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Research Article

Psychological Immune Competence as a Mediator Between Perceived Stress and Mood: A Pandemic Perspective

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ABSTRACT

This research examined the effects of perceived stress on general mood mediated by psychological immune competence during the COVID-19 pandemic. In a sample of 581 participants from Serbia (75.7% female), an instrument set was applied comprising the Psychological Immune Competence Inventory (PICI), the Brief Mood Introspection Scale (BMIS), and the Perceived Stress Scale (PSS-10). The results of the mediation analysis revealed that the relationship between perceived stress and general mood was significantly shaped by emotion control and social mobilizing capacity as aspects of psychological immune competence. These aspects had a protective role in general mood, with the perceived stress level compromising the role of emotion control but supporting the role of social mobilizing capacity. The obtained findings can aid the development of psychological interventions aimed at enhancing psychological immune competence and, consequently, improving mental health and building the capacity for more functional coping in crisis situations.

Keywords: perceived stress, psychological immune competence, mood, COVID-19 pandemic

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Introduction

The initial waves of the COVID-19 pandemic constituted a global public health disaster and a constant threat to people's health and lives. As a response to the pandemic, the Government of the Republic of Serbia declared a state of emergency on March 15, 2020, and introduced a movement ban three days later. Although adherence to certain protective measures was still officially required, the state of emergency ended on May 6. At the height of the pandemic, people's everyday lives changed drastically: movement bans of varying severity were introduced (e.g., in Serbia, senior citizens were only allowed to leave their homes between the early morning hours of four and seven), schools and universities moved to online learning, safety concerns caused a major shift to remote work, etc. (Agbaria & Mokh, 2022; Park et al., 2021).

Mental Health Consequences of Pandemic Stress

The rapid spread of the virus and the growing number of victims understandably caused global medical concern. Thus far, the numerous studies that have researched the mental health state of the world population have primarily focused on the first several months of the pandemic (Aknin et al., 2022). Although certain countries including the Czech Republic, the USA, and Great Britain initially observed slightly disquieting tendencies in the form of a higher general level of distress and even an increased prevalence of certain mental disorders (Daly et al., 2020; McGinty et al., 2020; Winkler et al., 2021), other countries such as Brazil, Norway, and the Netherlands did not register a significant deterioration of mental health compared to the pre-pandemic period (Brunoni et al., 2021; Knudsen et al., 2021; van der Velden, 2020). The results of a nationally representative study conducted in Serbia did not show an increase in the prevalence of psychopathological disorders, and the observed indicators of depression and anxiety did not reach clinical significance (Marić et al., 2022). Recent longitudinal research has shown that even in countries in which various indicators of compromised mental health were documented at the very beginning of the pandemic, most of the indicators reverted to pre-pandemic levels by mid-2020 (Aknin et al., 2022; Daly & Robinson, 2021; Fancourt et al., 2020).

Apart from focusing on topics highlighting difficulties in psychological functioning during the pandemic, a contribution to understanding the global population's mental health in the context of the COVID-19 crisis has also been made from the perspective of positive psychology. Subjective well-being, most broadly defined as a cognitive and affective evaluation of the quality of life (Diener, 2000), has figured as the main variable of interest in numerous studies on the effect of the pandemic, both in the sense of an evaluation of life satisfaction (the cognitive component) and in the sense of experiencing pleasant and unpleasant emotions and moods (the affective component). The first wave of research on adverse emotional responses to the wide range of pandemic-related stressors predicted an intensification of short-term and long-term emotional reactions, including heightened fear, anxiety, irritability, anger, exhaustion, negative mood, and loneliness (Agbaria & Mokh, 2022; Marić et al., 2021). However, comprehensive systematic analyses of subjective well-being in the pandemic context have highlighted striking incompatibilities between study conclusions. Namely, while the World Happiness Report emphasized the pandemic's toll on negative emotions in the form of significantly higher frequency of negative emotions among the world's population (Helliwell et al., 2021), meta-analyses of longitudinal research have revealed a negligible effect of the pandemic and associated quarantine measures on negative affect and positive psychological functioning (Prati & Mancini, 2021). The results of certain studies conducted in Serbia also suggested that the initial intensification off negative affect in the first wave of the pandemic was followed by a return to previous, baseline values (Barzut et al., 2023; Sadiković et al., 2020).

