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What can we learn from gritty persons? Coping strategies adopted during COVID-19 lockdown

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Abstract

Social isolation and the loss of control associated with the COVID-19 lockdown led to elevated levels of perceived stress in many countries. The present study examines the effectiveness of 13 different coping strategies (SVF-78) and the personality trait grit (Grit-S) on perceptions of stress (PSS-10) in 438 participants (362 women, M_{age} = 33.45 years, SD = 12.48) from the second to third week of lockdown. A structural equation model showed that coping strategies acted as a complete mediator of the relationship between grit and perceived stress, indicating that grit does not directly affect perceived stress but that people with higher levels of grit choose more effective coping strategies and that results in lower perceived stress. Overall, active emotion-focused strategies such as minimization and positive self-instruction were associated with lower levels of helplessness and a higher self-efficacy to cope with stress. Taking into account the different ways participants adopted coping strategies and relied upon grit, non-hierarchical clustering identified four specific profiles: gritty persons, easy-goers, avoiders, and people feeling powerless. The implications for each group are discussed.

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1. Introduction

The outbreak of COVID-19 led many countries to introduce social distancing measures and a period of lockdown (Di Giacomo, 2020; WHO, 2020) linked with elevated stress levels among the population (Casagrande et al., 2020; Mazza et al., 2020; Ozamiz-Etxebarria et al., 2020; Wang et al., 2020b). Natural disasters and pandemics are thought to be normatively stressful for all the

inhabitants in the affected areas and have a broad range of physiological and psychological effects. The evidence from the SARS, MERS and COVID-19 outbreaks indicates that people experiencing lockdown or social isolation suffer from higher perceived stress levels, depression, anxiety, posttraumatic stress disorder (PTSD), and related mental health problems (e.g., sleeping difficulties; Ammar et al., 2020; Chatterjee & Chauhan, 2020; Chew et al., 2020; Hossain et al., 2020; Röhr et al., 2020). Typically, the prevalence of these symptoms is related to younger inhabitants and lower level of education (Chatterjee & Chauhan, 2020; Filgueiras & Stults-Kolehmainen, in press; Mazza et al., 2020; Mustafa, 2020).

During the COVID-19 pandemic, severity of symptoms has depended on the duration of lockdown, with perceived stress and anxiety levels increasing consistently over the first two weeks and falling thereafter. However, the decline was not found to be clinically significant owing to the fact that the severity of symptoms was still high (Vicario-Merino & Muñoz-Agustin, 2020; Wang et al., 2020b). This is to be expected as after the initial alarm reaction individuals experience on encountering the stressor, they are generally capable of adapting or employing different coping strategies to reduce the impact of stressful events (Larzelere & Jones, 2008). However, if the stressor is extremely intense or persists, the organism enters a state of exhaustion (Selye, 1976) or allostatic overload (McEwen & Wingfield, 2003), which leads to severe physiological and psychological changes, such as immunosuppression, alterations in the circuitry of the hippocampus, amygdala, and prefrontal cortex, connected with mood and anxiety disorders (McEwen, 2005). To avoid these negative consequences, it is vital to identify the effective and ineffective coping strategies adopted by people living under lockdown, identify the individuals using ineffective ones and offer them interventions that address their specific needs (Settineri & Merlo, 2020b).

1.1 Coping

During adulthood, people improve their coping strategies so they can adapt to everyday stressors (Selye, 1976). However, adapting in order to cope with unpredictable events in the environment (e.g., natural disasters) and disease outbreaks is not the same as adapting to ordinary daily life situations, as these are superimposed on our daily routines (McEwen, 2005). Notably, since COVID-19 outbreak, lockdowns and social isolation have increased the feeling of being trapped and not in control (Chatterjee & Chauhan, 2020) having two basic implications for everyday life.

Firstly, lockdown prevents people from engaging in face-to-face contact (Polizzi et al., 2020) and the absence of social contact has been negatively correlated to mental wellbeing (Amman et al., 2020). This can be especially alarming for young people (Chew et al., 2020) and members of cultures in which social support (e.g., talking with peers, family members, or colleagues) is the basic coping mechanism (e.g., Spanish or Italian culture; see Polizzi et al., 2020; Vicario-Merino & Muñoz-Agustin, 2020).

Secondly, the perceived uncontrollability of stressful events triggers higher stress levels and negatively affects emotional wellbeing (Lazarus & Folkman, 1984; Ruggiero et al., 2003). This is why reinstating or creating personal (e.g., cooking, physical exercise, time spent with family) and professional (e.g., time schedules) daily routines has been found to decrease the salience of uncertainty related to pandemic and increase the salience of controllability, enhancing the ability to cope with stress (Burtscher et al., 2020; Filgueiras & Stults-Kolehmainen, in press; Vicario-Merino & Muñoz-Agustin, 2020). In other words, the more people feel able to control a situation, the better they can cope with it (Vinkers et al., 2020). Furthermore, the perceived ability to control oneself and one's situation has been correlated with the use of problem-solving strategies (Chew et al., 2020). However, problem-solving coping strategies are aimed at removing or reducing the stressor and so are not fully applicable in natural disasters or disease outbreaks. In these situations, active emotion-focused strategies (e.g., minimization or positive self-instruction) that enable the person to preserve positive self-esteem are more common (Lazarus & Folkman, 1984). On the other hand, passive emotion-focused coping strategies (e.g., persistently thinking about the situation, resignation, crying) have been used by people with higher levels of perceived stress (López-Vázquez & Marván, 2003).

