



## Profiles in COVID-19: peritraumatic stress symptoms and their relation with death anxiety, anxiety sensitivity, and emotion dysregulation

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### ABSTRACT

**Background:** The COVID-19 pandemic might be experienced as an ongoing traumatic event and could result in peritraumatic stress symptoms. Evidence implies that individuals' levels of death anxiety, anxiety sensitivity, and difficulties in emotion regulation may contribute to their peritraumatic stress symptomatology in the aftermath of trauma exposure.

**Objective:** The current study aimed to explore these hypotheses in the context of the COVID-19 pandemic.

**Method:** An online survey was conducted among a convenience sample of 846 Israeli adults from April 2 to 19 April 2020. COVID-19-related stressors, death anxiety, anxiety sensitivity, difficulties in emotion regulation, and peritraumatic stress symptoms were assessed via self-report questionnaires.

**Results:** Analyses indicated significant relations between death anxiety, anxiety sensitivity, and emotion regulation difficulties, on the one hand, and peritraumatic stress symptoms, on the other. Three distinct profiles were identified. Furthermore, profile type – namely having low, medium, and high levels of death anxiety, anxiety sensitivity, and emotion dysregulation – had a significant effect in explaining peritraumatic stress symptoms.

**Conclusions:** Results suggest that during the pandemic, levels of death anxiety, anxiety sensitivity, and emotion dysregulation may explain heterogeneity in individuals' trauma-related symptomatology.

### Perfiles en COVID-19: síntomas de estrés peritraumático y su relación con la ansiedad por la muerte, sensibilidad de la ansiedad, y desregulación emocional

**Antecedentes:** La pandemia del COVID-19 podría ser experimentada como un evento traumático en curso y podría resultar en síntomas de estrés peritraumático. La evidencia implica que los niveles individuales de la ansiedad por la muerte, la sensibilidad de la ansiedad, y las dificultades en la regulación emocional podrían contribuir a su sintomatología del estrés peritraumático en las secuelas de la exposición al trauma.

**Objetivo:** El presente estudio buscó explorar estas hipótesis en el contexto de la pandemia del COVID-19.

**Método:** Se realizó una encuesta en línea en una muestra por conveniencia de 846 adultos israelíes desde el 2 al 19 de abril de 2020. Los estresores relacionados al COVID-19, la ansiedad por la muerte, la sensibilidad de ansiedad, las dificultades en la regulación emocional, y los síntomas de estrés peritraumático fueron evaluados por medio de cuestionarios de auto-reporte.

**Resultados:** Los análisis indicaron relaciones significativas entre la ansiedad por la muerte, la sensibilidad de la ansiedad, y las dificultades de regulación emocional, por un lado, y los síntomas de estrés peritraumático, por el otro lado. Tres perfiles distintivos fueron identificados. Además, el tipo de perfil – específicamente tener niveles bajos, medios, y altos de ansiedad por la muerte, sensibilidad de la ansiedad, y desregulación emocional – tuvieron un efecto significativo en explicar los síntomas de estrés peritraumático.

**Conclusión:** Los resultados sugieren que, durante la pandemia, los niveles de ansiedad por la muerte, sensibilidad de la ansiedad, y desregulación emocional podrían explicar la heterogeneidad en la sintomatología relacionada al trauma de los individuos.

### COVID-19 概况: 创伤后应激症状及其与死亡焦虑, 焦虑敏感性和情绪失调的关系

**背景:** COVID-19 疫情可能被视为一件持续的创伤性事件, 并可能导致创伤性应激症状。证据表明个体的死亡焦虑水平, 焦虑敏感性和情绪调节困难可能会导致他们在创伤暴露后的创伤性应激症状。

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### 关键词

创伤性应激症状; 死亡焦虑; 焦虑敏感性; 情绪调节; 新冠肺炎; COVID-19; 疫情

### HIGHLIGHTS

- Death anxiety was related to peritraumatic stress symptoms.
- Anxiety sensitivity was related to peritraumatic stress symptoms.
- Emotion regulation was related to peritraumatic stress symptoms.
- Three profiles were found.
- Profile type explained peritraumatic stress symptoms.

**目的:** 当前研究旨在 COVID-19 疫情背景下探索这些假设。

**方法:** 在 2020 年 4 月 2 日至 4 月 19 日期间, 在一个 846 名以色列成年人便利样本中进行了一项在线调查。通过自我报告问卷评估 COVID-19 相关应激源, 死亡焦虑, 焦虑敏感性, 情绪调节困难和创伤性应激症状。

**结果:** 分析表明, 一方面死亡焦虑, 焦虑敏感性和情绪调节困难之间存在显著关联, 另一方面也与创伤性应激症状之间存在显著关联。确定了三个不同的剖面。此外, 剖面类型——即具有低, 中和高水平的死亡焦虑, 焦虑敏感性和情绪失调——在解释创伤性应激症状上有显著效应。

**结论:** 结果表明, 在疫情期间, 死亡焦虑, 焦虑敏感性和情绪失调的水平可以解释个体创伤相关症状的异质性。

## 1. Introduction

In December 2019, the novel and highly infectious severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) – the virus that causes COVID-19 – broke out in Wuhan, China and quickly escalated into a global pandemic by 11 March 2020. SARS-CoV-2 is highly transmissible in humans and may lead to a wide range of symptoms ranging from mild symptoms (e.g. fever, dry cough) to severe illness (e.g. difficulty breathing or shortness of breath, chest pain or pressure; Johns Hopkins University & Medicine, 2021). Since the outbreak of the COVID-19 pandemic, 186.4 million people globally have been diagnosed with it, and 4.03 million people have died as a result of it (Johns Hopkins University & Medicine, 2021). The pandemic has had worldwide catastrophic repercussions, including national lockdowns, unprecedented levels of unemployment and economic crises, overwhelmed hospital systems, and closures of workplaces, schools, and cultural centres (OECD, 2020).