Stress-Coping Resources – Psychological Immune System

Stress-coping resources refer to intrapsychic, social, and material capital for achieving healthy adaptation even when the perceived stress levels are significantly heightened, that is, when people appraise their life circumstances as unpredictable, uncontrollable, and overloaded (Agbaria & Mokh, 2022; Cohen & Williamson, 1988). The contemporary health psychology expert, Attila Oláh (2005), defined the psychological immune system as a set of personality traits, abilities, and skills that are grouped into cognitive, emotional, behavioral, and environmental dimensions that have the protective function of integrated stress-coping resources (Al-Hamdan et

al., 2021; Móró et al., 2011; Nagy & Nagy, 2016; Oláh, 2005; Takács et al., 2021).

Oláh's complex, multilayered model of the psychological immune system integrates as many as 16 stress-coping resources, several of which were selected for examination in the present research due to their potential to constitute relevant psychic antibodies in coping with pandemic conditions. *Positive Thinking* describes optimistic, success-oriented individuals who expect desirable stress process outcomes even under unfavorable circumstances (Oláh, 2005). Multiple studies have documented optimists' tendency to view different stressors as challenges and not threats, along with their tendency to exhibit fewer signs of distress and generally higher degrees of satisfaction and happiness (Carver et al., 2010; Snyder & Mann Pulvers, 2001).

Sense of Control denotes individuals' tendency to primarily rely on their own skills and abilities in the coping process due to the belief that different life circumstances predominantly depend on them, which further implies that such individuals have a pronounced internal locus of control (Genc, 2021). Empirical research has consistently reported on internals' tendency to interpret stressors more benignly and prevent illness more successfully (Thompson, 2005).

Change and Challenge Orientation pertains to curiosity and enjoyment in unexpected events. This concept describes individuals who commonly interpret unpleasant situations as challenges, readily choose active coping strategies, and perceive every stress process outcome as a precious benefit to be added to their arsenal of useful life experiences (Oláh, 2005).

Persons with highly developed *Self-Efficacy* deeply believe in their possession of the abilities necessary to achieve the set goals. They successfully choose and implement adequate coping strategies (Genc, 2021). Relevant research has shown that the frequency of experiencing positive and negative moods depends on the degree of Self-Efficacy (Joie-La Marle et al., 2021).

Social Mobilizing Capacity describes individuals who are open to interpersonal contact, possess highly developed communication skills, and show satisfaction with their social network (Jaiswal et al., 2020). These qualities contribute to the tendency to rely on the strengths of others in

stressful situations, that is, successfully use social support as an external stress-coping resource and a form of interpersonal capital (Kaur & Som, 2020). Findings suggest that adequately provided and received social support has significant psychological and health benefits, including more common and intense pleasant emotions, more effective coping with a wide range of stressors, and a lower overall distress level (Batenburg & Das, 2014; Bodie et al., 2011).

Emotion Control refers to the ability to regulate unpleasant emotions. Persons in whom this psychological immune system component is underdeveloped often experience more unpleasant emotions. For instance, they can be more prone to feeling worried, anxious, irritable, and upset. It appears that their tendency to frequently experience such affective states becomes particularly conspicuous in tense and potentially threatening situations, and a pandemic certainly encompasses an entire array of threatening stressors (Oláh, 2005).

The results of several empirical studies obtained thus far seem promising, indicating that high psychological immune competence significantly positively correlates with subjective well-being dimensions such as life satisfaction, purpose in life, and personal growth (Gombor, 2009; Hullám et al., 2006; Jaiswal et al., 2020; Kaur & Som, 2020; Oláh et al., 2010; Shapan & Ahmed, 2020; Voitkáné, 2004). To the best of our knowledge, the components of the psychological immune system have not been empirically researched in relation to positive and negative moods as potential indicators of subjective well-being. Thus, the present research addressed the question of whether previously described psychic antibodies mediate the relationship between perceived stress and general mood as indicators of the affective component of subjective well-being in the context of pandemic stress.

