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Coping profiles and their association with psychological functioning: A latent profile analysis of coping strategies during the COVID-19 pandemic

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ABSTRACT

While many adversities affect limited groups of people, the COVID-19 pandemic brought a range of stressors to entire populations. Using a person-centered approach, this study analyzed the most frequent combinations of coping strategies used by general population during the first wave of the pandemic in a sample of 1347 Slovenian adults. Latent profile analysis identified three coping profiles similar to those found in previous studies in specific samples and stressful circumstances: the engaged profile (active coping, planning, acceptance, positive reframing), the disengaged profile (low problem-focused coping, social support, acceptance, positive reframing), and the avoidant profile (substance use, self-blame, humor). Individuals with the engaged profile reported the highest levels of well-being and the lowest levels of ill-being. While individuals with the avoidant profile had the highest levels of anxiety and stress, those with the disengaged profile had the lowest levels of well-being, especially engagement and positive relationships. The results imply the need to distinguish between the two less adaptive coping profiles, as one is characterized by the active use of dysfunctional strategies, and the other by the low use of all strategies, suggesting that psychological interventions should be tailored to these specificities.

1. Introduction

While some coping strategies tend to be more adaptive than others (e.g., Folkman, 2008), their functionality depends on the specifics of the stressful situation (Carver & Connor-Smith, 2010). Past studies trying to determine the adaptiveness of coping relied on three distinct approaches, aimed at identifying correlates of (i) individual coping strategies (e.g., Zacher & Rudolph, 2021), (ii) groups of coping strategies, such as emotion- and problem-focused coping or approach and avoidance coping (e.g., Dawson & Golijani-Moghaddam, 2020), or (iii) combinations of coping strategies used by individuals (e.g., Pété et al., 2021). The latter approach, which fully captures the multidimensionality of the coping construct, is referred to as the person-centered approach (Nicholls et al., 2016).

When facing adversities, people use a combination of different coping strategies (e.g., Skinner et al., 2003), called coping profiles. While studies used different measures of coping strategies, they predominantly revealed three to four coping profiles. Research employing one of the most commonly used measures of coping, i.e. COPE (Carver et al., 1989) and its abbreviated version Brief-COPE (Carver, 1997), which was also used in this study, suggests some common patterns: some people predominantly use a combination of approach-oriented strategies (e.g., active coping, instrumental and emotional support, planning, positive reframing, acceptance), some opt primarily for avoidance strategies (e.g., behavioral disengagement, denial), and some use few strategies at all to cope with life stressors (Aldridge & Roesch, 2008; Doron et al., 2014; Luszczynska et al., 2007; Nielsen & Knardahl, 2014). Other profiles revealed previously were less consistent across studies (e.g., Doron et al., 2014; Herres, 2015; Pété et al., 2021). One previous study investigated coping profiles during the COVID-19 pandemic. Pété et al. (2021) applied Brief-COPE in French athletes and revealed four distinct latent coping profiles, that only partially matched previously reported profiles, possibly due to a different methodology.

Empirical evidence clearly shows that the individuals employing specific coping profiles differ in measures of mental health (e.g., Eisenbarth, 2012). Better psychological outcomes are associated with profiles characterized by frequent use approach-oriented strategies and relative absence of avoidance strategies, while poorest psychological outcomes go along with coping profiles characterized by avoidant coping. However, the efficiency of coping strategies depends, at least in

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part, on the characteristics of a stressful situation. Some of the past studies controlled for these effects by targeting people in specific circumstances, such as athletes (Martinent & Nicolas, 2016), cancer patients (Li et al., 2017), and minority adolescents (Aldridge & Roesch, 2008). However, the COVID-19 outbreak brought on a series of stressors for entire populations. Although specific circumstances of individuals' lives vary extensively also during the pandemic, many stressors related to the COVID-19 infection and associated preventive measures are shared among the population of a country.

