as discriminant validity of the MHC-SF to be strong (Lamers et al., 2011). Further, looking at specific dimensions of well-being, subscales were computed using mean scores for the three dimensions of emotional well-being (Item 1-3),

social well-being (item 4-8), and psychological well-being (item 9-14). Regarding the MHC-SF the items were summed up into one general well-being score for each participant, as well as into mean scores for each dimension of well-being (emotional, social, and psychological).

International Personality Item Pool (IPIP)

Additionally, a questionnaire assessing the personality characteristics was fielded in the LISS panel, providing a broad range of social core information about the panel members. The 50-item International Personality Item Pool (50-item IPIP; Goldberg, 2001) can be divided into 10 items for each of the Big-Five personality dimensions, from which this study is solely using the neuroticism scale (emotional stability). Participants indicated how well they believed the presented statements to describe them on a 5-point Likert scale, with one indicating 'very inaccurate' and a five meaning 'very accurate'. Two items were reversed and therefore they have been re-coded (item 1: Am relaxed most of the time; item 2: seldom feel blue). The items were summed into one mean score for the participants' level of neuroticism. A greater score indicates higher levels of neuroticism and less emotional stability. The KMO of the principal component analysis examined the scale's construct of emotional stability (neuroticism) with ten items, verifying the adequacy of this scale (KMO= .90). Bartlett's test of sphericity $p < .001$ indicates that factor analysis can be done. One factor emerged with an eigenvalue above Kaiser's criterion of 1, accounting for 53% of the variance. This points towards sufficient validity for the independent scale of emotional stability (neuroticism), comprising one factor with the highest value of .65 for Item 7 ('get upset easily') and .41 for item 9 ('worry about things'). The scale showed strong reliability in this study with a Cronbach's alpha of .90.

Positive and Negative Affect Scale (PANAS)

Moreover, the positive and negative affect scale (PANAS) was used to assess individual levels of negative affect (Watson, Clark, & Tellegen, 1988). The PANAS consists of 20 items, indicating different affective states. Participants were asked to indicate on a 7-point Likert scale how much the presented questions are accountable for them, with one meaning 'not at all' to a seven 'extremely'. Negative affect (e.g., angry, guilty, scared) is assessed with ten items, for each participant the mean score was calculated per item. Scores can range from 10-50, with a greater score indicating to experience more negative affect. The KMO of the principal component analysis examined solely the scale construct of negative affect with ten items verified the sampling adequacy of this analysis (KMO = .92). Bartlett's test for sphericity $p < .001$ indicates an adequate correlation structure for proper factor analysis. One factor emerged with an eigenvalue above Kaiser's criterion of 1, accounting for 60% of the variance. Therefore, sufficient validity for the independent scale of negative affect is given, consisting of one factor with the highest value of .74 (Item 4) and the lowest value of .41 (Item 1). The scale showed strong reliability in this study ($\alpha = .92$).

Data Analysis

The data was downloaded in April 2021 and analysed using the statistical software SPSS. The mean scores and standard deviations of neuroticism, negative affect, and the three dimensions of well-being were calculated (see table 3). After conducting a normality check it became visible that almost all three questionnaires showed skewness and kurtosis values that ranged between -1 and +1 and therefore met the normality assumptions (see table 2). The subscale measuring emotional well-being was slightly outside of this range, but due to the sample size (N=636), this scale was handled as normally distributed. Additionally, the data set

Correlations between Neuroticism, Negative affect and Well-being

The first hypothesis can be confirmed as the results show a moderate positive significant relationship between neuroticism and negative affect, meaning that neurotic individuals experience more negative affect.

Regarding the second hypothesis, the levels of well-being showed a moderate negative significant relationship with neuroticism, meaning that more neurotic individuals experience significantly less well-being on all components (emotional, social and psychological), having the strongest association with emotional well-being.

Considering the third hypothesis, negative affect displayed a weak negative significant correlation with well-being, indicating that individuals who experience more negative affect report significantly lower levels of emotional, social, and psychological well-being. Hereby the impact of negative affect was found to be moderately on emotional and psychological well-being and only weak on the component of social well-being. Individuals who are experiencing negative affect more frequently are more prone to report lower levels of well-being, especially on the emotional and psychological dimensions.

