



COVID-19 pandemic-related representations, self-efficacy, and psychological well-being in the general population during lockdown

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Abstract

The aim of this study was to examine the association among representations of the COVID-19 pandemic, self-efficacy to cope with the anti-pandemic measures (e.g., general lockdown), and psychological distress in the Greek general population. The study was conducted online, during the general lockdown in the country, and 358 individuals (239 females) participated (mean age = 36.89; *SD* = 12.15). A perception of personal control over the condition, negative emotions towards the pandemic, and self-efficacy to cope with the current anti-pandemic measures were related to psychological distress. Also, a significant interaction between representation clusters and self-efficacy to cope with potential future difficulties (i.e., after the anti-pandemic measures are ended), was found. Specifically, the association between this type of self-efficacy and psychological distress was significant only for the 'low-impact' representations cluster (i.e., a perception of the pandemic as less burdensome and more controllable). The findings indicate that the factors which, according to previous research and theory, are significantly related to psychological distress during a health threat, are important also in times of a pandemic. They also suggest a potential adaptation-promoting synergy between pandemic-related self-efficacy and a more positive representation of COVID-19, as far as psychological distress is concerned. Thus, these factors may serve as the basis for the development of pandemic-related health behavior promotion programs.

Keywords COVID-19 · Pandemic · Illness representations · Self-efficacy · Psychological distress

Introduction

In late December 2019 a highly infectious disease, caused by a new coronavirus (the Severe Acute Respiratory Syndrome Coronavirus 2; SARS-CoV-2) was officially reported in Wuhan, China, and rapidly spread outside China in the first months of 2020 (Shigemura et al., 2020; WHO, 2019). The disease caused by the coronavirus was called Coronavirus Disease 19 (COVID-19) and was declared a pandemic by the World Health Organization on March 11, 2020 (WHO, 2020). COVID-19-related symptoms include high fever, cough, shortness of breath, and malaise, while in severe cases the infection may lead to severe pneumonia and cause death (Li et al., 2020). In an effort to prevent further spread of the

SARS-CoV-2, several restrictions were adopted in most countries worldwide (e.g., social distancing, travel controls and restrictions, closing of schools, general lockdown). Within this context, the aim of this study was to examine the relationship of two factors, which are crucial for adaptation to a health threat (i.e., health threat-related representations and self-efficacy; e.g., Bandura, 1997; Hagger et al., 2017; Leventhal et al., 2016), to the psychological distress of the general population during the anti-pandemic general lockdown in Greece.

The risk of infection, the severe anti-pandemic measures, and the news about the impact of the pandemic locally and around the world, seem to have significantly affected psychological health. Recent studies have shown that most people are really concerned about the risk of infection and its potential consequences on their health (e.g., Abdelhafiz et al., 2020; Geldsetzer, 2020). The first nationwide relevant study in China revealed that almost 35% of the respondents reported a variety of psychological problems, such as anxiety, panic disorder and depression, during the pandemic (Qiu et al., 2020). A significant impact of the pandemic on psychological health was also reported in other countries, such as Spain (e.g.,

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Losada-Baltar et al., 2020), Israel (e.g., Shacham et al., 2020), and Italy (e.g., Montemurro, 2020; Pancani et al., 2020). In addition, a recent review suggested that symptoms of perceived stress, anxiety, and depression are reported by 10–30% of the participants during the COVID-19 pandemic (Rajkumar, 2020). Younger age, being female, and lower education are associated with more psychological symptoms (Losada-Baltar et al., 2020; Qiu et al., 2020; Wang et al., 2020).

