

LONGITUDINAL ASSOCIATIONS BETWEEN RESILIENCE AND MENTAL HEALTH DURING THE COVID-19 PANDEMIC

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Abstract

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Objective: Research on the psychological impact of the COVID-19 pandemic has pointed out that lockdowns had small effects on the overall mental health, despite considerable heterogeneity among studies is present. Psychological resilience may be responsible for an amount of variance in individual reactions to the pandemic, despite the fact that its longitudinal associations with mental health symptoms remain unclear. This study sought to investigate changes in resilience and its relationships with depression, anxiety, and stress during the COVID-19 pandemic.

Method: A total of 814 participated in this longitudinal study via an online survey during the first lockdown consequent to the COVID-19 pandemic (T1) and during the third wave (T2). The Resilience Scale and the Depression Anxiety Stress Scales – 21 were administered. Sociodemographic data and COVID-19 related information were also collected.

Results: Psychological resilience decreased during the third wave of the pandemic, whereas depression and stress increased. Moreover, psychological resilience had a direct effect only on depression during the third wave, while its effect on anxiety and stress is mediated by the mental health during the first lockdown.

Conclusions: The mental health symptoms worsened during the third wave, while protective factors such as resilience decreased. Individuals showing high resilience experienced lower depression, anxiety, and stress over time. Psychological intervention that enhances resilience should be embraced in the action of health care authorities to reduce the impact of pandemic.

Key words: COVID-19, longitudinal, depression, anxiety, stress, resilience

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1. Introduction

Since March 2020, when the COVID-19 was declared a pandemic by the World Health Organization, the spread of contagion has concerned worldwide. The restrictive measures taken by the states most affected have strongly influenced our daily life. Accordingly, several studies have examined mental health among the general population founding that at least one third of people experienced severe psychological distress (Lenzo et al., 2020; Qui et al., 2020; Serafim et al., 2021). As one avenue to increase the understanding of the psychological impact of the pandemic, some researchers have turned attention to the role of stable protective factors such as resilience in mitigating the effect of adverse events. In this vein, Lenzo and colleagues (2020) have found that resilience may mitigate the huge psychological impact of the COVID-19 pandemic during the first Italian

lockdown. However, despite the great heterogeneity across the studies, a meta-analysis including 72,004 participants found a small effect of pandemic on anxiety and depression (Prati & Mancini, 2021). For the sake of clarity, while most research in mental health during pandemic has adopted cross-sectional design, the Prati and Mancini's (2021) meta-analysis taken into account only longitudinal studies. In this research field, there is a paucity of research that have investigated the longitudinal association between resilience and negative emotional states during the pandemic.

Based on these premises, the first aim of this study was to examine differences between the first and third wave of pandemic for resilience as well as depression, anxiety, and stress. We hypothesized no significant differences for resilience, while, in contrast, we hypothesized a decrease in depression, anxiety, and stress levels among the general population. The second aim of this study

was to investigate the effect of resilience on the reported symptoms of depression, anxiety, and stress measured during the third wave. We also investigate the mediated effect of the depression, anxiety, and stress levels during the first lockdown. We hypothesized both a significant direct and indirect effect of resilience on the reported symptoms.

2. Methods

2.1. Participants and Procedure

The study was approved by the Research Ethics Committee for Psychological Research of the University of Messina, Italy (no. 12106). A longitudinal design to assess resilience, depression, anxiety, and stress during the first lockdown and the third wave in Italy was adopted. The data were collected through an online survey on the Microsoft Azure platform. All participants gave informed consent electronically. Furthermore, participants were asked to provide an email contact and to create an identification code to anonymize it. After indicating consent, the URL of the Google Form was accessible and each participant needed to insert the identification code earlier created to ensure anonymity for all the collaborators taking part in this research project. Questionnaires were created on the Google Cloud platform, which was anonymous. Participants were enrolled in this study through university communication systems, social networks, online blogs, and other analogous sources (e.g., WeChat groups). Our questionnaire was set to continue only when each option was concluded before the final submission. All procedures of this study were conducted in accordance with the 1964 Declaration of Helsinki and its later amendments.

The T1 baseline wave of data collection was fielded during the first lockdown and, specifically, from March to May, 2020. The T2 data collection was carried out during the third wave of the pandemic and, specifically, from April to May, 2021. T1 participants were contacted by anonymous email from the coordinator and data holder (CF). Inclusion criteria were an age of 18 years or over, living in Italy during the COVID-19 pandemic. Exclusion criteria were a pre-existing mental disorder and/or taking psychotropic medication. Of the 5,655 subjects characterizing the final sample of the baseline measurement, 814 completed the T2 survey. Characteristics of the final sample are visualized in **table 1**.

