How time perspective, personality, and morningness contributed to psychological well-being during the Coronavirus lockdown
Contribución de la perspectiva temporal, personalidad y matutinidad en el bienestar durante el confinamiento por Coronavirus

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Abstract

The exceptionality of the Coronavirus-related quarantines motivated the design of a longitudinal study aimed at exploring how the confinement can affect psychological well-being. 205 participants (81% female) took part in the study. Personality, time perspective, and morningness were assessed at the beginning of the quarantine, along with levels of depression, anxiety, and satisfaction with life as mood and well-being indicators. A post measure was taken 2 weeks after the first data collection. Two weeks later, a supplementary follow-up measure was performed again. A significant increase in depression and anxiety was found between pre and post measures that remained stable at follow up, whereas life satisfaction was not affected. Past-negative temporal orientation and neuroticism were the highest risk factors for a decline in psychological well-being. Results are discussed in terms of how individual differences should be considered in assessing citizens' response to public health policies regarding isolation measures.

Keywords: **Quarantine; Time perspective; Personality; Morningness; Well-being**

Resumen

La excepcionalidad de las cuarentenas relacionadas con el Coronavirus motivó el diseño de un estudio longitudinal destinado a explorar cómo el confinamiento puede afectar al bienestar psicológico. 205 participantes (81% mujeres) participaron en el estudio. Se evaluó la personalidad, la perspectiva temporal y la matutinidad al inicio de la cuarentena, junto con los niveles de depresión, ansiedad y satisfacción con la vida como indicadores del estado de ánimo y bienestar. Se tomó una medida posterior dos semanas después de la primera recolección de datos. A las dos semanas se volvió a realizar una medida de seguimiento complementaria. Se encontró un aumento significativo en los niveles de depresión y ansiedad entre las medidas pre y post que se mantuvieron estables en el seguimiento, mientras que la satisfacción con la vida no se vio afectada. La orientación temporal negativa hacia el pasado y el neuroticismo fueron los factores de riesgo más predictores de una disminución en el bienestar psicológico. Los resultados se discuten en términos de cómo se deben considerar las diferencias individuales al evaluar la respuesta de los ciudadanos a las políticas de salud pública con respecto a las medidas de aislamiento.

*Palabras clave: **Cuarentena**; **Personalidad**; **Perspectiva temporal**; **Matutinidad**; **Bienestar***

INTRODUCTION

The COVID-19 outbreak, caused by severe acute respiratory syndrome corona-virus 2 (SARS-CoV-2) started in Hubei province, China, in November 2019, and was recognized as a pandemic on 10th of March 2020 by the World Health Organization (WHO). Cases were reported in more than 200 countries, resulting in thousands of deaths. Some of the non-pharmacological preventive measures imposed by several governments were social distancing, self-isolation, cancellation of public events, and travel restrictions. But some territories, starting in Wuhan (the first source of infection in China), and followed by Italy, Spain, and many others opted for more drastic measures such as complete lockdowns and quarantines, which forced citizens to stay at home for weeks and being allowed to go out to buy essential goods or to seek medical care only. It is estimated that as of mid-April 2020, about a third of the world's population was under some kind of lockdown (Perper et al., 2020).

Coronavirus-related mass quarantines are an exceptional and unforeseen situation in which separation from family and friends, loss of freedom and stability, uncertainty, and significant changes in routines can have detrimental effects on mental health (Basner et al., 2014; Infocop Online, 2020). Since isolation is an infrequent situation among the general population, most of the studies about the psychological impact of confinement have been conducted with prisoners or astronauts (Grassian, 2006; Haney, 2019; Taylor et al., 1969). For example, studies conducted during isolation periods in space exploration missions indicate that the probability of a behavioral and psychiatric emergency increases in direct proportion to the length of the mission (Ball & Evans, 2001), and subclinical levels of mood (depression and anxiety) and sleep disturbances are commonly reported (Basner et al., 2014; Slack et al., 2016). The contributing factors for psychological risk include internal variables such as personality, resiliency, and negative emotions, and external factors such as job design, monotony, cultural factors, social support, and sleep shifting that can lead to circadian rhythms disruptions (Slack et al., 2016). Due to the exceptionality of long disease-related mass-quarantines or social distance measures reported in the past (mainly SARS and Ebola), the literature on the topic is not very extensive. However, according to a recent review on the psychological impact of disease-related quarantines (Brooks et al., 2020), duration is among the most predictive factors for symptoms of anxiety, anger, and depression. The vast majority of those who are quarantined report increased negative feelings such as fear, anger, nervousness, sadness, and guilt or frustration during the period. Other stressors involved are fear of infection, frustration and boredom due to loss of routine and reduced social contact, inadequate basic supplies, inade-

quate information, and financial loss that can be long-lasting and may cause serious socioeconomic distress.

