POSTTRAUMATIC STRESS AND DEPRESSIVE SYMPTOMS AND SYMPTOM CLUSTERS IN US MILITARY PERSONNEL: THE LONGITUDINAL EFFECTS OF GENERAL SELF-EFFICACY AND MEANING IN LIFE

by

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ABSTRACT

US military personnel often experience ongoing distress after being exposed to traumatic events, and many develop posttraumatic stress disorder (PTSD) and major depressive disorder (MDD). Both general theories of stress and coping and cognitive theories of PTSD suggest that traumatic events give rise to distress by negatively influencing important beliefs and goals related to the self, other people, and the world. According to these theories, more positive belief- and goal-systems are associated with less severe symptoms of distress. Two constructs that tap into these systems are general self-efficacy and subjective meaning in life. The overall goal of the current study was to examine the ways general self-efficacy and subjective meaning in life relate to posttraumatic stress and depressive symptoms and symptom clusters in US military personnel, both cross-sectionally and longitudinally. Data from a VA-funded intervention study (n = 191) were examined. Results demonstrated that meaning in life is consistently associated with posttraumatic stress and depressive symptoms and symptom clusters cross-sectionally, whereas general self-efficacy is only associated with some aspects of depressive symptoms. Longitudinal analyses further revealed that meaning in life is associated with the Cluster D symptoms of PTSD and the cognitive-affective symptoms of depression. Interpretations, possible explanations, implications, and future directions are provided. Continued research in this area may identify important targets for treatment that enhance ongoing efforts to facilitate recovery from trauma.

INTRODUCTION

While most US military personnel demonstrate resilience in the face of trauma (Bonanno et al., 2012; Isaacs et al., 2017), many will develop ongoing symptoms of distress. US military personnel are at greater risk than the general population of developing posttraumatic stress disorder (PTSD; Lehavot, Katon, Chen, Fortney, & Simpson, 2018). PTSD is diagnosed when individuals develop various symptoms after being exposed to specific events, including intrusive thoughts or memories, persistent avoidance, and negative alterations in thoughts, mood, and arousal for more than one month (DSM-5; American Psychiatric Association, 2013). A review of over four million veterans of the most recent wars in Afghanistan and Iraq found the prevalence rate of PTSD to be 23% (Fulton et al., 2015).

US military personnel also develop other symptoms or psychological disorders in the aftermath of trauma. In fact, other anxiety and depressive disorders can develop independently of, or co-occur with, PTSD (Breslau et al., 2000; Kessler et al., 1995). The disorder most commonly comorbid with PTSD in US military personnel is MDD (Stander, Thomsen, & Highfill-McRoy, 2014). This may be due to the fact that both disorders share symptoms (e.g., loss of interest; negative views of self) but may also be related to the nature of certain traumatic events. For example, the death of a close friend on the battlefield may produce symptoms of traumatic stress, such as hypervigiliance or flashbacks, and it might also generate depressive symptoms, such as feelings of hopelessness.

PTSD and MDD are both associated with a number of physical and psychological problems. Research suggests US military personnel attempt and complete suicide at higher rates than the general population (Kang et al., 2015; Kaplan, Huguet, McFarland, & Newsom, 2007) and US military personnel with co-occuring PTSD and MDD are three times as likely to report suicidality than those with either diagnosis alone (Ramsawh et al., 2014; cf. Guerra & Calhoun, 2011). Veterans with diagnoses of PTSD or MDD have also been shown to be three to four times as likely to experience comorbid substance use disorders (Seal et al., 2011). Both PTSD and MDD have been shown to contribute to cardiovascular complications over time (Beristianos, Yaffe, Cohen, & Byers, 2016; Edmondson & von Känel, 2017; Hare, Toukhsati, Johansson, & Jaarsma, 2014; Joynt, Whellan, & O'connor, 2003). These problems can reduce quality of life, interfere with interpersonal functioning, and increase treatment costs (Haarasilta, Marttunen,

Kaprio, & Aro, 2005; Schnurr & Jankowski, 1999; Schulz et al., 2000; Tanielian, Tanielian, & Jaycox, 2008). In addition, because PTSD often develops a chronic course (Hermes, Rosenheck, Desai, & Fontana, 2012; Kessler et al., 1995; Markowitz et al., 2016; Marmar et al., 2015), these problems may worsen over time (Pacella, Hruska, & Delahanty, 2013). Considering the delterious effects that posttraumatic stress and depressive symptoms have on the overall health and well-being of US military personnal, there is need to identify factors that may attenuate the severity of these symptoms. In so doing, it may also be of use to determine whether these factors differentially predict particular PTSD and MDD symptom clusters as this could improve treatment precision.