This study aimed to determine which combinations of coping strategies the general population adults used during the early stages of the COVID-19 pandemic. Because the exact composition of coping profiles seems to be influenced by the stressful circumstances (e.g., Martinent & Nicolas, 2016) and the pandemic was an unprecedented stressful situation, no hypotheses were set regarding the specific content of coping profiles. In addition to identifying coping profiles, we explored their adaptiveness by comparing their levels of well-being and ill-being. Generally, copers predominantly using approach-oriented strategies seem to have better mental health (e.g., Nielsen & Knardahl, 2014) though the uncertainty and uncontrollability of the pandemic circumstances may pose an obstacle to the efficacy of these strategies. On the other hand, research suggests that using primarily a combination of avoidance strategies may be associated to the least favorable psychological outcomes (e.g., Pété et al., 2021). Finally, this study aspires to augment knowledge about coping profiles in response to a large-scale stressor affecting people worldwide.

2. Method

2.1. Participants and procedure

Data collection began two weeks after the epidemic was declared in Slovenia (March 12th, 2020) and preventive lockdown measures went into effect. Recruitment was open for 23 days (i.e., from March 28th to April 19th, 2020), with most responses received in the first week. The invitation to participate in the online survey was distributed via social media and posted on the National Radio and Television website.

The participants provided informed consent prior to the start of the survey. The final sample included 1347 Slovenian adults aged from 18 to 77 years ($M = 34.6$; $SD = 13.7$), of whom 83.1% were female. In terms of education, 27.7% of participants had a high school degree or lower and 72.3% were students or had at least post-secondary education. The study was approved by the Human Research Ethics Committee (#186-2020).

2.2. Measurement instruments

The study employed previously validated measures, extensively used in studies of coping profiles (e.g., Butler et al., 2016) and research on mental health during this pandemic (e.g., Wąsowicz et al., 2021).

2.2.1. Coping

The brief version of the COPE inventory (Brief-COPE; Carver, 1997) was used to measure 14 coping strategies: active coping, planning, instrumental support, emotional support, self-distraction, venting, behavioral disengagement, positive reinterpretation, denial, acceptance, religion, substance use, humor, and self-blame (2 items each; e.g., *I've been thinking hard about what steps to take*; *I've been giving up trying to deal with it*). Response scale ranged from 0 ('I never do this') to 3 ('I always do this'). Alpha coefficients ranged from 0.59 to 0.93, except for the self-distraction subscale, which was excluded from further analyses due to unacceptable alpha (0.26).

2.2.2. Ill-being

The 21-item Depression Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995) was used to measure levels of depression, anxiety, and stress (7 items each; e.g., *I felt that I had nothing to look forward to*). The total score, representing the overall level of negative emotionality, is calculated as the sum of responses to all items. The items were scored on a scale ranging from 0 ('did not apply to me at all') to 3 ('applied to me very much or most of the time'). The alpha coefficients were 0.90 for depression, 0.83 for anxiety, 0.91 for stress, and 0.94 for the total score.

2.2.3. Well-being

The PERMA Profiler (Butler & Kern, 2016) was used to measure five domains of well-being (3 items each; e.g., *In general, how often do you feel joyful?*): positive emotions, engagement, relationships, meaning, and accomplishment. It is based on a recent model of well-being by Seligman (2018) but captures the same type of well-being as more prominent models (Goodman et al., 2018). The total score is calculated by summing all 15 items. Items were scored on a 7-point scale anchored at variously labelled extremes. The alpha coefficients were 0.84 for positive emotions, 0.63 for engagement, 0.77 for relationships, 0.87 for meaning, 0.77 for accomplishment, and 0.92 for the total score.