Method

Sample and Procedure

The sample comprised 581 respondents (75.7% female) from Serbia aged between 19 and 75 years, with an average age of 38.74 years (*SD* = 10.48). Most respondents lived with someone in the household at the time of the pandemic (83.7%) and more than half of them (53.6%) knew someone

with a coronavirus infection. All respondents participated voluntarily and anonymously and provided informed consent in compliance with the ethical guidelines for psychological research. Using Google Forms, the data were gathered online during April and May 2020 as part of a larger study. Each participant spent roughly 30 minutes filling out the questionnaires. The research has been approved by the Institutional Ethics Committee (http://psihologija.ff.uns.ac.rs/etika/?odobreno=202004161954_RNmE).

Instruments

Perceived Stress Scale (PSS-10)

The PSS-10 (Cohen & Williamson, 1988) is a 10-item self-report scale measuring the perception of unpredictable and uncontrollable stressful life events. Responses are provided on a Likert-type scale ranging from 0 (*never*) to 4 (*very often*). The sum of the 10 items can be used to determine the overall perceived stress score (for details, v. Cohen & Williamson, 1988). We modified the response instructions to limit the perceived stress evaluation to the period of the COVID-19 pandemic (e.g., *How often have you been nervous and stressed since the start of the pandemic?*). The measure's overall reliability was .83.

Brief Mood Introspection Scale (BMIS)

The BMIS scale (Mayer & Gaschke, 1988) is an open-source mood scale comprising 16 mood-adjectives. The scale can yield measures of overall pleasant-unpleasant mood and arousal-calm mood. It can also be scored according to positive-tired and negative-calm mood. Responses are provided on a Likert-type scale ranging from 1 (*definitely do not feel*) to 4 (*definitely feel*). In this research, we used the inverse scale scoring to obtain the overall pleasant-unpleasant mood, with a higher total score indicating a higher level of pleasantness. We also modified the instructions to address the COVID-19 pandemic *(Circle the response on the scale that indicates how well each adjective – tired, sad, lively, happy, etc. describes your mood during the pandemic.)*. Namely, in the present research, the frequency of different moods was assessed over a longer time period (from the state of emergency declaration until the time of the research), which provided insights into the

affective component of respondents' subjective well-being (Diener et al., 1999). The overall reliability of the BMIS was .86.

Psychological Immune Competence Inventory (PICI)

The PICI (Oláh, 2005) measures the level of psychological immune competence using 80 items. We selected 30 items measuring six subscales of this inventory. Positive Thinking (e.g., *I enjoy thinking about the future*; α = .79) refers to the tendency to expect a positive or favorable outcome even in the most difficult stressful conditions. Change and Challenge Orientation (e.g., *I'm mostly looking for new challenges*; α = .83) is described as sensitivity to novelty and immediate enjoyment of the moment. Emotion Control (e.g., reverse *I get easily annoyed when I make a mistake*; α = .77) pertains to the ability to regulate unpleasant emotions. Social Mobilizing Capacity (e.g., *Among the people I know, there are many who I can certainly rely on*; α = .79) involves managing other people and getting appropriate support from others. Self-Efficacy (e.g., *I successfully achieve the goals I set for myself*; α = .70) refers to one's belief in being able to successfully perform all actions necessary to achieve a goal. Finally, Sense of Control (e.g., *In my experience, success is the result of good planning*; α = .61) refers to people's belief that they can influence the events in their lives. Responses are provided on a Likert-type scale ranging from 1 (*completely disagree*) to 4 (*completely agree*).