The DSM-5 diagnosis of PTSD consists of four symptom clusters (i.e., Cluster B, Cluster C, Cluster D, and Cluster E; see table 1 for a description of each cluster). Evidence shows the four PTSD symptom clusters to be differentially associated with indicators of mental and physical health, such as alcohol misuse, physical health-related quality of life, and suicidality (e.g., Aversa et al., 2013; Horwitz, Miron, & Maieritsch, 2019; Jakupcak, Tull, et al., 2010; Tsai, Whealin, Scott, Harpaz-Rotem, & Pietrzak, 2012). For example, only decreases in the Cluster D symptoms of PTSD are significantly associated with decreases in suicidal ideation over time (Horwitz et al., 2019).

The DSM-5 diagnosis of MDD does not categorize symptoms into clusters, but there is evidence to suggest that doing so may have clinical utility (e.g., separating the cognitive-affective and somatic-vegetative symptoms of depression; Beck, Steer, & Brown, 1996; Dozois, Dobson, & Ahnberg, 1998; Steer, Ball, Ranieri, & Beck, 1999; see table 2 for a description of each cluster) For instance, increases in somatic-vegetative symptoms (e.g., fatigue), but not cognitive-affective symptoms (depressed mood), may worsen insulin resistance over time and increase the risk of diabetes (Khambaty, Stewart, Muldoon, & Kamarck, 2014). Consequently, the extent to which factors are associated with each of these clusters could inform research aimed at identifying mechanisms of change, ultimately increasing the effectiveness of existing clinical interventions. In order to identity factors that are inversely associated with the severity of posttraumatic stress and depressive symptoms, it may be useful to consider how these symptoms can develop following exposure to a traumatic event.

Cognitive restructuring theories of stress and coping

Several cognitive theories of stress and coping have been developed to explain why only a subset of people who experience traumatic life events develop persistent symptoms of distress (e.g., Joseph & Linley, 2005; Lazarus & Folkman, 1987; Neimeyer, 2001). According to these theories, attempts to make sense of, or find meaning in, traumatic events is common; successful adjustment is thought to occur when information learned from the event is either integrated into peoples' belief systems or accommodated by them. Park's (2010) meaning-making model provides a thorough synthesis of these theories.

According to Park's (2010) model, two aspects of meaning exist: situational meaning and global meaning. S*ituational meaning* refers to specific appraisals about an experience, such as why it occurred or the role one played in determining its outcome (Lazarus & Folkman, 1987). Situational meaning is determined by the specific details of a traumatic event and by a person's global meaning system (Park, 2010; Park & Folkman, 1997). *Global meaning* refers to a general orienting system, which supports cognitive frameworks that facilitate the interpretation of experiences.

Global meaning is composed of three interrelated parts: 1) global beliefs; 2) global goals; and 3) subjective meaning in life. *Global beliefs* refer to foundational beliefs about the self, other people, and the world (Park & Folkman, 1997). These include assumptions regarding perceived agency and justice, as well as notions that contribute to personal identity (Janoff-Bulman, 1989). *Global goals* refer to higher-order goals or values that people work to attain or maintain across the lifespan (Karoly, 1999), as well as expectancies of success (Maes & Karoly, 2005). Global goals motivate behavior and contribute to people's sense of worthiness and identity (Austin & Vancouver, 1996). *Subjective meaning in life* (defined in more detail later) refers, broadly, to a sense of "meaningfulness" (Klinger, 1977). Meaning in life is theorized to be informed by global beliefs and global goals, which are often considered to operate outside of conscious awareness (Baumeister, 1991; Carver & Scheier, 1998; Janoff-Bulman, 1989; Park & George, 2018). When global beliefs and global goals are functioning adaptively, the world is ordinarily perceived as meaningful (Park, Currier, Harris, & Slattery, 2017).

