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## **The importance of resilience and coherence in dealing with the COVID-19 pandemic among medical and non-medical students**

**Agnieszka Syrowatko**

ORCID iD <https://orcid.org/0000-0003-1715-0358>

Affiliation Student of health psychology, Faculty of Health Sciences, Pomeranian Medical University in Szczecin

Country Poland

Bio Statement —

Principal contact for editorial correspondence.

**Krzysztof Zdziarski**

ORCID iD <https://orcid.org/0000-0001-5766-026X>

Affiliation PhD Subdepartment of Social Medicine and Public Health

Department of Social Medicine

Pomeranian Medical University in Szczecin

Country Poland

Bio Statement —

## **Abstract**

The aim of the study is to determine the level of resilience and coherence as well as the type of affective reactions manifested among students of medical and non-medical faculties, as well as to analyze potential predictors of the intensification of positive and negative reactions to the COVID-19 pandemic.

**Key words: coherence, resilience, COVID-19 pandemic, affect, coping**

## **Admission**

On March 11, 2020, WHO granted the infectious viral disease COVID-19 a pandemic status [1], which was associated with radical changes in the lifestyle and social functioning of the population.

The dynamics and direction of a pandemic may be difficult to predict for a person without medical education. Due to insufficient education of the society, disinformation and the so-called fake news, spread especially via social networks. In addition, due to the systematic worsening of the epidemiological situation, the government decided to introduce further restrictions aimed at limiting the transmission of the virus, i.e. temporary closure of state borders, restrictions in internal traffic, trade, freedom of assembly, the functioning of schools, universities, workplaces, hotels and entertainment facilities.

The need for social isolation and distancing oneself, also from the immediate family, fear of infection, which is a cause of chronic stress, restrictions on free travel and leisure activities, and the resulting implications for social life seem to have a significant negative impact on mental health population [2].

Home isolation is the primary tool in fighting the pandemic. Infectious disease experts recommend that the individual remain where he or she lives and avoid contact with others as much as possible. In the event of a reasonable suspicion of contact with an infected person or after obtaining a positive PCR test for SARS-CoV2 antigens, a statutory quarantine or isolation order is imposed. The necessity to stay at home has negative psychological effects, which include: fear, anger, frustration, loneliness, suspected threat from other people, insecurity and anxiety [3].

The global SARS-CoV-2 virus pandemic may cause a crisis in the lives of students. The anxiety associated with a new disease entity and its possible complications overlaps with

young people's fears of employment opportunities. Before the pandemic, students often found employment in retail and service outlets, which are now subject to temporary restrictions. No less important factor is the quality of distance learning, as well as less time than previously spent on practical classes, which are often subject to temporary suspension. Moreover, the possibility of realizing oneself in various forms of activity has been significantly limited. These factors may affect the mental health of students in our country.

In order to deal with the dynamically changing and additionally very difficult situation, which is the coronavirus pandemic, while maintaining good mental health, the individual should cognitively assess the stressor as possible to cope with it, which is supported by the theory Lazarus and Folkman (1970), according to which stress is a transaction between an individual and the environment. During this transaction, a primary assessment is carried out, which includes an analysis of the requirements posed by the environment, and a secondary assessment, during which the calculation of own abilities to cope with the stressor takes place. In making the primary assessment, the relationship may be judged to be meaningless, favorable, or stressful. Considering it as stressful, may consequently be considered a loss, a threat or challenge. As a response to a stressful situation, an individual starts coping processes. Depending on the cognitive assessment made by the person coping can be focused on an emotion or a problem [4].

An individual's ability to assess the stressor as a challenge may be a specific psychological property that will allow him to adapt to difficult conditions and increase the type and amount of constructive activities undertaken by him and understood as coping. This is supported by Hobfoll's concept, according to which stress occurs in a situation of loss or the possibility of losing resources necessary for an individual to continue functioning. As one of the resources, the author of the concept mentions personal resources, which include a sense of coherence and resilience. They allow the individual to assess the stressor as not threatening to lose its resources, which contributes to the assessment of the stressful factor as not constituting a threat, but a challenge [5].