In the past months, several studies have already been conducted within the COVID-19 crisis. In this sense, most of the research has focused on healthcare professionals due to their central role in the crisis management. Results show that because of the rapidly increasing numbers of confirmed cases and deaths in the general population, professionals have been experiencing psychological problems related to stress disorders, including high levels of anxiety, depression symptoms, and insomnia (Lai et al., 2020; Liu et al., 2020; Zhu et al., 2020). These findings replicate previous observations of mental health consequences during the 2003 SARS outbreak, which also involved depression, anxiety, fear, and frustration among health workers (Xiang et al., 2020). But less is known about the impact of the quarantine on the general population, especially during the first days of the lockdowns. The exceptionality of the situation, the fact that most of the studies conducted so far on the topic have mainly considered sociodemographic variables, and the lack of empirical data about quarantines in European samples (Brooks et al., 2020), motivated the present research, which consists of a longitudinal pre, post, and follow-up repeated measures study aimed at exploring the psychological effects of the confinement on mood and well-being, considering individual differences such as personality, time perspective, and morningness/eveningness as predictors. It should be noted that these 3 factors are considered stable across time (Lenneis et al., 2021; Levasseur et al., 2020; Muro et al., 2009, 2015, 2017; Zimbardo & Boyd, 1999) and although they might change as age increases, the interval between data collection in the present study was too short to expect any changes.

Among the many variables that can be assessed as predictors of psychological well-being, individual differences in personality were included as they are highly associated with mental health development, as well as with habits and lifestyles (Eysenck, 1967; Strickhouser et al., 2017; Zuckerman, 2005). Personality is the result of the behavioral patterns, emotions, and thoughts that make individuals different from each other. It is genetically rooted and educationally shaped, and it significantly contributes to unique individuals' adaptation to the environmental demands. One of the most accepted and commonly used models is the Big Five model of personality (Caprara et al., 1993; Costa & McCrae, 1992; John et al., 1991; Rammstedt, 2007; Rammstedt & John, 2007). It is a model framed in the dispositional-lexical approach (Cattell, 1977; Eysenck, 1984; Larsen & Buss, 2002) that describes five broad personality dimensions emerging from a factorial analysis of the most embedded traits in language.

The resulting big five dimensions are: Neuroticism, Extraversion, Conscientiousness, Agreeableness, and Openness, that can give a general insight of individuals' behavioural patterns. Several studies on the adaptation of individuals to challenging situations suggest that individuals with more stable personalities and greater ability to modulate negative emotions are less severely affected by stressful situations such as isolation than their unstable peers, high in neuroticism, who are the most at risk for anxiety and depression during challenging times (Grassian, 2006; Lahey, 2009; Zuckerman et al., 1968). Studies exploring Extraversion, suggest that although introverts might find it easier to cope with social distance due to their disposition to be alone and to a lower motivation to socially engage (Dossey, 2016; Hawkley, 2019), extraversion would be more associated with well-being and health behaviors (Costa & McCrrae, 1980; Otonari et al., 2012). Higher scores in Conscientiousness indicate more self-control, organization, and goal-orientation, and this trait would help individuals adapt to changing demands in the environment (Fleming et al., 2016). Individuals high in Agreeableness, who tend to be cooperative might find it easier to live the isolation conditions feeling thankful for being safe and contributing to the community from social networks, whereas individuals high in openness to experience, who tend to be curious and imaginative, might be able to find creative solutions to beat the dullness and boredom and become engaged in entertainment (Vartanian et al., 2018).

On the other hand, time perspective is the cognitive tendency to be oriented toward the past, the present, or the future. It is considered as a relatively stable and independent characteristic that refers to the temporal content of the cognitive structures that characterizes how individuals project, access, organize, and value what happens to and around them. Therefore, it acts as a cognitive frame that mediates situational responses and behavioral patterns through time and situations, suggesting that it may be a manifestation of a dispositional style or an individual-difference variable (Zimbardo & Boyd, 1999). Time perspective could be considered a core feature of some psychiatric disorders such as depression and suicidal ideation (van Beek et al., 2011), and it has been widely linked to personality traits and well-being factors. For instance, a bias toward present-fatalistic or, more importantly, past-negative, is usually associated with depression, anxiety, higher perceived stress, and less perceived happiness, while the opposite pattern is found in individuals with high scores in past-positive (Zimbardo & Boyd, 1999). Future orientation correlates with conscientiousness but weakly with anxiety and depression (Papastamatelou et al., 2015; van Beek et al., 2011; Zimbardo & Boyd, 1999), whereas being present-hedonistic oriented does not tend to correlate with anxiety, but it is strongly associated with impulsivity (Muro, et al., 2015). Moreover, time perspective

has also been linked to risky and healthy behaviors and it has been suggested that being future-oriented can act as a protective factor (Castellà et al., 2018). Therefore, assessing time perspective might provide useful information on how a cognitive construct might help coping with the negative outcomes of confinement.