2.3. Data analyses

The data were analyzed in M*plus* version 8.6 (Muthén & Muthén, 1998–2017). Latent profile analysis (LPA) was performed using the MLR estimator to identify the optimal number of latent profiles of participants based on 13 coping strategies measured by the Brief-COPE. The plausibility of 1 to 5 latent profile models was examined. The optimal model was selected based on the theoretical support and conceptual interpretability of the profiles, as well as on a review of several statistical indices, including the Akaike information criterion (AIC; Akaike, 1987), Bayesian information criterion (BIC; Schwarz, 1978), sample-adjusted BIC (SABIC; Sclove, 1987), adjusted Lo-Mendel-Rubin likelihood ratio test (aLMRT; Lo et al., 2001), and bootstrap likelihood ratio test (BLRT; McLachlan & Peel, 2000). For AIC, BIC, and SABIC lower values indicate better model fit, and a larger drop in these fit indices between competing models generally suggests stronger support for the model with lower values. aLMRT and BLRT are used to compare nested models with statistical significance indicating that the given model with k profiles is superior to the less parsimonious model with k – 1 profile. Entropy values were also considered (Celeux & Soromenho, 1996). These values can vary between 0 and 1 with higher values representing greater accuracy of classification and values above 0.80 evidencing classification with minimal uncertainty. Finally, the percentage of individuals in the smallest class was considered as a practical criterion, as classes with <5% of the sample may not be replicable in other samples.

Once the optimal latent profile model was identified, a multiple group analysis was performed to examine the differences between the latent profiles in ill-being and well-being. For this purpose, the automatic version of the BCH method (Bakk et al., 2013) implemented in M*plus* was employed, which is a preferred method for continuous and categorical distal outcomes, as it uses observation weights that reflect the measurement error of the latent class variable and in this way accounts for individual uncertainty in profile classification (Asparouhov & Muthén, 2021).

3. Results

3.1. Identification of latent coping profiles

Table 1 presents fit indices of models with increasing number of coping profiles. Based on revision of the fit statistics and substantial and interpretive consideration of various latent profile models, we opted for a three-profile solution. Although the largest drop in AIC, BIC, and SABIC indices is observed for the two-, followed by the four-profile solution, the entropy value for the two-profile solution is below the recommended threshold of 0.80, and the smallest class of the four-, as well as the five-profile solution, contains <5% of the sample. The aLMRT

Table 1
Summary of fit statistics for latent profile models based on 13 coping strategies measured by Brief COPE.

Model	LL	# FP	AIC	BIC	SABIC	Entropy	aLMRT	*p*(aLMRT)	BLRT	*p*(BLRT)	Smallest profile (%)
1 profile	−31,993.01	26	64,038.02	64,173.37	64,090.78						
2 profiles	−31,176.17	40	62,432.33	62,640.56	62,513.49	0.791	1617.66	< 0.001	1633.69	< 0.001	30.2
3 profiles	−30,786.66	54	61,681.33	61,962.43	61,790.90	0.856	771.36	0.350	779.01	< 0.001	15.4
4 profiles	−30,313.32	68	60,762.63	61,116.61	60,900.61	0.904	937.40	< 0.001	946.70	< 0.001	4.0
5 profiles	−30,054.82	82	60,273.63	60,700.49	60,440.01	0.859	511.93	0.002	517.00	< 0.001	4.0

Note. LL – log-likelihood; # FP – number of free parameters; AIC – Akaike information criterion; BIC – Bayesian information criterion; SABIC – sample-adjusted BIC; aLMRT – adjusted Lo-Mendel-Rubin likelihood ratio test; BLRT – bootstrap likelihood ratio test.

suggests that additional profiles improve the fit for all but the three-profile model. However, the BLRT index, which was found to outperform other likelihood ratio tests (e.g., Nylund et al., 2007), informs that one additional profile to each successive model significantly improves fit. While the goodness-of-fit indices were not fully consistent in supporting any particular model, further investigation of the theoretical interpretability and meaningfulness of the various profile solutions supported the decision to retain the three-profile solution, which also had sufficient class membership and a large entropy value.

The patterns of coping strategies that characterize the three coping profiles are shown in Fig. 1. The most numerous first profile contains 57.6% of the participants and can be referred to as the "engaged coping" profile. Although none of the coping strategies stands out strongly compared to the other profiles, this profile is characterized by the predominant use of approach-oriented coping strategies, such as active coping, planning, acceptance, and positive reframing. In contrast, avoidance-oriented coping strategies, especially substance use, are least used by individuals with this profile. The second profile contains 26.9% of individuals and can be described as a "disengaged coping" profile. Individuals in this profile have the lowest scores on most coping strategies compared to the other two profiles, but their scores are particularly low on the approach-oriented strategies of active coping and planning. Their way of coping with the pandemic seems to be primarily through behavioral disengagement and denial. The last, third profile contains 15.4% of the respondents and was labelled an "avoidant coping" profile. Compared to the other two profiles, individuals with this profile use various approach-oriented coping strategies to a moderate extent but stand out for their use of avoidant strategies, such as humor, self-blame, and especially substance use.

