

# THE SENSE OF COHERENCE AND SUBJECTIVE WELL-BEING AS RESOURCES OF RESILIENCE IN THE TIME OF STRESSFUL SITUATIONS: COVID-19 OUTBREAK AND EARTHQUAKES

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## SUMMARY

**Background:** The coronavirus outbreak was labeled a global pandemic by the WHO in March 2020. Simultaneously, an earthquake of 5.5 hit Croatia's capital Zagreb. The present study investigated the association between the sense of coherence, subjective well-being, and emotional distress (depression, anxiety, and stress) that people went through while facing an acute stress situation of COVID-19 outbreak and the earthquakes.

**Subjects and methods:** This cross-sectional study included 1152 subjects. Orientation to Life Questionnaires (OLQ-13), Personal Wellbeing Index (PWI) and DASS-21 scale were used in an anonymous online survey which was conducted on 22 March 2020 (the twelfth day of the COVID-19 outbreak in Croatia and the day of the earthquakes in the Capital). The results of the questionnaires were determined by the correlation analysis. Hierarchical multiple regression was used to evaluate the association between the subjective well-being and the sense of coherence on the emotional distress.

**Results:** The sense of coherence correlated positively with subjective well-being ( $p < 0.01$ ) and negatively with all distress domains ( $p < 0.01$ ) as well as subjective well-being ( $p < 0.01$ ). Mild emotional distress was detected. Subjects who experienced the earthquakes showed a significantly higher degree of anxiety ( $p = 0.005$ ) and stress ( $p = 0.003$ ), with significantly decreased the two personal well-being domains: standard of living ( $p = 0.023$ ) and personal safety ( $p = 0.026$ ). Sense of coherence made a major contribution in explaining emotional distress ( $p < 0.001$ ).

**Conclusion:** The results support the importance of improving coping efficiency of the sense of coherence with respect to obtaining an appropriate level of well-being and reducing emotional distress in acute stressful situations.

**Key words:** sense of coherence - psychological distress - COVID-19 - earthquakes

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## INTRODUCTION

The coronavirus disease (COVID-19), as a viral zoonosis, rapidly spread throughout the world after being detected in China in December 2019. Public Health Emergency of International Concern was declared by WHO on January 30, 2020 (Jakovljevic et al. 2020). The first patient tested positive on COVID-19 was confirmed in Croatia on February 25, and then the government declared a national health emergency on March 11. During that time, there were more than million confirmed cases around the world with thousands of casualties (Lazzari et al. 2020).

As the other countries, Croatia has also issued the recommendations and instructions on how to behave in the new world of COVID-19. Most of the instructions were aimed at maintaining physical health or preventing the spread of the virus, while the mental health of the citizens was slightly neglected. At the same time, scientific articles researching the psychological effects of the COVID-19 pandemic were being published (Covic et al. 2020). Their focus was on emphasizing a wide spectrum of psychological distress, depressive and anxiety symptoms from moderate to severe levels

(Cortés-Álvarez et al. 2020, Kontoangelos et al. 2020). These difficulties are mostly caused by the mental states that usually culminate during a pandemic. The states are namely anger regarding social isolation and quarantine, feelings of loneliness, fear of being infected and finally fear of death (Brooks et al. 2020). The pandemic outbreak of COVID-19 has seriously affected social life, economy, and medical community around the world (Jakovljevic 2020).

Simultaneously with the COVID – 19 outbreak, an earthquake with a magnitude of 5.5 on the Richter scale hit Croatian capital at 6:24 a.m. on March 22, 2020. Soon after that, at 07:01 a.m. another strong earthquake followed and more than 200 weaker earthquakes in the following five days. A large part of the city center was heavily damaged.

The earthquakes put the people in an ambiguous position because they were advised to keep social distance, but they were too scared to remain indoors. The weather conditions were also unfortunate as the snow started to fall. Plenty of hospitals were damaged and therefore the patients had to be relocated. Besides that, the damaged homes could not be repaired either due to the COVID-19 situation which meant that the

residents had to be relocated as well. The government has also restricted travelling so that people were not allowed to leave their places of residency. It was a time of great distress and fear. The economic loss from the earthquakes is assessed to be very great, and together with the difficulties caused by countries locking down due to the threat of the virus, people are really worried about the future. Also, due to the COVID-19 pandemic in those days, many people lost their jobs.

