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From Secondary Traumatic Stress to Vicarious Posttraumatic Growth Amid COVID-19 Lockdown in Greece: The Role of Health Care Workers' Coping Strategies

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Objective: Health care workers (HCWs) are at risk for suffering negative psychological consequences of the COVID-19 pandemic, such as secondary traumatic stress symptoms (STS), as they are exposed to this traumatic experience both directly, as community residents, and indirectly, in the care of infected patients. Following vicarious exposure, positive psychological outcomes, such as vicarious posttraumatic growth (VPTG), are also likely, though they are less studied. The present study aims to examine (a) the associations among STS, VPTG, and coping strategies among HCWs during the COVID-19 lockdown and (b) the mediating role of coping strategies in the STS–VPTG relationship. **Method:** Cross-sectional online data were collected amid the COVID-19 lockdown in Greece (March 23, 2020 through May 3, 2020) from a sample of 647 HCWs (25% men, 75% women). The Secondary Traumatic Stress Scale, the Post Traumatic Growth Inventory, and the Brief Coping Orientation to Problems Experienced Inventory were used to measure STS, VPTG, and coping strategies, respectively. **Results:** HCWs reported moderate to low levels of STS and VPTG, with the VPTG dimensions of personal strength and appreciation of life being the highest categories. Intrusions mental and both adaptive and maladaptive coping strategies predicted VPTG. Adaptive coping strategies partially mediated the relationship between STS and VPTG, whereas maladaptive coping strategies fully mediated this relationship. **Conclusions:** Understanding the coping responses during lockdown among HCWs is important for developing tailored prevention and intervention actions to protect the populations at risk from the deleterious impacts of uncontrollable and life-threatening diseases and promote posttraumatic growth.


Clinical Impact Statement

Positive and negative psychological outcomes might follow vicarious trauma exposure, with the first being less studied. Using a sample of 675 Greek health care workers (HCWs), we examine vicarious posttraumatic growth (VPTG), its association with secondary traumatic stress (STS), and whether coping responses facilitated posttraumatic growth (PTG) during the COVID-19 lockdown. HCWs demonstrated moderate to low levels of STS and PTG. Interestingly, both mental intrusions and coping strategies (both adaptive and maladaptive) were important predictors of PTG. Adaptive coping partially mediated the STS–VPTG relationship, whereas—unexpectedly—maladaptive coping fully mediated this relationship. Stakeholders could implement these findings to protect HCWs and promote their PTG.

Keywords: vicarious traumatization, vicarious posttraumatic growth, secondary traumatic stress, coping responses, coronavirus disease

On February 11, 2020 the World Health Organization (WHO) announced the official name for the infectious disease that caused

the 2019 novel coronavirus outbreak, first identified in Wuhan, China in December 2019. The name of this disease is Coronavirus

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The data reported in this article were collected as part of a larger data collection. Findings from the data collection have been reported in MSI (2021), which focuses on related variables (i.e., resilience, coping strategies, PTSD, and posttraumatic growth). However, that article focuses on the general population, whereas for this article only data from

health care workers have been analyzed. The variables and relationships examined in the present article have not been examined in any previously published articles.

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Disease-2019 (COVID-19). On March 11, 2020, WHO declared the COVID-19 outbreak to be a pandemic. The first case in Greece was reported on February 27, 2019, and 1 month later, the Greek government enforced social distancing measures to constrain virus transmission. Cumulative evidence suggests that the COVID-19 pandemic and the resultant lockdown has detrimental effects on the mental health (e.g., PTSD, confusion, anger, stress, anxiety, and depression) of the general population worldwide (Chew et al., 2020; Rajkumar, 2020). Less is known about the effects of lockdown on the mental health of health care workers (HCWs). HCWs could be considered a high-risk population subgroup as they are both personally—as community residents—and professionally—through the care of infected patients—exposed to the pandemic, not to mention work-related stressful conditions and pressures (Kalaitzaki et al., 2020).

Being at the frontline of this crisis and trying to cope with a life-threatening disease can be an extremely traumatic experience for the HCWs (Jung et al., 2020). Recent studies have shown that HCWs who are involved in the diagnosis, treatment, and care of patients with COVID-19 are at the highest risk of various mental health symptoms, such as secondary traumatic stress (STS; Kang et al., 2020; Lai et al., 2020). STS involves symptoms similar to those of PTSD, the only difference being that STS develops from one's vicarious (indirect) exposure to the traumatic events experienced by others, through a professional relationship of empathetic engagement with and caring for them (Finklestein et al., 2015; Roden-Foreman et al., 2017).

Overwhelming evidence suggests that traumatic experiences undoubtedly have negative consequences for HCWs; however, some studies have indicated that it is possible to experience a positive reaction to indirect trauma, which has been called *vicarious posttraumatic growth* (VPTG; Manning-Jones et al., 2015; Ogińska-Bulik & Zadworna-Cieślak, 2018). Tedeschi and Calhoun (2004) have argued that traumas cause psychological pain, which in turn, initiates a process of deliberate cognitive restructuring of the self, others, and the world, such that people acquire wisdom from adversity, strengthen relationships with others, foster acceptance of life's uncertainties, and facilitate openness to new experiences. Kalaitzaki et al. (2020) were the first to suggest that patient care during the COVID-19 pandemic can be a positive experience for professionals, which they referred to as *bouncing forward*. Few studies have examined the positive psychosocial impact of infectious diseases, such as the severe acute respiratory syndrome (i.e., SARS) epidemic, but only among the general public (e.g., Cheng et al., 2006). The scarcity of research on VPTG during the COVID-19 pandemic makes any research effort imperative.