Sense of coherence-SOC defined as the life orientation of an individual, which consists of three components, i.e. the sense of comprehensibility, resourcefulness and meaningfulness. The sense of comprehensibility refers to the degree of the individual's belief that both the external and internal environment is understandable and predictable to him. Another element is the sense of resourcefulness, manifested by the belief that the individual has resources, which will enable her to cope with stressors. The last component is a sense of meaningfulness, expressing the degree to which a given person believes that the challenges they undertake are worth their commitment and sacrifice [6]. Research conducted in Spain in the period of March 26-26, 2020 among health professionals regarding the sense of coherence showed that a high level of this variable correlates with their better somatic and mental health. Due to the specificity of their profession, i.e. caring for COVID-19 patients, these people are exposed to SARS-CoV-2 infection, which may contribute to the more frequent occurrence of mental disorders in this study group. The results of the conducted research indicate that a high level of SOC was associated with lower symptoms of anxiety, depression and stress [7].

In the studies in which disabled people taking part in sports activities took part, it was confirmed that disabled people practicing sports are characterized by a higher level of

coherence compared to physically disabled people and non-disabled people who do not participate in sports. The existence of a relationship between the sense of coherence (especially the sense of meaningfulness and the sense of manageability) and satisfaction with life in disabled people practicing sports has also been demonstrated. This suggests that coherence is a factor facilitating adaptation to difficult conditions (in this case, disability) and improving coping mechanisms [8].

The high level of fear of developing COVID-19 lowered the level of perceived stress among the respondents, which was reflected in the level of coherence they showed. People with severe anxiety had high SOC levels. They could have felt that the restrictions were meaningful and could prevent contamination of themselves and others. A sense of the sense of isolation and following the recommendations can give you a sense of control over the existing situation. This is confirmed by the statement of Sullivan (1989), who stated that coherence depends on belief in the validity and logic of an event, and not on the needs of an individual [9].

It can therefore be assumed that people with a high SOC level will be better able to cope with a pandemic situation.

Another factor contributing to better adaptation to difficult situations is resilience, which is a relatively young construct in psychological sciences. The first research on it took place in the 1960s. The definition of this factor is related to the design of the research tool used to measure it. The scale for measuring resilience, called The Resilience Scale, defines it as a permanent property of a person expressed in two dimensions, i.e. personal competence and acceptance of self and life. In turn, Block and Kremen(1996) defined this construct as a set of traits: bravery in coping with stress, strength of character and flexibility in adapting to new conditions. Luthar and Zelazo (2003) presented the view that resilience is a dynamic process of positive adaptation to emerging difficulties [10].

Among paramedics working during the epidemic, it was found that resilience and certain coping strategies contribute to reducing their stress levels and help avoid further trauma. Coherence allowed them to activate their internal resources, e.g. it enabled them to remain active in solving difficulties while maintaining a sense of resistance to the prevailing situation. Moreover, resilience had a strong effect when it was associated with coping strategies, e.g. with the problem-focused coping strategy. Mental resilience and coping may be factors protecting against the symptoms of post-traumatic stress disorder [11].

People with a diagnosis of oncological disease, which was undoubtedly a life difficulty, who were characterized by a higher level of resilience, showed greater flexibility in coping, which was a factor in their better adaptation to the disease [12].

Research on loneliness and personal resources among nursing students confirmed the importance of resilience in coping with the epidemic and its implications. Students who were characterized by a higher level of mental resistance and had greater social support showed a lower level of loneliness [13].

It can be assumed that the level of coherence and resilience is significantly related to the intensification of constructive ways of dealing with the negative aspects of the epidemic. The higher the level of resilience and coherence, the more often constructive ways of coping will

be chosen, and the sense of subjective coping will be assessed as better. The aim of this study is to determine whether there are relationships between the given variables and to determine whether students of medical faculties who have contact with infectious diseases during their studies are characterized by their higher level compared to students of non-medical faculties.

## Materials and methods

### Study group

519 people took part in the study, and the results of 18 people were excluded from further analyzes due to significant gaps in the data. Therefore, 501 people were included in the analyzed group, of which 248 (49.5%) medical students and 253 (50, 5%) of non-medical students. The examined students were aged from 18 to 46, the mean age was  $M = 22.51$  ( $SD = 3.27$ ). The study involved 407 (81.24%) women and 94 (18.76%) men. The exact sociodemographic characteristics of the studied group are presented in Table 1. There were significantly more women and residents of large cities among medical students.