The pandemic has unleashed a multitude of stressors in the daily lives of many, including but not limited to loneliness and isolation during lockdowns and social distancing (Beam & Kim, 2020); the stress of belonging to a high-risk group (Sun, Qiu, Huang, & Yang, 2020); and fear for the health and safety of loved ones at risk for COVID-19 (Mertens, Gerritsen, Duijndam, Salemin, & Engelhard, 2020). In addition, many have had to deal with the fear of death (Menzies & Menzies, 2020) or of surviving COVID-19 with lasting negative health effects (Marshall, 2020). In the United States between mid-February and mid-March 2020, the rise in stressors was reflected in the increased demand for prescriptions for anti-anxiety medication (by 34.1%), anti-depressants (by 18.6%), and sleep medications (by 14.8%; Digon, 2020).

Furthermore, COVID-19 might be experienced as an ongoing traumatic event and could potentially eventuate in peritraumatic stress symptoms which reflect responses that occur during and immediately following trauma exposure, comprising intrusion, avoidance, negative changes in mood and cognition, and hyperarousal clusters (Horesh & Brown, 2020). The intrusion cluster signifies a re-experiencing of the traumatic event (e.g. flashbacks, nightmares). The

avoidance cluster reflects persistently avoiding stimuli associated with the traumatic event (e.g. avoidance of trauma reminders). The negative changes in mood and cognition cluster consists of pessimistic beliefs (e.g. negative views about oneself or the world) and negative mood states (e.g. fear, guilt, shame). Lastly, the hyperarousal cluster reflects elevated reactivity to stimuli (e.g. exaggerated startle response, irritability, and aggression; American Psychiatric Association, 2013).

Previous studies have indeed documented peritraumatic stress symptomatology during the pandemic. In a study conducted in the immediate aftermath of the COVID-19 outbreak that examined peritraumatic stress symptoms in 6,049 participants, 13.0% exhibited moderate and 6.1% displayed high levels of symptoms (Jiang, Nan, Lv, & Yang, 2020). In another study, conducted in the first month after the U.S. declared a state of emergency due to the pandemic, 898 participants reported high levels of depression (43.3%), anxiety (45.4%), and peritraumatic stress symptoms (31.8%; Liu, Zhang, Tin, Hyun, & Hahm, 2020).

Yet trauma-related symptomatology may vary across individuals, with some being susceptible to peritraumatic stress symptoms more than others. In the face of the ongoing pandemic, conducting momentary assessment methods in order to identify vulnerable populations and factors related to elevated symptomatology is of importance (Horesh & Brown, 2020). Specifically, although evidence indicates that only a minority of people are vulnerable to long-term distress in the aftermath of trauma exposure (Bonanno, 2004; Santiago et al., 2013), the global scale and ongoing nature of the present pandemic may significantly increase the mental health burden of peritraumatic symptomatology (Horesh & Brown, 2020). Furthermore, as peritraumatic distress has been found to be one of the most powerful predictors of subsequent posttraumatic stress disorder (PTSD) (Thomas, Saumier, & Brunet, 2012; Vance, Kovachy, Dong, & Bui, 2018), uncovering factors that are associated with elevated symptomatology during the peritraumatic phase may contribute to the development of preventative interventions meant to reduce the incidence of COVID-19-related traumatic stress (Horesh & Brown, 2020). The present investigation addressed

this subject matter and explored the contribution of death anxiety, anxiety sensitivity, and emotion regulation in explaining peritraumatic stress symptoms during the pandemic.

Given the higher mortality rates of COVID-19 compared to previous coronaviruses and influenza (Maragakis, 2021), death anxiety could be expected to be implicated in one's trauma-related symptoms (Lee, Jobe, Mathis, & Gibbons, 2020). Death anxiety is defined as the anticipation and awareness of the reality of dying and death that includes cognitive, emotional, and motivational components that can vary by sociocultural life occurrences and one's developmental stage (Lehto & Stein, 2009). It has been argued that death anxiety is a personality trait, suggesting that some individuals may be more vulnerable to experiencing it than others (Pettigrew & Dawson, 1979). Becker claimed that human behaviour is basically motivated by death anxiety, and that the individual expends a great deal of energy in denying death in order to keep death anxiety under control (Becker, 1973). Nevertheless, when these efforts fail, the experience of death anxiety may lead to maladaptive responses, such as existential worries or avoidant self-protective responses (Sharif Nia et al., 2019), and to psychopathology (Furer & Walker, 2008).

Death anxiety may also affect reactions to the current pandemic, and be related to peritraumatic stress symptoms. Studies have found death anxiety to be associated with PTSD in the aftermath of disease (e.g. Cella & Tross, 1987; Safren, Gershuny, & Hendriksen, 2003). In a sample of 75 adults with HIV, it was found that those with higher death anxiety may have been interpreting their illness symptoms in a more maladaptive and catastrophic way than those with lower death anxiety, resulting in more PTSD symptoms (Safren et al., 2003). A similar process may be taking place during the current pandemic, such that individuals' death anxiety may contribute to their peritraumatic stress symptoms.