3.2. Psychological functioning outcomes of coping profiles

The results of the multiple group analysis of the differences between the three latent profiles in the measures of psychological functioning are presented in Table 2. They showed the lowest scores for ill-being and specifically for depression, anxiety, and stress in the engaged coping profile. The disengaged coping profile had intermediate scores, and the avoidant coping profile had the highest scores for anxiety and stress, but these two profiles did not differ in scores for depression and ill-being. General well-being and all its specific components were highest in the engaged coping profile. The avoidant coping profile had intermediate scores, and the disengaged coping profile had the lowest scores for general well-being and for engagement and relationships. Scores for positive emotions, meaning, and accomplishment did not differ between these two coping profiles.

4. Discussion

The present study employed a person-centered approach to examine coping strategies used during the first wave of the COVID-19 pandemic, not as independent or even mutually exclusive behaviors, but rather as part of an interconnected coping system. Although coping profiles are sensitive to the type of stressors, and the number and types of strategies measured, several studies reported similar combinations of coping strategies within individuals. Three of these common combinations were also identified in our research.

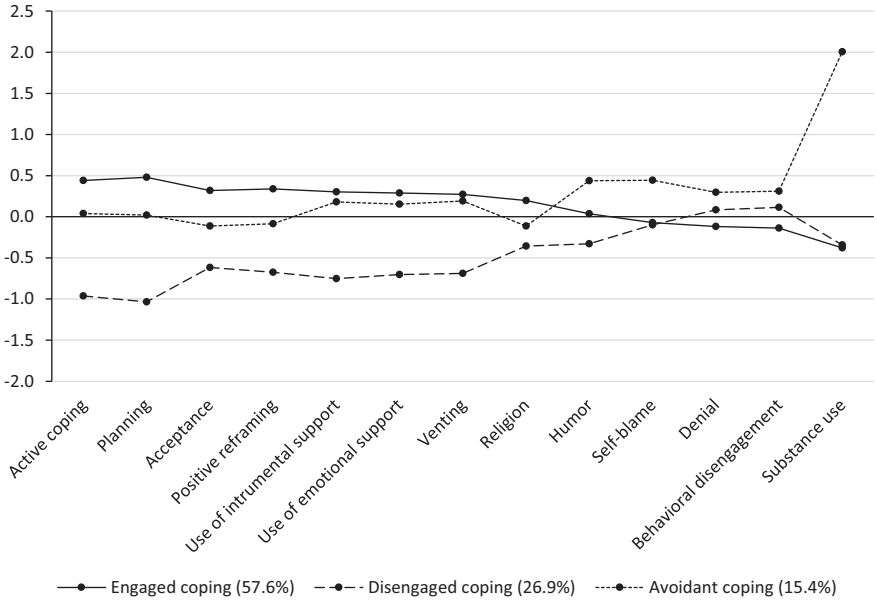

Fig. 1. The three coping profiles characterized by their patterns (mean z-scores) of the 13 coping strategies. Final class proportions based on the most likely latent class membership are specified in parenthesis.

Table 2
Multiple group analysis of the differences between latent profiles in psychological functioning using the BCH method.

	Engaged coping (1)	Disengaged coping (2)	Avoidant coping (3)	Differences between profiles
	M (*SE*)	*M* (*SE*)	*M* (*SE*)	
DASS-21 (ill-being)	12.253 (0.41)	17.726 (0.85)	20.263 (1.00)	1 < 2 = 3
Depression	3.696 (0.15)	6.829 (0.34)	7.293 (0.40)	1 < 2 = 3
Anxiety	2.383 (0.13)	3.269 (0.24)	4.110 (0.32)	1 < 2 < 3
Stress	6.174 (0.18)	7.628 (0.35)	8.861 (0.40)	1 < 2 < 3
PERMA (well-being)	75.423 (0.43)	62.608 (0.92)	65.759 (1.07)	2 < 3 < 1
Positive emotions	13.800 (0.10)	11.626 (0.21)	11.921 (0.24)	2 = 3 < 1
Engagement	14.013 (0.10)	11.965 (0.18)	12.666 (0.23)	2 < 3 < 1
Relationships	14.342 (0.12)	11.618 (0.23)	12.809 (0.24)	2 < 3 < 1
Meaning	14.820 (0.11)	11.861 (0.24)	12.197 (0.30)	2 = 3 < 1
Accomplishment	13.761 (0.09)	11.552 (0.19)	12.130 (0.23)	2 = 3 < 1