**Table 1: Sociodemographic characteristics of the group, taking into account intergroup differences.**

Variables	The whole group, N = 501	Medical, n = 248	Non-medical n = 253	Group comparison		
	M (SD) / N (%)	M (SD) / N (%)	M (SD) / N (%)	X <sup>2</sup> / Z *	df	p
Age	<u>22.51 (3.27)</u>	<u>22.25 (3.03)</u>	<u>22.75 (3.48)</u>	-0.931 *	-	0.352
Sex						
women	407 (81.24%)	213 (85.89%)	194 (76.68%)	6.965	1	0.009
men	94 (18.76%)	35 (14.52%)	59 (23.32%)			
Place of residence						
village	80 (15.97%)	30 (12.1%)	50 (19.76%)	8.257	3	0.041
small town (less than 20,000 inhabitants)	34 (6.79%)	15 (6.05%)	19 (7.51%)			

medium city (20,000-100,000 inhabitants)	69 (13.77%)	31 (12.5%)	38 (15.02%)			
a large city (over 100,000 inhabitants)	318 (63.47%)	172 (69.35%)	146 (57.71%)			
Year of study						
1 year	117 (23.35%)	63 (25.40%)	54 (21.34%)	13.539	5	<0.001
2 year	55 (10.98%)	26 (10.48%)	29 (11.46%)			
3 year	103 (20.56%)	32 (12.90%)	74 (29.25%)			
4 year	106 (21.16%)	69 (27.82%)	34 (13.44%)			
5 year	104 (20.76%)	42 (16.94%)	62 (24.51%)			
6 years	16 (3.19%)	16 (6.45%)	-			
Marital status						
lonely	236 (47.11%)	116 (46.77)	120 (47.43%)	2.668	3	0.446
in an informal relationship	240 (47.90%)	123 (49.60)	117 (46.25)			
in a formal relationship	24 (4.79)	9 (3.63)	15 (5.93%)			
in separation	1 (0.2)	0 (0)	1 (0.4%)			

### The course of the study

The study was conducted in the period from October 25, 2020 to December 7, 2020, during which distance learning was continued and further restrictions were implemented. The data was collected using an on-line questionnaire. The link to the survey was sent to groups of medical and non-medical students at universities in Poland, which are on the Facebook social platform. Participation in the study was voluntary and anonymous. The survey instruction

recommended that the respondent should choose only one answer in each question that was most consistent with his / her convictions.

### **Research tools**

The study used an original questionnaire and two standardized psychological questionnaires:

1. The resilience was measured using the Resilience Assessment Questionnaire (KOP-26) by: Gąsior, Chodkiewicz, Cechowski. It consists of 26 questions in which the participant assesses to what extent the statements relate to his life so far on a scale from 1 (completely disagree) to 5 (completely agree). It allows to calculate the general resilience index and its three sub-dimensions: Competences Personal (KO), Family Competences (KR), Social Competences (KS) and General Resilience being the sum of the above-mentioned. In the original version, the tool achieved a satisfactory internal compliance (Cronbah alpha = 0.81) [10].
2. Coherence was measured using the Polish version of the Life Orientation Questionnaire (SOC-29). The author of the tool is Antonovsky (1983). The tool is characterized by high reliability ((Cronbah's alpha = 0.84-0.93). It consists of 29 items rated on a scale from 1 to 7. It measures the sense of coherence, i.e. life orientation, consisting of three correlated components: the sense of comprehensibility, a sense of manageability and a sense of meaningfulness. The respondent assesses how each of the given statements relates to his life so far and gives answers on a seven-point scale: 1 = I never have this feeling, 7 = I always have this feeling. On the basis of the sum of points, the Comprehensibility, Resourcefulness and Sense of Understanding are assessed for individual components [14].
3. Author's personal questionnaire consisting of 20 questions: 6 sociodemographic questions (gender, age, place of residence, marital status, field of study, year of study), 11 questions about selected affective states experienced during the epidemic, being an expression of coping with a pandemic, assessed on a scale of 1 (never) to 5 (very often), regarding the subjective sense of own resourcefulness, tension, contentment, joy, fear, relaxation, sociability, peace, organization, inner strength and stress). The positive and negative responses were then summed up into more complex indicators, which are the main variables explained in the study.