Anxiety sensitivity appears to be another factor that, during this pandemic, could be associated with trauma-related symptomatology. Anxiety sensitivity is conceptualized as a fear of anxiety-related somatic sensations due to the expectation of consequences that can be catastrophic (Reiss, 1991). Individuals with high levels of anxiety sensitivity tend to negatively interpret benign somatic sensations as being potentially dangerous or catastrophic (Rosmarin, Bourque, Antony, & McCabe, 2009). This tendency, in turn, may intensify the sense of threat in the face of the current pandemic and increase one's vulnerability to trauma-related symptomatology. Individuals with high levels of anxiety sensitivity might interpret normal sensations as indications of having contracted COVID-19 or of other serious medical conditions that would make them particularly vulnerable at this

time, and, as a result, experience elevated fears and worries (Rogers et al., 2021), as well as peritraumatic stress symptomatology.

Research has indicated that anxiety sensitivity might intensify the experience of threat during the pandemic, resulting in a fear of contamination and compulsive hygiene checks (Taylor et al., 2020). Stress stemming from COVID-19 has been found to be associated with a greater likelihood of clinically significant anxious arousal symptom severity and global anxiety symptom severity at higher levels of anxiety sensitivity (Manning et al., 2021). Furthermore, research has found associations between anxiety sensitivity and PTSD (e.g. Elwood, Mott, Williams, Lohr, & Schroeder, 2009), perhaps due to anxiety sensitivity serving as a broad-based cognitive vulnerability for anxiety and related problems (Leen-Feldner, Feldner, Reardon, Babson, & Dixon, 2008).

One's ability to modulate emotions, known as emotion regulation, may be a third factor contributing to peritraumatic stress symptoms in the context of this pandemic. Emotion regulation has been defined as 'the ability to monitor, understand, and accept emotions, and to engage in goal-directed behavior when emotionally activated' (Roemer et al., 2009, p. 143), and is the conscious or unconscious effort to affect the intensity or duration of an emotion (Gross & Thompson, 2007). Difficulties in emotion regulation can lead to challenges in controlling one's behaviours when experiencing emotional distress, prevent the individual from employing adaptive coping strategies, and lead to further maladaptive reactions such as rumination, catastrophizing, and a lack of positive reappraisal (Gratz & Roemer, 2004). Emotion dysregulation appears to play a role in various mental health difficulties, including PTSD symptomatology (Bardeen, Kumpula, & Orcutt, 2013; Weiss, Dixon-Gordon, Peasant, & Sullivan, 2018). In studies of participants in the early phase of the COVID-19 outbreak, emotion dysregulation was related to depression severity (Moccia et al., 2020) and health anxiety (Jungmann & Witthöft, 2020). Furthermore, peritraumatic stress symptomatology was found to increase with greater levels of exposure to COVID-19 when participants demonstrated a greater reliance on maladaptive versus adaptive strategies to modulate emotions (Jiang et al., 2020).

The aforementioned literature suggests that death anxiety, anxiety sensitivity, and emotion dysregulation may be associated with trauma-related symptoms in the context of the pandemic, such that higher levels of each of these factors may be related to elevated levels of peritraumatic stress symptoms. Nevertheless, the relation between different patterns of combinations between these three factors and peritraumatic stress symptoms is unknown. One could postulate that distinct profiles of death anxiety, anxiety sensitivity, and

emotion dysregulation might exist and explain the heterogeneity in peritraumatic stress symptomatology among individuals. For example, it might be that individuals who are characterized by high levels of death anxiety, anxiety sensitivity, and emotion dysregulation are particularly vulnerable to peritraumatic stress symptomatology during the pandemic. These individuals may interpret benign somatic sensations as indications of having contracted COVID-19, and be especially anxious over the threat of dying as a result of the disease. Moreover, given the challenges they have in being aware of the existence of their emotions as well as in understanding and modulating them, these individuals may experience their emotions as unmanageable, and may over-rely on maladaptive strategies, which could further intensify their peritraumatic distress in the long run. Conversely, individuals who are characterized by lower levels of death anxiety, anxiety sensitivity, and emotion dysregulation might be relatively resilient in the face of the pandemic. These individuals might be less threatened by bodily sensations and rightly ascertain normal bodily experiences as innocuous. They may be less preoccupied with existential worries, more able to keep the threat of death due to COVID-19 at bay, and more capable of utilizing adaptive strategies to handle their emotional responses. These tendencies, in turn, may reduce their risk for trauma-related symptomatology, as manifested in lower levels of peritraumatic stress symptomatology.

To explore this prospect – that is, to uncover differential profiles of death anxiety, anxiety sensitivity, and emotion dysregulation and their link with peritraumatic symptomatology – it may not be satisfactory to utilize traditional variable-centred statistical approaches. Rather, a more nuanced exploration, which takes into account a wide range of combinations and patterns between the explanatory variables, is needed. Nevertheless, to the best of our knowledge, to date this sort of investigation has not been conducted. Being the first, presumably, to address this gap, the current study, which was conducted during the first wave of the pandemic in Israel, was exploratory in nature. Three main goals were set:

- (a) To explore the relations between death anxiety, anxiety sensitivity, and emotion dysregulation, on the one hand, and peritraumatic stress symptoms, on the other.
- (b) To identify profiles of death anxiety, anxiety sensitivity, and emotion dysregulation, and their prevalence.
- (c) To assess the contribution of profile type (i.e. a combination of death anxiety, anxiety sensitivity, and emotion dysregulation) in explaining peritraumatic stress symptoms.