In order to understand the coping strategies adopted by different individuals, it may be beneficial to examine underlying factors (e.g., personality traits). During the COVID-19 lockdown, having long-term goals was found to be beneficial in dealing with fear and anxiety (Polizzi et al., 2020), this study therefore examines the role played by the personality trait grit, defined as perseverance and a passion for long-term goals (Duckworth et al., 2007).

1.2 Grit

Grit is typically understood as a higher-order construct with two facets: *perseverance of effort* and *consistency of interest*. These two facets refer to the tendency to work hard for extended lengths of time even in the face of setbacks and without frequently changing goals and interests (Credé et al., 2017). Grit is usually associated with enhanced performance, especially in harsh learning and working environments (Duckworth et al., 2007).

However, extensive meta-analysis conducted by Credé and colleagues (2017) found only a weak link between grit and performance (ϱ between .08 and .21), yet discovered that grit was a medium-to-strong predictor of mental toughness (ϱ = .46), self-control (ϱ = .72) and depression (ϱ = -.48). Research findings show that the relationship between grit and perceived stress level is consistent across populations (r between .22 and .40); however, the connection between grit and use of coping strategies had not been addressed (Lee, 2017; O'Neal et al., 2016; Wong et al., 2018; Zhang et al., 2018), leaving a knowledge gap in our understanding of the relationship between grit, coping strategies, and perceived stress.

1.3 The present study

Previous research has provided a substantial amount of information about life experiences under the COVID-19 lockdown, identifying loss of control and loss of social contact as the two major causes of higher perceived stress levels (Chatterjee & Chauhan, 2020; Vinkers et al., 2020; Wang et al., 2020a). But there has been no systematic evaluation of the effectiveness of coping strategies, nor any discussion of underlying factors that could potentially be beneficial.

The present study therefore examined the effect of thirteen coping strategies on perceived levels of stress during the second and third weeks of lockdown. Moreover, the relationship between a non-cognitive personality trait (grit) and coping strategies and stress levels was tested. Since gritty persons alter their behavior in difficult situations (Duckworth et al., 2007) and relationship between grit and perceived stress was established in previous research (Lee, 2017), the coping strategies were hypothesized to mediate the relationship between grit and perceived stress (Hypothesis 1), or, in other words, it was assumed that people with different levels of grit adopted different coping strategies.

Furthermore, Selye (1976) pointed out that people may react differently even when the degree and agents of stress are the same. The second aim of the present study was therefore to identify different clusters of people with similar profiles. Therefore, we hypothesized that there will be participants with different combinations of levels of grit and coping strategies (Hypothesis 2). Identifying these profiles may provide us with an appropriate starting point for designing personalized, targeted assistance for the most vulnerable groups of people under lockdown.

2. Methods

2.1 Participants

The a priori sample size calculation for a structural equation model with five latent (grit, perceived stress, positive, negative and overall coping strategies) and fifteen observed variables

(separate questionnaire scales) was calculated for $a = .05$, $\beta = .20$ and detectable effect size $r = .20$. The desired sample size was 376 participants.

The data collection took place between the second and third week of the COVID-19 lockdown. The sample of 438 volunteers (76 men and 362 women) with a mean age of 33.45 years ($SD = 12.48$) was recruited via the university website. The sample consisted of 130 students, 137 helping professionals and scientists, and 171 other professionals. Expedited ethics approval was obtained from the Ethical Committee of the Institute for Research in Social Communication, Slovak Academy of Sciences, in accordance with the principles set out in the Declaration of Helsinki. There were no missing data cases.

2.2 Measures

2.2.1 Stress. The standardized Czech version (Brabcova & Kohout, 2018) of the Perceived Stress Scale (PSS-10; Cohen & Williamson, 1988) was used as a measure of stress. PSS-10 is a self-report questionnaire consisting of 10 items assessing how uncontrollable and unpredictable respondents find their lives and their perceived ability to cope with that. Participants were instructed to indicate on a 5-point Likert scale, ranging from 0 (never) to 4 (very often), how they felt and how they reacted since the beginning of the COVID-19 outbreak. PSS-10 consists of six positively formulated items (*perceived self-efficacy* scale) and four negatively formulated items (*perceived helplessness* scale). The confirmatory factorial analysis (CFA) indicated the questionnaire had excellent internal consistency, $\chi^2(30, 438) = 39.413$, $p = .117$, CFI = .994, RMSEA = .027, SRMR = .022.