### **Statistical analysis**

The results were quantified using the IBM SPSS Statistics v. 25 package. Various statistical description techniques were used, the Shapiro-Wilk test to assess the normality of distributions, Spearman's rank correlation analysis, tests for comparing two independent groups (Mann-Whitney U test and chi-Square Pearson), and the hierarchical regression model. The p value <0.05 was adopted as the statistical significance index.

## RESULTS

**Table 2.**

Variables	The whole group, N = 501	Medical, n = 248	Non-medical n = 253	Group comparison	
	min-max M (SD)	min-max M (SD)	min-max M (SD)	WITH	p
Resilience	30.00 - 130.00 96.55 (16.39)	30.00- 130.00 95.32 (16.97)	42.00- 130.00 97.76 (15.74)	-1.397	0.163
Personal Competencies	9.00-45.00 34.71 (6.42)	9.00- 45.00 34.25 (6.27)	12.00- 45.00 35.17 (6.54)	-1.952	0.051
Family Competencies	12.00-55.00 44.13 (8.84)	12.00- 55.00 43.73 (9.55)	19.00- 55.00 44.53 (8.09)	-0.307	0.759
Social competence	6.00-30.00 17.71 (5.37)	6.00- 30.00 17.34 (5.48)	6.00- 30.00 18.07 (5.26)	-1.525	0.127
Coherence	54.00- 175.00 119.08 (22.47)	60.00- 175.00 118.06 (24.06)	54.00- 173.00 120.09 (20.80)	-1.239	0.215
Intelligibility	16.00- 65.00 39.64 (8.46)	16.00- 60.00 39.04 (8.35)	20.00- 65.00 40.24 (8.55)	-1.610	0.107
Resourcefulness	16.00- 65.00 42.16 (9.25)	17.00- 64.00 41.74 (9.92)	16.00- 65.00 42.58 (8.55)	-1.172	0.241
Meaningfulness	10.00- 55.00 37.28 (8.66)	13.00- 55.00 37.28 (9.14)	10.00- 54.00 37.27 (8.18)	-0.057	0.955
Positive Emotions	9.00- 40.00 26.01 (5.98)	12.00- 40.00 25.95 (6.35)	9.00- 40.00 26.08 (5.61)	-0.319	0.750



Negative emotions	3.00- 15.009.20 (3.17)	3.00- 15.009.3 5 (3.32)	3.00- 15.009.04 (3.01)	-1.293	0.196
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Table 3 presents the results of hierarchical regression analysis, taking into account three blocks of variables: sociodemographic, resilience and coherence, explaining the intensity of positive emotions experienced in the experience of a pandemic. The first model, taking into account only sociodemographic variables, explained a negligible percentage of the variance of the explained variable, and the only significant predictor was gender ( $p = 0.001$ ) - men showed higher results. After considering the resilience indexes in the second model,  $R^2$  increased significantly and the model explained nearly 29% of the total variance of the results. Gender maintained its significance ( $p < 0.01$ ) and, moreover, two resilience factors turned out to be significant predictors. ( $p < 0.001$ ). Along with the increase in personal competences by every single measurement point, the intensity of positive emotions increased by an average of over 0.4 points. On the other hand, the increase in social competences coincided with an increase by 0.2 point. Taking into account another variable resulted in a further increase in  $R^2$  and the range of explained variance to around 36%. Among the sociodemographic variables, gender retained its importance ( $p < 0.05$ ). Resilience in terms of personal competences remained a significant predictor, with the beta index declining more than twice ( $p = 0.001$ ). The importance of social competences decreased slightly ( $p < 0.01$ ). Among the coherence indices, significant predictors of the intensity of positive emotions during a pandemic were comprehensibility ( $p < 0.001$ ) and meaningfulness ( $p = 0.001$ ). For every single point of increase in the severity of these two coherence factors, there was an increase in the severity of positive affects in experiencing a pandemic by an average of 0.2 points. Means, that people characterized by a higher intensity of positive emotional reactions during the epidemic were characterized by greater resilience in terms of responsible action and the ability to nourish hope despite adversities. In addition, they are easier to establish interpersonal contacts, have a wider circle of friends, adapt faster to new conditions and can more easily ask for help, showing more positive responses to the crisis. The predictive significance of coherence indicates that the increase in positive reactions is also accompanied by an increase in the feeling that the surrounding reality is understandable and that the requirements of life make sense and are worth the commitment and effort. They were characterized by greater resilience in the field of responsible action and the ability to nurture hope despite adversities. Moreover, they are characterized by greater ease of establishing interpersonal contacts, have a wider circle of friends, adapt faster to new conditions and can more easily ask for help, showing more positive reactions to the crisis. The predictive significance of coherence indicates that the increase in positive reactions is also accompanied