Table 3

Bivariate Correlations between Neuroticism, Negative Affect and Levels of Well-being (emotional, social, & psychological)

Variable	Neuroticism	Negative affect
Mean_WB	-.33**	-.57*
Emotional_WB	-.42**	-.34**
Social_WB	-.23**	-.15*
Psychological_WB	-.27**	-.25**
Negative affect	.57**	-

** Correlation is significant at $p < .01$ level

* Correlation is significant at $p < .05$ level

Mediating Effects of Negative Affect on the Relation Between Neuroticism and Well-Being

It was tested whether negative affect mediated the effect of neuroticism on emotional, social, and psychological well-being. The mediation analysis regarding emotional well-being indicated that neuroticism had a significant positive effect on negative affect ($a = .57$, $SE = .46$, $t = 17$, $P < .001$) and that negative affect had a significant negative effect on emotional well-being ($b = -.43$, $SE = .05$, $t = -7.6$, $P < .001$). Moreover, the significant direct effect of neuroticism on emotional well-being ($c = -.42$, $SE = .05$, $t = -7.6$, $P < .001$) stayed significant ($c' = -.02$, $SE = .01$, $t = -3.4$, $p < .001$) after the indirect effect ($a*b$) of negative affect was considered but became weaker. The 95% bias-corrected confidence interval for the indirect effect did not include 0 (95% CI = $[-.18, -.04]$), indicating a significant mediation. This means, negative affect is mediating the relationship between neuroticism and emotional well-being, as the direct effect declined from $-.42$ to $-.02$ indicating that a lot of variation is explained by negative affect. However, the direct effect is still significant, pointing towards a partial mediation, meaning that there is not only a significant relationship between negative

affect and emotional well-being but also some direct effect of neuroticism on emotional well-being. The first part of the last hypothesis can therefore be partially confirmed, as the direct effect declines but is still present when taking negative affect into account.

Looking at social well-being, this analysis indicated that neuroticism had a significant positive effect on negative affect ($a = .57$, $SE = .46$, $t = 17.5$, $P < .001$) and that negative affect had a significant negative effect on social well-being ($b = -.29$, $SE = .06$, $t = -4.4$, $P < .001$). Moreover, the significant direct effect of neuroticism on social well-being ($c = -.29$, $SE = .06$, $t = -4.4$, $P < .001$) became non-significant ($c' = -.002$, $SE = .004$, $t = -.62$, $p = .54$) after the indirect effect of negative affect was taken into account. The 95% bias-corrected confidence interval for the indirect effect included 0 (95% CI = [-.1, .05]), indicating no significant mediation. That is, negative affect did not mediate the relationship between neuroticism and social well-being (see Figure 4). Therefore, the hypothesis that negative affect is mediating the relation between neuroticism and social well-being can be falsified.

For the dimension of psychological well-being the analysis indicated that neuroticism had a significant positive effect on negative affect ($a = .57$, $SE = .46$, $t = 17.5$, $P < .001$) and that negative affect had a significant negative effect on psychological well-being ($b = -.25$, $SE = .06$, $t = -4$, $P < .001$). Moreover, the significant direct effect of neuroticism on psychological well-being ($c = -.25$, $SE = .06$, $t = -4$, $P < .001$) stayed significant ($c' = -.013$, $SE = .004$, $t = -3$, $p = .003$) after the indirect effect of negative affect was taken into account. The 95% bias-corrected confidence interval for the indirect effect did not include 0 (95% CI = [-.18, -.02]), indicating a significant mediation. That is, negative affect mediated the relationship between neuroticism and psychological well-being, partially, as the direct effect was still present and significant (see Figure 5). This confirms the hypothesis, partially, as the direct effect stayed significant.