Results

Descriptive Statistics and Correlations Between Measures

The most pronounced dimension of psychological immune competence was Positive Thinking, followed by Social Mobilizing Capacity (Table 1). On the other hand, Emotion Control and Self-Efficacy were the least pronounced dimensions. All the PICI dimensions, as well as the general PICI measure, were significantly more expressed compared to the assumed theoretical values, as indicated by the one-sample t-test. The same applies to perceived stress and general mood. All measures were normally distributed, according to the guidelines proposed by Tabachnick & Fidell (2021).

Table 1

Descriptive Statistics of Perceived Stress, General Mood, and Psychological Immune Competence Dimensions

	M	*SD*	*Skewness*	*Kurtosis*	Min	Max	*t*
Perceived Stress	2.13	0.44	-0.15	1.46	0.00	3.70	7.26**
General Mood	2.60	0.29	-0.09	1.26	1.56	3.94	7.99**
Positive Thinking	3.17	0.58	-0.81	0.63	1.20	4.00	27.83**
Change and Challenge Orientation	2.84	0.53	-0.44	0.57	1.00	4.00	15.32**
Emotion Control	2.59	0.50	-0.14	-0.31	1.20	4.00	4.44**
Social Mobilizing Capacity	3.04	0.62	-0.51	0.01	1.20	4.00	21.16**
Self-Efficacy	2.77	0.38	-0.37	0.53	1.20	4.00	17.26**
Sense of Control	2.97	0.46	-0.52	1.09	1.00	4.00	24.34**
PICI Total Score	2.90	0.34	-0.42	0.60	1.70	3.77	28.77**

Note. t – t-test value; ** $p < .01$.

Correlations between general mood and all dimensions of psychological immune competence were significant and positive (Table 2). Conversely, perceived stress showed significant and positive relations with Social Mobilizing Capacity and Sense of Control, but it correlated negatively with Emotion Control. The intercorrelation between perceived stress and general mood was also significant and negative. The general PICI measure did not significantly correlate with either general mood (r = 0.01, p = .76) or perceived stress (r = -0.01, p = .88).

Table 2

Correlations Between Perceived Stress, General Mood, and Psychological Immune Competence

	1	2	3	4	5	6	7
(1) Perceived Stress	-						
(2) General Mood	-.27**	-					
(3) Positive Thinking	.01	.52**	-				
(4) Change and Challenge Orientation	.03	.33**	.55**	-			
(5) Emotion Control	-.30**	.46**	.29**	.12**	-		
(6) Social Mobilizing Capacity	.12**	.28**	.44**	.35**	.07	-	
(7) Self-Efficacy	-.04	.35**	.45**	.40**	.20**	.30**	-
(8) Sense of Control	.12**	.21**	.34**	.40**	-.01	.33**	.39**

Note. ** $p < .01$.