It is known that the prevalence of anxiety, depression and post-traumatic stress disorder is higher after an earthquake, even one year after the exposure (Thapa et al. 2018), and the Croatian population has now been affected by more than one acute stressful situation. Although, natural disaster brings the risk of mental health problems with short-term and long-term effects some studies state that stress reaction following trauma is due not only to the exposure but is also connected with the ways of coping (Ando et al. 2017). Despite numerous coping conceptualization proposals, there is no agreement as to the core coping categories (Stanisławski 2019).

The conceptual framework of our study is the salutogenic approach established by Antonovsky (1987) with a sense of coherence (SOC) as a fundamental construct of health promotion and subjective well-being (SWB). It is about a sense of confidence that stimuli from the environment are explainable; the strength needed to meet the requirements set by the stimulus available; and that these requirements are challenging, worth the investment and effort (Antonovsky 1987). Thanks to own life orientation by which events are perceived logically, people who develop a higher degree of sense of coherence become more resistant to stress.

People with a strong sense of coherence prefer to assess life events as explanatory. They believe that they can manage them thanks to available resistance resources (physical, material, cognitive, emotional, sociocultural and interpersonal determinants) and that solving challenges is worth the effort. These are also the three components of a sense of coherence, comprehensibility, manageability, and meaningfulness (Antonovsky 1987). Since the role of sense of coherence in mental health (Eriksson & Lindström 2006) and personal well-being (Eriksson & Lindström 2007) has been confirmed, the main priorities of crisis researchers are to examine the role of sense of coherence as a resource for resilience to stressful events, especially in acute stressful situations (Braun-Lewensohn & Sagy 2011).

This study aimed to explore the association between sense of coherence, subjective well-being and emotional distress facing the acute stressful situations. We compared two groups – those who faced the COVID-19 outbreak and those who at the same time lived in the earthquake-struck area.

## SUBJECTS AND METHODS

### Subjects

The subjects of this prospective, cross - sectional study were recruited on-line among the members of the largest Facebook group dedicated to the coronavirus epidemic in Croatia: *Korona virus Hrvatska-COVID-19-savjeti i informacije*. This moderated group brings together 30,000 members with the aim of accurately and scientifically informing the public about the prevention and protection against the coronavirus in Croatia. Because it was not feasible to do a community-based national sampling survey during this special period, we decided to collect the data online via the questionnaires posted to the group on March 22, 2020. It was the twelfth day of the pandemic in Croatia and the day of the earthquakes in the Capital. No inclusion or exclusion criteria were used apart from the subjects being of legal age. All subjects were informed that the research was interested in their experiences and anonymity was emphasized. On the day of the survey, it was filled in by 1265 subjects out of which 1152 were over the age of 18. There were 970 female and 182 male subjects, with an average age of 37.73 (SD = 11.53). Most of the subjects had a high school diploma and mostly lived in the city. As many as 44% of the subjects answered “yes” to the question “Have you recently felt such an earthquake in your house /apartment that you had to quickly seek shelter or go outside?”. Demographic characteristics of the sample are presented in Table 1.

**Table 1.** Characteristics of the sample (N=1152)

Variable	No.	%
Age (mean, SD)	37.73	11.53
Sex		
female	970	84.2
male	182	15.8
Working status		
employed	788	68.4
unemployed	206	17.9
student	140	12.2
sick leave	18	1.6
Level of education		
primary education	23	2.0
secondary education	587	51.0
undergraduate study	209	18.1
graduate study	309	26.8
postgraduate study	24	2.1
Place of residence		
urban	842	73.1
rural	310	26.9
Earthquake-stricken area		
yes	506	43.9
no	646	56.1

## Instruments

The sense of coherence was measured by the short-form version of the Orientation to Life Questionnaire (SOC-13) consisting of 13 items on a seven - point semantic differential scale (Antonovsky 1987). The total sum ranges from 13 to 91. A higher score indicates stronger SOC. The sense of coherence scale shows high internal consistency with a Cronbach's ranging from .70. to 0.92 (Eriksson & Lindström 2005). Internal consistency in the present study revealed Cronbach's  $\alpha$  0.78.