Figure 2

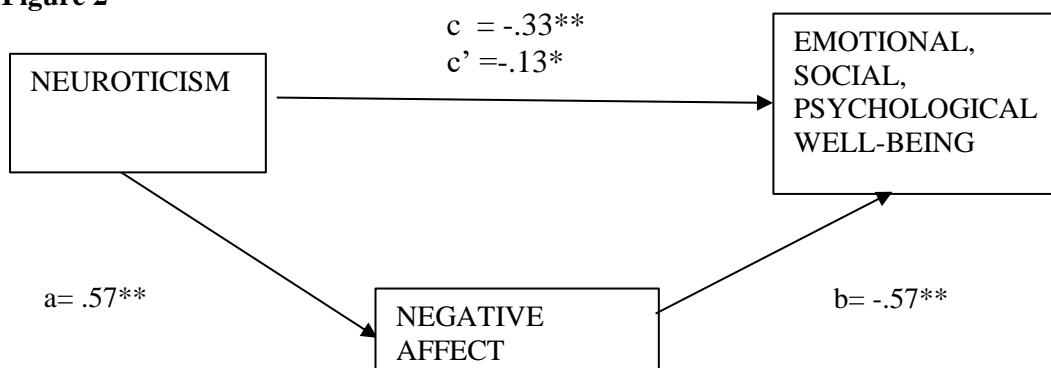


Figure 3

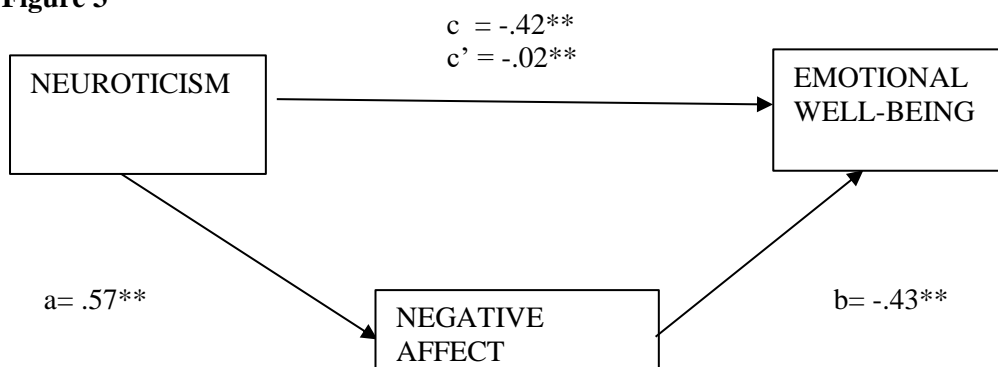
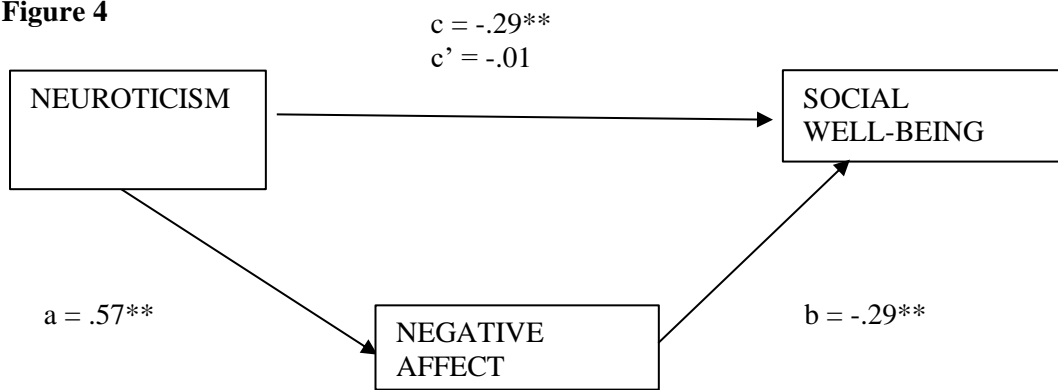
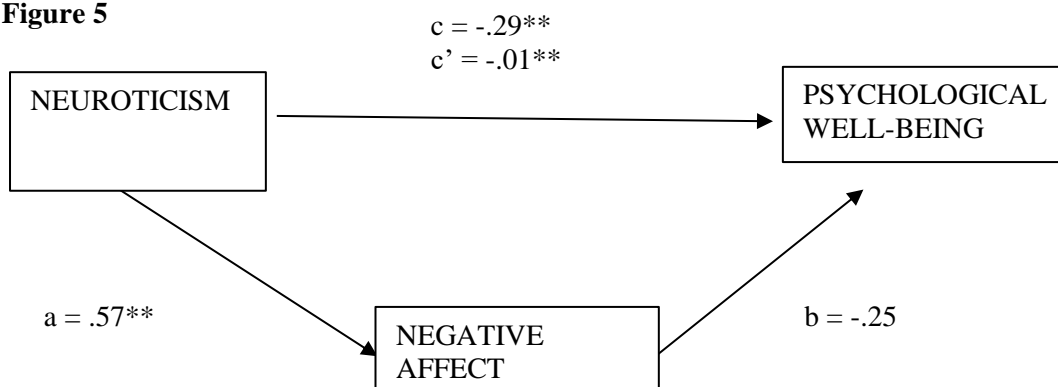