A factor which has systematically been associated with physical and psychological health in the face of a major health threat is illness representations (e.g., Hagger et al., 2017). According to the Common-Sense Model (CSM; Leventhal et al., 1980; Leventhal et al., 2016), when confronted with a health threat, people develop dynamic and interactive cognitive and emotional representations of their experience which they use in order to understand and efficiently cope with the threat. These representations refer to the identity of the threat (i.e., its label and symptoms), its potential cause, consequences, timeline (i.e., the course of the threat), cure/control (what can be done to cure or manage the threat), and emotional reactions (e.g., fear, anger). There is extensive evidence of the importance of illness-related representations in shaping health behaviors and outcomes, across many conditions. Overall, a more positive representation of the condition (e.g., as more controllable) has been related to better physical and psychological outcomes (Hagger et al., 2017). Especially, with regard to psychological health, representations of illness as a more chronic or burdensome condition, and higher levels of emotional representations have been associated with more symptoms of anxiety and depression in chronic physical conditions (e.g., Hermele et al., 2007; Pai et al., 2019). Also, there is evidence that illness representations are significant for adaptation in mental health difficulties (e.g., more positive representations are related to better adaptation in patients with depression; Fortune et al., 2004; Vollmann et al., 2010).

Research in previous pandemics have shown that illness representations are significant predictors of behavior and well-being (e.g., Karademas et al., 2013). With regard to the current pandemic, to our knowledge, there is only one study that has examined the association between illness representations about COVID-19 and adherence to precautionary measures (e.g., physical distancing; Chong et al., 2020). According to the results of this study, a more negative representation of COVID-19 (i.e., as more burdensome and fearful) was related to higher adherence. No study has examined the association of COVID-19 related representations with psychological health during the pandemic.

Another significant predictor of health-related behavior and health outcomes is self-efficacy. Self-efficacy refers to the personal evaluation of own abilities to perform specific behaviors in order to overcome a taxing situation (Bandura, 1997). Self-efficacy is a major factor in self-regulation and a

significant predictor of physical and psychological health (Bandura, 1997). It has been associated with less distress and better quality of life across several health conditions. For example, self-efficacy to cope with cancer has been related to fewer symptoms of anxiety, depression, and fatigue, and better quality of life, across a variety of cancer diagnoses (e.g., Chirico et al., 2017; Merluzzi & Martinez Sanchez, 1997). Also, general self-efficacy has been related to higher level of quality of life and psychological health in patients with a cardiovascular disease (e.g., Banik et al., 2018) or diabetes (Knowles et al., 2020), and better self-management in multiple sclerosis (e.g., Wilski & Tasiemski, 2016). Self-efficacy has also been found to mediate the relation of illness representations to physical health (Knowles et al., 2020).

Considering that a pandemic is a highly demanding condition (e.g., Abdelhafiz et al., 2020; Geldsetzer, 2020), which may tax personal coping abilities, as well as that self-efficacy refers to the evaluation of these abilities (Bandura, 1997), one might expect for self-efficacy to be important also for adaptation to a pandemic. According to Bandura's (1997) theory, a stronger sense of self-efficacy reflects a perception of adequate personal skills and resources so as to control or effectively cope with the demanding situation and its potential consequences (e.g., the emotional impact of the situation). Thus, higher levels of self-efficacy are expected to facilitate adaptation even in conditions like a pandemic, and protect or promote well-being. Indeed, with respect to the current pandemic, lower general self-efficacy has been associated with higher levels of psychological distress and more psychological symptoms during the pandemic (Losada-Baltar et al., 2020; Shacham et al., 2020). Specific self-efficacy to execute preventive measures and recommendations were also associated with greater adherence to behaviors such as social distancing, frequent handwashing (Chong et al., 2020). Self-efficacy and illness representations are complimentary concepts, as the first assists in identifying successful performers (i.e., the successful outcome), while the second in understanding how they have succeeded (i.e., the process of adaptation; Leventhal et al., 2016).