On the other hand, morningness/eveningness is the behavioral manifestation of human's circadian rhythms and it can be defined as the inclination for the individual to sleep at a particular time during a 24-hour period (Adan et al., 2012; Muro et al., 2009; 2011). Evening-type individuals show a delayed sleep period whereas morning-type individuals show an advanced sleep period. Circadian rhythms may affect psychological processes such as positive affect and well-being, and morningness/eveningness has also been linked to personality traits (see Lipnevich et al., 2017 and Tsaousis, 2010, for reviews). In this sense, among the big five traits, conscientiousness seems to be the most strongly related with morningness, while agreeableness is highly unrelated to circadian type. Morning-types tend to be more active and stable, and they also show more indicators of psychological well-being (Randler, 2008). Accordingly, this variable might give some insight on how individuals adapt to the confinement situation in terms of underlying biological rhythms.

Taken together, a significant reduction in psychological well-being is expected due to quarantine and isolation measures, specifically, higher scores in depression and anxiety, and lower scores in satisfaction with life across phases. Based on the previously mentioned research on the impact of individual differences on depression and anxiety, the personality factors that could potentially be protective of this expected decline could be extraversion, conscientiousness, agreeableness, and openness, while neuroticism could account for a higher increase between phases. Regarding time perspective, we could expect a protective effect of the future and past-positive factors, while past-negative could be linked to higher scores in depression and anxiety, and lower scores in life satisfaction. In relation to morningness/eveningness, morning-types would show a better adaptation once the new rhythms imposed by the quarantine are established, while evening-types are expected to show higher variability in their sleep and eating patterns, which could contribute to a decline in well-being. However, due to the exceptionality of the situation that involves an unprecedented scenario, and the lack of a consistent body of literature on the impact of this type of quarantines, the determination of the best risk and protective predictors will be exploratory in nature.

METHODS

Participants

An initial sample of 256 participants from the province of Barcelona (Europe) took part in the study. Only those participants who answered all the questionnaires of the pre and post phases were included in the data analyses. The final sample (n = 205) consisted of 166 females and 39 males, ranging from 16 to 76 years old (M = 37.8, SD = 14.5). The sample was homogenous in terms of education: 74.2% had completed University studies, 20.3% high school studies, 4.3% primary studies, and only 0.8% had not received any formal education. Regarding employment, 46.8% were working from home, 15.6% were students, 7.3% were working outside-home, 9.8% were unemployed or retired, and 18.6% had experienced some kind of change such as reduction of hours or being under a dismissal program for employees. Only 2% had lost their job during the study. 10.5% of the participants reported living alone, 31.6% with another person, 25.4% with 2 more people, 23% with 3 more people, and 9.4% with 4 or more people.

Participants were informed of the procedure before answering the questionnaires, gave consent prior to their inclusion in the study and provided their email address to be contacted at the following phases. Email addresses were replaced by a numerical code in order to match phases and guarantee anonymity. All participants participated voluntarily and anonymously and did not receive any reward for their collaboration. The present study met the international standards of ethical research (APA, 2017) and was monitored by CORE (entity of the Faculty of Psychology at UAB that mediates strategic research). Of the final sample, 192 participants also replied at Phase 3, and these data were used as a supplementary follow up measure.

Design and procedure

A longitudinal repeated measures pre, post, and follow-up study was designed to explore the psychological effects of the confinement in well-being, anxiety, and depression in three temporal moments. Although the moments of interest were Phase 1 (pre) and Phase 2 (post), Phase 3 was designed as a supplementary follow-up in order to observe the trends in the scores. The questionnaires were administered online through Google Forms following the snow-ball technique. To collect data for Phase 1, the link to the questionnaires was sent after the Government's official confinement call on the evening of Saturday 14th March 2020, and data were collected between day 2 and day 5 of the official confinement period (M = 3.2 days, SD = 1.5). At this first stage, participants answered all the questionnaires including sociodemographic information (age,

gender, education, and employment) and the standardized tests selected to measure the relevant 3 independent variables or predictors: personality, time perspective, and morningness/eveningness. The initial levels of mood states (anxiety and depression) and a general measure of well-being (satisfaction with life) were assessed as the dependent variables. Data of Phase 2 was collected between day 18 and day 21 of the official confinement period (M = 18.5 days, SD = 3.9), in order to make sure that participants had spent at least 2 weeks in confinement. Finally, data of Phase 3 (follow-up) was collected between day 34 and day 37 of the official confinement period (M = 34.9 days, SD = 5.8). At Phases 2 and 3, only mood states and well-being questionnaires were administered to explore the psychological effects of the confinement.

Materials

The independent variables or predictors were assessed as follows: To assess circadian typology (chronotype) participants completed the Spanish version of the reduced Morningness/Eveningness Questionnaire (rMEQ; Adan & Almirall, 1991). It consists of five items covering daily physical performance and sleep/awake preferences. Morningness pole refers to a preference for being active early in the morning while eveningness describes the tendency to be more active and aroused in the afternoon and evening. The internal reliability for the present sample was Cronbach's a = .75