Figure 4**Figure 5**

Discussion

Introduction

The aim of this study was to assess how neuroticism impacts well-being on all its three dimensions: emotional, social and psychological while taking into account negative affect. The results indicated that all four hypotheses were confirmed, except for the mediating role of negative affect on individuals' levels of social well-being. Moreover, there was a moderate negative significant correlation between neuroticism and the three components of well-being, especially between neuroticism and emotional well-being. This insinuates the fact that individuals who have been found to be more neurotic, reported notably lower well-being levels, especially on emotional well-being. Especially, neuroticism and negative affect displayed the lowest correlations with the dimension of social well-being. Moreover, all the mediating effects were partial, except for the social component of well-being. The results show that the relation between neuroticism and social well-being is not mediated by negative affect. The following paragraph discusses the hypotheses more in detail.

H1: Higher scores of neuroticism are related to greater levels of negative affect.

The analysis demonstrated that neurotic individuals experience greater levels of negative affect during the COVID-19 pandemic. This confirms the first hypothesis and is in line with previous research (Kroencke, Geukes, Utesch, Kuper, & Back, 2020), indicating that the relations between negative affect and neuroticism are robust, even in times of a pandemic.

The distinctiveness of this study in terms of longitudinal design during a pandemic with a Dutch sample gives important information to the existing pool of data about this subject.

H2: Higher scores of neuroticism are related to lower levels of well-being during the pandemic.

It has been shown that neuroticism has a negative effect on all components of well-being, emotional, social, and psychological (Costa, & McCrae, 1980). This confirms the second hypothesis and gives insights into the interplay of personality and well-being during challenging situations, such as a pandemic.

Taking the **emotional** dimension into account, it can be stated that high levels of neuroticism represent a threat to individuals' emotional outcomes since neuroticism is strongly linked to emotions (Ready, Åkerstedt, & Mroczek, 2012). As mentioned in previous studies, people who score higher on the neuroticism scale tend to respond negatively to nuisances caused by traumatic experiences, such as the COVID-19 pandemic and are more prone to emotional distress, as well as unfavourable health outcomes, such as anxiety and mood disorders (Shokrkon & Nicoladis, 2021).

Moreover, looking at **social well-being**, it can be observed that people's relationships have been influenced by social distancing and security measures, especially when individuals score high on the neuroticism scale. For instance, people's persistent fear of infection leads to obsessive thoughts about being contaminated, which can increase a person's gradual closure, has an impact on daily life, leads to social isolation and alters human relationships (Saladino, Algeri, & Auriemma, 2020). Additionally, highly neurotic people seem to make more use of social distance to avoid COVID-19 infection. According to Shokrkon and Nicoladis (2021), the new regulations governing the COVID-19 pandemic had forced numerous social restrictions on people's daily lives, which were harmful to their social well-being and reduced people's opportunities to experience independence, sense of purpose, feelings of accomplishment, and positive relationships with significant others.

In a study done by Długosz and Kryvachuk (2021), a decline in **psychological well-being** has been observed among highly neurotic people. The pandemic and the processes that surround it, such as the fear of contracting the virus, isolation, deprivation of necessities, decline of financial circumstances, fear of job loss and income level, are predicted to cause a decline in mental health among people who score highly on the neuroticism scale. It is not surprising that the pandemic is linked to societal mental health. However, it is remarkable that highly neurotic people are prone to suffering more severe psychological consequences than less neurotic people: the more unpleasant the quarantine conditions are, the higher the number of psychological disorders (Długosz, & Kryvachuk, 2021).

It can be concluded that the implications and consequences of a neurotic personality stay rather stable, also during challenging times such as a pandemic, and the accompanying measures such as a lockdown.

H3: higher scores of negative affect are related to lower levels of well-being.

The analysis demonstrated that negative affect is linked to an individual's level of well-being. Firstly, negative affect has an impact on an individual's level of emotional well-being, as it is causing a more frequent experience of emotions such as fear, anger, sadness or guilt, reducing the subjective satisfaction with life (Snyder & Lopez, 2002).