When people experience a traumatic event, they evaluate the extent to which their situational meaning fits within their existing global meaning. When there is consistency between these two kinds of meaning, distress is minimal and fleeting (Park, 2010). However, a person's

situational meaning may not be consistent with their global meaning (Lazarus & Folkman, 1987). When this occurs, distress is thought to emerge. For example, a person may interpret their inability to fend off an attacker as indicating personal inadequacy. When this appraisal goes against their global meaning or how they typically view themselves (e.g., "I have always been a capable person"), it will generate distress (Park et al., 2016). In theory, it will also prompt a process of meaning-making as a way to reduce the discrepancy (Park, 2010).

Meaning-making processes may be automatic (e.g., ruminative), deliberate (e.g., considering other explanations), or a combination of both (Folkman & Moskowitz, 2007), and include positive reappraisal or the revision of goals, among others strategies (Park, 2010; Park & Folkman, 1997). Optimal adjustment usually occurs by changing the situational meaning (e.g., "There was nothing I could have done") or by altering the global meaning (e.g., "No one is perfect"). When this process is successful, people are believed to have made sense of the event, and this new understanding is theorized to inform their global meaning (e.g., meaning in life; Park, 2010). However, adaptive adjustment may not occur. People may make sense of the event in a negative or overly rigid way (e.g., "It is all my fault they died"), or they may be unable to reconcile the discrepancy produced by the experience. In either case, this maladjustment can lay the foundation for the development of posttraumatic stress and depressive symptoms.

This understanding of how distress can develop is consistent with several cognitive theories of PTSD, which also suggest that traumatic events can challenge, or violate, existing systems of meaning (see Brewin & Holmes, 2003; Cahill & Foa, 2007; Dalgleish, 2004 for reviews). For example, both Horowitz's (1986) Stress Response Theory and Janoff-Bulman's (1989, 1992) Shattered Assumptions Theory suggest that traumatic events can damage foundational beliefs (e.g., one's sense of justice), which, in turn, leads to the development of posttraumatic stress symptoms. According to these theories, when people are unable to integrate traumatic events into their existing beliefs, alternative beliefs about how the world operates may form (Janoff-Bulman, 1989). For instance, following a traumatic event, survivors may no longer view the world as predictable, others as kind, or themselves as competent and in control; moreover, they may no longer appraise themselves as capable of pursuing valued goals. Instead, they may begin to view the world as chaotic, others as dangerous, and themselves as fundamentally bad or inept—beliefs that are consistent with posttraumatic stress (Elklit, Shevlin, Solomon, & Dekel, 2007; Frazier et al., 2011) and depressive symptoms (Beck, Rush, Shaw, &

Emery, 1979). This may be why certain psychological treatments for PTSD (e.g., Cognitive Processing Therapy; Resick, Monson, & Chard, 2016) that target violations of various global beliefs (e.g., safety; esteem) reduce both posttraumatic stress and depressive symptoms (Iverson, King, Cunningham, & Resick, 2015).

Both Park's (2010) model and cognitive theories of PTSD prioritize the idea that traumatic events disrupt global meaning. That is, traumatic events are seen as incongruent with how people *previously* viewed themselves, others, and the world. However, this is not always the case, especially when working with US military personnel. For example, compared to their civilian counterparts, men with a history of military service are twice as likely to have been physically or sexually abused by the age of 18 (Blosnich, Dichter, Cerulli, Batten, & Bossarte, 2014). Accordingly, negative beliefs may precede the experience of military trauma (Cloitre et al., 2009) and be congruent with how individuals already see the world. For instance, a victim of childhood sexual abuse may assume "I deserve for bad things to happen" when he or she experiences additional trauma in adulthood. This notion would be consistent with data from several meta-analyses showing previous trauma to be a correlate of PTSD (Brewin, Andrews, & Valentine, 2000a; Ozer, Best, Lipsey, & Weiss, 2003b; Xue et al., 2015). It would also be consistent with evidence-based treatments for PTSD that incorporate the possibility that traumatic events occurring during military service are compatible with individuals' prior experience (e.g., Foa & Rothbaum, 2001; Resick et al., 2016). Posttraumatic stress and depressive symptoms may be indicative of a maladaptive global meaning system, regardless of whether this emerged as the result of military trauma or was present prior to military service. In other words, traumatic events experienced during the military may lead to the development of negative beliefs and expectations that promote prolonged symptoms of distress, or they may reinforce beliefs that already existed. In either case, higher levels of global meaning may attenuate the severity of these symptoms. Two aspects of global meaning that may reduce the severity of posttraumatic stress and depressive symptoms are *general self-efficacy* and *meaning in life*.