## 2. Methods

### 2.1. Participants and procedure

An online survey was conducted among a convenience sample of Israeli adults. The survey was accessible through Qualtrics, a secure web-based survey data collection system. The survey took an average of 25 minutes to complete and was open from 2 April 2020 to 19 April 2020. It was anonymous and no data were collected that linked participants to recruitment sources. The Tel Aviv University institutional review board (IRB) approved all procedures and instruments. Clicking on the link to the survey guided potential respondents to a page that provided information about the purpose of the study, the nature of the questions, and a consent form (stating that the survey was voluntary, respondents could quit at any time, and responses would be anonymous). The first page also offered researcher contact information. Each participant was given the opportunity to take part in a lottery that rewarded four \$60 gift vouchers to the winners.

A total of 1,500 people began the survey, and 976 answered some of the questionnaires. Of them, 846 participants (86.7%) who provided data concerning the study variables were included in this study. Participants' ages ranged from 18 to 78 ( $M = 43.97$ ,  $SD = 14.08$ ). Most of the sample were women (80.8%); secular (67.1%); with a high school education or under (51.5%); and in a relationship (64.0%). Half of the sample had an average Israeli income or above (50.3%).

### 2.2. Measures

#### 2.2.1. Background variables

Participants completed a brief demographic questionnaire that assessed age, gender, education, relational status, religiosity, and income.

#### 2.2.2. COVID-19-related stressors

Specific stressors related to the COVID-19 pandemic were measured via items designed by the research team. Participants were asked to indicate 1) how they perceived their own physical health, 2) whether they were in quarantine, 3) whether they were living alone during the outbreak, 4) whether they belonged to a high-risk group for COVID-19, 5) whether they had close others who belonged to a high-risk group, 6) whether they had close others who were hospitalized due to the disease, 7) whether they had close others diagnosed with the disease, 8) whether they were diagnosed with the disease, 9) whether they experienced the loss of close others due to the disease. All stressors, apart from perceiving one's health, were coded as dummy variables, with '0' reflecting the absence of a stressor and '1' reflecting the presence of a stressor. Participants' perceptions



regarding their own health ranged from 1 (*bad*) to 5 (*excellent*). Given that fewer than eight participants reported experiencing either of the last two stressors (being diagnosed with the disease and experiencing the loss of close others due to the disease), these specific stressors were not included in the present analyses.

### 2.2.3. Peritraumatic stress symptoms during the pandemic

Peritraumatic stress symptoms were measured via a modified version of the PTSD Checklist for the DSM-5 (PCL-5; Weathers et al., 2013). This 20-item self-report measure asks participants to indicate the extent to which they experienced each PTSD symptom, on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). The original version was adapted for the current study so that the timeframe for experiencing each symptom was changed from 'in the past month' to 'since the outbreak of the COVID-19 pandemic,' and the index event was the COVID-19 pandemic. The PCL-5 demonstrates high internal consistency and test-retest reliability (Bovin et al., 2016). Internal consistency reliabilities in this study for intrusion, avoidance, negative alterations in mood and cognition, and hyperarousal clusters were good ( $\alpha = 0.89, 0.82, 0.83, 0.83$ , respectively).

### 2.2.4. Difficulties in emotion regulation

Difficulties in emotion regulation were measured via the 16-item Difficulties in Emotion Regulation Scale (Bjureberg et al., 2016), which assesses five domains: non-acceptance of negative emotions, inability to engage in goal-directed behaviours when distressed, difficulties controlling impulsive behaviours when distressed, limited access to effective emotion regulation strategies, and lack of emotional clarity. Participants are asked to rate the extent to which each item applies to them on a 5-point Likert-type scale from 1 (*almost never*) to 5 (*almost always*). The DERS-16 has been found to have good test-retest reliability and adequate convergent validity (Bjureberg et al., 2016). Internal consistency reliability in this study for the total score was excellent ( $\alpha = 0.94$ ).

### 2.2.5. Death Anxiety Scale (Templer, 1970)

Death anxiety was assessed via the Death Anxiety Scale (Templer, 1970) which includes 15 items. Participants were asked to indicate whether they agreed with each of the statements ('0' reflecting disagreement and '1' reflecting agreement). Higher scores reflected greater levels of death anxiety. In a prior study, this scale was reported to have good internal consistency (Templer, 1970). In this study, internal consistency reliability was reasonably high ( $\alpha = 0.71$ ).

### 2.2.6. The Anxiety Sensitivity Index Revised (ASI-R; Cox, Taylor, Borger, Fuentes, & Ross, 1996)

The ASI-R is a 36-item, self-report rating scale used to assess anxiety sensitivity. Participants are asked to indicate the extent to which they agree with each statement on a 5-point Likert-type scale ranging from 0 (*not at all*) to 4 (*very much*). The total score is computed by summing all items and ranges from 0 to 144, with higher scores reflecting higher levels of anxiety sensitivity. The ASI-R has been found to have good psychometric properties (Cox et al., 1996). Internal consistency reliability in this study for the total score was excellent ( $\alpha = 0.96$ ).