2.2.2 Coping strategies. The standardized Czech version of the Stress Coping Style Questionnaire (SVF-78; Janke & Erdmann, 2003) was used as a measure of coping strategies. Participants were instructed to indicate for each of the items how likely they were to have reacted in that way when disturbed, irritated or upset since the beginning of the COVID-19 outbreak. The inventory contains 78 items rated on a 5-point Likert scale, ranging from 0 (not at all) to 4 (very likely), and contains 13 scales (see Table 1 for description). Scales 1 to 7 are considered to be positive coping strategies, scales 8 to 9 are considered to be rarely used coping strategies, and scales 10 to 13 to be negative coping strategies. The fit indices indicated acceptable internal consistency of the instrument, $\chi^2(2513, 438) = 4458.723$, $p < .001$, CFI = .883, RMSEA = .042, SRMR = .069.

Table 1. Description of coping strategies contained in the Stress Coping Style Questionnaire (SVF-78).

	Description	Example	Solution v. Emotion	Active v. Passive
(+) Minimization	Reduce intensity, duration or importance of stress.	I tell myself that I take it easier than others in this situation.	emotion	active
(+) Guilt denial	Acknowledge not to be personally responsible for the situation.	I don't think I am responsible for the situation.	emotion	active
(+) Dist. from situation	Self-distract by doing something unrelated to stressor.	I try to distract myself.	emotion	active
(+) Subst. satisfaction	Self-distract by buying things or eating food.	I buy myself something I've been wanting for a long time.	emotion	active
(+) Situation control	Analyze the situation, plan actions, and act to exert control and solve problems.	I plan how to solve the difficulties involved.	solution	active
(+) Reaction control	Bring or keep one's reactions under control.	I tell myself I must not lose my temper.	emotion	active
(+) Pos. self-instruction	Promote self-competence and the ability to exert control.	I tell myself that I can cope with this.	emotion	active
(r) Need for soc. support	Look for somebody to talk to, for social support and help.	I try to talk with someone about the problem.	emotion	active
(r) Active avoidance	Try to understand the causes of the problem in order to avoid it in the future.	I find a solution and avoid such situations in the future.	solution	active
(-) Flight tendency	Tendency to escape from stressor without resolution.	I tend to run away from the situation.	emotion	active
(-) Rumination	Persistently thinking about stressor.	I keep thinking about the situation for a long time afterwards.	emotion	passive
(-) Resignation	Giving up, with feelings of helplessness and hopelessness.	I feel powerless.	emotion	passive
(-) Self-accusation	Attribute stress to one's own mistakes.	I blame myself.	emotion	passive

Note. Based on Janke & Erdmann, 2003; Natovová & Chýlová, 2012; Weyers et al., 2005.
(+) refers to positive coping strategies; (r) refers to rarely used coping strategies; (-) refers to negative coping strategies.

2.2.3 Grit. The Short Grit Scale (Grit-S; Duckworth & Quinn, 2009), standardized Czech version (Kropacova et al., 2018), was used as a measure of grit. Grit-S consists of 10 items and two scales (*consistency of interest* and *perseverance of effort*). Each item is rated on a 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). The internal consistency of the

questionnaire was excellent, $\chi^2(17, 438) = 21.875$, $p = .190$, CFI = .994, RMSEA = .026; SRMR = .032.

2.3 Assumptions of mediation model. Following the procedure used by Baron and Kenny (1986), the individual relationships between independent (grit), mediator (coping strategies) and dependent variable (perceived stress) were tested in separate steps. The regression path between grit and perceived stress was significant ($\beta = -.418$, $SE = .103$, $p < .001$), as was the regression path between grit and coping strategies ($\beta = .866$, $SE = .079$, $p < .001$), and coping strategies and perceived stress ($\beta = -.562$, $SE = .720$, $p < .001$, controlling for the relationship between grit and perceived stress). All the assumptions for the mediation model were met.

2.4 Structural equation model (SEM). The hypothesized mediation model included latent variables of grit (consisting of two scales of Grit-S) as the independent variable, coping strategies (consisting of 7 positive coping strategies and 4 negative coping strategies from SVF-78) as the mediator variable, and perceived stress (consisting of two scales of PSS-10) as the dependent variable. The fit indices for the model, $\chi^2(69, 438) = 205.134$, $p < .001$, CFI = .953, RMSEA = .067, SRMR = .060, indicated good fit. Mediation model was calculated in IBM SPSS Amos 26.

2.5 Clustering. Non-hierarchical clustering with automatic cluster detection was employed to examine the participants' profiles. Log-likelihood was used as the distance measure and Schwarz's Bayesian Criterion (BIC) as the clustering criterion. Standardized scores (*T*-scores) from fifteen scales (Grit-S, SVF-78) were used as the continuous variables, resulting in four separate clusters described in Table 3 and visualized in Figure 2. The average silhouette measure was .20 indicating acceptable separation of clusters. Non-hierarchical clustering was performed in IBM SPSS 27.

3. Results

The preliminary analyses of the linear correlations in Table 2 showed significant relationships between measures of grit, coping strategies, and perceived stress. People who were more consistent in their interests used more positive coping strategies ($r = .308$, $p < .001$), fewer negative coping strategies ($r = -.357$, $p < .001$), and considered themselves less helpless ($r = -.268$, $p < .001$) and more self-efficient ($r = .220$, $p < .001$). The results were similar for people more perseverant in their efforts: they used more positive coping strategies ($r = .424$, $p < .001$), fewer negative coping strategies ($r = -.342$, $p < .001$), considered themselves less helpless ($r = -.165$, $p < .001$) and more self-efficient ($r = .205$, $p < .001$).