The aim of the present study was to examine the relation of personal representations about COVID-19 and self-efficacy to cope with the anti-pandemic measures to psychological distress in a sample of Greek adults. The first COVID-19 case in Greece was reported on February 26, 2020, and a general lockdown was adopted by the government on March 23rd, although several other anti-pandemic measures (such as social distancing, closure of schools, travel restrictions) were taken earlier that month. The gradual lifting of the anti-pandemic measures started on May 4th. During the first wave of the pandemic and until mid-June 2020, almost 3200 cases were officially diagnosed in Greece, and almost 190 deaths occurred (<https://covid19govgr/covid19-live-analytics/>). According to a recent survey, almost 25% of the Greek

general population reported significant psychological distress during the pandemic and the strict measures taken to control it (Skapinakis, 2020).

Based on previous research (e.g., Karademas et al., 2013; Losada-Baltar et al., 2020) and the positive association of self-efficacy and positive illness representations to well-being, our first hypothesis was that a more positive representation of COVID-19 (i.e., representing the pandemic as a more controllable, less fearsome condition) and higher levels of self-efficacy to cope with the anti-pandemic measures are related to lower levels of psychological distress during the general lockdown. In other words, we hypothesized that the stronger the personal sense that the situation can be controlled or that its consequences will not be severe, as well as the stronger the sense of personal ability to deal with the difficulties that may arise due to the lockdown, the lower the psychological arousal will be, and thus the less symptoms of psychological distress will be reported.

Moreover, we anticipated a synergy between the representations of COVID-19 and specific self-efficacy. We hypothesized that a more positive representation of COVID-19 (i.e., as a not very fearful condition or as a condition that can be controlled in some way), in combination with a sense that one can deal with the strict measures taken to control this situation act as a personal psychological ‘shield’ against the fear of the pandemic and its impact on psychological health. This shield could ameliorate the negative psychological reactions to the stressful condition (e.g., worry) and thus be related to fewer symptoms of psychological distress. The examination of these two hypotheses can help us better understand the processes that are involved in the adaptation of the general population to a pandemic and, in this respect, may contribute to the development of appropriate psychosocial interventions that will aid populations struggling with such a situation.

Method

Participants and Procedure

The study was conducted online. An online survey portal (i.e., Google Forms) was developed and potential participants were invited to complete the relevant form. The link was shared on social media and through community announcements. Inclusion criteria were: to be an adult, not have been diagnosed with COVID-19, be a Greek and currently live in Greece, be able to understand the study protocol and provide informed consent. There were no incentives for participation in the study. Participants were simply informed about the overall aim of the study (i.e., to examine personal reactions during the lockdown). The study was approved by the University of Crete, Greece Ethics Committee (No 82/

07.04.2020), and was performed in line with the principles of the Declaration of Helsinki.

The study took place from April 10 to April 26, during the first general lockdown in the country. An a priori examination, using G*Power, a free tool to compute statistical power (Faul et al., 2007), revealed that for a statistical power of .95 at an alpha level equal to 1% and a medium effect size, and with regard to the most complex statistical analyses performed (i.e., moderation analyses and MANOVAs; see, Method), a sample of about 320 participants was needed. After removing incomplete forms, 358 individuals (119 males; 239 females) participated in the study. Their mean age was 36.89 years ($SD = 12.15$; range = 18–76). Of them, 13.4% had finished the mandatory 9-year education, 13.75% were university students, and 72.9% were holders of a higher education degree. Also, 52.2% of the participants were married, and 15.6% reported a chronic disease (e.g., cardiovascular, diabetes, autoimmune disorders).

Measures

Psychological Distress Psychological distress was assessed with the 21-item version of the Depression Anxiety Stress Scales (DASS-21; Henry & Crawford, 2005; as adapted in Greek by Lyrakos et al., 2011), which measures symptoms of anxiety (e.g., I was aware of dryness of my mouth), depression (e.g., I couldn’t seem to experience any positive feeling at all), and tension/stress (e.g., I found it hard to wind down). To answer, participants used a Likert-type scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). They were asked to respond with regard to their condition after March 11, when the first strict anti-pandemic measures were employed in Greece, as well as during the general lockdown which was imposed a few days later, on March 23rd. The change in the original instructions was made in order to better capture the symptoms specifically experienced during this period. For the purposes of this study, a single overall score was used to reflect respondents’ psychological distress (Cronbach $\alpha = .92$).