Joseph (2011) has suggested that a level of posttraumatic stress is necessary for the process of posttraumatic growth. However, the relationship among the effects, both negative (i.e., STS) and positive (i.e., VPTG), of vicarious traumatic exposure among HCWs has been a topic of intense research debate, and, therefore, the results are still inconclusive (Manning-Jones et al., 2015). Some researchers have suggested that STS and VPTG are uncorrelated (Gibbons et al., 2011), whereas others have suggested that they are positively correlated (Kjellenberg et al., 2014). Moreover, Manning-Jones et al. (2017) indicated that moderate levels of STS among HCWs is associated with higher levels of VPTG; this was true only for psychologists and not for nurses, social workers, or counselors. They argued that

posttraumatic stress must be challenging enough to promote VPTG, but not so challenging as to inhibit growth.

Stress-related research has focused on coping strategies, where *coping* is defined as the cognitive, behavioral, and emotional efforts made by individuals in managing and conceptualizing a stressful event (Lazarus & Folkman, 1984). Traditionally, coping styles have been classified into three groups (Carver, 1997): problem-focused (i.e., active coping, instrumental support, and planning), emotion-focused (i.e., acceptance, emotional social support, humor, positive reframing, and religion), and dysfunctional (i.e., behavioral disengagement, denial, self-distraction, self-blaming, substance use, and venting). Meyer (2001) has suggested a second-order dimension of coping that includes both problem-focused and emotion-focused into the adaptive dimension and dysfunctional coping into the maladaptive dimension. Following vicarious traumatic exposure, coping strategies (adaptive and maladaptive) might protect against symptoms of STS and promote VPTG (Rodríguez-Rey et al., 2017). During the COVID-19 pandemic, maladaptive coping has been associated with greater STS among HCWs, whereas adaptive coping has been found to increase the likelihood of positive trauma outcomes (Babore et al., 2020; Ye et al., 2020). Some studies among HCWs have suggested that adaptive strategies might be beneficial for VPTG (i.e., Hamama-Raz & Minerbi, 2019), whereas others (i.e., Ogińska-Bulik & Zadworna-Cieślak, 2018) have indicated that both adaptive and maladaptive coping can predict VPTG. However, to the authors' knowledge, no study has examined the relationship between coping and VPTG among HCWs during the COVID-19 pandemic.

Based on inconclusive findings on the relationship between STS and PTG (Manning-Jones et al., 2015) and the inconsistent findings on the types of coping strategies (i.e., adaptive, maladaptive, or both) that predict PTG and decrease stress, this study aims to examine (a) the relationships among STS, VPTG, and coping strategies in a sample of Greek HCWs during the COVID-19 pandemic and (b) whether adaptive, maladaptive, or both types of coping strategies predict VPTG. Furthermore, the mediating role of coping strategies in the relationship between STS and VPTG is examined. We hypothesized that VPTG would be predicted by both STS and coping strategies and that adaptive and maladaptive coping would mediate the relationship between STS and VPTG. To the best of our knowledge, this study is the first to examine the relationships among STS, VPTG, and coping strategies among HCWs during the COVID-19 pandemic. Examining the links among these variables on HCWs is of the utmost importance for promoting positive outcomes.

Method

Participants

After excluding two participants not living in Greece, the final sample included 647 HCWs (41% physicians, 37% nurses, 12% social workers, and 10% psychologists). The respondents ranged in age from 23 to 74 years ($M = 43.41$, $SD = 9.81$), were mostly female ($n = 503$; 75%), married ($n = 419$; 62%), and without children ($n = 249$; 37%). Participants had university ($n = 309$; 46%) or postgraduate education ($n = 296$; 44%), over 15 years of work experience ($n = 150$; 22%), and they were mostly residing in

southern Greece ($n = 311$; 46%). The majority reported that they either definitely or most likely had contact in their workplace with patients who had suspected ($N = 604$; 90%) or confirmed cases of COVID-19 ($N = 429$; 64%).

Instruments and Measures

The questionnaire booklet collected information on demographics, posed work-related questions (exposure to confirmed or suspected COVID-19 cases), and included instruments to assess the psychological impact of the COVID-19 pandemic. Alpha coefficients and score ranges of the measures are presented in Table 1. Total and subscale scores for each instrument were produced by adding all responses or responses on each subscale, respectively.

The Secondary Traumatic Stress Scale (STSS; Bride et al., 2004) consists of 17 items, allocated in three subscales (Intrusions, Avoidance, and Hyperarousal) measuring the intensity of STS experienced in the last 7 days. Items are scored on a 5-point scale, ranging from 1 (*never*), to 5 (*very often*). Example items are “Reminders of my work with clients upset me,” “I wanted to avoid working with some clients,” and “I felt jumpy.” Satisfactory reliability and validity (convergent, discriminant, and factorial) has been reported (Bride et al., 2004).

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) consists of 21 items, allocated in five subscales (Relating to Others, New Possibilities, Personal Strength, Spiritual Enhancement, and Appreciation of Life) measuring growth after a traumatic experience. Participants were instructed to respond in terms of the change that occurred following the COVID-19

pandemic, using a 6-point scale, ranging from 0 (*I did not experience this change*) to 5 (*I experienced this change to a very large extent*). Example items are “I know better that I can handle difficulties,” “I developed new interest,” and “I can better appreciate every day.” The PTGI has excellent internal and test–retest reliability in Western samples (Tedeschi & Calhoun, 1996).