2.2. Measures

2.2.1. Resilience

Resilience was measured with the 24-item Wagnild and Young Resilience Scale (RS) (Wagnild & Young, 1993) and responses were recorded on a 7-point Likert scale from “1” (disagree) to “7” (agree). The items are merged in five factors as follows: 1) meaningfulness, which evaluates the sense of having something for which live; 2) self-reliance, which evaluates the beliefs in oneself and one’s abilities; 3) perseverance, which evaluates endurance in spite of adversity or discouragement; 4) existential aloneness, which evaluates feeling of freedom and sense of uniqueness; and 5) equanimity, which evaluates a balanced perspective vision of one’s life and experience. Total scores are obtained by the sum of the item scores. Higher scores indicate higher resilience, especially values of 126.6 and above (Girtler et al., 2010).

Previous studies have shown that the RS is a reliable and simple tool with good psychometric properties (Girtler et al., 2010; Wagnild & Young, 1993). Adequate levels of reliability were detected in this sample with McDonald’s omega coefficients of .95 for T1 Resilience and .94 for T2 Resilience.

2.2.2. Depression, Anxiety, and Stress

Emotional states of depression, anxiety and stress were measured with the 21-item Depression Anxiety Stress Scale – 21 (DASS-21) (Lovibond & Lovibond, 1995) and responses were recorded on a 4-point Likert scale from “0” (never) to “3” (always), with higher scores denoting more severe symptoms. Items are grouped into three scales as follows: 1) depression, assessing dysphoria, hopelessness, low self-esteem, and anhedonia; 2) anxiety, including somatic symptoms and subjective experience of them; 3) stress; assessing chronic arousal, difficulty relaxing, psychological tension, and agitation. Several studies have highlighted that the DASS-21 is a simple tool with excellent psychometric properties (Antony et al., 1998; Bottesi et al., 2015). Adequate levels of reliability were detected in this sample with McDonald’s omega coefficients ranging from .81 for T1 Anxiety to .91 for T3 Depression.

2.2.3. Sociodemographic and COVID-Related Information

Sociodemographic characteristics included age, gender, education, relationship status, and geographical area of residence. The COVID-related information comprised having contracted the virus, mandatory quarantine, infected acquaintances in the last 3 months, and the death of a loved one for COVID-19.

2.3. Statistical Analysis

The data were analyzed using SPSS v. 26 (IBM, Armonk, NY, USA) statistical software and EQS version 6.4 (Multivariate Software Inc, Encino, California). First of all, univariate normality was verified for all items of the self-report measures. Values of skewness and kurtosis greater than |1| constitute normality deviations (Marcoulides & Hershberger, 1997). Independent *t* tests were used to verify differences between the first (T1 evaluation) and the third waves (T2 evaluation) of the pandemic in the variables of interest. To investigate mental health during the third wave, a mediation analysis was performed. The outcome variables for analysis were depression, anxiety, and stress during the third wave (T2 Depression, T2 Anxiety, and T2 Stress). The predictor variable for the analysis was resilience evaluated during the first lockdown (T1 Resilience). The mediator variables for the analysis were depression, anxiety, and stress evaluated during (T1 Depression, T1 Anxiety, and T1 Stress). Age, gender, and the COVID-19 related variables were inserted as covariates in the model.

3. Results

3.1. Psychological resilience and mental health differences between the first (T1) and the third wave (T2)

Table 2 displays the results of comparisons between the first (T1) and the third wave (T2) for the observed variables. The results showed that there were significant

Table 1.

Demographic characteristics of the sample (N = 814)				
Characteristics	M	SD	n	%
Age (in years)	32.15	13.10		
Gender				
Female			635	78
Male			179	22
Education				
Primary or middle school diploma			20	2.5%
High school diploma			371	45.5%
Graduate			366	45.0%
Postgraduate			57	7.0%
Marital status				
Unmarried, divorced or widowed			329	40.4
Married or in a steady partnership			485	59.6
Area of residence				
Northern Italy			650	79.9
Central-southern Italy			164	20.1
COVID-19 infection in the last 3 months				
Yes			64	7.9
No			750	92.1
Mandatory quarantine for COVID-19 in the last 3 months				
Yes			168	20.6
No			646	79.4
Infected acquaintances or loved ones in the last 3 months				
Yes			436	53.6
No			378	46.4
Death of loved ones for COVID-19				
Yes			102	12.5
No			712	87.5

differences between the T1 and T2 assessments in the variables measuring resilience, depression, and stress. Specifically, the T2 Depression ($M = 12.85$, $SD = 10.69$) and the T2 Stress ($M = 17.39$, $SD = 10.23$) scores were higher than the T1 scores (respectively, $M = 11.95$, $SD = 9.67$ for depression and $M = 16.65$, $SD = 9.78$ for stress) and these differences were statistically significant (respectively, $t(813) = -2.688$; $p = 0.007$ for depression and $t(813) = -2.249$; $p = 0.025$). Conversely, the T2 Resilience mean scores ($M = 123.24$, $SD = 23.81$) were lower than the T1 ones ($M = 125.02$, $SD = 24.45$) and the difference was statistically significant. No significant differences were observed between the two assessments for the anxiety variable.