Subjective well-being (SWB) was measured by the Personal Wellbeing Index (PWI) developed by International Wellbeing Group (2013). The PWI questionnaire was translated, validated, and standardized prior to being used for studies on the Croatian population (Kaliterna & Prizmic-Larsen 2014). The questionnaire consists of seven items in which subjects evaluate their own satisfaction with some domains of life on an 11-point rating scale ranging from 0—not satisfied at all to 10—extremely satisfied. All reported values have been converted into a standard 0-100 range by shifting the decimal point one-step to the right, where 70+ points are a normal level of SWB. The PWI has demonstrated favorable psychometric properties (Jovanović et al. 2019). The internal consistency in the present study showed Cronbach's  $\alpha$  0.85.

The emotional distress was measured by the DASS scale. The scale was designed to measure depression, anxiety, and stress (Lovibond & Lovibond 1995). The DASS-21 (short-form version) consists of three 7-item self-report scales based on a four-point rating the extent to which each state has been experienced over the past week. To calculate comparable scores with full DASS, each seven-item scale was doubled. It is clear from the literature that the DASS-21 is a well-established instrument for measuring depression, anxiety, and stress in the Western world (Oei et al. 2013). The higher the score, the more severe the emotional distress was. The reliability was estimated using Cronbach's alpha as .93 (Henry & Crawford 2005). The internal consistency in the present study showed Cronbach's  $\alpha$  .89.

A short demographic questionnaire was also used, consisting of several questions about gender, age, education level, work status, place of residency, earthquake experience.

## Statistical analysis

Cronbach's  $\alpha$  were computed to estimate the internal consistency of instruments. Normality testing was conducted with the Kolmogorov-Smirnov test. The categorical variables are expressed as counts and percentages. Continuous data are expressed as mean and standard deviation. The significance of difference between the groups was assessed with the t-test. The result of the questionnaire was determined by correlation analysis. Hierarchical multiple regression was used to evaluate the association between the predictor variables of SWB

and SOC on the criterion variable emotional distress. The hierarchical analysis was conducted in three steps. The first step included demographic variables of gender, age, level of education as well as the earthquake experience. In the second step the subjective well-being was introduced and in the third step the sense of coherence. The level of statistical significance was set at  $p < 0.05$ . Statistical analysis was performed with SPSS version 22.0 (IBM Corp., Armonk, NY, USA).

## RESULTS

### Correlation analysis

The results from the correlation analysis are presented in Table 2. There were significant moderate correlations between SOC, SWB, and psychological distress. The SOC correlated positively with SWB and negatively with all distress domains (depression, anxiety, and stress) as well as SWB.

**Table 2.** SOC moderately correlate positive with SWB and negative with emotional distress: Pearson correlation coefficients (N=1152)

	1	2	3
SOC**	-		
SWB***	0.555*	-	
Emotional distress****	-0.531*	-0.411*	-

\*  $P < 0.001$ ; \*\* Sense of coherence; \*\*\* Subjective well-being; \*\*\*\* The three related negative emotional states of depression, anxiety, and stress

### Differences between the observed groups regarding SOC, SWB, and emotional distress

Table 3 shows that the people who did not experience the earthquakes are significantly more satisfied with two personal well-being domains: standard of living and personal safety. A significant difference is also visible in the results on the DASS scale, namely in the overall results and in the subscales of anxiety and stress. Subjects who experienced the earthquakes show a significantly higher degree of anxiety and stress. No significant difference was found in the degree of depression.

### Regression analysis for variables predicting emotional distress

Table 4 presents the results following the hierarchical multiple regression analysis investigating the association between psychological distress, SOC, and SWB controlled for gender, age, and earthquake experience. To meet the assumptions for conducting the hierarchical regression analysis, the results of collinearity were checked, and it was concluded that they are within acceptable values. The assumption about the correlation of the residuals with the Durbin-Watson criterion was also tested, which showed an acceptable result and amounts to 1.85. The results of the first step of the hierarchical