The Brief Coping Orientation to Problems Experienced Inventory (COPE; Carver, 1997) assesses coping strategies via 28 items, allocated in 14 subscales. Participants were instructed to respond about how often they use each strategy to deal with the COVID-19 pandemic on a 4-point scale ranging from 0 (*not at all*) to 4 (*very much*). Example items are “I’ve been taking action to try to make the situation better,” “I’ve been expressing my negative feelings,” and “I’ve been getting emotional support from others.” Satisfactory psychometric properties of COPE have been reported in a sample of adults recovering from a hurricane (Carver, 1997).

Procedure

This cross-sectional survey was conducted online amid the lockdown in Greece (March 23, 2020 through May 3, 2020). Approval of the study was obtained from the Research Ethics Committee of the Hellenic Mediterranean University. Participants were recruited using a convenience and snowball mixed-sampling procedure. The Google forms questionnaire, the first page of which included an informed consent statement, was distributed through social networking sites and webpages and forwarded through email to the authors’ contacts. Participants were also asked to distribute it similarly.

Table 1
Means and Standard Deviations, Coefficient Alphas, and Pearson Correlations Among the Study Variables (N = 675)

Variable	M	SD	Score range	α	1	2	3	4	5
Vicarious posttraumatic growth (VPTG)									
Relating to others	14.31	9.08	0–35	.91	—				
New possibilities	10.25	6.16	0–25	.85	.80**	—			
Personal strength	10.32	5.36	0–20	.84	.76**	.80**	—		
Spiritual change	3.53	2.95	0–10	.72	.62**	.65**	.65**	—	
Appreciation of life	8.20	4.17	0–15	.84	.68**	.68**	.72**	.62**	—
Total VPTG	46.60	24.61	0–105	.96	.93**	.93**	.90**	.76**	.84**
Secondary traumatic stress (STS)									
Mental intrusion	12.23	4.52	5–25	.79	.24**	.17**	.20**	.30**	.32**
Avoidance	16.02	5.54	7–35	.77	.15**	.11**	.13**	.20**	.26**
Arousal	12.05	4.73	5–25	.82	.14**	.12**	.11**	.17**	.24**
Total STS	40.31	13.53	17–85	.91	.19**	.14**	.16**	.24**	.30**
Coping strategies									
Self-distraction	5.22	1.62	2–8	.55	.26**	.25**	.27**	.26**	.31**
Active coping	5.86	1.52	2–8	.59	.25**	.29**	.27**	.22**	.25**
Denial	3.58	1.50	2–8	.64	.17**	.13**	.16**	.22**	.25**
Substance use	2.31	0.92	2–8	.94	-.10*	-.09*	-.10**	-.09*	-.10**
Use emotional support	4.85	1.77	2–8	.76	.30**	.21**	.17**	.14**	.21**
Use instrumental support	4.80	1.77	2–8	.82	.35**	.28**	.18**	.21**	.24**
Behavioral disengagement	2.63	1.07	2–8	.64	.01	.01	-.03	.01	.02
Venting	4.21	1.24	2–8	.60	.21**	.17**	.15**	.21**	.23**
Positive reframing	6.22	1.53	2–8	.70	.28**	.32**	.34**	.27**	.28**
Planning	6.23	1.54	2–8	.71	.17**	.20**	.25**	.15**	.23**
Humor	4.55	1.53	2–8	.47	.09*	.10*	.10**	.01	.07
Acceptance	6.43	1.37	2–8	.63	.09*	.17**	.22**	.06	.11**
Religion	4.05	1.78	2–8	.73	.29**	.30**	.29**	.65**	.32**
Self-blame	3.89	1.51	2–8	.58	.17**	.15**	.11**	.10**	.15**

* $p < .05$. ** $p < .01$. *** $p < .001$.

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Statistical Analyses

The expectation maximization algorithm was used to estimate missing values. Descriptive statistics were means and standard deviations for continuous data or frequencies and percentages for categorical data. Cronbach's alpha coefficient assessed the internal consistency of the scales. Bivariate correlation analyses were performed using Pearson product-moment correlation coefficients to examine the relationship among STS, coping strategies, and VPTG. Five hierarchical multiple regression analyses (using a stepwise method) were performed for the prediction of VPTG (i.e., per the Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation of Life subscales) by the dimensions of STS and coping strategies. All analyses with $p < .05$ were considered significant and were performed with IBM SPSS Version 23 (IBM, 2015). Three mediation analyses were conducted as path analysis models with AMOS Version 20 (Arbuckle, 2011), using maximum likelihood estimation to test the mediating effect of the three dimensions of coping (problem-focused, emotion-focused, and dysfunctional) in the relationship between STS and VPTG. Direct effects included the relationship between the latent variables STS and VPTG, whereas indirect effects included the relationship between STS and VPTG accounting for the latent variables of the three coping strategies. Parametric bootstrapping of standard errors across 2,000 samples was used for the estimation of indirect effects. Model fit indices were assessed (Hooper et al., 2008; Hu & Bentler, 1999) and demonstrated by the comparative fit index (CFI), Tucker–Lewis index (TLI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and standardized root-mean-square residual (SRMR).