Individuals relying predominantly on a combination of approach-oriented strategies were previously labelled engaged copers (Nielsen & Knardahl, 2014), adaptive copers (Butler et al., 2016; Doron et al., 2014), assimilative copers (Luszczynska et al., 2007), or active copers (Aldridge & Roesch, 2008). The most extensive profile in our study, the engaged coping profile, corresponds to this combination. It is characterized by higher active coping, planning, and positive reframing, but also by higher acceptance. As measured by the COPE, acceptance is an active strategy, not a resigned one (Nakamura & Orth, 2005). The decision to accept the situation, learn to live with its demands, and adjust goals is actively made. Although acceptance is not a core strategy in engaged copers (e.g., Nielsen & Knardahl, 2014), it is essential in situations with low personal control, such as terminal illness (e.g., Li et al., 2017), and the COVID-19 pandemic. Certain coping strategies are relatively adaptive regardless of the situation (e.g., Skinner et al., 2003), and several of these are salient in our engaged coping profile. Accordingly, this profile was characterized by the lowest levels of all ill-being indicators and the highest levels of all well-being indicators among all three profiles. In our opinion, a combination of acceptance and approach-oriented coping could foster well-being and prevent ill-being by enabling individuals to effectively manage aspects of the pandemic that can be controlled (e.g., making sure one has necessary supplies at home) and accept those that cannot. However, the causal association could be reversed, i.e. people with better psychological functioning may be better equipped to approach the (pandemic-related) stressors.

Another commonly encountered coping profile characterizes individuals who report using few strategies to cope with stressors, thus they were previously named passive, low copers (Doron et al., 2014; Nielsen & Knardahl, 2014) or disengaged copers (Butler et al., 2016). A quarter of our participants had the most likely membership in the disengaged coping profile, distinguished by low use of all strategies, in particular low levels of planning and active coping. These individuals had higher levels of ill-being than people with the engaged coping profile and the lowest levels of well-being, again suggesting that psychological functioning is related to the strategies individuals use to reduce or adapt to a stressful situation. Our results suggest that it is not uncommon for individuals to passively cope with the uncertain and uncontrollable circumstances of the pandemic, but this is likely to have a detrimental effect on their psychological functioning, possibly because they do not take on at least the controllable aspects. Alternatively, the disengaged coping could be a consequence of poor psychological functioning.

The third commonly revealed coping profile is characterized by elevated use of avoidance strategies, and individuals are described as avoidant (Doron et al., 2014) or disengaged copers (Nielsen & Knardahl, 2014). The avoidant coping profile identified in our study resembles this profile. In comparison to other profiles, this coping profile was characterized by the highest levels of denial and behavioral disengagement, the two most central strategies of avoidant coping (Aldridge & Roesch, 2008; Doron et al., 2014), but also the highest levels of humor, self-blame and especially substance use. Previous studies reported consistent results regarding substance use and self-blame as avoidant strategies (Aldridge & Roesch, 2008; Pété et al., 2021). Conversely, results for humor are mixed as it is sometimes grouped with problem-focused or engaged coping strategies (Butler et al., 2016; Pété et al., 2021) and sometimes with avoidance strategies (Wu & Chan, 2013). Humor styles can be either adaptive or maladaptive (i.e., aggressive, and self-harming humor; Martin et al., 2003), but the humor items in the Brief-COPE may not capture this difference. The humor during the early stages of the COVID-19 pandemic could have been predominantly avoidant and maladaptive, possibly reflecting the uncontrollability and uncertainty of the situation.