COVID-19 Representations To assess representations about COVID-19, we employed a single-item approach, similar to the method used in the Brief Illness Perception Questionnaire (Broadbent, Petrie, Main and Weinman 2006), which assesses illness-related representations according to the CSM. Participants were asked to reply to the following questions using a Likert-type scale ranging from 0 (not at all) to 10 (very much/very well): “how much has the COVID-19 pandemic affected your life” (consequences); “how long do you think the COVID-19 pandemic will continue” (timeline); “how much control do you feel you have over the COVID-19 situation, e.g., not getting infected” (personal control); “how much do you think existing treatments can help COVID-19

patients” (treatment control); “how concerned are you about the COVID-19 pandemic” (worry); “how well do you feel you understand the COVID-19 pandemic” (coherence); “how much does the COVID-19 pandemic affect you emotionally? (e.g. does it make you angry, scared, upset or depressed)” (emotional representations).

Self-Efficacy In consistence with the COVID-19 representations assessment, a single-item approach was also employed for self-efficacy. Two separate items were used to assess personal self-efficacy to cope with the adversities caused by the anti-pandemic measures. The first item was referring to the ability to cope with the difficulties currently caused by the anti-pandemic measures (i.e., I can deal with the difficulties that the social distancing and the ‘staying at home’ measures may cause). The second item was referring to the practical difficulties that may arise in the future, after the lockdown is ended, given the problems that a long arrest of the economic and personal life may cause (i.e., I will be able to deal with the financial, practical and other difficulties that may follow the end of the lockdown and the strict anti-pandemic measures). These two items were analyzed separately as they refer to different situations. The first item refers to the difficulties due to the lockdown (such as social isolation) which participants were already experiencing, whereas the second refers to the different difficulties that may arise after lockdown is lifted, such as the financial impact of the pandemic and the lockdown. Participants used a Likert-type scale ranging from 1 (not true at all) to 4 (absolutely true) to answer these items.

Analyses

First, a series of MANOVAs, with psychological distress, COVID-19 representations, and self-efficacy as the dependent variables, and gender, marital status (married vs non-married), educational level (holders vs. non-holders of a higher education degree), and the presence of a chronic disease, as the independent variables, were performed so as to identify potential control variables. To the same goal, the correlations of psychological distress, representations, and the self-efficacy items to age were also examined.

Also, Pearson product-moment correlations and a hierarchical regression analysis were used to examine the strength of the relationships among psychological distress, COVID-19 representations, and specific self-efficacy. Also, in order to facilitate the examination of potential interactions between pandemic-related representations and self-efficacy, and given that representations are parts of broader health-related schemata (Leventhal et al., 1980), a two-stage cluster analysis of the representations was employed, as suggested by Clatworthy et al. (2007). Specifically, the Ward’s method, which is a widely-used criterion applied in cluster analysis, was employed to identify the number of clusters. This was

followed by a K-means analysis where the cluster centroids from the Ward’s analysis were imported. The K-means analysis aims to partition the observations into k clusters. The squared Euclidean distance was the proximity measure used. According to Clatworthy et al. (2007), who tested the performance of several cluster analysis methods especially with respect to illness representations, this two-step approach provides the most appropriate method for use with illness representations. The decision regarding the appropriate number of clusters was based on the dendrogram and the agglomeration schedule.

To examine the potential interactions between representation clusters and self-efficacy as far as their impact on psychological distress is concerned, two moderation analyses (one for each self-efficacy item) were performed with representation clusters serving as the moderator, self-efficacy as the independent variable, and distress as the dependent. To run the moderation, PROCESS, a freely available computational tool for SPSS and SAS (Hayes, 2013), was used. Both normal-theory tests and bias-corrected and accelerated bootstrapping (5000 bootstrap samples) were employed to test these effects, while the continuous variables included in the analysis were mean-centered. A significance level of .01 was employed for all analyses.