Results

A high percentage of HCWs (79.3%) reported a cumulative STS score of ≥ 3 (i.e., experiencing occasionally, or often, or very often at least three symptoms; Bride et al., 2004), which is indicative of at least moderate levels of STS. Women scored significantly higher than did men in STS total and subscales scores. HCWs reported moderate to low levels of VPTG, with personal strength and appreciation of life being the highest categories. They

also reported frequent use of a range of coping strategies, with acceptance, planning, and positive reframing being the most highly endorsed, followed by active coping and self-distraction. Gender differences were found with women scoring higher in all VPTG subscales. Age negatively correlated with the VPTG dimensions of Relating to Others, $r(673) = -.09$, $p < .05$, and New Possibilities, $r(673) = -.12$, $p < .001$. The results are presented in Table 2.

Regression Analyses

All VPTG subscales correlated with the STS subscales and coping strategies (see Table 1), so they were subsequently entered as predictor variables in the regressions. Regression analyses (see Table 3) showed that the VPTG relating to others was predicted by use of instrumental support, religion, intrusion, positive reframing, substance use (inversely), and self-distraction. New possibilities were predicted by positive reframing, religion, self-distraction, use of instrumental support, and substance use (inversely). Personal strength was predicted by positive reframing, religion, acceptance, self-distraction, substance use (inversely), and denial. Spiritual change was predicted by religion, intrusion, positive reframing, use of emotional support (inversely), self-distraction, use of instrumental support, planning (inversely), and substance use (inversely). Appreciation of life was predicted by intrusion, religion, positive reframing, self-distraction, substance use (inversely), and denial.

Mediation Analyses

The three mediation analyses that examined the mediating effect of the three coping groups in the STS–VPTG relationship demonstrated acceptable model fit (see Figure 1). Both problem-focused and emotion-focused coping strategies partially mediated the STS–VPTG relationship (see Figure 1a and 1b), whereas dysfunctional coping strategies fully mediated this relationship (see Figure 1c).

Discussion

The aim of this study was to examine the association between STS and VPTG among HCWs and to explore the link between both adaptive and maladaptive coping strategies to STS and VPTG. The overwhelming majority of the HCWs exhibited

Table 2
Correlation of Age With Vicarious Posttraumatic Growth (VPTG) and Secondary Traumatic Stress (STS) and Gender Differences

Variable	Age	Men ($n = 170$) $M (SD)$	Women ($n = 503$) $M (SD)$	t
VPTG				
Relating to others	-.09*	11.46 (7.84)	15.29 (9.29)	-5.25***
New possibilities	-.12**	8.84 (5.54)	10.75 (6.30)	-3.75***
Personal strength	-.06	8.97 (5.23)	10.78 (5.33)	-3.85***
Spiritual change	-.04	2.76 (2.60)	3.79 (3.02)	-4.31***
Appreciation of life	-.04	7.08 (3.99)	8.59 (4.17)	-4.13***
Total VPTG	-.09*	39.10 (22.01)	49.20 (24.97)	-4.99***
STS				
Mental intrusion	.02	10.68 (4.23)	12.77 (4.50)	-5.49***
Avoidance	-.01	14.76 (5.55)	16.46 (5.48)	-3.46***
Arousal	-.06	10.91 (4.60)	12.45 (4.73)	-3.75***
Total STS	-.02	36.34 (13.22)	41.68 (13.40)	-4.54***

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Hierarchical Regression Results for Predicting the Dimensions of Posttraumatic Growth by the Dimensions of Secondary Traumatic Stress (STS) and Coping Strategies

Variable	Relating to others		New possibilities		Personal strength		Spiritual change		Appreciation of life	
	Step (ΔR^2)	β final	Step (ΔR^2)	β final	Step (ΔR^2)	β final	Step (ΔR^2)	β final	Step (ΔR^2)	β final
STS Mental intrusion	3 (0.02)	0.12**					2 (0.02)	0.13***	1 (0.10)	0.15***
STS Avoidance										
STS Arousal										
Self-distraction	6 (0.01)	0.10**	3 (0.02)	0.14***	3 (0.03)	0.16***	5 (0.01)	0.10**	4 (0.02)	0.15***
Active coping										
Denial					6 (0.01)	0.10**			6 (0.01)	0.10**
Substance use	5 (0.01)	-0.12***	5 (0.01)	-0.10**	5 (0.01)	-0.11***	6 (0.01)	-0.07**	5 (0.01)	-0.13***
Use emotional support							4 (0.01)	-0.17***		
Use instrumental support	1 (0.12)	0.23***	4 (0.01)	0.14***			7 (0.00)	0.11*		
Behavioral disengagement										
Venting										
Positive reframing	4 (0.02)	0.13***	1 (0.10)	0.20***	1 (0.11)	0.20***	3 (0.01)	0.15***	3 (0.04)	0.18***
Planning							8 (0.01)	-0.08*		
Humor										
Acceptance					4 (0.02)	0.14***				
Religion	2 (0.04)	0.14***	2 (0.05)	0.18***	2 (0.05)	0.18***	1 (0.43)	0.60***	2 (0.06)	0.19
Self-blame										
Total R^2	0.22		0.20		0.22		0.49		0.24	

Note. Those variables that have no data were not entered in the regression model.