by an increase in the feeling that the surrounding reality is understandable and that the requirements of life make sense and are worth the commitment and effort. They are characterized by greater ease in establishing interpersonal contacts, have a wider circle of friends, adapt faster to new conditions and can more easily ask for help, showing more positive reactions to the crisis. The predictive significance of coherence indicates that the increase in positive reactions is also accompanied by an increase in the feeling that the surrounding reality is understandable and that the requirements of life make sense and are worth the commitment and effort. They are characterized by greater ease of establishing interpersonal contacts, have a wider circle of friends, adapt faster to new conditions and can more easily ask for help, showing more positive reactions to the crisis. The predictive significance of coherence indicates that the increase in positive reactions is also accompanied by an increase in the feeling that the surrounding reality is understandable and that the requirements of life make sense and are worth the commitment and effort.

**Table 3.**

Reactions positive	Model 1; R2 = 0.020		Model 2; R2 = 0.285		Model 3; R2 = 0.357	
	beta	p	beta	p	beta	p
Sex	<b>0.153</b>	<b>0.001</b>	<b>0.106</b>	<b>0.007</b>	<b>0.076</b>	<b>0.044</b>
Age	0.057	0.283	0.046	0.315	0.035	0.419
Place of residence	-0.003	0.953	0.064	0.099	0.071	0.054
Type of studies	-0.009	0.836	-0.041	0.295	-0.031	0.410
Year of study	0.054	0.312	0.019	0.672	0.006	0.882
Resilience - Personal Competence			<b>0.424</b>	<b>&lt;0.001</b>	<b>0.194</b>	<b>0.001</b>
Resilience - Family Competencies			-0.002	0.962	-0.027	0.539
Resilience - Social Competences			<b>0.172</b>	<b>&lt;0.001</b>	<b>0.117</b>	<b>0.006</b>
Coherence - Understandability					<b>0.189</b>	<b>&lt;0.001</b>

Coherence - Resourcefulness					0.090	0.117
Coherence - Meaningfulness					<b>0.185</b>	<b>0.001</b>

Table 4 presents the results of an analogous regression analysis explaining the intensity of negative emotions related to the pandemic. The model taking into account only the sociodemographic variables still explained a negligible percentage of the variance and the only significant predictor was female gender ( $p < 0.001$ ). The second model explained about 13% of the variability in negative reactions, apart from sex ( $p < 0.001$ ), significant predictors were also two resilience factors, also significant in the model explaining positive emotions. Along with the increase in personal competences ( $p < 0.001$ ) and social competences ( $p < 0.05$ ), the intensity of negative affective reactions in the pandemic decreased, successively by about 0.3 and 0.1 measuring points. After taking into account the importance of coherence in the third model, the range of explained variance increased to over 26%. Besides the still important meaning of gender observed an interesting disappearance of the significance of the significance of all resilience indicators. Two of the three coherence indices turned out to be significant predictors - slightly different than those which explained the positive reactions. As in the previous analysis, lower intelligibility ( $p < 0.01$ ) was significant for the intensity of negative emotions, but meaningfulness was not significant, and in its place, resourcefulness was revealed as the strongest predictor of the entire model ( $p < 0.001$ ). The increase in the sense of resourcefulness by every single measuring point resulted in a decrease in the feeling of negative feelings by an average of about 0.4 points.

This means that although, contrary to positive emotions, resilience did not have a significant importance, the lower intensity of negative responses to the pandemic coexisted with a higher level of coherence. People experiencing negative affects less frequently were characterized by higher coherence in the area of understanding the surrounding reality and the conviction that they had remedial resources to help them deal with challenges such as a support network, authorities or the sacred and counteracting the feeling of helplessness in times of crisis.