Results

Preliminary Results

A significant impact of gender, Wilks’ $\lambda = .93$, $F(10, 347) = 2.60$, $p < .01$, partial $\eta^2 = .07$, and marital status, Wilks’ $\lambda = .93$, $F(10, 347) = 2.45$, $p < .01$, partial $\eta^2 = .07$, on the psychological variables used in this study was found. Specifically, females and non-married reported higher distress; female reported more worry and negative emotions towards the pandemic; non-married reported less worry ($p < .01$). Education level and the presence of a chronic illness were not associated with distress, representations, or self-efficacy, Wilks’ $\lambda < .93$, $F_s(10, 347) < 2.15$, $p > .05$, partial η^2 s $< .06$. Age was negatively correlated to distress (Pearson $r = -.17$, $p < .01$), and positively to COVID-19 related worry, and both self-efficacy items (Pearson r s $> .18$, $p < .01$). Therefore, all subsequent analyses were performed after controlling for gender, marital status, and age.

The Relation of Representations and Self-Efficacy to Psychological Distress

The correlations between psychological distress, representations, and the two self-efficacy items are presented in Table 1. Psychological distress was positively related to several representations (ie, emotional representations, consequences,

Table 1 Descriptive statistics and Intercorrelations of psychological distress and COVID-19 related representations and self-efficacy ($N = 358$)

	1	2	3	4	5	6	7	8	9	10
1 Psychological distress	1.00									
2 Consequences	.20**	1.00								
3 Timeline	.19**	.16*	1.00							
4 Personal control	-.27**	.03	.03	1.00						
5 Treatment control	-.09	.02	-.01	.13	1.00					
6 Worry	.16*	.17*	.20**	.20**	.05	1.00				
7 Coherence	-.05	.11	.09	.25**	.02	.08	1.00			
8 Emotional representations	.41**	.34**	.19**	-.05	.02	.46**	.06	1.00		
9 Self-efficacy; current measures	-.31**	-.22**	.00	.22**	.01	.05	.07	-.29**	1.00	
10 Self-efficacy; after lockdown ends	-.13	-.13	-.03	.04	.06	.001	.05	-.12	.30**	1.00
Mean	10.64	7.58	7.48	7.18	5.18	6.90	7.66	6.61	3.18	2.96
SD	9.05	1.90	1.49	1.71	1.87	2.01	1.61	2.23	.63	.66

* $p < .01$, ** $p < .001$

timeline, and worry; Pearson $r_s > .16$, $p < .01$) It was negatively correlated to personal control as well as self-efficacy to cope with the current anti-pandemic measures (Pearson $r_s > -.27$, $p < .001$)

A hierarchical multiple regression analysis showed that representations and self-efficacy were related to distress, even after controlling for covariates (R^2 -change = .26, $F(9, 345) = 14.17$, $p < .001$) Personal control ($\beta = -.22$, $t = -4.52$, $p < .001$), self-efficacy to cope with the current anti-pandemic measures ($\beta = -.15$, $t = -2.92$, $p < .01$), and emotional representations ($\beta = .28$, $t = 4.97$, $p < .001$) were associated with psychological distress

Interactions between Representations and Self-Efficacy

Based on the results of the clustering analyses, two clusters were considered to be the optimum solution. The centroids suggested that participants in the first, the “low impact”, cluster ($N = 152$) reported less consequences, worry and emotional representations, shorter timeline and more personal control, in comparison to the participants in the second, the “high impact”, cluster ($N = 206$). No differences in cluster participation were found regarding gender, education level, marital status, the presence of chronic illness (chi-squares $< .53$, $p > .05$), and age, $F(1, 356) = .05$, $p > .05$. However, the high impact cluster participants reported more distress (12.88 vs. 7.59) and lower self-efficacy to cope with the current anti-pandemic measures (3.30 vs. 3.10), $F(1, 356) = 32.51$ and 9.52 , $p < .001$ and $.01$, partial $\eta^2 = .08$ and $.03$, respectively. There were no differences regarding self-efficacy to cope with the difficulties that may arise in the future, $F(1, 356) = 4.08$, $p > .01$, partial $\eta^2 = .01$