**Table 3.** Differences in the observed variables with respect to adverse event exposure

	COVID-19 outbreak and earthquake (N=506) M ± SD****	COVID-19 outbreak (N=646) M ± SD****	P*****1
SOC*	58.63±11.01	58.35±11.19	0.665
SWB**	67.64±17.72	67.79±18.29	0.895
standard of living	67.02±24.22	63.62±25.88	0.023
personal safety	65.99±25.47	69.30±24.44	0.026
Emotional distress***	37.70±24.40	33.90±22.96	0.007
depression	11.58±8.76	10.83±8.64	0.148
anxiety	8.26±7.40	7.09±6.70	0.005
stress	16.21±8.98	14.62±8.66	0.003

\*Sense of coherence. The summed scores of the whole scale were calculated with a minimum of 13 and maximum of 91. The higher the score, the stronger the SOC; \*\*Subjective well-being. The summed scores of the Personal Wellbeing Index ranged from 0-100 with higher summed indicating better SWB, where 70+ points are a normal level; \*\*\*Emotional distress measured by DASS-21. Normal score for depression = 0-9, anxiety 0-7, stress 0-14; \*\*\*\*Data are expressed as a mean ± standard deviation; \*\*\*\*\* Two tailed t test

**Table 4.** The results of hierarchical regression analyses with emotional distress as the criterion variable

	Standardized coefficients			R <sup>2</sup>	Δ R <sup>2</sup>	P
	β	t	P			
<i>Step 1</i>						
Constant		6.820	<0.001			
Gender	0.13	4.283	<0.001			
Age	-0.06	-2.013	0.044			
Earthquake	-0.08	-2.667	0.008	0.024	0.021	<0.001
<i>Step 2</i>						
Constant		15.048	<0.001			
Gender	0.11	4.276	<0.001			
Age	-0.12	-4.421	<0.001			
Earthquake	-0.07	-2.806	0.005			
SWB*	-0.42	-15.836	<0.001	0.199	0.196	<0.001
<i>Step 3</i>						
Constant		20.375	<0.001			
Gender	0.08	3.279	0.001			
Age	0.002	0.068	0.945			
Earthquake	-0.08	-3.463	0.001			
SWB*	-0.16	-5.388	<0.001			
SOC**	-0.43	-13.924	<0.001	0.315	0.312	<0.001

\* Subjective well-being; \*\* Sense of coherence

regression analysis show that sociodemographic variables contribute to the emotional distress with a percentage of only 0.2%. It can be seen that gender and the experience of earthquakes contribute significantly to the degree of emotional distress; women are more likely to be distressed and, as expected, people who have experienced an earthquake are more likely to show emotional distress. In the second step, SWB was introduced, and it is evident that the variance of the criteria significantly increased to 19%. People who had a lower SWB also had a higher score on the scale of depression, anxiety, and stress. To examine the contribution of sense of coherence to the degree of emotional distress, SOC was introduced in the third step, and the explained variance was statistically significantly increased to 31%.

## DISCUSSION

Our study aimed to investigate stress reactions and psychological resources in subjects while facing an acute stress situation of COVID-19 outbreak and the earthquakes. We further aimed to explore the role of demographics as well two psychological resources, sense of coherence and well-being in explaining stress reaction. A first, we had the COVID-19 pandemic, but then the earthquake in Zagreb occurred. Having both, natural disaster and pandemic at the same time, which is very rare, we wanted to establish sense of coherence in such unusual conditions.

The results from the correlation analysis show positive correlation between SOC and SWB, and negative between SOC and SWB with all emotional

distress domains. These results are in line with previous findings regarding the investigation of psychological distress, SOC and well-being (Eriksson M & Lindström 2007, Bíró et al. 2010, Merakou et al. 2019).

The initial results showed that a group of people who experienced earthquakes during COVID-19 outbreak show a significantly higher degree of anxiety and stress compared to a group without the earthquake experience. Such results are expected as it is known that multiple stressors, of which the earthquake is very intense, increase the level of emotional distress. Some of the key factors in dealing with stress are individual differences in resilience and tolerance to uncertainty, self-assessment of one's own vulnerability and the vulnerability of loved ones as well as propensity to stress and anxiety (Asmundson & Taylor 2020). An important result is that both groups show mild emotional distress with values that are twice as high as the normative ones (Henry & Crawford 2005). Subjects on the DASS scale had similar results immediately before life-threatening events such as myocardial infarct (Sengül et al. 2011). Wang et al. (2020) surveyed an online questionnaire of 1210 subjects from 194 different cities, shortly after the outbreak of the Wuhan pandemic. Among other things, the DASS scale was used to examine the level of depression, stress and anxiety, and it has shown that over 50% of respondents described the psychological consequences of a pandemic as moderate to severe. One-third of respondents reported moderate to severe symptoms of anxiety (Wang et al. 2020).