* $p < .05$. ** $p < .01$. *** $p < .001$.

moderate to low levels of STS symptoms. This is in line with one study that found low and moderate STS scores in HCWs during the first period of COVID-19 pandemic (Zhou et al., 2020). Whereas other findings have shown high levels of STS among HCWs (Reynolds et al., 2008; Vagni et al., 2020), it should be noted that the lockdown in Greece was implemented soon after the first confirmed cases, intubated patients and deaths occurred, and before the health care system became overly burdened (statistics are available at https://commons.wikimedia.org/wiki/Data:COVID-19_cases_in_Greece.tab). It can be assumed that if the STS had been measured at a later point, higher scores could have been obtained because the effects of the traumatic exposure on mental health might appear in the future (Kang et al., 2020; Lai et al., 2020).

The current study also provides the first piece of empirical evidence on VPTG among HCWs who were indirectly exposed to the COVID-19 pandemic through the care of their patients. In agreement with previous findings among HCWs (Beck et al., 2017), the HCWs in our sample, although they reported moderate to low levels of VPTG during the initial period of lockdown, had higher scores in the VPTG domains of personal strength and appreciation of life. It appears that facing the COVID-19 pandemic resulted in awareness of personal capabilities and enhancement of self-confidence. Appreciation of life might be an inevitable consequence of facing life-threatening diseases and death itself. It is not known whether the other three domains (relating to others, new possibilities, and spiritual change) need more time to develop or whether the sample possessed specific characteristics that allowed change to rapidly occur in other domains. It has been shown that professionals initially respond with increased levels of distress which later are replaced by personal growth, suggesting that time is needed for any permanent change to occur (Manning-Jones et al., 2015). Therefore, higher levels of VPTG could be expected and

are reasonably likely to occur in the long run. Further, because previous studies among HCWs have found that moderate rates of STS were predictive of VPTG (Kjellenberg et al., 2014; Manning-Jones et al., 2017), and we found that STS predicted VPTG, it seems that STS might likely provide the appropriate platform for VPTG to occur in the future (Joseph, 2011). A longitudinal study might highlight potentially higher levels of VPTG.

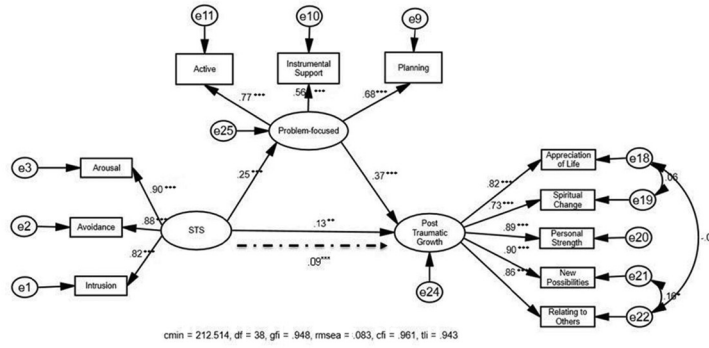
In line with other findings (Tominaga et al., 2019) in HCWs, mental intrusions predicted VPTG. It has been argued (Brooks et al., 2020; Tedeschi & Calhoun, 2004) that intrusive thinking is a natural response to a stressful event that might have an impact on the degree of growth in the aftermath of trauma. Our study provides further evidence that mental intrusions might be crucial in posttraumatic processing and might promote VPTG. It seems that a severe negative event, such as the COVID-19 pandemic, immediately initiates a cognitive process through intrusive thoughts, which potentially force HCWs to reexamine the meaning of the threat.

Females had significantly higher STS and VPTG scores than males. Studies have indicated that women are more vulnerable to STS symptoms (Cheng et al., 2006), but they can also achieve higher VPTG than men (Jeon et al., 2017). This tendency can be explained by gender differences in their response to trauma. According to Calhoun and Tedeschi (2006) women are more likely to perceive traumatic experiences as threats, and the more threatening an event is perceived, the more growth might occur. In line with other findings (Sleijpen et al., 2016), we also found age to be negatively correlated with VPTG, suggesting that younger people might be more ready to change their cognitive schemas and make positive meanings from trauma.

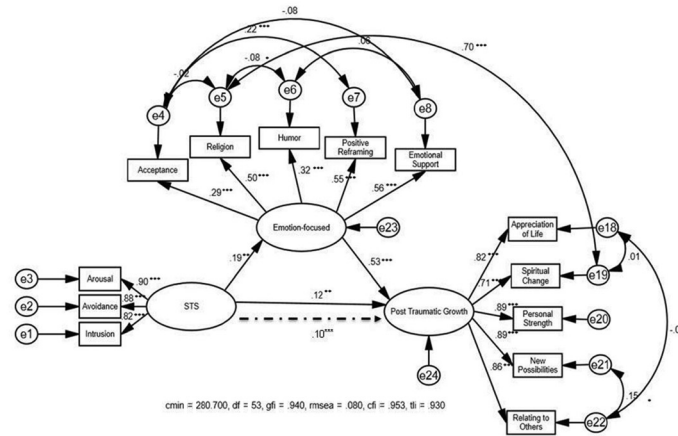
Somewhat surprisingly, we found that both adaptive and maladaptive coping strategies predicted VPTG. Whereas adaptive coping strategies (i.e., problem-focused and emotion-focused) partially mediated the relationship between STS and VPTG, the

Figure 1
Mediating Effects of (a) Problem-Focused, (b) Emotion-Focused, and (c) Dysfunctional Coping Strategies on Secondary Traumatic Stress (STS) and Vicarious Posttraumatic Growth (VPTG)