To assess temporal perspective, the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) — Spanish version (Díaz-Morales, 2006) was administered. This version contains 56 items which are assessed on a 5-point scale ranging from 1 (very uncharacteristic) to 5 (very characteristic). There are five dimensions: Past-negative, Present-hedonistic, Future, Past-positive and Present-fatalistic, described as follows: 1) Past-negative (10 items) embodies a negative and pessimistic attitude toward the past and past events. 2) Past-positive (9 items) reflects a warm, sentimental, and nostalgic attitude toward the past. 3) Present-hedonistic (15 items) describes an orientation toward present enjoyment, immediate pleasure or benefit with little concern for future consequences. 4) Present-fatalistic (9 items) reveals hopeless attitudes toward the future and life, and a sense that the future is predestined and not influenced by present individual actions .5) Future (13 items) reveals an orientation toward the achievement of future goals and rewards and it is characterized by planning and organizing daily activities. The ZTPI has demonstrated good psychometric properties in different cultures, showing a good cross-cultural validity (Boyd & Zimbardo, 2005; Díaz-Morales, 2006). The subscales' internal reliability (Cronbach's α) for the present sample were Past Positive = .72, Past Negative = .82, Present Hedonistic = .81, Present Fatalistic = .62, and Future = .74.

To assess personality, the Spanish version of the Big Five Inventory-10 (Rammstedt & John, 2007) was used. It was developed based on the 44-item Big Five Inventory (BFI-44; John et al., 1991; Rammstedt, 2007) in response to an increasing need for shorter personality instruments. The BFI-10 (Rammstedt & John, 2007) is a 10-item scale (two items for each personality dimensions) measuring the five general personality dimensions: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness and can be administered in about one minute. The internal reliabilities (Cronbach's α) for the present sample were as follows: Neuroticism = .73, Extraversion = .69, Openness = .63, Agreeableness = .36, Conscientiousness = .35. The low consistencies obtained in the last two scales are somehow expected, since the items' internal consistencies reported for the BFI-10 are considerably smaller than the BFI-44, given that there are only two items per scale (Rammstedt & John, 2007).

On the other hand, the following tests were administered to assess the 3 dependent variables (depression and anxiety as indicators of mood changes during the confinement, and well-being): To assess depression, the Beck Depression Inventory-II (BDI-II; Beck et al., 1996) — Spanish version (Sanz et al., 2003) was used. The BDI-II contains 21 items on a 4-point scale from 0 (symptom absent) to 3 (severe symptoms). Affective, cognitive, somatic, and vegetative symptoms of depression are covered, reflecting the DSM criteria for major depression. Scoring is achieved by adding the ratings for all 21 items. The minimum score is 0 and the maximum score is 63. Higher scores indicate greater symptom severity. In non-clinical populations, scores above 20 indicate depression. The average Cronbach's α across the three phases for the present sample was .91. Item 16 and Item 18 of the BDI-II test were examined independently, as they provided valuable information on sleeping and eating disturbances. They were treated as quantitative dependent variables ranging from 1 to 6, where higher values imply more disturbance.

To assess anxiety, the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970) was administered in its Spanish adaptation (Buela-Casal et al., 2015) which is a commonly used, valid, and reliable measure of anxiety. It can be used in clinical and non-clinical settings to explore anxiety levels and to distinguish it from depressive syndromes. It has 20 items for assessing and differentiate trait anxiety (general disposition) and 20 for assessing state anxiety. In the present research only items for assessing state anxiety were used, as the trait was already assessed by the BFI-10 and the aim was to measure variations in anxiety as mood state. Items are rated on a 4-point scale ranging from 0 (almost never) to 3 (almost always). Higher scores indicate greater state anxiety. It has been shown to be a sensitive predictor of distress over time, and it can

vary with changes in individuals' state, support systems, health context, and other individual characteristics. In the Spanish adaptation, the mean state anxiety score for women is 18.2 points and for men is 15.9 points (Guillén-Riquelme & Buela-Casal, 2011). The average Cronbach's *a* across the three phases for the present sample was .92.

Finally, to assess psychological well-being variations during the confinement, the Satisfaction with Life Scale (SWLS; Diener et al., 1985) was administered. It measures the subjective feeling of satisfaction with life and the Spanish version (Atienza et al., 2000) consists of 5 items with a scale ranging from 1 (completely disagree) to 5 (completely agree). The average Cronbach's *a* across the three phases for the present sample was .86.

Data analyses

Firstly, a repeated measures ANOVA was conducted on the dependent variables scores of the sample who completed the 3 phases (n = 192) in order to determine whether there were significant changes across phases. Further analyses were performed with the whole sample of 205 participants. Correlational analyses between dependent variables and between independent variables were conducted, in order to characterize the relationships. *T*-test comparisons on gender, and correlational analyses between age, number of days in quarantine, and the dependent variable were analysed. Then, correlational analyses between each independent variable and the scores of the dependent variables at Phase 2 were performed. Finally, stepwise multiple linear regression analyses were performed in order to identify the risk and protective factors that could significantly predict the scores of each dependent variable at Phase 2.

RESULTS

Descriptive statistics for personality, time perspective factors, and morningness/eveningness at Phase 1, and for anxiety, depression, satisfaction with life, sleep, and eating disturbance scores in each Phase can be seen in Table 1.