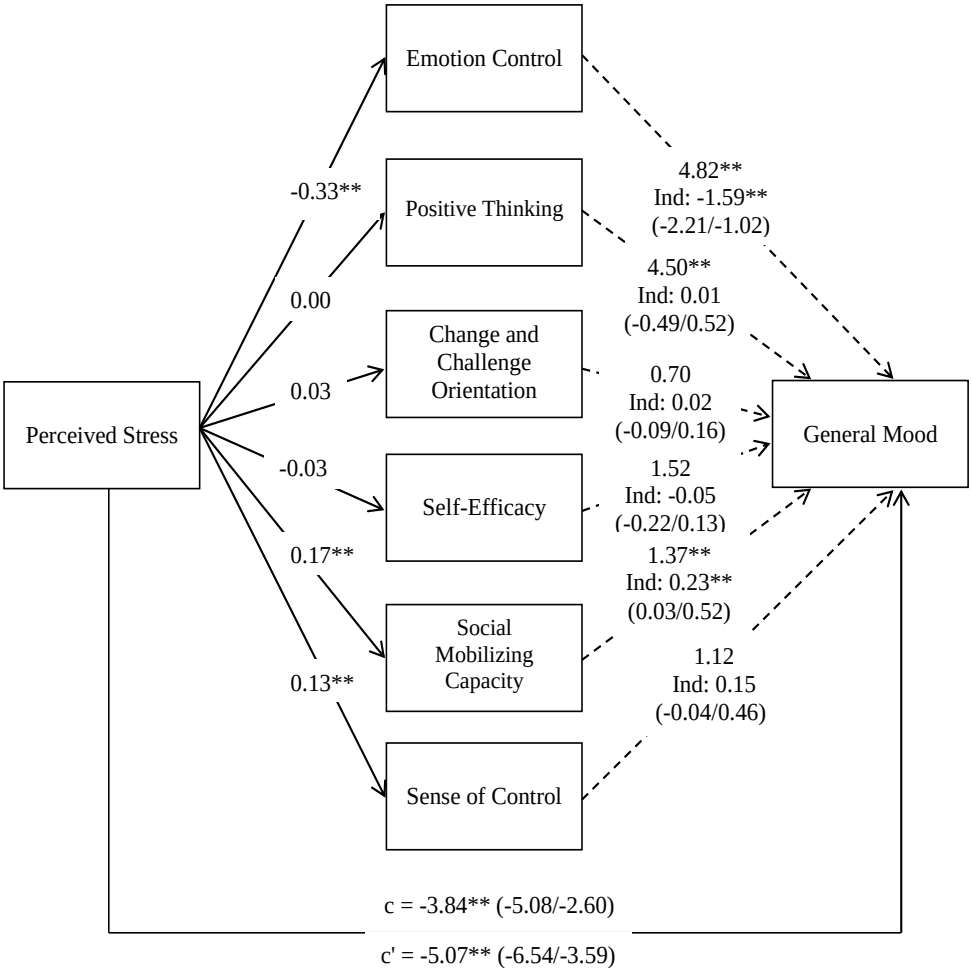
Psychological Immune Competence as a Mediator in the Relation Between Perceived Stress and General Mood

The data were analyzed using the PROCESS macro for SPSS (Hayes, 2017), which serves to determine multiple simultaneous mediations between variables. This method allows for (1) an analysis of the total indirect effect – the joint effect of all mediation variables included in the research, and (2) an analysis of specific indirect effects, the effect of each mediator separately. More precisely, this method enables the examination of the total effect of the predictor variable on the criterion variable (c'), the direct effect of the predictor variable on the criterion variable when controlling for mediators (c), and the indirect effect, that is, the individual effect of each mediator (ab). In addition to the simultaneous inclusion of a larger number of mediators in the analysis, this procedure also covers the bootstrapping method for calculating the confidence interval of the indirect effect. The lower confidence interval coefficient (LLCI) represents the lowest value of the indirect effect (ab), and the upper confidence interval coefficient (ULCI) represents the highest value. To detect a significant mediation effect, the

condition of significant relations between the predictor and the mediator (a) as well as the mediator and the criterion (b) must be satisfied. Likewise, the LLCI-ULCI range should not contain zero value. The results of the multiple mediation analysis are presented in Figure 1.

Figure 1

Multiple Mediation Analysis Results with General Mood as the Dependent Variable



Note. c – direct effect; c' – total effect; Ind – indirect effect; LLCI and ULCI are presented in parenthesis. ** $p < .01$.

Emotion Control and Social Mobilizing Capacity emerged as significant PICI mediators. Perceived stress reduced Emotion Control but increased Social Mobilizing Capacity. On the other hand, the general mood was positively affected by Emotion Control and Social Mobilizing Capacity and negatively affected by perceived stress. Therefore, both PICI scales had a protective role in the relationship between perceived stress and general mood, with perceived stress compromising the role of Emotion Control and facilitating the role of Social Mobilizing Capacity. Perceived stress did not significantly correlate with the general PICI measure, β = .01, *SE* = .03, *t* = -0.15, *p* = .79, 95% CI [−0.07, 0.06]; and the general PICI measure did not have a significant mediator role in the relation between perceived stress and general mood, β = .00, 95% CI [−0.07, 0.06].