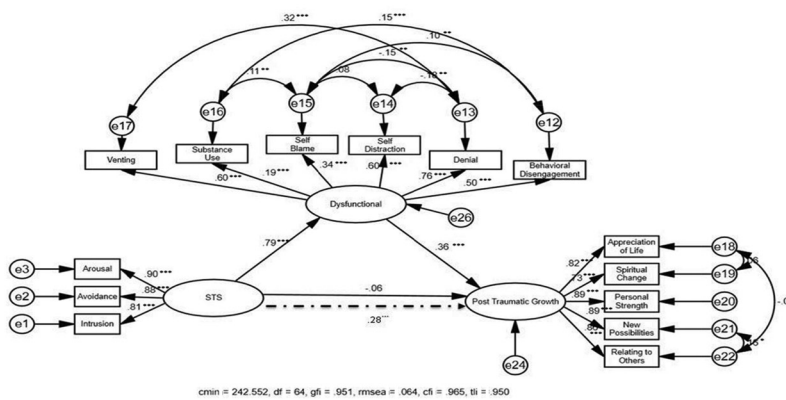
a) CMIN = 212.51, DF = 38, $p < .001$; CFI = .96; IFI = .96; TLI = .94; RMSEA = .083 (LO = .072, HI = .094); SRMR = .049



b) CMIN = 280.70, DF = 53, $p < .001$; CFI = .95; IFI = .95; TLI = .93; RMSEA = .080 (LO = .071, HI = .089); SRMR = .058.



c) CMIN = 242.55, DF = 64, $p < .001$; CFI = .97; IFI = .97; TLI = .95; RMSEA = .064 (LO = .056, HI = .073); SRMR = .063.



Note. The standardized path coefficients are presented. Dotted lines represent indirect effects.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

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maladaptive or dysfunctional coping strategies fully mediated this relationship. Consistent with the theory by Tedeschi and Calhoun (2004), coping responses seem to be mediators between the pain that the trauma causes and the consequent growth. Furthermore, different coping strategies predicted different dimensions of VPTG (Ogińska-Bulik & Zadworna-Cieślak, 2018). The more they reconsidered the situation (*positive reframing*) and turned to other activities to avoid thinking about it (*self-distraction*), the more VPTG they achieved in all five dimensions, whereas the more use of alcohol or other substances (*substance use*) the less VPTG. Admittedly, positive reframing predicted all five domains of VPTG. Whereas religion and use of instrumental support rather expectedly (Kapsou et al., 2010) predicted four and three domains, respectively, other adaptive coping strategies, such as acceptance, planning, and use of emotional support, predicted only one dimension. Kalaitzaki (2021) has shown that planning might be stressful for the HCWs as it contributed to higher STS. It was surprising though that 'self-distraction', a so-called maladaptive coping strategy predicted all five domains of VPTG, and 'denial', predicted personal strength and appreciation of life. These findings are consistent with others, suggesting that avoidance and emotionally focused strategies positively correlate with VPTG (Ogińska-Bulik & Zadworna-Cieślak, 2018). It might be that people need time to distance themselves from the threat and/or adversity (self-distraction) and at the same time reconsider the situation positively (positive reframing) in order to develop PTG (Tedeschi & Calhoun, 2004).

Although the use of maladaptive coping strategies to deal with the COVID-19 pandemic is seemingly incongruent, Main et al. (2011) have argued that adaptive strategies are effective in dealing with controllable stressors, whereas maladaptive are more effective in dealing with uncontrollable stressors such as infectious viruses. Ye et al. (2020) have also suggested that when an outbreak is perceived as a severe life-threatening situation, then maladaptive coping strategies might be employed. It seems quite plausible that the COVID-19 pandemic is perceived as an uncontrollable disease of extreme threat and uncertainty, which causes feelings of helplessness and hopelessness. It might be that, not knowing how to cope with this new situation and being required to deal with this urgently, a range of coping strategies are recruited and implemented, regardless of whether they are adaptive or maladaptive (Kalaitzaki, 2021). Maladaptive coping strategies are not an effective way to deal with stress, but they do quickly, directly, and temporarily relieve stress. It is, therefore, suggested that the strict categorization of coping strategies is needless and that any strategy that helps individuals to cope, adapt, and reconceptualize stressful events and adversities should instead be considered successful and beneficial responses to stress.

Terror management theory might also explain why dysfunctional coping strategies fully mediated the relationship between the STS and VPTG. The COVID-19 pandemic might be perceived as a mortality reminder, as thoughts of death are in focal attention and people attempt to remove them from their consciousness through suppression, denial, or minimizing perceptions of the threat, or engaging in behaviors to reduce vulnerability, such as abiding by the measures to avoid infection (Pyszczyński et al., 2021). All these coping strategies, contrary to the typical classification as maladaptive strategies, are adaptive in that they help people cope with the threat of personal death.

There are limitations to this study that should be acknowledged. Findings cannot be generalized due to the cross-sectional nature of

the study, the convenience sampling, and the overrepresentation of certain subgroups (e.g., women). Causal relationships cannot be established, and any positive impacts might not have developed yet or might not persist in the long run. It is also unknown whether the current findings can be generalized in all HCWs because most of the participants were physicians, who tend to have greater financial resources than other HCWs. Potential interspecialty differences would have provided diversified findings. The self-reported measures administered online might have resulted in social desirability and selection bias. Because HCWs treat traumatized patients, while being concurrently exposed to the same traumatic events themselves (Finklestein et al., 2015), they might suffer both PTSD and STS; future studies should examine the likelihood of HCWs suffering what we call *double traumatization*.