A repeated measures ANOVA was performed on the main dependent variables (*n* = 192). Regarding depression $F_{(2, 362)}$ = 12.753, *p* < .001, partial $\eta2$ = .07), there was a significant increase in scores between Phase 1 and 2, and Phase 1 and 3 (*p* < .001, respectively), but no change was found between Phase 2 and Phase 3 (*p* = .25). The same pattern was found for anxiety $F_{(2, 362)}$ = 11.734, *p* < .001, partial $\eta2$ = .06): A significant increase was found between Phase 1 and 2 and between Phase 1 and 3 (*p* < .001, respectively) and no change between Phase 2 and Phase 3 (*p* = .83) was observed. Finally, satisfaction with life $F_{(2, 362)}$ = 3.297, *p* = .04, partial $\eta2$ = .02), declined between Phase 2 and

3 (p = .008) but no change was observed between Phase 1 and Phase 2 (p = .86), and between Phase 1 and Phase 3 (p = .06), indicating that although there was a non-significant increase at Phase 2, the scores went back to baseline at Phase 3. Items 16 and 17 of the BDI test, which measure sleep and eating disturbances respectively were also assessed. Regarding sleep F (2, 362) = 12.090, p < .001, partial $\eta 2$ = .06), a significant increase in the scores (which indicates a trend to a worse sleep quality) was found between Phase 1 and 2 and between Phase 1 and 3 (p < .001, respectively) and no change between Phase 2 and Phase 3 (p = .19) was observed. Eating disturbances showed the same pattern F (2, 362) = 7.058, p = .001, partial $\eta 2$ = .04): There were significant differences between Phase 1 and 2 (p = .006) and between Phase 1 and 3 (p = .001) and no changes were observed between Phase 2 and Phase 3 (p = .85).

	Mean	SD				
ZTPI						
Present Fatalistic	2.63	.56				
Past Negative	2.71	.76				
Present Hedonistic	3.09	.56				
Future	3.61	.55				
Past Positive	3.42	.63				
MEQr	15.69	4.05				
BFI						
Neuroticism	2.96	.97				
Extraversion	3.48	.95				
Openness	3.72	.99				
Agreeableness	3.07	.76				
Conscientiousness	3.87	.75				
	Phase 1		**Phase 2**		**Phase 3**	
	Mean	SD	Mean	SD	Mean	SD
STAI/S	20.23	10.91	23.20	11.03	23.34	11.99
BDI	8.59	8.73	10.44	8.44	10.93	9.28
SWLS	17.98	4.52	18.03	3.99	17.43	3.79
Sleep dist.	1.09	1.37	1.53	1.35	1.69	1.46
Eating dist.	.77	1.37	1.09	1.31	1.10	1.30

Notes: ZTPI = Zimbardo Time Perspective Inventory; rMEQ = Reduced Morningness-Eveningness Questionnaire; BFI = Big Five; Inventory; STAI/S = State Trait Anxiety Inventory/state; BDI = Beck Depression Inventory; SWLS = Satisfaction with Life Scale.

Table 1. Descriptive statistics for independent variables (ZTPI, BFI, MEQr; N = 205), and for dependent variables in each Phase (N = 192)

The same significant changes between Phase 1 and Phase 2 emerged when the sample of 205 participants was considered, following the same pattern, and indicating that Phase 2 was the temporal moment where a change was observed in all dependent variables except for satisfaction with life. Therefore, correlational analyses between dependent variables among them (see Table 2) and between independent variables among them (see Table 3) were performed with the whole sample.

	Sleep disturbances	Eating disturbances	STAI/S	SWLS
Eating disturbances	.312**			
STAI/S	.221**	.308**		
SWLS	-.187**	-.141*	-.465**	
BDI	.418**	.455**	.729**	-.565**

Table 2. Correlations among all dependent variables at Phase 2 (N = 205)

ZTPI	N	E	O	A	C	rMEQ
Past Positive	-.108	-.022	-.030	-.043	.047	-.037
Past Negative	.405**	-.187**	-.013	-.221**	-.283**	-.128*
Present Fatalistic	-.079	.082	.048	-.014	-.004	-.003
Present Hedonistic	-.063	.306**	.173*	-.004	-.013	-.089
Future	.016	-.011	-.028	-.099	.266**	.296**
rMEQ	-.079	-.011	-.032	.078	.175*	

Notes: **$p < .001$. * $p < .05$; ZTPI = Zimbardo Time Perspective Inventory; N = Neuroticism. E = Extraversion. O = Openness. A = Agreeableness. C = Conscientiousness; rMEQ = Reduced Morningness-Eveningness Questionnaire.

Table 3. Correlations among independent variables (Big Five Inventory personality factors, rMEQ, and ZTPI temporal frames; N = 205)

T-test comparisons on gender did not show differences in any dependent variable at Phase 2. Age correlated negatively with anxiety (r = -.14, p = .04) and depression (r = -.30, p < .001), and with sleep (r = -.20, p = .003) and eating disturbances (r = -.16, p = .02), indicating better quality as age increases. Number of total days in confinement did not correlate with any variable.