Discussion

Relations Between Perceived Pandemic Stress and General Mood

The evaluation of the stressogenicity of life circumstances during the first wave of the COVID-19 pandemic correlated negatively with general mood during the state of emergency in Serbia. This relationship between the variables was observed both at the bivariate correlation level and the level of direct predictor effect on the criterion, controlling for mediators. The established relationships between perceived stress and the affective component of subjective well-being can be explained via the concept of subjective evaluation of stressful events, which constitutes the cornerstone of the transactional stress model (Lazarus & Folkman, 2004). Namely, the theoretical foundation for the construction of the PSS-10 (Cohen & Williamson, 1988) lies in the transactional belief that stress constitutes individuals' assessment that an aspect of their surroundings is threatening or otherwise challenging and that their coping resources are insufficient under such circumstances (Lazarus & Folkman, 2004). The PSS-10 encompasses both the evaluation of the severity of the stressful situation (primary cognitive appraisal) and the assessment of the available stress-coping resources (secondary cognitive appraisal) (Cohen et al., 1983). Hence, the obtained results on the negative association between perceived stress and general mood align with studies in which evaluating pandemic circumstances as highly threatening correlated with lower positive and higher negative affect,

while evaluating personal control of events as high correlated with higher positive and lower negative affect in the context of the pandemic (Zacher & Rudolf, 2021). Similarly, in studies exploring cognitive appraisals and psychological distress in the context of the H1N1 pandemic in 2009, higher appraisals of the threat and uncontrollability of the pandemic circumstances led to an increase in anxiety levels (Taha et al., 2014).

However, the mean values showed that general mood was significantly more pleasant compared to the assumed arithmetic mean, indicating that in the weeks leading up to the end of the state of emergency in Serbia, respondents predominantly experienced pleasant moods. This finding is supported by studies reporting that after the initial, pandemic-induced deterioration in the affective component of subjective well-being, in most cases, a return to emotional functioning within baseline subjective well-being occurred by mid-2020 (Ebert et al., 2020; Hagen et al., 2022; Sadiković et al., 2020; Zacher & Rudolph, 2024). Such findings align with the empirically validated assumptions of set-point theory (Cummins & Wooden, 2014) and can be explained by a genetically predetermined set-point of subjective well-being, which is constantly temporarily disturbed and reestablished according to the principle of homeostasis (Bonanno, 2004; Diener et al., 2006). Namely, the aforementioned studies registered a specific recovery pattern during the first wave of the pandemic, within which the initial intensification of negative affect was followed by a gradual decrease in the level of negative emotions and a return to their previous, baseline values, which is a regularity observed even in situations involving significant losses and traumas (Bonnano, 2004). It is entirely possible that the present research, since conducted in the final weeks of the state of emergency, captured a resetting of people's set-point in general mood and a return to the baseline, reflected in the predominant saturation of general mood with a sense of pleasantness.

Mediating Effects of Psychological Immune System Components

Having in mind the colossal scale of the pandemic crisis, evaluations recognizing the pandemic circumstances as highly demanding conditions of low controllability affected general mood via Social Mobilizing Capacity, which constitutes a psychological immune system component