3.2. Psychological resilience as a predictor of depression, anxiety, and stress during the third wave (T2) mediated by mental health during the first lockdown (T1)

Table 3 displays the results of mediation analysis. T1 Resilience showed a significant effect on T2 Depression ($\beta = -0.11$, $p = 0.001$, $CI = [-0.17, -0.05]$) but not on T1 Anxiety or T1 Stress (respectively, $\beta = -0.06$, $p = .066$, $CI = [-0.12, 0.01]$ and $\beta = -0.05$, $p = 0.140$, $CI = [-0.11, -0.02]$).

Regarding the indirect paths, as shown in **table 3**, the effects from T1 Resilience to T2 Depression, T2 Anxiety, and T2 Stress were all mediated by them T1

Table 2.

Results of t-test between the first (T1) and the third wave (T2) for psychological resilience, depression, anxiety, and stress (N = 814)

Variable	Mean T1 (SD)	Mean T2 (SD)	t(813)	p	Mean Difference	95% CI for Mean Difference [Lower, Upper]
Resilience	125.02 (24.45)	123.24 (23.81)	2.254	.024	1.79	[0.23, 3.34]
Depression	11.95 (9.67)	12.85 (10.69)	-2.688	.007	-0.90	[-1.16, -0.24]
Anxiety	6.98 (7.14)	7.44 (7.59)	-1.911	.056	-0.47	[-0.95, 0.01]
Stress	16.65 (9.78)	17.39 (10.23)	-2.249	.025	-0.74	[-0.09, -2.25]

scores (respectively, $\beta = -0.14, p < .001, CI = -0.19, -0.10, \beta = -0.06, p < .001, CI = -0.09, -0.03,$ and $\beta = -0.08, p < .001, CI = -0.11, -0.04$). Moreover, the effect from T1 Resilience through T1 Anxiety was significant for T2 Stress ($\beta = -0.02, p = .024, CI = -0.03, -0.01$). **Table 3** also shows that R^2 of the model reached .34 for T2 Depression and .33 for both T2 Anxiety and T2 Stress. Lastly, no significant changes were observed in the model after adding the covariates.

4. Discussion

As revealed by our results, depression and stress increased during the third wave of the COVID-19 pandemic, while psychological resilience decreased. These findings are consistent with other longitudinal studies focusing on changes in mental health. For example, Rogowska and colleagues (2021) have found an increment in the anxiety risk during the third wave, while Balleisio and colleagues (2022) have detected an increase in the prevalence of sleep disturbances. Of particular interest is that no significant changes in mental health were found between the first and the

second wave of the pandemic (Prati & Mancini, 2021).

Whatever the cause, previous research has well demonstrated that psychological resilience is very common among people facing stressful experiences (Bonanno, 2004). However, very few studies have investigated the contribution of this factor to the low psychological impact of the COVID-19 pandemic. Among these, a cross-sectional study conducted during the first lockdown has pointed out that higher resilience was associated with lower symptoms of depression, anxiety, and stress (Lenzo et al., 2020). Relatedly also, the findings of another study using a longitudinal design have depicted substantial differences in mental distress over time, together with significant associations with resilience (Riehm et al., 2021).

In this longitudinal study, we detected the significant role of resilience in predicting symptoms of mental health over time. Specifically, it turned out that resilience had a direct effect on depression, while the effects on anxiety and stress were mediated by mental health during the first lockdown. Notably, sociodemographic characteristics and the COVID-19 related variables had not a significant effect on these relationships. Several

Table 3
Results of mediation analysis (N = 814)