Correlational analyses between each independent variable and the scores of the dependent variables at Phase 2 (see Table 4) showed that depression scores correlated positively with past-negative (r = .52, p < .001) and neuroticism

(*r* = .47, *p* < .001), and negative correlations were found with extraversion (*r* = -.19, *p* = .005), agreeableness (*r* = -.20, *p* = .004), Conscientiousness (*r* = -.35, *p* < .001) and morningness/eveningness (*r* = -.23, *p* = .001;) indicating that higher depression scores are associated with evening-type individuals). Anxiety scores correlated positively with past-negative (*r* = .45, *p* < .001) and neuroticism (*r* = .51, *p* < .001), and negatively with extraversion (*r* = -.22, *p* = .002), Conscientiousness (*r* = -.28, *p* < .001), past-positive (*r* = -.16, *p* = .03), and morningness/eveningness scores (*r* = -.15, *p* = .03); indicating that higher anxiety is associated with evening-type individuals. Sleep and eating disturbances correlated positively with past-negative (*r* = .26, *p* < .001; *r* = .15, *p* = .03; respectively) and neuroticism (*r* = .21, *p* = .003; *r* = .21, *p* = .002; respectively), whereas sleep correlated negatively with conscientiousness (*r* = -.17, *p* = .01), and eating disturbances correlated negatively with agreeableness (*r* = -.14, *p* = .04) and openness (*r* = -.19, *p* = .007). Finally, satisfaction with life scores correlated positively with agreeableness (*r* = .19, *p* = .005) and conscientiousness (*r* = .34, *p* < .001), and negatively with past-negative (*r* = -.48, *p* < .001) and neuroticism (*r* = -.27, *p* < .001). However, as this dependent variable did not show a significant decline across phases, no further analyses were performed.

	Sleep Disturbances	Eating Disturbances	STAI/S	BDI	SWLS
ZTPI					
Present Fatalistic	.104	.021	.015	.048	-.032
Past Negative	.261**	.150*	.445**	.523**	-.481**
Present Hedonist	.042	.100	-.105	-.056	.037
Future	-.006	.024	-.046	-.069	.105
Past Positive	.026	-.029	-.156*	-.114	.099
rMEQ	-.098	-.122	-.153*	-.234**	.124
BFI					
Extraversion	-.088	-.124	-.219**	-.195**	.087
Agreeableness	-.079	-.142*	-.097	-.201**	.197**
Conscientiousness	-.172*	-.115	-.284**	-.345**	.341**
Neuroticism	.208**	.214**	.508**	.470**	-.276**
Openness	-.081	-.187**	-.113	-.102	.050

Notes: **p < .001. * p < .05; ZTPI = Zimbardo Time Perspective Inventory; MEQ = Reduced Morningness-Eveningness Questionnaire; BFI = Big Five Inventory; STAI/S = State Trait Anxiety Inventory/state; BDI = Beck Depression Inventory; SWLS = Satisfaction with Life Scale.

Table 4. Correlations among independent variables (ZTPI, MEQr, BFI) and dependent variables (STAI/S, BDI, SWLS; N = 205)

To identify the risk and protective factors that could significantly predict the scores of each dependent variable at Phase 2, stepwise multiple linear regression analyses were performed (see Table 5).

Variable	B [95% CI]	β	t	p
BDI				
Past Negative	3.805 [2.488, 5.122]	.350	5.698	< .001
Neuroticism	2.370 [1.350, 3.389]	.278	4.582	< .001
Conscientiousness	−1.656 [-2.935, -.377]	−.149	−2.553	.011
Morningness/eveningness	−.286 [-.509, -.062]	−.141	−2.518	.013
STAI/S				
Neuroticism	4.274 [2.862, 5.685]	.377	5.969	< .001
Past Negative	4.243 [2.450, 6.036]	.293	4.666	< .001
Past Positive	−2.089 [-4.137,-.04]	−.166	−2.011	.046
Sleep disturbances				
Past Negative	.455 [.223, .688]	.261	3.859	< .001
Eating disturbances				
Neuroticism	.278 [.101, .455]	.208	3.096	.002
Openness	−.257 [-.433, -.082]	−.197	−2.890	.004
Present Hedonist	.398 [.036, .760]	.148	2.166	.031

Notes: BDI = Beck Depression Inventory; STAI/S = State Trait Anxiety Inventory/state. The β coefficients are standardized.

Table 5: Stepwise multiple regression analysis for each dependent variable (N = 205)

In the case of depression, a significant model was found that accounted for 39.8% of the variance F (4, 200) = 33.116, p < .001. The significant risk factors were higher past-negative and neuroticism scores, whereas higher conscientiousness and higher morningness scores were significant protective factors. For anxiety, a significant model was found that explained 34% of the variance F (3, 201) = 34.477, p < .001. The significant risk factors were higher neuroticism and past-negative, whereas a higher score in past-positive was a significant protective factor. For sleep disturbances, a significant model was found with a rather low *R-squared* of .07, F (3, 203) = 14.889, p < .001, where only past-negative entered the model as a significant risk factor. Finally, for eating disturbances, again a significant model with a low *R-squared* of .09 was found, F (3, 201) = 14.889, p < .001, where neuroticism and present-hedonistic were significant risk factors and openness was a protective factor.