encompassing the ability to establish/deepen relationships with others, successfully use social support as an external stress-coping resource, and leverage interpersonal capital (Kaur & Som, 2020). The discussion of these findings can be taken in at least three directions. Namely, the finding that the perception of pandemic stress intensified Social Mobilizing Capacity and consequently contributed to a more pleasant mood can be most closely linked to the concept of social capital, which is defined as the tendency to establish relationships of trust, solidarity, and reciprocity with members of the social community (Putnam, 2000). A significant number of studies have identified social capital as a crucial resource for overcoming crisis situations as it contributes to a wider and more rapid spread of information within a given community, helping members stay informed about new knowledge, procedures, and threats related to crisis events (Aldrich, 2010). It can further reinforce informal support among community members (Hurlbert et al., 2000) and contribute to a higher level of social responsibility (e.g., in the form of adhering to pandemic prevention measures; Barrios et al., 2021; Ding et al., 2020). Another line of research on interpersonal relations during the pandemic has generated consistent findings on increased social cohesion among community members (Courtet et al., 2020; Tull et al., 2020), with people bridging the social distance by using diverse digital modes of communication (Richter, 2020), which could undoubtedly contribute to stabilizing general mood. Finally, research on the mechanism of homeostasis in the domain of subjective well-being has emphasized the crucial significance of social support as an external attenuator of the effects of negative life events on experiencing positive emotions (Diener & Oishi, 2005), with social resources having a protective role in relation to affective well-being only when the individual is exposed to prominent stressors (Kuhn & Brulé, 2019).The power of the psychological immune system component – Emotion Control – has been shown to decrease with an increasing level of perceived stress, which consequently contributes to more pronounced unpleasant moods. The negative effect of stress on Emotion Control could be explained by the fact that the beginning of the pandemic generated a higher level of distress (Daly & Robinson, 2021), which negatively affected emotion regulation abilities. However, in the final weeks of the state of emergency in Serbia, Emotion Control emerged as a prominent protective factor in relation to general mood, which corresponds to the consistently

replicated finding that adaptation to major stressors is characterized by a specific resilience trajectory that involves a gradual shift from initial distress towards baseline psychological functioning (Hobfoll et al., 2009). These observations are supported by findings indicating that in countries where different indicators of heightened distress were documented at the very beginning of the pandemic, most of the indicators reverted to pre-pandemic levels by mid-2020 (Aknin et al., 2022; Daly & Robinson, 2021; Fancourt et al., 2020). On the other hand, effective Emotion Control positively affected general mood, suggesting that a greater capacity to recover from intense negative emotions, such as feeling worried, anxious, irritable, and upset, contributes to a more conspicuously pleasant general mood. This result aligns with findings indicating that emotion regulation in the form of modifying the intensity and valence of emotional reactions to stress significantly correlates with subjective well-being (Schelhorn et al., 2022).

Conclusion

The main contribution of the present research lies in a more thorough understanding of the mechanism underlying the effect of pandemic stress on affective well-being, along with insights into the mediating role of stress-coping resources from the perspective of a lesser-known theoretical model. Out of the six examined components of the psychological immune system, only two emerged as relevant psychic antibodies in coping with pandemic conditions. Namely, unlike Positive Thinking, Change and Challenge Orientation, Self-Efficacy, and Sense of Control, which are primarily cognitive dimensions, Social Mobilizing Capacity and Emotion Control constitute predominantly emotional aspects of the shield protecting a person's psychic apparatus. Due to the striking differences in the protective potential of various dimensions of psychological immune competence in relation to the abovementioned criterion, the obtained results bring into question the sustainability of Oláh's conception of the dimensions of psychological immune competence as integrated stress-coping resources. Hence, future research should further examine the attenuating effects of diverse components of psychological immune competence to illuminate the validity of their systemic conception.

Regardless of the necessity for further validating the concept of psychological immune competence, the obtained results have significant practical implications for enhancing psychological immunity by raising laypeople's awareness of the importance of social support and social cohesion in crisis situations and implementing psychological interventions aimed at improving the capacity to regulate unpleasant emotions when confronted with prominent stressors undermining affective well-being. Still, the present research is not devoid of methodological limitations, which are reflected in at least two aspects. Firstly, the research employed only one measure of general mood. Hence, caution is required when interpreting the obtained general mood level upon return to emotional functioning within baseline subjective well-being. Namely, in the absence of data on the pre-pandemic general mood level and multiple measurements of this construct in the first wave of the pandemic, it is impossible to confidently assert the existence of a specific recovery pattern based on the principle of homeostasis. The second methodological limitation lies in the inability to clearly differentiate between pandemic-induced stress and the stress caused by strict quarantine measures, which leaves open the question of the primary basis of respondents' perceptions of stress in the context of the pandemic.

Conflict of interest

We have no conflicts of interest to disclose.

Data availability statement

Data used in this paper are available upon a reasonable request.

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