Table 2. Descriptive statistics, linear correlations and Cronbach's alphas for questionnaires.

	M (SD)	Skew	Kurt	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PSS-10																						
1. Helplessness	2.19 (0.89)	-.069	-.677	1																		
2. Self-efficacy	2.12 (0.73)	-.068	-.349	-.697***	1																	
Grit-S																						
3. Consistency of interest	2.90 (0.84)	.194	-.711	-.268***	.220***	1																
4. Perseverance of effort	3.67 (0.76)	-.279	-.301	-.165***	.205***	.445***	1															
SVF-78																						
5. (+) Minimization	11.74 (5.73)	.151	-.588	-.327***	.420***	.242***	.362***	1														
6. (+) Guilt denial	12.66 (5.11)	-.083	-.310	-.079	.113*	.229***	.228***	.400***	1													
7. (+) Dist. from situation	15.22 (4.27)	-.193	-.122	.015	.044	.125**	.249***	.263***	.305***	1												
8. (+) Subst. satisfaction	13.86 (5.23)	-.232	-.332	.074	-.025	.013	.083	.175***	.304***	.403***	1											
9. (+) Situation control	16.50 (4.33)	-.198	-.467	-.070	.208***	.238***	.349***	.283***	.175***	.175***	.066	1										
10. (+) Reaction control	16.12 (4.07)	-.282	-.005	-.024	.096*	.256***	.295***	.386***	.354***	.439***	.218***	.515***	1									
11. (+) Pos. self-instruction	16.22 (4.99)	-.374	-.373	-.153***	.228***	.326***	.399***	.483***	.417***	.340***	.225***	.578***	.706***	1								
12. (r) Need for soc. support	13.74 (5.85)	-.296	-.648	.188***	-.094*	.003	.019	-.185***	-.011	.064	.235***	.150***	.107*	.097*	1							
13. (r) Active avoidance	14.58 (4.74)	.021	-.481	.060	.025	.156***	.134**	.213***	.218***	.362***	.228***	.363***	.464***	.382***	.167***	1						
14. (-) Flight tendency	11.40 (4.99)	.274	-.452	.454***	-.378***	-.266***	-.269***	-.279***	.000	.196***	.136**	-.207***	.080	-.179***	.132**	.230***	1					
15. (-) Rumination	13.47 (5.85)	-.197	-.764	.516***	-.441***	-.275***	-.204***	-.421***	-.165***	-.049	-.008	.035	-.029	-.205***	.283***	.070	.491***	1				
16. (-) Resignation	8.69 (5.21)	.499	-.341	.581***	-.539***	-.336***	-.389***	-.485***	-.152***	-.108*	-.016	-.343***	-.202***	-.407***	.168***	.012	.666***	.614***	1			
17. (-) Self-accusation	8.72 (5.94)	.491	-.471	.372***	-.368***	-.300***	-.275***	-.422***	-.446***	-.138**	-.097*	-.138**	-.164***	-.332***	.209***	.040	.434***	.606***	.604***	1		
18. (+) Positive coping	14.61 (3.18)	.065	.076	-.135**	.246***	.308***	.424***	.675***	.656***	.615***	.531***	.581***	.758***	.805***	.088	.469***	-.068	-.202***	-.379***	-.392***	1	
19. (-) Negative coping	10.57 (4.55)	.262	-.471	.582***	-.523***	-.357***	-.342***	-.491***	-.243***	-.038	-.001	-.188***	-.099*	-.341***	.246***	.103*	.768***	.837***	.867***	.817***	-.321***	1
Cronbach's α				.851	.724	.682	.728	.876	.775	.746	.797	.785	.712	.862	.893	.821	.741	.907	.808	.871	.785	.841

Note: PSS-10 stands for Perceived Stress Scale; Grit-S stands for Short Grit Scale; SVF-78 stands for Stressverarbeitungsfragebogen-78 (Stress Coping Style Questionnaire).
Skew refers to skewness; kurt refers to kurtosis.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Notably, positive coping strategies did indeed lower perceived helplessness (r = -.135, p < .001) and improve perceived self-efficacy (r = .246, p < .001), but the effects were significantly smaller than the effects of negative coping strategies (z = -7.81, p < .001, for helplessness and z = -4.86, p < .001, for self-efficacy). The use of negative coping strategies exacerbated the perception of helplessness (r = .582, p < .001) and lowered the perception of self-efficacy (r = -.523, p < .001).

However, in order to understand the causal structure between grit, coping strategies, and perceived stress, a structural equation model had to be created.

In Fig. 1, the relationships between latent variables in structural model can be found. Each latent variable consisted of observed variables, two scales of Grit-S in the latent variable of grit, seven positive coping strategies scales and four negative coping strategies scales from SVF-78 in the latent variable of coping strategies, and two scales of PSS-10 in the latent variable of perceived stress. All observed variables were significantly related to the latent variables (p < .001).