Secondly, when taking a look at how negative affect influences the experience of an individual's social world, measured in terms of social well-being a negative relation was established. This study managed to associate lower scores of negative affect with greater social well-being. This can be explained by the fact that social well-being consists of an individual's perception of their public and social lives (Keyes, 2002; Petrillo, Capone, Caso, & Keyes, 2015). Experiencing frequent negative affect stimulates a more negative perception

of an individual's situation, resulting in a reduced experience of social acceptance, actualization and/or integration (Cacioppo, Hawkey & Thisted, 2010).

Thirdly, Iani, Lauriola, Cafaro & Didonna (2016) identified individuals that experience more negative affect to report more challenges regarding environmental mastery, self-acceptance, or personal growth. Additionally, it has been established that negative affect is impacting an individual's perceptions of psychological well-being as it is challenging an individual's sense of living a meaningful life (Zika & Chamberlain, 1992). During the pandemic, individuals with elevated levels of negative affect were found to experience lower levels of psychological well-being. One of the reasons for this is their negative attitude towards themselves and others as well as due to a diminished sense of growth and autonomy (Zika & Chamberlain, 1992; Iani, Lauriola, Cafaro & Didonna, 2016).

H4: Negative affect is mediating the relation between neuroticism and (emotional, social and psychological) well-being.

According to the aforementioned hypothesis, neuroticism has a negative effect on individual levels of well-being, while negative affect was found to mediate the relationship between neuroticism and the three components of well-being. This is in line with previous research as, for instance, in a study performed by Salavera, Usán, Teruel & Antoñanzas (2020), individuals were prone to show more accentuated signs of decreased well-being, when experiencing high levels of negative affect and elevated levels of neuroticism. Furthermore, negative affect comprises a general tendency to show less interest in performing activities and being overly self-conscious in comparison to one's peers who score lower on the negative affect scale (Salavera, Usán, Teruel & Antoñanzas, 2020). Additionally, the dimension of negative affect was found to make participants experience feelings of distress, fear and alertness, especially during the COVID-19 imposed lockdown (Kumar & Nayar, 2020). Moreover, individuals high in neuroticism tend to wrongfully and subjectively interpret information, which makes them susceptible to a decrease in their overall well-being, while experiencing more frequent negative affect in comparison to less neurotic people (Staw & Cohen-Charash, 2005; Uziel, 2006; Kootker et al., 2016). This can also be observed in the current study. Furthermore, this study investigated the three components of well-being (emotional, social, psychological) and more specifically, their interplay with neuroticism and negative affect.

It has been established that under COVID-19 circumstances, negative affect partially mediated the relationship between neuroticism and emotional well-being, confirming the fourth hypothesis. However, this mediation was only partial as the direct effect of neuroticism on emotional well-being decreased but stayed significant. The same was observable for the psychological component of well-being, where negative affect partially mediated the relation between neuroticism and psychological well-being. Observing a partial mediation indicates the tendency that there might be more variables present that influence these two components of well-being, besides the direct effect of neuroticism on emotional and psychological well-being. Considering these results, it comes to the forefront that neurotic individuals encounter severe difficulties, while struggling with emotional stability. Such individuals are trying to demonstrate a sense of competence, along with developing self-acceptance and personal growth. Merging these factors with an individual's feelings of emotional distress, more specifically, negative affect, this study showed that one's quality of, and satisfaction with life will undoubtedly be impaired, which in turn caused the emotional and psychological levels of well-being to decline (Staw & Cohen-Charash, 2005; Uziel, 2006; Weiss, Gale, Batty & Deary, 2009).

Furthermore, this study pointed towards no mediating effect of negative affect on the relation between neuroticism and social well-being. Both independent variables were

significantly negatively correlated with social well-being. However, the direct effect became weaker and nonsignificant. Therefore, no significant indirect effect was observable when negative affect was used as a mediator between neuroticism and social well-being.

Regarding this hypothesis, it was assumed that individuals who experience higher neurotic states encounter significant struggles when it comes to their social well-being. In a study by Costa and McCrae (1980), highly neurotic individuals displayed less social interest when it came to being gregarious to their peers, as they had a lowered capability to self-actualize, as well as less positive relationships with the ones around them. Therefore, it becomes visible that this study's results are contradictory to previous literature as the hypothesis cannot be verified, indicating that no mediation takes place between neuroticism, negative affect and the social component of well-being.