These findings contribute to the scant literature on VPTG (and its contributing factors) by revealing the impact of HCWs' STS and coping strategies on VPTG during the COVID-19 lockdown in Greece. The implications for the psychological rehabilitation of COVID-19 indirect trauma survivors are obvious. Acknowledging the coping strategies that HCWs use to deal with the COVID-19 pandemic could direct the development of timely and tailored prevention and intervention services. Encouraging efficient and effective coping responses to stress could safeguard those at risk and facilitate their VPTG. The present findings could also inspire future researchers to examine the underlying mechanisms of the links among coping strategies and VPTG, whether coping responses change, and whether positive changes persist over time.

References

- Arbuckle, J. (2011). *IBM SPSS Amos 20 User's Guide*. Amos Development Corporation.
- Babore, A., Lombardi, L., Viceconti, M. L., Pignataro, S., Marino, V., Crudele, M., . . . Trumello, C. (2020). Psychological effects of the COVID-2019 pandemic: Perceived stress and coping strategies among healthcare professionals. *Psychiatry Research*, *293*, 1–6. <https://doi.org/10.1016/j.psychres.2020.113366>
- Beck, C. T., Rivera, J., & Gable, R. K. (2017). A mixed-methods study of vicarious posttraumatic growth in certified nurse-midwives. *Journal of Midwifery & Women's Health*, *62*(1), 80–87. <https://doi.org/10.1111/jmwh.12523>
- Bride, B. E., Robinson, M. M., Yegidis, B., & Figley, C. R. (2004). Development and validation of the secondary traumatic stress scale. *Research on Social Work Practice*, *14*(1), 27–35. <https://doi.org/10.1177/1049731503254106>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet*, *395*(10227), 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Calhoun, L. G., & Tedeschi, R. G. (Eds.). (2006). *Handbook of post-traumatic growth: Research and practice*. Lawrence Erlbaum.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief COPE. *International Journal of Behavioral Medicine*, *4*(1), 92–100. https://doi.org/10.1207/s15327558ijbm0401_6
- Cheng, S., Chong, G., Chang, S., Wong, C., Wong, C., Wong, M., & Wong, K. (2006). Adjustment to severe acute respiratory syndrome (SARS): Roles of appraisal and post-traumatic growth. *Psychology & Health*, *21*(3), 301–317. <https://doi.org/10.1080/14768320500286450>
- Chew, Q. H., Wei, K. C., Vasoo, S., Chua, H. C., & Sim, K. (2020). Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: Practical considerations for the COVID-19 pandemic. *Singapore Medical Journal*, *61*(7), 350–356. <https://doi.org/10.11622/smedj.2020046>