## 2.3. Analytic strategy

To explore the relations between death anxiety, anxiety sensitivity, and emotion dysregulation on the one hand, and peritraumatic stress symptoms, on the other, we conducted Pearson correlation analyses. To derive discrete latent variables that describe distinct subgroups of participants who share similar patterns of death anxiety, anxiety sensitivity, and emotion dysregulation, a latent profile analysis (LPA) was conducted. Four models were tested with increasing numbers of profiles: (1) a model with equal variances and covariances fixed to 0, (2) a model with equal variances and equal covariances, (3) a model with varying variances and covariances fixed to 0, and (4) a model with varying variances and varying covariances. The best fitting model was determined by an analytic hierarchy process that makes use of Akaike's Information Criterion (AIC), Approximate Weight of Evidence (AWE), Bayesian Information Criterion (BIC), Classification Likelihood Criterion (CLC), Kullback Information Criterion (KIC), entropy and by theoretical interpretability (Akogul & Erisoglu, 2017).

Next, to examine the association between latent class membership derived from the LPA and peritraumatic stress symptoms, MANCOVAs were conducted. Age, gender, income, perception of one's health, and belonging/not belonging to a high-risk group for COVID-19, which were found to be related to peritraumatic stress symptoms ( $P < .05$ ), were entered as covariates. The tidy LPA R package was used to conduct the LPA, while SPSS 27 was used to conduct Pearson correlation analyses and the MANCOVAs.

## 3. Results

### 3.1. Stressors during the COVID-19 pandemic

Several COVID-19-related stressors were reported by the respondents. These included being in quarantine

( $n = 75$ , 8.8%), living alone during the outbreak ( $n = 127$ , 15.0%), belonging to a high-risk group for COVID-19 ( $n = 274$ , 32.3%), perceiving one's health as not good or as poor ( $n = 58$ , 6.8%), having close others who belonged to a high-risk group ( $n = 708$ , 83.4%), and having close others who were diagnosed with the disease ( $n = 59$ , 6.9%).

### 3.2. Death anxiety, anxiety sensitivity, emotion dysregulation, and peritraumatic stress symptoms

Of the total sample, 27.8% ( $n = 321$ ) reported at least one intrusion symptom, 26.9% ( $n = 228$ ) reported at least one avoidance symptom, 59.4% ( $n = 504$ ) reported at least one symptom reflecting negative alterations in mood and cognition, and 62.2% ( $n = 528$ ) reported at least one hyperarousal symptom. Table 1 presents the study's variables and inter-correlations. As can be seen in the table, death anxiety, anxiety sensitivity, and emotion dysregulation were associated with peritraumatic stress symptoms: The higher the scores on death anxiety, anxiety sensitivity, and emotion dysregulation, the higher the intrusion, avoidance, alteration in cognition and mood symptoms, and hyperarousal peritraumatic stress symptoms.

### 3.3. Profiles of death anxiety, anxiety sensitivity, emotion dysregulation

Results indicated that the best fitting model was a three-profile model with varying variances and varying covariances (see Table 2). This model fit best across criteria, except for entropy, which was, nevertheless, in the acceptable range (Jung & Wickrama, 2008). Profile 1 ( $n = 142$ ; 16.7% of entire sample) was characterized by relatively low levels of death anxiety, anxiety sensitivity, and emotion dysregulation. Profile 2 ( $n = 429$ ; 50.5% of the entire sample) was characterized by relatively moderate levels of death anxiety, anxiety sensitivity, and emotion dysregulation. Last, Profile 3 ( $n = 278$ ; 32.7% of the entire sample) was characterized by relatively high levels of death anxiety, anxiety sensitivity, and emotion dysregulation (see Figure 1).

### 3.4. Profile membership and peritraumatic stress symptoms

We conducted MANCOVAs to assess the contribution of profile variation in explaining peritraumatic stress symptoms, above and beyond age, gender, income, perception of one's health, and belonging/not belonging to a high-risk group for COVID-19

**Table 1.** Inter-correlations between death anxiety, anxiety sensitivity, and emotion dysregulation, and peritraumatic stress symptoms, since the outbreak of the COVID-19 pandemic ( $n = 849$ ).

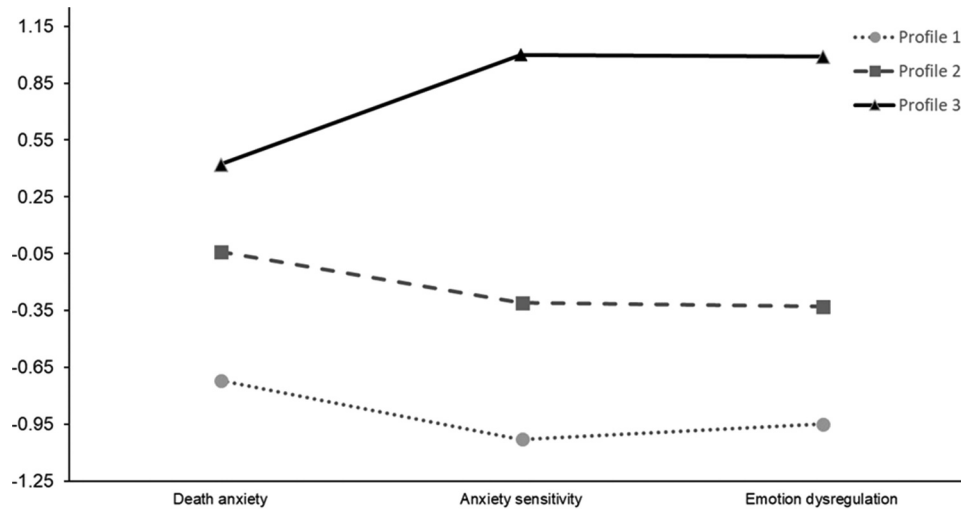
Measure	1	2	3	4	5	6	7
1. Death anxiety	-						
2. Anxiety sensitivity	.47***	-					
3. Emotion dysregulation	.26***	.52***	-				
4. Peritraumatic intrusion symptoms	.35***	.47***	.33***	-			
5. Peritraumatic avoidance symptoms	.32***	.41***	.32***	.69***	-		
6. Peritraumatic negative alterations in mood and cognition	.32***	.45***	.48***	.67***	.59***	-	
7. Peritraumatic hyperarousal symptoms	.36***	.52***	.48***	.69***	.58***	.76***	-
M (SD)	8.01 (2.97)	31.69 (25.17)	29.76 (11.55)	3.24 (3.90)	1.35 (1.79)	5.13 (4.74)	5.53 (4.67)
Range	14	137	64	19	8	26	21

\*\*\*  $p < .001$ .