Considering the results, social well-being displayed the weakest correlation to neuroticism as well as to negative affect, pointing towards a low impact to no impact of these two variables on the social dimension of well-being during the pandemic. Possible reasons for this might be the advantages that social media and other technological developments bring along. Individuals did not have to dispense their social interactions but had the opportunity to rather shift their social world into a virtual one, staying connected with their peers through social media and reducing the impact of the pandemic on people's social connectedness.

Interpretations

Numerous advantages of the study's approach add to the credibility of the analysis conducted here. Considering the results depicted from the mediation analysis, neuroticism displayed a significant positive relationship with the experienced negative affect, and both variables displayed a significant negative relationship with all three components of well-being. This aligns with existing literature, indicating a tendency of neurotic individuals to possess higher emotional sensitivity due to underlying overwhelming fears of threatening stimuli, causing a decline in levels of well-being. The tendency to experience negative affect in relation to the challenging situation caused by the COVID-19 pandemic gives complementary insight into the development of reporting lower levels of well-being, on all three components (Caci, Miceli, Scrima, & Cardaci, 2020).

Overall, this study has found that the government-imposed measures and changes in people's lives, due to the pandemic, did not impact the tendency of neurotic individuals to report more challenges in regard to well-being. This study can therefore confirm the stability of this trait also in pandemic situations. Additionally, the interplay and relation of neuroticism and negative affect could be observed, and this study confirms that these two concepts are interrelated. Moreover, it was visible that taken together, the two independent variables neuroticism and negative affect account for more variability regarding emotional and psychological well-being, than considered separately. Likewise, it became visible that in the examined sample the dimension of social well-being was not affected by the interplay of the two independent variables. Only considered separately, neuroticism and negative affect can explain changes in the dimension of social well-being, during the pandemic situation. One possible explanation for this observation could be the developments in social and communicative technologies such as Facebook Messenger, Instagram or other social media platforms that enable individuals despite the pandemic induced regulations to continue living their social lives without severe restrictions (Daly, Fresno Garcia, & Bjorklund, 2020). Moreover, neurotic individuals seem to be more affected on the dimensions of emotional and psychological well-being than on the social dimension. However, the absence of a partial mediation in regard to the effect of the two independent variables on social well-being could be explained by other intervening variables, such as age, as the sample was slightly biased regarding the mean age of participants.

All in all, it has been found that neurotic people are likely to have additional difficulties in maintaining good levels of well-being as a result of the COVID-19-induced alterations. In addition to inherent neuroticism, the condition of negative affect is an essential factor to consider. People who are more vulnerable to experiencing negative affect are more inclined to experience these well-being concerns.

Limitations

Even though the study has tried to evaluate the factors related to neuroticism and emotional well-being, there are still certain limitations that restrict the study from wide-scale generalization. Considering recent literature, online data are criticized for possible sample biases. However, there has been substantial evidence that data obtained online can be compared to data collected in traditional settings (Martinez-Marti & Ruch, 2016). Nonetheless, there is no way to control the distribution of a population in an online survey. Thus, individuals who have little or no experience with a subject of interest might decide to take part in the study. Valuable research is meaningful when there is a possibility to generalize the findings of a sample to a relevant population. If a sample of a population cannot be determined and in the event of the sample being contaminated by individuals with no experience, the most appropriate findings from an online survey should be carefully considered (Nederhof, 1986).

Another limitation that should be considered is related to the amount of time that a survey takes to be completed and to the full commitment of the respondents. Along with that, if there are multiple topics addressed to the participants while completing the survey, this can be perceived as bothersome and can therefore cause a backlash, determining the participants to abandon the study or cause for missing values. (Baruch & Holtom, 2008). The chosen LISS Panel mainly focused on administering multiple questionnaires over an extended period of time. Consequently, participants are prone to lose interest and abandon the study, causing missing values. The multiple questionnaire administration of the LISS Panel over such a long period of time could be a possible cause for the reduction of valid responses in the current study. On that account, future research should consider the fact that in an online survey, the higher the survey's response rate is, the greater the study's validity. Hence, a survey should take a short amount of time to be completed in order to not cause the respondents to abandon the course of the study (Weaver, Beebe, & Rockwood, 2019).