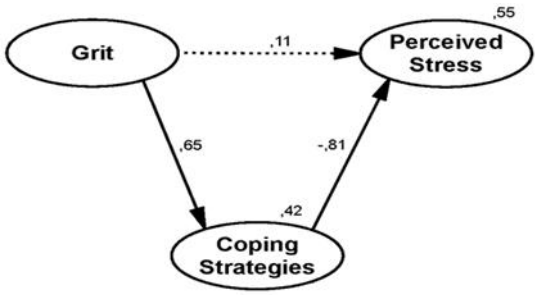


Figure 1. Causal structure of grit, coping strategies, and perceived stress. *Note.* Mediation model was calculated with all observed variables, the figure represents only relationships between latent variables. Dotted line represents a non-significant relationship (p = .341); the other two relationships are significant at level p < .001.

Examining the mediation in Figure 1, several conclusions can be drawn. The direct effect of grit on coping strategies is significant (β = .647, SE = .045, p < .001), as is the direct effect of coping strategies on perceived stress (β = -.810, SE = .679, p < .001), but the direct effect of grit on perceived stress is non-significant (β = .114, SE = .168, p = .341). This indicates that coping strategies acted as a mediator of the relationship between grit and perceived stress. The indirect effect of grit on perceived stress (β = -.524) was statistically significant, using both bootstrapping for 5,000 samples (SE = .158, 90% CI = [-.858, -.346], p < .001) and the Sobel test (z = -3.49, SE = .21, p < .001). Moreover, the proportion of the effect that is mediated (1.16) is greater than the threshold (0.80) proposed by Baron and Kenny (1986), therefore it can be concluded that coping strategies completely mediated the relationship between grit and perceived stress. This result indicates that people with higher grit altered their use of coping strategies and thus lowered their perceived stress.

In order to identify specific profiles of participants in terms of levels of grit and the coping strategies related to them, a cluster analysis had to be conducted. The analysis identified four separate clusters of participants, (a) *gritty persons* with high grit and high use of positive coping strategies and low use of negative coping strategies, (b) *easy-goers* with average grit and average use of positive coping strategies, but low use of negative coping strategies, (c) *avoiders* with average grit, active use of both positive and negative coping strategies with a specific tendency to escape or to avoid, and feeling (d) *powerless*, participants with low grit and low use of positive coping strategies and high use of negative coping strategies with a specific tendency for self-accusation and resignation. The clusters are described in detail in Table 3 and visualized in Figure 2.

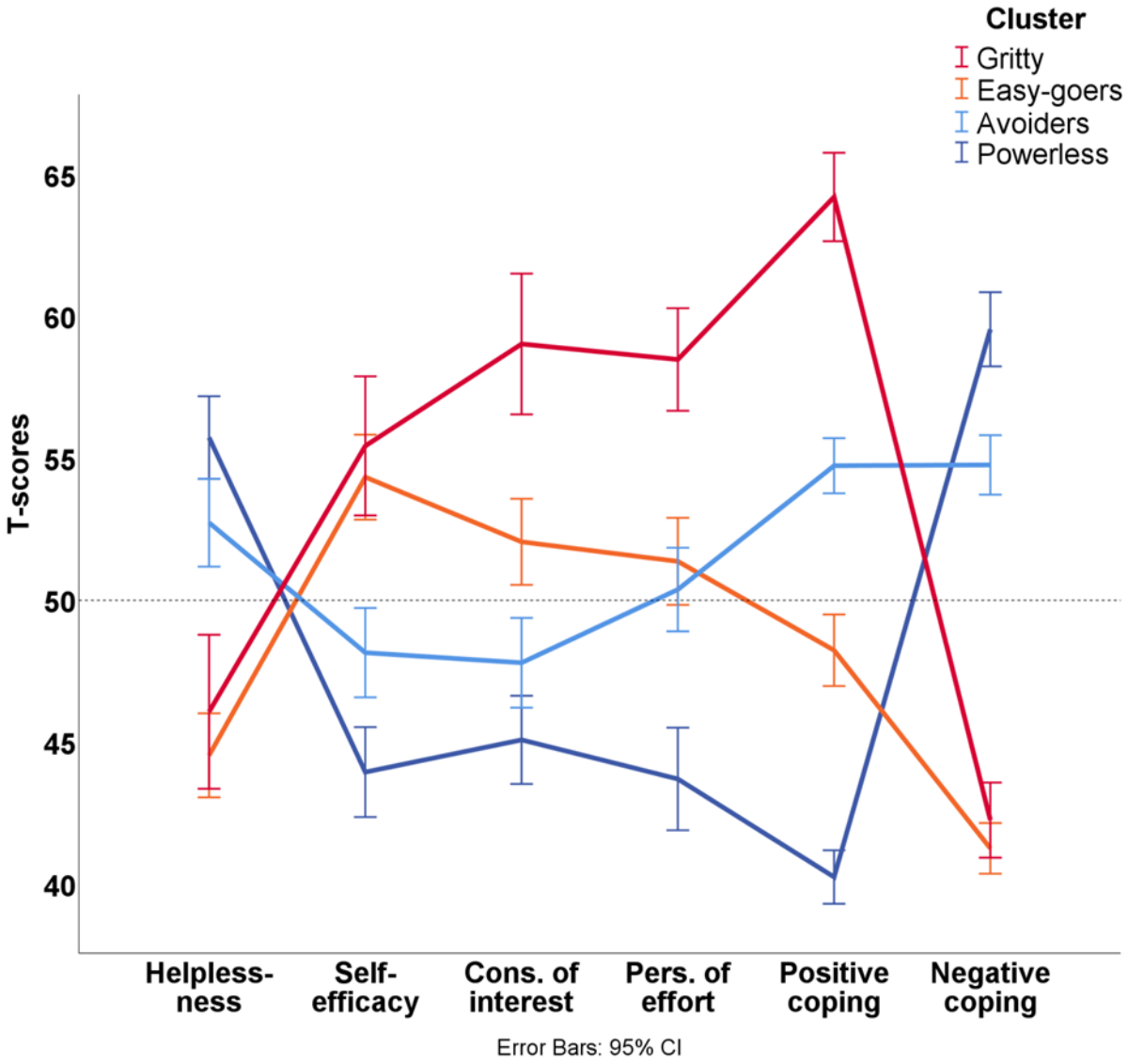
Table 3. Standardized scores (*T*-scores) for separate clusters of participants and results of one-way ANOVA comparisons.