DISCUSSION

The present study aimed at exploring the impact of the Coronavirus quarantine and isolation measures imposed by public health policies on mood and psychological well-being, and more specifically, at determining whether individual differences in personality traits, time perspective, and morning-ness/eveningness, could predict a decline or else, act as protective factors. Before examining the critical relationships, it is worth noting that the sample showed patterns regarding the associations between personality and time perspective that are consistent with the most replicated findings in this topic of research (Adams & Nettle, 2009; Dunkel & Weber, 2010; Muro et al., 2015; van Beek et al., 2011). Particularly, past-negative correlated positively with neuroticism, and negatively with extraversion, agreeableness, and conscientiousness; present-hedonistic showed positive correlations with extraversion and openness, while future correlated positively with conscientiousness. Finally, morning individuals showed higher future orientation and were less focused on the negative aspects of the past, which is also consistent with previous literature (Stolarski et al., 2013).

The relationships between dependent variables among them were also explored and results showed that, as expected, depression and anxiety scores correlated positively with each other (Smoller, 2016), with sleep and eating disturbances (Allison et al, 2016), and negatively with satisfaction with life (Altun & Yacizi, 2015). Sleep and eating disturbances were associated among them and both correlated negatively with satisfaction with life. Finally, higher age was associated with less anxiety and depression, and with a better sleep and eating quality. Considering that the risk of COVID-19 complications and deaths are more prevalent among the elderly, this could be seen as a rather unexpected pattern. However, being at home might be perceived as a more secure and safe measure as people age, which would explain a trend towards feeling less anxious. Moreover, anxiety in the general population tends to be higher before 25 years of age, and moderate between 26 and 70 (Gomà-i-Freixanet & Valero, 2008).

When exploring the relationships between individual-differences variables and the scores of the dependent variables, results show a significant increase in depression and anxiety levels at Phase 2, that is, around 18.5 days after the onset of the confinement. These levels remained stable at a follow up measure taken around 35 days from the initial data collection. Therefore, a decline in mood states was detected at a relatively early stage and did not get worse at later stages, which contradicts previous studies that argue that longer confinements are associated with poorer mental health and with an increase in

behavioral and psychiatric emergencies (Ball & Evans, 2001; Hawryluck et al., 2004; Marjanovic et al., 2007). However, these studies emphasize that duration might be particularly relevant in an increased prevalence of post-traumatic stress disorder symptoms, emotional exhaustion, and anger, which we did not assess, and the temporal frame between our data collection phases was rather reduced. Although a significant increase was found across phases, the scores were not high enough to indicate clinical depression but a mild mood disturbance. The anxiety scores, however, were quite high compared to the general population means (Guillén-Riquelme & Buela-Casal, 2011). On the other hand, satisfaction with life did not decline across phases, in fact, the scores were slightly higher at Phase 2 and went back to baseline levels at follow-up, which seems to indicate that this well-being indicator was not negatively affected by the quarantine. This is in line with previous studies and highlights the fact that life satisfaction is considered a stable variable that is a cognitive-judgmental process, focused on overall evaluations of life (Diener et al. 1985; Muro et al., 2017), and it is not subject to temporary changes as mood states are. It is worth noting that individuals with high scores in past-negative and neuroticism in the present study tended to obtain lower satisfaction scores, which is consistent with previous research (Muro et al., 2015, 2017).

In fact, our results show that past-negative and neuroticism are the key predictors of an increase in both depression and anxiety scores. Past-negative alone accounts for the sleep disturbances found, and neuroticism is the main contributor to eating disturbances. Neuroticism has been strongly associated with lower levels of psychological well-being in the general population and with unhealthy eating behavior (Costa & McCrrae, 1980; Otonari et al., 2012; Walker et al., 2015). In extreme isolated environments with unique stressors such as space missions, the fact that the average incidence rate of behavioral or psychiatric emergencies is relatively low has been attributed to the low scores in neuroticism — along with high scores in conscientiousness — usually found among astronauts (Basner et al., 2014; Slack et al., 2016). On the other hand, past-negative has been traditionally associated with depression, anxiety, unhappiness, low self-esteem, and unsatisfactory interpersonal relationships, and negative attitudes towards the past could be attributed to actual unpleasant experiences or negative reconstructions of positive events (Zimbardo & Boyd, 1999). Either reason can contribute to feeling depressed, anxious, and having difficulties to sleep. Taken together, the shared contribution of past-negative and neuroticism to an increase in both depression and anxiety scores is the highest compared to other predictors. Their larger impact on well-being during the quarantine might be more relevant than sociodemographic characteristics alone, which seem to be the most analysed variables in previous studies that do

not assess psychological individual differences (Hawryluck et al., 2004; Lai et al., 2020; Liu et al., 2020; Zhu et al., 2020).