There was no difference between the groups in the terms of subjective well-being except for the domains of standard of living and personal safety. Those were significantly lower with the respondents who survived the earthquakes, as expected given the known effects of earthquakes are that they decrease the quality of life (Wen et al. 2012). Total SWB was proven stable with a 68% scale maximum (SM), close to normative values. The obtained result testifies to a relatively high level of subjective quality of life with respect to a stressful event and confirms Cummins' theory of the homeostatic model of subjective quality of life according to which values are maintained within a narrow range of higher values between 70 and 80% SM. Cummins believes that some events may reduce or increase life satisfaction, but an individual will find themselves at an initial value of 75% SM over a period of time. The same author, based on a systematic review of scientific papers, has found that the average subjective quality of life is at the level of  $75\% \pm 2.5\%$  SM (Cummins 1995). According to a research conducted by Kaliterna & Prizmic-Larsen (2014) on a representative Croatian sample conditions that were not marked by any crisis events such as those from our study, the mean of the subjective well-being achieved was  $68 \pm 18\%$  SM.

The sense of coherence also showed no deviations within the study groups. The theoretical assumption is that SOC as a life orientation of an individual stabilizes

at a certain point of the continuum, especially in adulthood after the individual has profiled in large areas of life, and the sense of coherence further varies slightly (Antonovsky 1987).

Our main question, however, was the contribution of a sense of coherence to reducing emotional distress in times of acute stressful events such as the corona virus pandemic and the earthquakes. According to the theory of salutogenesis, stressors act on people daily, either as a result of simple or more complex life events, they stimulate various tensions that are impossible to avoid. Stress will only occur if the tension is not adequately resolved or not managed properly (Stanic 2011). People who develop a higher degree of sense of coherence become more resistant to stress, since they prefer to assess life events as explainable, consider that they can manage them thanks to available resources, and that solving challenges is worth the effort (Antonovsky 1987). This study confirmed a significant contribution of a sense of coherence in explaining the variance of depression, anxiety, and stress in states of acute stressful life events. Sense of coherence is crucial in maintaining mental health and it is very important that people work on developing defense mechanisms to reduce anxiety during unstable times. It is important to promote a sense of coherence in a society that will be able to manage better its own mental health and quality of life in the face of significant stressful events.

Key measures to reduce depression, relieve stress, and prevent anxiety disorders during periods of sudden events include information and communication. It is very important for people to be familiar with the situation, greater information reduces the fear of uncertainty. During the pandemic in Croatia, a telephone line of free psychological support was opened in each county of the state. People in isolation are advised to develop a daily routine that is most like their usual schedule. An important aspect of maintaining mental health is to maintain the normality of everyday life, as much as possible.

However, the study has some limitations, primarily a cross-sectional design. The study was conceived as longitudinal. It is planned to repeat the measurement to identify the degree of psychological distress and the occurrence of PTSD and the role of sense of coherence in the same subjects. Also, all results were based on self-reports and therefore subjected to potential self-reporting bias. However, the procedure with strictly anonymous responses may compensate for such bias. Also, online data collection may be a limitation, however in terms of complete lock-down there is no other way to collect data other than remotely as done in this study. There is also a significantly larger proportion of female subjects which is the limitations of the study. We assumed women are more likely to participate in surveys and share their opinions with others. Smaller difference in the number of male and female respondents should be noted in the future research.

## CONCLUSION

In conclusion, this study has shown that acute stressful situations such as COVID-19 outbreak and the earthquakes affecting our psychological well-being produce moderate depression, anxiety and stress. At the same time, it supports the view that sense of coherence and well-being have implications to a mental health protective role as salutogenic theory suggests.

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### Contribution of individual authors:

Ivica Matić: design of the study, literature searches, investigation, interpretation of data, first draft, collaborative manuscript writing, approval of the final version.

Iva Takšić: literature searches, statistical analyses, collaborative manuscript writing, approval of the final version.

Marija Božičević: literature searches and analyses, collaborative manuscript writing, approval of the final version.

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