After controlling for covariates, the interaction between representation clusters and self-efficacy to cope with the current anti-pandemic measures was not statistically significant

($B = 1.60$, $SE = 1.45$ $t = 1.11$, $p > .05$, Bootstrap Confidence Intervals (BCI) = -1.23 to 4.45) On the contrary, the interaction between representation clusters and self-efficacy to cope with the practical difficulties that may arise after the lockdown is over, was statistically significant ($B = 3.43$, $SE = 1.39$ $t = 2.56$, $p < .01$, BCI = $.69$ to 6.18). The association between self-efficacy and psychological distress was significant for the ‘low-impact’ cluster, but not for the ‘high-impact’ cluster (see Table 2).

Discussion

The overall aim of this study was to examine the association among representations about the current COVID-19 pandemic, self-efficacy to cope with the anti-pandemic measures, and the psychological impact of the pandemic. The findings seem to provide support to our first hypothesis. Even after controlling for gender, marital status, and age, certain illness representations, and self-efficacy to cope with the present anti-pandemic measures (e.g., social distancing, lockdown) were associated with current psychological distress. In fact, these few variables explained more than 25% of the psychological distress variance. Also, the cluster of participants who perceived COVID-19 as less compounding, reported lower levels of distress. Moreover, the findings provided partial support to the second hypothesis, as only the interaction between representation clusters and self-efficacy to cope with the possible post-lockdown difficulties was statistically significant.

The importance of illness representations in shaping behavior and health-related outcomes in a variety of conditions is well established (e.g., Hagger et al., 2017). Our study confirmed that this is also true regarding the psychological distress during the pandemic. It seems that the ways people understand the pandemic is significantly related to their

Table 2 Mean effects (SE in parentheses) of self-efficacy to cope with post-lockdown difficulties on psychological distress at COVID-19 representation clusters, and confidence intervals

	COVID-19 Representations Clusters	
	“High impact” cluster [CI (95%) [†]]	“Low impact” cluster [CI (95%) [†]]
Effects on Psychological Distress	.15 (.89) [−1.59 to 1.89]	−3.10 (1.09) [−5.25 to −.95]

SE standard error, CI confidence intervals

[†] Bootstrapping bias corrected and accelerated (5000 bootstrap samples); after controlling for covariates

psychological adaptation. Specifically, although several representations were related to distress (e.g., consequences, timeline, worry), two emerged as the strongest correlates: the perception of personal control over the condition, and negative emotions towards it. This is consistent with the findings of a previous study during the H1N1 pandemic (Karademas et al., 2013). It is possible that a perception of personal control (either accurate or not) may protect against the burden that a serious health threat can cause, but may also facilitate the adoption of more effective preventive behaviors (Hagger et al., 2017; Leventhal et al., 1980), which in turn may lessen the sense of personal vulnerability and, thus, psychological distress. On the other hand, negative emotional reactions convey significant amounts of information regarding the overall impact of the situation and reflect the difficulties to self-regulate in such conditions (e.g., Peters et al., 2006). In this regard, their significant negative association with psychological distress comes as no surprise.

Likewise, the significant negative relation of self-efficacy to cope with the current anti-pandemic measures to psychological distress is consistent with the findings of previous studies, according to which self-efficacy is related to better health even during the pandemic (e.g., Losada-Baltar et al., 2020). As argued by Bandura (1997), a high perception of the personal ability to effectively deal with a taxing situation is central in maintaining an overall positive attitude and achieving a better adaptation. Furthermore, the significant interaction between representation clusters and self-efficacy to cope with the potential future difficulties might be a reflection of the link between the two concepts (Leventhal et al., 2016), as well as an indication of an adaptation-promoting synergy between pandemic-related self-efficacy and a positive COVID-19 representation. Still, the lack of a corresponding interaction between representation clusters and self-efficacy to cope with the current anti-pandemic measures may actually indicate that the above-mentioned significant finding is only an echo of a generally effective self-regulation mechanism, which is also linked to less psychological distress.