	Gritty (N = 62)	Easy-goers (N = 140)	Avoiders (N = 115)	Powerless (N = 121)	ANOVA $F(3, 434)$	η_p^2
PSS-10						
1. Helplessness	46.07 (10.68)	44.54 (8.86)	52.73 (8.38)	55.73 (8.09)	42.804	.228
2. Self-efficacy	55.44 (9.65)	54.34 (8.95)	48.15 (8.52)	43.95 (8.80)	39.118	.213
Grit-S						
3. Consistency of interest	59.03 (9.77)	52.06 (9.08)	47.80 (8.56)	45.08 (8.63)	38.247	.209
4. Perseverance of effort	58.49 (7.11)	51.37 (9.18)	50.38 (7.97)	43.70 (10.04)	40.413	.218
SVF-78						
5. (+) Minimization	60.28 (8.65)	52.23 (8.26)	49.79 (8.74)	42.35 (7.41)	70.666	.328
6. (+) Guilt denial	57.75 (8.15)	49.13 (10.08)	53.85 (7.55)	43.38 (8.26)	47.769	.248
7. (+) Dist. from situation	60.56 (8.01)	46.10 (9.39)	54.05 (7.70)	45.26 (7.70)	65.714	.312
8. (+) Subst. satisfaction	54.74 (9.08)	46.99 (10.26)	54.58 (8.70)	46.71 (8.67)	24.782	.146
9. (+) Situation control	60.18 (6.83)	49.12 (9.90)	51.87 (8.21)	40.02 (8.31)	50.211	.258
10. (+) Reaction control	61.89 (6.24)	46.89 (9.14)	54.91 (6.29)	42.85 (7.14)	112.157	.437
11. (+) Pos. self-instruction	61.07 (4.46)	50.28 (9.15)	53.54 (6.23)	40.64 (7.52)	118.089	.449
12. (r) Need for soc. support	48.08 (8.11)	46.80 (9.41)	53.99 (9.75)	50.89 (10.39)	12.926	.082
13. (r) Active avoidance	59.18 (8.92)	44.65 (8.90)	54.20 (8.26)	47.49 (8.18)	54.881	.275
14. (-) Flight tendency	47.77 (7.90)	41.89 (6.35)	55.15 (8.83)	55.63 (8.66)	86.831	.375
15. (-) Rumination	43.21 (8.42)	42.50 (7.96)	55.48 (6.33)	56.94 (7.06)	122.299	.458
16. (-) Resignation	41.64 (5.92)	40.01 (5.60)	53.22 (7.55)	59.31 (8.08)	158.741	.523
17. (-) Self-accusation	42.29 (5.98)	43.70 (5.91)	51.95 (7.71)	59.39 (8.91)	126.071	.466
18. (+) Positive coping	64.21 (6.14)	48.24 (7.54)	54.74 (5.26)	40.25 (5.24)	235.045	.619
19. (-) Negative coping	42.25 (5.21)	41.26 (5.35)	54.77 (5.67)	59.55 (7.26)	259.952	.642

Note. All ANOVAs are significant at level $p < .001$.
T-scores have mean value = 50 and standard deviation = 10.

The MANOVA results revealed significant differences between clusters in the measures of stress, $F(6, 866) = 24.493$, $p < .001$, $\eta_p^2 = .145$; grit, $F(6, 866) = 28.561$, $p < .001$, $\eta_p^2 = .165$; as well as positive coping strategies, $F(21, 1229.535) = 33.753$, $p < .001$, $\eta_p^2 = .353$, and negative coping strategies, $F(12, 1140.610) = 57.703$, $p < .001$, $\eta_p^2 = .342$. The results of the follow-up one-way ANOVAs are reported in Table 3.

Figure 2. Profiles of perceived stress, grit, and coping strategies in different participant clusters. *Note*. Clustering analysis was performed with all 13 coping strategies scales, in the figure, they are collapsed into positive and negative coping strategies. Overlapping confidence intervals imply non-significant differences between clusters.