**Table 4.**

Reactions negative	Model 1; R2 = 0.044		Model 2; R2 = 0.133		Model 3; R2 = 0.262	
	beta	p	beta	p	beta	p
Sex	<b>-0.207</b>	<b>&lt;0.001</b>	<b>-0.179</b>	<b>&lt;0.001</b>	<b>-0.119</b>	<b>0.003</b>
Age	-0.081	0.122	-0.073	0.145	-0.057	0.220
Place of residence	0.075	0.094	0.033	0.443	0.018	0.649

Type of studies	-0.007	0.880	0.009	0.826	0.010	0.809
Year of study	0.056	0.284	0.075	0.136	0.090	0.053
Resilience - Personal Competence			<b>-0.267</b>	<b>&lt;0.001</b>	-0.106	0.088
Resilience - Family Competencies			0.034	0.497	0.083	0.076
Resilience - Social Competences			<b>-0.103</b>	<b>0.031</b>	-0.013	0.774
Coherence - Understandability					<b>-0.144</b>	<b>0.007</b>
Coherence - Resourcefulness					<b>-0.390</b>	<b>&lt;0.001</b>
Coherence - Meaningfulness					0.082	0.172

## DISCUSSION OF THE RESULTS

The study was aimed at determining whether there are statistically significant relationships between the level of resilience and coherence and the perceived intensity of positive or negative emotions. The hypotheses were partially confirmed. The construct of resilience, and more precisely its two components, which are personal and social competences, significantly influenced the experience of positive emotions during a pandemic. This corresponds to the results of research conducted among nurses, which showed a significant correlation between the level of resilience and the intensity of stress, which [15] is often associated with negative emotions. It was shown that a higher level of resilience was associated with a lower intensity of stress among the examined women. [16] Corresponding results were obtained by researchers looking for relationships between positive emotions, coping with resilience and mental health. In this case, there was also a positive relationship between resilience and positive affect, which may indicate the importance of these variables in shaping mental well-being and improving coping, as was the case with the components of the sense of coherence. Two of them, understandability and meaningfulness increased the intensity of experiencing positive affects. An unexpected result was obtained while exploring the relationships between the investigated explanatory variables and negative reactions. Well, taking into account the importance of coherence in experiencing difficult emotions, the share of resilience factors significantly decreased. Coherence became of key importance, however, in the case of

explaining the experience of negative emotions, these were not the same factors of this construct as in the case of positive feelings. Here, the level of resourcefulness and understandability played a role. Similar results were obtained in the study of the correlation between the relationship between the sense of coherence and positive and negative affect depending on the stress level. In this case, the level of intensity of the components of coherence was important in experiencing negative reactions. However, there are discrepancies in the relationship between coherence and experiencing positive emotions. The researcher failed to demonstrate the relationship between the sense of coherence and positive affect. This is in contrast to the results of this study. Similarities also appeared with regard to the coherence components. There was no correlation between the level of meaningfulness and the experience of negative feelings[17]. There was also a relationship between the sex of the respondents in the type of experienced emotions. In the case of experiencing positive reactions, the predictor of male gender was significant, while in the case of negative reactions - female gender. Attention is drawn to the need to be critical, due to the numerical advantage of women who participated in the study, which is characteristic of internet research, and which significantly limits the possibility of generalizing the results.

Although every effort has been made to maintain the methodological correctness, the presented study also has its limitations. There are doubts about the possibility of generalizing the research results for the entire Polish population. This is due to the small size of the study group and the selection of the sample. All test persons were students, which significantly limits the possibility of relating the obtained results to the entire population of young adults. Extending the study group to cut the population of young people and including a larger number of men would allow to provide more precise data, which in turn could allow for the generalization of the results obtained.

Moreover, the measured variables were assessed with the use of self-report, despite the existence of research tools for objective and reliable measurement of variables such as emotions. The obtained results could also be influenced by the mood manifested at the time of filling in the form or the current level of self-esteem, contributing to positive or negative assessments of the features that make up the variable which is resilience. The study was based on a correlation model that allows to show only significant relationships between. However, the results show that despite significant limitations, the obtained results show the importance of internal factors such as coherence and resilience and the type of affect experienced.

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