Both the avoidant and the disengaged coping profile showed higher levels of ill-being and lower levels of well-being than the engaged coping profile, consistent with previous findings that avoidant strategies do not facilitate adaptive functioning (Hofmann & Hay, 2018). However, compared to disengaged profile, avoidant profile demonstrated higher levels of anxiety and stress but also higher levels of engagement and positive relationships. These differential associations are consistent with the dual continua model (Keyes, 2005), which posits that mental health encompasses the absence of ill-being and the presence of well-being, with the two aspects being related but independent. It appears that disengagement from coping with the pandemic relates to the most reduced well-being but is less detrimental in terms of ill-being symptoms than relying on a combination of avoidance strategies. The characteristic psychological functioning of people most likely to belong to the avoidance coping profile might suggest, that they find various aspects of the pandemic quite disturbing, which leads them to engage in coping, but the chosen avoidance strategies do not seem to be efficient in reducing ill-being symptoms although they are somewhat more efficient than disengagement in preventing reduced well-being. Then again, higher levels of experienced stress and anxiety could promote the use of avoidance strategies.

Regarding the limitations of the study, it is noteworthy that the cross-sectional nature of our study does not allow us to draw causal conclusions. Therefore, longitudinal data would provide more refined conclusions. The predominantly female, well-educated sample from one Central European country might limit the generalizability of the results. However, we used a large, age-heterogeneous sample from the general population, which is relatively rare in stress studies. The results are also limited by the nature of the Brief COPE, which measures coping strategies with only two items each. In addition, the self-distraction subscale was excluded from the present study due to low internal consistency, further limiting the comparability of our results with previous studies. Although LPA is a powerful statistical procedure, it does not guarantee the correct assignment of respondents to classes. However, the BCH method, which was used to study the relationship between coping and ill−/well-being, takes into account individual inaccuracy in profile classification (Asparouhov & Muthén, 2021). Finally, this study examined a brief snapshot of the COVID-19 pandemic, which represents a persistent and evolving stressor for respondents whose coping may have changed over the course of the pandemic.

In summary, our study identified three most common coping profiles during the first wave of the COVID-19 pandemic. With slight specificities, the engaged, disengaged, and avoidant coping profiles were similar to those found in previous studies in different stressful situations (Aldridge & Roesch, 2008; Doron et al., 2014; Luszczynska et al., 2007;

Nielsen & Knardahl, 2014). A combination of approach-oriented strategies along with acceptance proved to be the most adaptive during the pandemic. In addition, our study highlighted the importance of distinguishing between specific less adaptive coping patterns, as the avoidant and disengaged profile showed differential links with well-being and ill-being. Although both of these profiles emerged in previous research, they were rarely revealed simultaneously within the same study (but see Aldridge & Roesch, 2008; Doron et al., 2014). The differentiation between less adaptive copers has important implications for public health and counselling practice. Specifically, our results indicate that disengaged and avoidant copers would likely require adapted interventions. For example, disengaged copers may benefit from interventions focused on their passiveness, which is reflected in low use of all coping strategies, and in low engagement as a facet of well-being. Another well-being facet that is low among disengaged individuals is satisfaction with relationships, which could be a cause or a consequence of low use of social support, thus interpersonal relationships could be another focus of interventions for disengaged copers. On the other hand, avoidant individuals do cope with stress, but their coping is focused on feeling better by avoiding problems. Therefore, through adequately tailored interventions they could gain understanding of their coping profile, its mechanisms and negative consequences, and learn more adaptive coping.

Although the specific circumstances of the pandemic may vary drastically at the individual and country level, many stressors associated with the pandemic were universal and shared by people around the world. Therefore, one might expect to replicate our findings in other countries, which would provide further insight into the trans-situational consistency of combinations of coping strategies and their adaptiveness. Our findings on the functionality of coping profiles are important as we come to understand how to cope with the pandemic and learn to live with the virus over the next number of years. Furthermore, they add to the knowledge on naturally occurring combinations of coping strategies employed in response to large scale stressors.

CRediT authorship contribution statement

All authors have equally and fully participated in all parts of the research and writing process.

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