As can be seen in Figure 2, gritty persons and easy-goers have similar perceptions of both helplessness and self-efficacy to cope. The avoiders and those that feel powerless have similar perceptions of helplessness, but differ in perceptions of self-efficacy.

A comparison of the clusters indicated that participants benefited more from the absence of negative coping strategies than from the presence of positive coping strategies. Avoiders use negative and positive coping strategies similarly, but their perceived helplessness is still greater than their perceived self-efficacy. This conclusion is in line with the comparison of linear correlations described above. To decrease the level of perceived stress it is therefore important to reduce the use of negative coping strategies and secondly to substitute them with the use of positive ones.

4. Discussion

Coping strategies that elicit positive emotions about active engagement in life and foster self-esteem were found to be critical in recovering from traumatic experiences and natural disasters (Polizzi et al., 2020). The present study supports this finding in scenarios where minimization and positive self-instruction are connected to both measures of stress, lower helplessness, and higher self-efficacy. Minimization is a strategy for reducing the intensity of stress whereby the person places the stressor in a larger context (e.g., "There are certainly people in a worse situation than me right now.") and for minimizing the stressor's importance by focusing on the approaching end of the stressful time. Positive self-instructions encourage the person to feel in control and able to cope with the stressor, for example through remembering occasions when he or she has successfully managed difficult situations in the past ("I dealt with that so I can also handle this," see Weyers et al., 2005). Previous research showed that low use of minimization is connected with a higher suicide risk (Horesh et al., 1996), while positive self-instructions were a strong predictor of quality of life in breast cancer survivors (Jarkovský et al., 2017). Both strategies were important in coping with PTSD symptoms after serious motor vehicle accidents (Dörfel et al., 2008). However, research by Dörfel et al. (2008) found that when coping with PTSD symptoms, situation control and reaction control strategies were important. In the present study, concerning stress levels experienced under the COVID-19 lockdown, situation control and reaction control were only weakly associated with perceived self-efficacy and did not predict lower helplessness. This is similar to the finding of Lazarus and Folkman (1984) that during natural disasters or disease outbreaks when people could not control their everyday conditions the use of emotion-focused coping strategies rose. Situation and reaction control may, however, regain importance in the weeks following the lockdown, and it is therefore important to monitor changes in the adoption of coping strategies over the long term.

Nevertheless, it is important to consider the effect of the positive coping strategies described above within a broader perspective. López-Vázquez and Marván (2003) found that in natural

and industrial disasters passive coping strategies such as rumination (persistently thinking about the stressor), resignation (giving up on the belief the person can cope with the stressor, feeling powerless and hopeless), or escape (tendency to withdraw or flee from the stressor without resolution) may have a larger negative effect on perceived stress levels than the positive effect of active ones. The present study supports this finding where the overall effect of the negative coping strategies was stronger on perception of both, helplessness and efficacy. Consistent with the research by Dörfel et al. (2008), the strategy of resigning or giving up had the largest negative effect. It would, however, be beneficial to examine how resignation evolved from the beginning of the lockdown. The data in the present research were collected from the second to third week and it may be that the resignation in our sample was the result of general exhaustion from the previous weeks. In other words, already the two-to-three-week-long allostatic overload of life under lockdown could lead some people to give up, lose hope, or become resigned.

But as will be discussed further, there were differences between participants in the emergence of separate coping strategies. The present study identified four specific participant profiles (i.e., gritty persons, easy-goers, avoiders, and feeling powerless), each of which was a different combination of positive and negative coping strategies along with one non-cognitive personality trait, grit. Using these specific profiles, targeted help could be devised to support, in particular, the most vulnerable group of participants – those feeling powerless in the stressful situation.

4.1 Implications for different groups of participants

The cluster of *gritty persons* consisted of 14% of participants. They had the highest level of grit, used the largest number of positive coping strategies and a small number of negative coping strategies, resulting in low perceived helplessness and high self-efficacy. Consistent with previous research (Lee, 2017; O'Neal et al., 2016; Wong et al., 2018; Zhang et al., 2018), the present study found support for the finding that grit is associated with lower levels of stress. Grit is generally understood as perseverance and passion for long-term goals (Duckworth et al., 2007) and a previous study indicated that dedication to long-term goals plays a protective role in minimizing the immediate effects of a stressor (Polizzi et al., 2020). People who adopted a long-term perspective realized that the stressful situation would end at some point and that it was therefore important to endure it until that moment arrived. This interpretation is supported by research by Silvia et al. (2013) measuring physiological activity during a complex problem-solving task that found that people with higher grit invested more effort into finishing the tasks. However, none of these studies examined the relationship between grit and coping. The structural equation model in the present study found that coping strategies act as a complete mediator of relationship between grit and perceived stress. This finding indicates that grit does

not directly affect perceived stress, but that rather people with higher grit choose more effective coping strategies resulting in lower perceived stress.