	β	S.E.	Z	p	95% CI [Lower, Upper]	Fit
Direct effects						
T1 Resilience → T2 Depression	-0.11	0.03	-3.501	<.001	[-0.17, -0.05]	
T1 Resilience → T2 Anxiety	-0.06	0.03	-1.842	.066	[-0.12, 0.01]	
T1 Resilience → T2 Depression	-0.05	0.03	-1.476	.140	[-0.11, 0.02]	
Indirect effects						
T1 Resilience → T1 Depression → T2 Depression	-0.14	0.03	-5.746	<.001	[-0.19, -0.10]	
T1 Resilience → T1 Anxiety → T2 Depression	-0.01	0.01	-0.629	.529	[-0.02, 0.01]	
T1 Resilience → T1 Stress → T2 Depression	-0.02	0.01	-2.002	.045	[-0.42, -4.42]	
T1 Resilience → T1 Depression → T2 Anxiety	-0.03	0.02	-1.990	.047	[-0.07, -5.04]	
T1 Resilience → T1 Anxiety → T2 Anxiety	-0.06	0.02	-3.566	<.001	[-0.09, -0.03]	
T1 Resilience → T1 Stress → T2 Anxiety	-0.02	0.01	-1.711	.087	[-0.03, 0.01]	
T1 Resilience → T1 Depression → T2 Stress	-0.03	0.02	-1.938	.053	[-0.06, 3.46]	
T1 Resilience → T1 Anxiety → T2 Stress	-0.02	0.01	-2.250	.024	[-0.03, -0.01]	
T1 Resilience → T1 Stress → T2 Stress	-0.08	0.02	-4.329	<.001	[-0.11, -0.04]	
Total effects						
T1 Resilience → T2 Depression	-0.28	0.04	-6.782	<.001	[-0.35, -0.20]	
T1 Resilience → T2 Anxiety	-0.16	0.04	-4.679	<.001	[-0.23, -0.10]	
T1 Resilience → T2 Depression	-0.17	0.04	-4.335	<.001	[-0.25, -0.09]	
Total indirect effects						
T1 Resilience → T2 Depression	-0.17	-0.17	-6.512	<.001	[-0.22, -0.12]	
T1 Resilience → T2 Anxiety	-0.11	0.02	-4.514	<.001	[-0.15, -0.06]	
T1 Resilience → T2 Depression	-0.13	0.03	-5.088	<.001	[-0.17, -0.07]	
T2 Depression						$R^2 = .335$
T2 Anxiety						$R^2 = .328$
T2 Stress						$R^2 = .333$
T1 Depression						$R^2 = .109$
T1 Anxiety						$R^2 = .018$
T1 Stress						

studies have already investigated the role of this kind of variable such as gender or age, but the absence of any effect stood out (Prati & Mancini, 2021). The statistical approach used by previous studies could explain these results. Research adopting a person-oriented approach focusing on the individuation of patterns found that specific sociodemographic variables (i.e., the female gender and older age) increased the likelihood of belonging to different profiles in dealing with the pandemic (Lenzo et al., 2022).

Despite the great heterogeneity of research designs and the considered variables, hence, evidence converged in suggesting that individuals with high resilience tend to experience low levels of mental health symptoms. In our opinion, more attention to psychological resilience would constitute a promising approach to the prevention of mental disorders and a worthwhile tool for identifying high-risk individuals. Besides identifying individuals at risk through a targeted assessment, psychological intervention to enhance resilience during or after stressor exposure would have many other relevant implications. Indeed, in either intervention, they may be useful in preventing or treating symptoms such as depression, anxiety, and stress related to the pandemic. Undoubtedly, time-limited group intervention might be appropriate for individuals who reported higher symptoms of mental disorders (Lenzo et al., 2014). To date, however, there is only a weak consistency regarding the definition of resilience across the studies (Macedo et al., 2014). What was noteworthy here was that we used an instrument such as the RS, originally developed to assess the individual's ability to cope with adversity (Wagnild & Young, 1993). In this regard, psychological intervention should focus on the underlying factors that may contribute to decreasing the psychological impact of the pandemic. For example, helping the individual to identify personal strengths in facing adversities and characterizing self-reliance may constitute a key component of any psychological intervention aiming to foster resilience. Our findings also highlighted another suggestion for implementing an effective intervention. The fact resilience had a direct effect on depression underpins the idea that the latter ought to be considered a primary outcome to treat and assess. Taken together, our findings may contribute to explaining the great variability of stress responses by highlighting the role of resilience during the pandemic. Accordingly, specialists within the field should consider it as a key component for implementing psychological intervention.

4.1. Limitations

Forthcoming research should take into account some limitations of this study. First, the oversampling of some characteristics (i.e., the female gender) due to the convenience sample may limit the generalizability of the results. Second, the use of an online survey for collecting data did not allow to exclude with absolute certainty preexisting psychiatric disorders among participants. Nevertheless, collecting data through online surveys was the only way during the Italian lockdown and the related restrictive measures aiming to decrease the spread of contagion. Third, the use of self-report instruments may induce a certain risk of response bias, even though RS and DASS-21 represent reliable and widely used tools.

5. Conclusions

In sum, our findings indicated that mental health worsened over time of the COVID-19 pandemic, even though a great variability is present. Arguably, individuals with higher resilience experienced a lower intensity of symptoms in both the first and the third wave of the pandemic, as well as demonstrated by previous research on stressful experiences. By and large, our findings may contribute to clarifying the role of resilience in mitigating the effects of chronic stressors. Psychological intervention to enhance resilience may foster a lower psychological impact of the pandemic.

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