There is a particular aspect that should be taken into consideration as a strength of the study, namely, the random sampling of the LISS Panel. In this case, through a random selection procedure, all the population units were granted an equal chance of being selected, thus, decreasing the risk of systematic bias. Moreover, an asset of randomly selecting samples in this study was represented by the fact that researchers were more prone to depend on statistical theory assumptions to infer from what is noticed (Moore & McCabe, 2003). Nevertheless, in the conducted study, the original sample of about 5000 participants was significantly reduced to 636 after all the missing responses were excluded and the dataset was reduced to one of the four versions of the MHC-SF. Furthermore, the final sample was biased regarding the participants' age. About 40% of the sample was older than 55 years and according to Waggel et al., (2015) the level of neuroticism declines with ageing. Therefore, the sample lacks representativeness, as younger members of society are less present, causing a bias in the study's generalizability. One reason for this might be that younger participants chose a different version when answering the well-being questionnaire (MHC-SF), which might have affected the distribution of age, as this study only used the third version leading to only 636 participants out of over 5000.

Implications

Recently, COVID-19 and its widespread outbreak have become one of the most significant concerns across the world, especially in relation to health care. A multitude of previous studies has shown that high levels of neuroticism have a direct link to the emotional states of individuals, determining how individuals respond to the COVID-19 induced changes (Abdelrahman, 2020). Therefore, this study can add practical implications for the creation of certain measures to address circumstances of psychological sensitivity. Especially, when looking at how well-being is affected by the COVID-19 induced changes, neurotic individuals, and individuals with higher levels of perceived negative affect seem to struggle more (Capone, Caso, & Keyes, 2015). The existing epidemic situation does not rule out the potential of future containment scenarios that might have a substantial impact on individuals' mental health (Kumar & Nayar, 2020). Therefore, social policies or governmental adaptation could be implemented to counteract the impact of the pandemic on people's well-being, especially their emotional and psychological components.

Given COVID-19's fast evolution, traditional interventions may be ineffective. Existing therapies, on the other hand, can be helpful. Effective psychological therapies that address pandemic-specific problems including social isolation and anxiety (Hansel, Saltzman, & Bordnick, 2020; Holmes, O'Connor, & Perry, 2020). Psychosocial treatments, such as informal groups and support networks for rehabilitating victims, should be promoted and can assist people to cope with COVID-19's lingering effects (Rashid, McGrath, 2020).

The proposed study's findings might assist health practitioners to establish mental health programs in the next few years by demonstrating personality factors important for exhibiting individual variations in managing the COVID-19 induced changes. Nonetheless, particular therapeutic and/or training institutions should seek to strengthen people's capacities to generate positive experiences through, for instance, imagination exercises (Waters et al., 2021). Developing a positive mindset about achieving a target in one's life might be a great way to overcome the impact of low emotional stability and the tendency to experience negative affect, helping individuals to stay motivated and better cope with the COVID-19 induced challenges, especially for neurotic individuals (Zhao, Xiong, Zhang, & Qi, 2021).

Conclusion

Given its limitations, the study's findings might assist mental health practitioners in creating various therapeutic interventions by demonstrating psychological characteristics important for exhibiting individual differences in coping with the COVID-19 fear. Taken individually, these findings reinforce prior studies showing that neuroticism has an influence on well-being (Jylhä, Melartin, Rytysälä, & Isometsä, 2009). It has been proven that people who ranked significantly higher on neuroticism had greater mental health problems and lower levels of emotional, social and psychological well-being.

Additionally, negative affect has been found to mediate the relationship between neuroticism and well-being. The current research demonstrated that negative affect exhibited substantial negative correlations with the three well-being components. In regards to mediation effects, this analysis showed that via negative affect, neuroticism has an indirect influence on emotional and psychological well-being in particular. In terms of social well-being, there were no mediating effects of negative affect that could be observed. The findings showed that neuroticism is positively linked with the negative affect variable and negatively correlated with the three dimensions of well-being. However, out of the three dimensions, emotional well-being displayed the greatest correlation with neuroticism. Furthermore, the present pandemic situation does not necessarily rule out the potential of additional lockdown circumstances that might have a substantial impact on people's well-being. As a result, it might be beneficial to establish different psychological interventions that focus on

individuals' capabilities to create a positive mindset, as well as overcoming pandemic-related issues such as anxiety, social isolation and lack of motivation (Waters et al., 2021).

This research adds valuable information to the existing pool of literature about possible effects of pandemics such as the COVID-19 outbreak and the consequences that follow, especially for highly neurotic individuals. According to this study's findings, future interventions to enhance people's well-being should consider their level of neuroticism and negative affect to develop an effective psychological intervention.

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