**Table 2.** Latent profile analysis fit indices ( $n = 849$ ).

Model number	Classes	AIC	BIC	Entropy
1	1	7237.07	7265.54	1.00
(equal variances and covariances fixed to 0)				
1	2	6753.76	6801.20	0.85
1	3	6629.09	6695.51	0.75
2	1	6767.01	6809.70	1.00
(equal variances and equal covariances)				
2	2	6559.11	6620.78	0.89
2	3	6565.08	6645.73	0.52
3	1	7237.07	7265.54	1.00
(varying variances and covariances fixed to 0)				
3	2	6431.21	6492.88	0.73
3	3	6240.84	6335.72	0.70
4	1	6767.01	6809.70	1.00
(varying variances and varying covariances)				
4	2	6245.65	6335.79	0.67
<b>4<sup>a</sup></b>	<b>3</b>	<b>6164.99</b>	<b>6302.57</b>	<b>0.69</b>

<sup>a</sup>The best fitting model. AIC = Akaike information criterion, BIC = Bayesian information criterion. Lower AIC, BIC values indicate a better fitting model. Entropy values approaching 1 indicate high classification probabilities, and entropy values between 0.60 and 0.80 are still in the acceptable range.



**Figure 1.** Mean standardized values of death anxiety, anxiety sensitivity, and emotion dysregulation according to profile.

**Table 3.** The contribution of profile variation in explaining peritraumatic stress symptoms since the outbreak of the COVID-19 pandemic ( $n = 849$ ).

	Peritraumatic intrusion symptoms		Peritraumatic avoidance symptoms		Peritraumatic negative alterations in mood and cognition		Peritraumatic hyperarousal symptoms	
	$F$	$\eta^2_p$	$F$	$\eta^2_p$	$F$	$\eta^2_p$	$F$	$\eta^2_p$
Age	2.79 (1, 838)	.00	4.92* (1, 838)	.01	19.81*** (1, 838)	.02	19.71*** (1, 838)	.02
Gender	3.24 (1, 838)	.00	.10 (1, 838)	.00	.16 (1, 838)	.00	.68 (1, 838)	.00
Income	2.15 (1, 838)	.00	6.24* (1, 838)	.01	9.20** (1, 838)	.01	6.30* (1, 838)	.01
Perceived health	14.03*** (1, 838)	.02	3.90* (1, 838)	.01	16.58*** (1, 838)	.02	12.32*** (1, 838)	.01
Belong/don't belong to risk group	4.25* (1, 838)	.01	3.37 (1, 838)	.00	.23 (1, 838)	.00	2.49 (1, 838)	.00
Profile type	54.06*** (2, 838)	.11	40.61*** (2, 838)	.09	96.52*** (2, 838)	.19	100.94*** (2, 838)	.19

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

(see Table 3). As can be seen, profile type had significant effects in explaining peritraumatic stress symptoms. Participants who were classified as Profile 3 were characterized by high death anxiety, anxiety sensitivity, and emotion dysregulation and had the highest scores on intrusion, avoidance, alteration in cognition and mood symptoms, and hyperarousal peritraumatic stress symptoms ( $M = 5.14$ ,  $SD = 4.54$ ;  $M = 2.06$ ,  $SD = 1.98$ ;  $M = 8.19$ ,  $SD = 5.18$ ;  $M = 8.46$ ,  $SD = 5.04$ , respectively); following participants who were classified as Profile 2 and were characterized by medium levels of death anxiety, anxiety sensitivity, and emotion dysregulation ( $M = 2.78$ ,  $SD = 3.33$ ;  $M = 1.24$ ,  $SD = 1.70$ ;  $M = 4.22$ ,  $SD = 3.85$ ;  $M = 4.81$ ,  $SD = 3.81$ , respectively); and participants who were classified as Profile 1 and were characterized by low levels of death anxiety, anxiety sensitivity, and emotion dysregulation ( $M = .85$ ,  $SD = 1.91$ ;  $M = .30$ ,  $SD = .77$ ;  $M = 1.92$ ,  $SD = 2.55$ ;  $M = 1.95$ ,  $SD = 2.42$ , respectively). These effects were significant above and beyond the effects of age, gender, income, perception of one's health, and

belonging/not belonging to a high-risk group for COVID-19.

#### 4. Discussion

Given that for some people the COVID-19 pandemic might be experienced as an ongoing traumatic event (Horesh & Brown, 2020), identifying the factors that are related to individuals' peritraumatic symptomatology is important. This study explored the link between death anxiety, anxiety sensitivity, emotion dysregulation, and peritraumatic stress symptoms during the pandemic's first wave in Israel. Results indicated significant correlations between death anxiety, anxiety sensitivity, and emotion dysregulation, and peritraumatic stress symptoms: The higher the scores on death anxiety, anxiety sensitivity, and emotion dysregulation, the higher the intrusion, avoidance, alteration in cognition and mood, and hyperarousal peritraumatic stress symptoms. Furthermore, results revealed

different patterns of death anxiety, anxiety sensitivity, and emotion dysregulation among participants, which explained levels of peritraumatic stress symptoms.