No other variable besides past-negative and neuroticism acted as a risk factor with such strength except for present-hedonistic, which contributed to enhancing eating disturbances. It has been shown that this temporal frame correlates highly with impulsivity (Muro, et al., 2015), which could explain a lower self-control when eating. However, sleep and eating disturbances found on the sample were moderate, as participants showed a tendency toward sleeping much more or much less than usual and eating a bit more or a bit less than usual. As the present sample is not clinical, a huge variation in these two relevant indicators of mental health was not expected (Worsfold & Sheffield, 2018).

Regarding protective factors, the contribution of the variables was varied. Consistent with our predictions, conscientiousness and morningness, which are usually linked (Walker et al., 2015), can help reducing depression levels. Higher conscientiousness is associated with goal orientation, greater flexibility, and ability to cope with unforeseen situations (Fleming et al., 2016), which might in turn allow individuals to stick better to a new daily routine of home isolation. Morningness is linked to responsibility and activity, and with less variability in sleep and eating patterns, so it might be easier for these individuals to adapt to the situation with a low impact on their mood and timings/schedules. Thus, in line with previous studies, morningness seems to be a protective factor for mental health and psychological well-being (Randler, 2008), also in times of sudden changes of routines and habits. On the other hand, being past-positive oriented seems to help reduce anxiety levels in times of isolation, in line with previous findings (Muro et al., 2015), which could be attributed to the fact that focusing on successful past achievements and memories might help individuals gain confidence in their ability to cope with the uncertainty. An unexpected protective factor for eating disturbances was openness. Although this finding is not commonly reported, René Mõttus et al. (2012) found this trait to be linked with health awareness, and argued that curiosity might prompt open people to engage in newer, and arguably healthier dietary habits.

Extraversion was not a significant predictor in the regression analysis, but it was negatively associated with depression and anxiety in the correlational analysis, which suggests that the social distance did not particularly affect extroverts, probably due to the role of social networks that allow them to keep on interacting from home and not feeling isolated. This is somewhat contradictory with the idea that introverts might cope better in solitude (Dossey, 2016; Hawkley, 2019), suggesting that introversion might be more related to differ-

ences in arousal levels rather than to being alone and not interacting with others (Costa & McCrae, 1980; Eysenck, 1967; Zuckerman, 2005). In any case, extraversion plays a slightly protective role when considered alone, but it is not that relevant when analysing it altogether in the regression analyses, showing that the most determinant personality risk factor for well-being is neuroticism, as expected (Costa & McCrrae, 1980; Eysenck, 1967; Lahey, 2009; Otonari et al., 2012; Strickhouser et al., 2017; Zuckerman, 2005). On the other hand, future orientation was expected to serve as a protective factor, as it is usually linked with conscientiousness and low anxiety and depression (Papastamatelou et al., 2015; van Beek et al., 2011; Zimbardo & Boyd, 1999), but it did not show significant relationships with any score whatsoever. A possible explanation could be that the exceptionally high degree of future uncertainty linked to this exceptional situation makes individuals focus as much as possible on the day-to-day as a coping mechanism, leaving future expectations on hold.

Finally, the present study has some limitations. For instance, the fact that there is a gender bias towards female participants, who are in turn quite homogenous in terms of education and employment (mainly higher education and stable employment with guaranteed income) limit the extrapolation of the conclusions. In this sense, caution in comparing with previous studies should be encouraged, given that most of these studies have been conducted on very specific populations, such as prisoners, astronauts, and health care professionals (Ball & Evans, 2001; Haney, 2019; Lai et al., 2020; Marjanovic et al., 2007; Slack et al., 2016; Taylor et al., 1969; Zhu et al., 2020), who show unique individual-differences characteristics that deviate from the general population. Nevertheless, it is worth noting that there was a clear impact on well-being in just 2 weeks among a non-clinical population with higher education levels, and guaranteed employment and income, so much worse negative outcomes of quarantine would be expected among individuals who have an extra source of uncertainty because of lower economic and employment conditions.

Moreover, a future follow-up would be desirable in order to assess the evolution of mood states and satisfaction with life scores, especially considering that quarantine could have an effect in the long-term (Hawryluck et al., 2004). However, the key findings are that anxiety and depression were significantly impacted by the quarantine as opposed to life satisfaction, and that neuroticism, but especially past-negative, had a key role on this negative impact. Therefore, the focus should be placed on the cognitive components that can be somewhat trained in order to help individuals cope with this kind of situations. For example, educational intervention programmes based on reducing the bias toward a negative past and enhance more protective temporal frames are po-

tentially relevant and could be readily implemented (Castellà et al., 2018). Another contribution of the present study is to highlight the need of deploying a system of online psychological counselling services and mental health education to provide service to quarantined citizens, as well as specific interventions for psychological crises considering individual differences during isolation periods. In sum, the study demonstrates that not only sociodemographic data play a role in predicting well-being, and that it is crucial to carefully identify the psychological aspects that might contribute to a better adaptation to a confinement situation, considering that self-isolation might be implemented again as a public health measure against future pandemics.

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