- Finklestein, M., Stein, E., Greene, T., Bronstein, I., & Solomon, Z. (2015). Post-traumatic stress disorder and vicarious trauma in mental health professionals. *Health & Social Work, 40*(2), e25–e31. <https://doi.org/10.1093/hsw/hlv026>
- Gibbons, S., Murphy, D., & Joseph, S. (2011). Countertransference and positive growth in social workers. *Journal of Social Work Practice, 25*(1), 17–30. <https://doi.org/10.1080/02650530903579246>
- Hamama-Raz, Y., & Minerbi, R. (2019). Coping strategies in secondary traumatization and post-traumatic growth among nurses working in a medical rehabilitation hospital: A pilot study. *International Archives of Occupational and Environmental Health, 92*(1), 93–100. <https://doi.org/10.1007/s00420-018-1354-z>
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modeling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6*(1), 53–60. <https://doi.org/10.21427/D7CF7R>
- Hu, L., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Jeon, G. S., Park, S. Y., & Bernstein, K. S. (2017). Socio-demographic and psychological correlates of posttraumatic growth among Korean Americans with a history of traumatic life experiences. *Archives of Psychiatric Nursing, 31*(3), 256–262. <https://doi.org/10.1016/j.apnu.2016.12.002>
- Joseph, S. (2011). *What doesn't kill us: The new psychology of posttraumatic growth*. Basic Books.
- Jung, H., Jung, S. Y., Lee, M. H., & Kim, M. S. (2020). Assessing the presence of post-traumatic stress and turnover intention among nurses post-Middle East respiratory syndrome outbreak: The importance of supervisor support. *Workplace Health & Safety, 68*(7), 337–345. <https://doi.org/10.1177/2165079919897693>
- IBM Corp. (2015). *IBM SPSS Statistics for Windows, Version 23.0*.
- Kalaitzaki, A. (2021). Posttraumatic outcomes during COVID-19 lockdown: The role of resilience and coping strategies. *Psychiatrik, 32*(1), 19–25. <https://doi.org/10.22365/jpsych.2021.001>
- Kalaitzaki, A., Tamiolaki, A., & Rovithis, M. (2020). The healthcare professionals amidst COVID-19 pandemic: A perspective of resilience and post-traumatic growth. *Asian Journal of Psychiatry, 52*, 102172. <https://doi.org/10.1016/j.ajp.2020.102172>
- Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., . . . Liu, Z. (2020). Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain, Behavior, and Immunity, 87*, 11–17. <https://doi.org/10.1016/j.bbi.2020.03.028>
- Kapsou, M., Panayiotou, G., Kokkinos, C. M., & Demetriou, A. G. (2010). Dimensionality of coping: An empirical contribution to the construct validation of the brief-COPE with a Greek-speaking sample. *Journal of Health Psychology, 15*(2), 215–229. <https://doi.org/10.1177/1359105309346516>
- Kjellenberg, E., Nilsson, F., Daukantaite, D., & Cardena, E. (2014). Transformative narratives: The impact of working with war and torture survivors. *Psychological Trauma: Theory, Research, Practice, and Policy, 6*(2), 120–128. <https://doi.org/10.1037/a0031966>
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., . . . Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to Coronavirus disease 2019. *JAMA Network Open, 3*(3), e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer. https://doi.org/10.1007/978-1-4419-1005-9_215
- Main, A., Zhou, Q., Ma, Y., Luecken, L. J., & Liu, X. (2011). Relations of SARS-related stressors and coping to Chinese college students' psychological adjustment during the 2003 Beijing SARS epidemic. *Journal of Counseling Psychology American Psychological Association, 58*(3), 410–423. <https://doi.org/10.1037/a0023632>
- Manning-Jones, S., de Terte, I., & Stephens, C. (2015). Vicarious posttraumatic growth: A systematic literature review. *International Journal of Wellbeing, 5*(2), 125–139. <https://doi.org/10.5502/ijw.v5i2.8>
- Manning-Jones, S., de Terte, I., & Stephens, C. (2017). The relationship between vicarious posttraumatic growth and secondary traumatic stress among health professionals. *Journal of Loss and Trauma, 22*(3), 256–270. <https://doi.org/10.1080/15325024.2017.1284516>
- Meyer, B. (2001). Coping with severe mental illness: Relations of the Brief COPE with symptoms, functioning, and well-being. *Journal of Psychopathology and Behavioral Assessment, 23*(4), 265–277. <https://doi.org/10.1023/A:1012731520781>
- Ogińska-Bulik, N., & Zadworna-Cieślak, M. (2018). The role of resiliency and coping strategies in occurrence of positive changes in medical rescue workers. *International Emergency Nursing, 39*, 40–45. <https://doi.org/10.1016/j.ienj.2018.02.004>
- Pyszczynski, T., Lockett, M., Greenberg, J., & Solomon, S. (2021). Terror Management Theory and the COVID-19 Pandemic. *Journal of Humanistic Psychology, 61*(2), 173–189. <https://doi.org/10.1177/0022167820959488>
- Rajkumar, R. P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry, 52*, 102066. <https://doi.org/10.1016/j.ajp.2020.102066>
- Reynolds, D. L., Garay, J. R., Deamond, S. L., Moran, M. K., Gold, W., & Styra, R. (2008). Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiology and Infection, 136*(7), 997–1007. <https://doi.org/10.1017/S0950268807009156>
- Roden-Foreman, J. W., Bennett, M. M., Rainey, E. E., Garrett, J. S., Powers, M. B., & Warren, A. M. (2017). Secondary traumatic stress in emergency medicine clinicians. *Cognitive Behaviour Therapy, 46*(6), 522–532. <https://doi.org/10.1080/16506073.2017.1315612>
- Rodríguez-Rey, R., Palacios, A., Alonso-Tapia, J., Pérez, E., Álvarez, E., Coca, A., . . . Belda, S. (2017). Posttraumatic growth in pediatric intensive care personnel: Dependence on resilience and coping strategies. *Psychological Trauma: Theory, Research, Practice, and Policy, 9*(4), 407–415. <https://doi.org/10.1037/tra0000211>
- Sleijpen, M., Haagen, J., Mooren, T., & Kleber, R. J. (2016). Growing from experience: An exploratory study of posttraumatic growth in adolescent refugees. *European Journal of Psychotraumatology, 7*(1), 28698. <https://doi.org/10.3402/ejpt.v7.28698>
- Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*(3), 455–471. <https://doi.org/10.1002/jts.2490090305>
- Tedeschi, R. G., & Calhoun, L. G. (2004). Target article: "Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry, 15*(1), 1–18. https://doi.org/10.1207/s15327965pli1501_01
- Tominaga, Y., Goto, T., Shelby, J., Oshio, A., Nishi, D., & Takahashi, S. (2019). Secondary trauma and posttraumatic growth among mental health clinicians involved in disaster relief activities following the 2011 Tohoku earthquake and tsunami in Japan. *Counselling Psychology Quarterly, 33*(4), 427–447. <https://doi.org/10.1080/09515070.2019.1639493>
- Vagni, M., Maiorano, T., Giostra, V., & Pajardi, D. (2020). Coping with COVID-19: Emergency stress, secondary trauma and self-efficacy in healthcare and emergency workers in Italy. *Frontiers in Psychology, 11*(566912), 1–12. <https://doi.org/10.3389/fpsyg.2020.566912>
- Ye, Z., Yang, X., Zeng, C., Wang, Y., Shen, Z., Li, X., & Lin, D. (2020). Resilience, social support, and coping as mediators between COVID-19-related stressful experiences and acute stress disorder among college students in China. *Applied Psychology: Health and Well-Being, 12*(2), 1074–1094. <https://doi.org/10.1111/aphw.12211>
- Zhou, Q., Lai, X., Wan, C., Zhang, X., & Tan, L. (2020). Prevalence and impact of burnout, secondary traumatic stress and compassion satisfaction on hand hygiene of healthcare workers in medical aid team during COVID-19 pandemic. <https://doi.org/10.21203/rs.3.rs-28820/v1>

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