The present results indicated that elevated death anxiety was related to higher levels of peritraumatic stress symptoms. Our findings are in line with Becker's (1973) theory, according to which death anxiety can play a role in psychopathology. They are also consistent with previous findings, such as from a study conducted among 1,210 Chinese participants that took place at the start of the outbreak, which found that participants' perceptions of their mortality were related to their virus-related distress (Wang et al., 2020).

Given the current state of affairs – that is, the global spread of a highly contagious virus which can result in death – individuals who suffer from elevated anxiety concerning their mortality may experience the pandemic as an ongoing and severe threat. Moreover, the newness of the SARS-CoV-2 virus, the fact that much is not yet known about its long-term consequences, and the unending media coverage devoted to it (Su et al., 2021) may intensify these individuals' distress (Bendau et al., 2020), leading them to experience the pandemic as traumatic and to develop, as a result, peritraumatic symptomatology.

Our results also indicated positive relations between anxiety sensitivity and peritraumatic stress symptoms. These findings are consistent with previous research that revealed a link between anxiety sensitivity and trauma-related symptoms in the aftermath of disease (Rogers et al., 2021; Taylor et al., 2020). It might be that individuals with elevated anxiety sensitivity respond more intensely to traumatic or stressful events, such as those related to the pandemic, and thus suffer from elevated distress (Rogers et al., 2021). Also, it is reasonable to suggest that during the current pandemic, the propensity to focus on one's bodily signals and negatively appraise benign physical sensations increases the experience of threat and leads to perseveration and rumination about the possibility of contagion, illness, or even death, which in turn contributes to trauma-related symptomatology.

The third factor examined, emotion regulation, was also associated with participants' peritraumatic stress symptomatology, so that higher levels of emotion regulation difficulties were related to elevated symptoms. Individuals who suffer from emotion dysregulation may experience more intensive negative emotions which could last for longer periods of time (Gratz & Roemer, 2004). Furthermore, difficulties in emotion regulation may not only prevent individuals from employing adaptive coping strategies, they may also lead to reliance on maladaptive strategies (Gubler, Makowski, Troche, & Schlegel, 2020), which exacerbate distress in the long run. These adverse

implications may in turn intensify one's vulnerability when facing the ongoing stress of the pandemic, leading to trauma-related symptomatology.

Emotion dysregulation has previously been found to play a role in psychopathology via rumination, catastrophizing, or self-blame (Aldao, Nolen-Hoeksema, & Schweizer, 2010). A study among 127 healthy individuals who suffered from increased trait anxiety indicated that maladaptive emotion regulation strategies measured prior to the pandemic predicted state anxiety and perceived stress during the pandemic (Brehl, Schene, Kohn, & Fernández, 2021). Another study comprising 6,049 participants in China revealed associations between emotion regulation strategies and peritraumatic stress symptoms during the pandemic: Cognitive appraisal, which is an adaptive emotion regulation strategy, was negatively associated with belonging to a profile that was characterized by elevated peritraumatic stress symptoms, whereas expression inhibition, a maladaptive emotion regulation strategy, had the opposite direction of association (Jiang et al., 2020).

As this study was cross-sectional, the directionality of the associations found cannot be determined. Thus, the relations between death anxiety, anxiety sensitivity, and emotion regulation, on the one hand, and peritraumatic stress symptoms, on the other, might also reflect the effects of trauma-related symptomatology on all three factors or reciprocal relations between them. The latter suggests that a vicious cycle might exist wherein individuals' death anxiety, anxiety sensitivity, and emotion dysregulation contribute to elevated peritraumatic stress symptomatology, which in turn, intensifies all three. Research has provided support for this line of thought. For example, a study among 677 survivors of traumatic physical injury revealed that the associations between anxiety sensitivity and PTSD symptom severity were bidirectional, insofar as the anxiety sensitivity predicted subsequent PTSD symptom severity which, in turn, predicted later anxiety sensitivity (Marshall, Miles, & Stewart, 2010). Additionally, findings from a study examining emotion regulation difficulties and posttraumatic stress symptoms among students in the aftermath of a school shooting on their university campus indicated that emotion regulation difficulties and posttraumatic stress symptoms were reciprocally influential from pre- to post-shooting (Bardeen et al., 2013).

When examining patterns of death anxiety, anxiety sensitivity, and emotion dysregulation among the study's participants, three profile types were identified: Profile 1, which was characterized by relatively low levels of death anxiety, anxiety sensitivity, and emotion dysregulation; Profile 2, which was characterized by relatively moderate levels of death anxiety, anxiety sensitivity, and emotion dysregulation; and Profile 3, which was characterized by relatively high levels of death anxiety, anxiety sensitivity, and emotion



dysregulation. Furthermore, our results indicated that profile type had a significant effect in explaining all four clusters of peritraumatic stress symptoms: Participants who were classified as Profile 3 had the highest scores on intrusion, avoidance, alteration in cognition and mood symptoms, and hyperarousal peritraumatic stress symptoms. Then came participants who were classified as Profile 2, and then participants who were classified as Profile 1. These effects were significant even after controlling for age, gender, income, perception of one's health, and belonging/not belonging to a high-risk group for COVID-19.