The cluster of *easy-goers* consisted of 32% of participants, who had average levels of grit, but perceived stress levels that were similar to those in the gritty person cluster. Easy-goers employed an average number of positive coping strategies, but tended to use the most effective ones (minimization and positive self-instruction). More importantly, their use of negative coping strategies was similar to that of the cluster of gritty persons, with an even lower tendency to escape. As discussed above, the absence of negative coping strategies had a larger effect on perceived stress levels than the presence of positive ones. For both the aforementioned clusters, gritty persons and easy-goers, it is therefore important to continue supporting the positive strategies already used (i.e, taking a long-term perspective and focusing on the approaching end of the stressful period, minimizing the intensity of stress, promoting positive self-esteem by being aware of past achievements in difficult situations), and continuously avoiding negative ones (i.e., not giving up, not thinking persistently about the situation, not self-blaming if things do not work out as planned).

The cluster of *avoiders* consisted of 26% of participants, who had, like the easy-goers, scored average in perseverance of effort, but lower than average in consistency of interest, indicating that they were less able to focus on one goal for longer time. Avoiders adopted above-average use of positive coping strategies, but also employed an above-average number of negative ones, with the result that they had a higher level of perceived helplessness than perceived self-efficacy to cope. An examination of the profile revealed that tendency to escape and persistent thinking about the stressor were the strategies adopted most. According to Huang and Zhao (2020), young people especially reported rumination, spending more time thinking about the outbreak, with higher associated anxiety. It is therefore vital to avoid expending effort on negative strategies and adopt positive ones instead. The present study found that rumination was negatively correlated with minimization and positive self-instruction, and that flight tendency correlated negatively with minimization, positive self-instruction, and situation control. Specific daily routines could be therefore created taking into account these relationships. Generally, daily routines were found to decrease uncertainty and increase controllability which led to participants' being better able to cope with stress in lockdown (Vicario-Merino & Muñoz-Agustin, 2020; Vinkers et al., 2020). However, since avoiders exhibit lower consistency of interest, it would be beneficial to create scenarios with numerous alternatives of what people can do in the situation. This could be especially helpful when setting more long-term goals (e.g. "If the lockdown is still in place this weekend, we will do *something,* and if the lockdown has been lifted, we will do something *else*."). Long-term goal-setting allows people to narrow their thinking

to focus on the desired outcome and to minimize the immediate effect of the stressor by putting it in a future context.

The last cluster identified, people feeling *powerless*, contained 28% of the participants. These participants had the lowest level of grit and adopted the smallest number of positive coping strategies and the highest number of negative ones. Their profile was characterized by the highest use of self-accusation and resignation and lack of control, resulting in the highest level of perceived helplessness and lowest level of perceived self-efficacy. This group should be considered vulnerable. Lazarus and Folkman (1984) defined vulnerable people as those whose need for control is threatened or those who struggle for control. Persistent thinking about a stressor, self-accusation, and feelings connected to resignation are among the diagnostic criteria for PTSD. In Italy, during the COVID-19 lockdown, 7.6% of people reported PTSD symptomatology (Casagrande et al., 2020). It is therefore vital to create interventions that specifically address the needs of this group. Larzelere and Jones (2008) suggested that feelings of hopelessness could be tackled by employing basic principles from cognitive-behavioral therapy (CBT). People who feel that they cannot handle the situation anymore could try focusing on counterexamples from their past of when they did not give up and ultimately succeeded. Bannink (2008) reported positive outcomes for solution-focused brief therapy (SFBT) when working with clients with PTSD, reframing the traumatic experience as an opportunity to learn and to grow personally. A larger-scale approach should, however, involve policy makers disseminating minimization principles in their public appearences and media adapting solution focused communication of the present state of affairs. Policy makers should ensure press conferences are held always at the same time (e.g., every Friday), that decisions are communicated clearly in the form of concrete steps leading to concrete goals, and there should be clear deadlines with a strong scientific rationale, avoiding unexpected changes. The policy makers' main aim should be to create a predictable environment that allows people to focus on future steps and thereby minimize the present effects of the stressor. The media should adopt the solutions journalism principles (McIntyre, 2017) and avoid sharing information containing unnecessarily negative details that could lead individuals to ruminate about the stressor (e.g., information about the number of newly infected individuals should come *after* the information about recently recovered patients). But the focus should always be on constructive solutions to the crisis (i.e., adopting a positive self-instruction strategy of presenting successful examples) that have a positive impact on the audience's perceived wellbeing, emotional affect, and, most importantly, self-efficacy (Curry & Hammonds, 2014; McIntyre, 2017; McIntyre & Sobel, 2017).

4.2 Limitations and future directions

The imbalanced proportion of male and female participants in the study sample can be understood as a main limitation of the study. As there are known differences between the use of coping strategies with respect to gender (Kelly et al., 2008; Meléndez et al., 2012), the imbalance between male and female participants in the present study could therefore influence the results, especially in the proportions of participants with different profiles. Moreover, based on the observed stress and anxiety symptoms, Taylor et al. (2020) developed a scale capable of identifying people at risk during and after the COVID-19 pandemic. Five factors were included (danger and contamination fears, fears about the economic consequences, xenophobia, compulsive checking, and traumatic stress symptoms relating to COVID-19). Especially fear of contamination can lead to stigmatization of others (Settineri & Merlo, 2020a, 2020b; Walsh & Foster, 2020). Future research should continue efforts to identify potentially vulnerable groups of citizens and investigate how stress perception evolves over the long term, focusing on the link between exhaustion and resignation, the strongest predictor of perceived stress.

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