In any case, the findings indicate that the same factors which, according to previous research and theories (Bandura, 1997; Leventhal et al., 2016), promote adaptation, are also important for psychological health even in times of a very distressing situation, like the SARS-CoV-2 pandemic. Although we cannot be certain about the direction of these

relationships, as this is a correlational study, our findings seem able to provide us with (some) insight into the processes that are involved in adaptation to the threats imposed by the COVID-19 pandemic, at least as far as the general population is concerned and with regard to psychological distress. We cannot be certain about the strength and the direction of the associations between COVID-19 related representations, self-efficacy, and other aspects of the pandemic. For example, Chong et al. (2020) have already shown that a more negative representation of COVID-19 is related to greater adherence to self-protective measures. Thus, the relations of COVID-19 representations to the different aspects of the experience of the pandemic may vary and/or depend on several other factors, such as the cultural background or the particular outcome variables being examined. It is possible for a more positive representation of the pandemic to protect against psychological distress (as shown in this study) but, at the same time, make people feel safer and, thus, less prone to adhere to self-protective measures (Chong et al., 2020). Such findings underline the complexity of the relationships between the several aspects of self-regulation during a crisis (e.g., between illness representations, emotion, and behavior; Leventhal et al., 2016), as well as the need for more studies that will explore this intriguing topic.

In interpreting the findings, one should consider the several limitations of this study. First of all, as underlined above, this is a correlational study and, therefore, no conclusions about the direction of relationships are possible. Also, a convenience sampling method was employed, while the study focused on a population which was not much affected by the pandemic (Greece reported a relatively low number of deaths due to COVID-19 during the first wave of the pandemic; <https://covid19govgr/covid19-live-analytics/>). The findings might be different if the study was conducted in another population (e.g., health professionals) or in a more affected part of the world, or during other phases of the pandemic. Also, almost two thirds of the participants were females and this might have an impact on the results. Moreover, single items were used to assess the different types of representations and specific self-efficacy, and thus may not have captured the complexity of these concepts, while the original instructions for DASS-21 were modified so as to cover the symptoms experienced during this period. Besides psychological distress, other dimensions of well-being (e.g., social and physical health) were not

assessed, although this might have provided a better overview of the adaptation process. Finally, though participants were specifically asked about their current distress symptoms, it is possible that their responses also reflect their general psychological health status.

Nevertheless, this was the first study, to our knowledge, that examined the relationship between psychological distress and two factors important for adaptation to a health threat, i.e., representations and self-efficacy, after the outbreak of the COVID-19 pandemic and while the strict control measures were in full swing. The findings underline the strong link among these variables and may also have certain practical implications. They indicate that, in order to facilitate psychological adaptation to the pandemic and the strict anti-pandemic measures, we could focus on (a) enhancing a sense of control, by effectively educating people about the health-related behaviors necessary to control the pandemic, as well as about the skills that may be useful in dealing with the difficulties of the anti-pandemic measures (e.g., time management; better communication skills; ways to develop new indoors leisure activities); (b) managing the negative emotions that may arise due to the condition, with the use, for example, of simple and easy to implement stress management techniques. It is also possible that helping people develop less negative (but not erroneous) representations of the pandemic (i.e., a sense that a person can personally do something about it), in combination with the provision of information about the effective ways to cope with the situation (e.g., how to implement self-protective measures in an easy way; how to effectively regulate negative emotions) may provide the basis for the development of appropriate psychosocial interventions for such distressing conditions.

Data Availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of Interest Evangelos C Karademas and Christoforos Thomadakis declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent All procedures followed were in accordance with ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

Informed consent was obtained from all patients for being included in the study.

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