Management of stress and fear in the face of a traumatic stressor can be impacted by factors ranging from genetic predispositions, temperaments, attachment issues, maltreatment, or other life challenges (Pyszczynski, Lockett, Greenberg, & Solomon, 2020). The profiles presented in this study may well reflect participants' characteristics in terms of death anxiety, anxiety sensitivity, and emotion dysregulation that might shape their appraisals and reactions when navigating the pandemic, and thus explain their trauma-related responses.

It might be that individuals who are characterized by high levels of death anxiety, anxiety sensitivity, and emotion dysregulation (Profile 3) interpret normal bodily sensations in a catastrophic fashion, as an indication for COVID-19 or other serious illnesses, and be particularly preoccupied with the threat of death implicated in the pandemic. Moreover, as these individuals suffer from elevated emotion dysregulation, they may lack adaptive coping strategies that would ease their negative emotional reaction. Instead, they may tend to rely upon strategies such as avoidance, expressive suppression, and rumination that often lead to emotional relief in the short term, but exacerbate distress in the long term (Crowell, Puzia, & Yaptangco, 2015). These processes, in turn, may negatively shape the way that these individuals view the current pandemic as well as themselves while navigating it: That is, they may lead to evaluating the pandemic as particularly intimidating and threatening and to appraising themselves as unable to handle it. Both types of appraisals, which have been found to be related to distress during trauma exposure (Benight, Cieslak, Molton, & Johnson, 2008; Ehlers & Clark, 2000; Lapid Pickman, Greene, & Gelkopf, 2017), may therefore contribute to peritraumatic stress symptomatology in the face of the pandemic.

Conversely, individuals who are characterized by moderate (Profile 2) or by low (Profile 1) levels of death anxiety, anxiety sensitivity, and emotion dysregulation may be more resilient. These individuals may be less prone to evaluate bodily sensations in a negative fashion and may be more capable of interpreting normal bodily sensations as harmless. They

may be more able to keep the threat of mortality due to COVID-19 under control, and to employ effective strategies to modulate their emotions. These propensities, in turn, may serve as important resources when facing the various ongoing challenges of the current pandemic: They may enable individuals to view the current pandemic as less threatening and themselves as capable of coping with it, and in this way decrease their risk of peritraumatic stress symptomatology.

This study has several limitations. First, convenience sampling was used, as were self-report online questionnaires, which could potentially lead to a response bias. Second, the sample was relatively small, the standard deviations of some scales were relatively large, and most of the respondents were female, secular, and Israeli, limiting the generalizability of the present findings. Third, the present study was conducted shortly after the outbreak of the COVID-19 pandemic. Thus, measures of COVID-19-related stressors were designed by the research team. Fourth, as this was a cross-sectional study, we cannot establish causality or the directionality of the associations between the study variables. Fifth, although many variables were examined, the potential mechanisms underlying the relations between death anxiety, anxiety sensitivity, emotion dysregulation, and peritraumatic stress symptoms, such as perceived threat or coping strategies, were not assessed. Future longitudinal studies should further explore the relations between these constructs in the context of the pandemic among varied samples, while also assessing the potential mechanisms that might underlie the present findings.

Notwithstanding these limitations, this study has important theoretical and clinical implications. The current findings suggest that, in the face of this pandemic, individuals who are characterized by elevated levels of death anxiety, anxiety sensitivity, and emotion dysregulation might be more susceptible to peritraumatic stress symptoms. Furthermore, given that distress during the peritraumatic phase has been found to be one of the most potent precursors for future PTSD (Thomas et al., 2012; Vance et al., 2018), the present findings may imply that this group of individuals could also be susceptible to long-lasting distress, after the COVID-19 pandemic finally comes to an end.

Thus, screening for individuals who exhibit a specific profile typified by elevated levels in all three factors – death anxiety, anxiety sensitivity, and emotion dysregulation – as part of the psychological intake with mental health services is recommended. Moreover, given that the peritraumatic phase of the COVID-19 pandemic is likely to be rather long, and given that evidence-based

treatments for PTSD are plagued by high rates of non-response and dropout (Bradley, Greene, Russ, Dutra, & Westen, 2005), providing this vulnerable group with clinical interventions during the peritraumatic phase, as a way to reduce current distress and to prevent the crystalizing of symptoms into full-blown PTSD, is of particular importance (Horesh & Brown, 2020).

Utilizing therapeutic methods intended to reduce death anxiety, anxiety sensitivity, and emotional dysregulation, alongside evidence-based treatments for trauma, may be effective. For example, providing strategies of cognitive behavioural therapy such as education, cognitive restructuring, and in vivo and imaginal exposure online, may lead to changes in interpretations of somatic sensations, and to a reduction in death anxiety, while promoting reliance on adaptive strategies in order to cope with emotional reactions (Furer & Walker, 2008; Smits, Berry, Tart, & Powers, 2008). At the same time, providing evidence-based treatments for trauma, such as prolonged exposure therapy (Foa, Hembree, & Rothbaum, 2007; Wells et al., 2020) or eye movement desensitization and reprocessing therapy (EMDR; Lenferink, Meyerbröker, & Boelen, 2020; Shapiro, 2017) online, might enable individuals to reprocess their current peritraumatic reactions and alleviate their distress.

### Ethics statement

Institutional review board approval information: The Tel Aviv University institutional review board (IRB) approved all procedures and instruments.

Informed consent/ Patient consent statement: All participants signed an informed consent form.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

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### Data availability statement

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

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