Self-efficacy

Self-efficacy is a global belief referring to an individual's perceived ability to produce desired outcomes (Bandura, 1982). It directly influences global goals through its appraisal of

outcomes and expectancies of success (Karoly, 1999; Maes & Karoly, 2005), making it a useful construct to examine in relation to the maintenance of posttraumatic stress and depressive symptoms. Unlike other global beliefs, such as self-esteem or self-worth, self-efficacy is more directly linked to motivation and has a strong influence on behavior, suggesting it may facilitate adaptive coping efforts (Bandura, 1997; Chen, Gully, & Eden, 2004). Moreover, because self-efficacy is a belief related to the self, it may be an optimal target for intervention. Indeed, it may be more beneficial to target beliefs related to the self than beliefs related to the world (e.g., justice). Said differently, it might be easier to alter people's beliefs about their ability to act in the world (e.g., "I can move toward the things I want") than it would be to modify their understanding of how the world works (e.g., "It is dangerous and unpredictable"). This could explain why previous research has suggested mental health professionals working with veterans suffering from posttraumatic stress and depressive symptoms utilize exercises designed to increase appraisals of self-efficacy as a way to reduce symptoms (Blackburn & Owens, 2015).

In support of this idea, there is meta-analytic evidence demonstrating a robust, inverse association between self-efficacy and posttraumatic stress symptoms both cross-sectionally and longitudinally (Gallagher, Long, & Phillips, 2020; Luszczynska, Benight, & Cieslak, 2009), as well as cross-cultural evidence showing an inverse association between self-efficacy and depressive symptoms (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005). Higher levels of self-efficacy contribute to a sense of control and the idea that one can overcome obstacles (Bandura, 1997), which may decrease the likelihood that people develop high levels of posttraumatic stress and depressive symptoms, regardless of the severity of the event. Appraisals of traumatic events (e.g., perceived controllability) have been found to be more predictive of distress than are the events themselves (Fairbrother & Rachman, 2006). Higher levels of self-efficacy may produce less threatening appraisals of traumatic events that minimize distress (Benight & Bandura, 2004). In fact, there is experimental evidence suggesting that higher levels of self-efficacy are associated with lower levels of stress and autonomic arousal (Bandura, Cioffi, Taylor, & Brouillard, 1988). This could enable the use of adaptive coping efforts.

People higher in self-efficacy tend to engage in problem-focused coping efforts that can reduce feelings of stress and uncertainty (Benight & Bandura, 2004). They also tend to seek out social support (Karademas, 2006), which is known to be beneficial in the aftermath of trauma (Bonanno, 2005). Higher levels of self-efficacy may also reduce the frequency with which

individuals use avoidant coping mechanisms, which are strongly associated with the maintenance of PTSD (e.g., Badour, Blonigen, Boden, Feldner, & Bonn-Miller, 2012). In summary, self-efficacy may directly reduce the severity of posttraumatic stress and depressive symptoms by altering how people appraise threats and reducing physiological responses. These appraisals may, in turn, enable the perception of control and the use of adaptive coping behaviors that promote more positive views of self.

Meaning in life

Higher levels of meaning in life may also reduce the severity of posttraumatic stress and depressive symptoms. Meaning in life is theorized to be composed of three interrelated dimensions: 1.) comprehension; 2.) purpose; and 3.) significance/mattering (George & Park, 2016; Heintzelman & King, 2014; Martela & Steger, 2016). *Comprehension* refers to the extent to which one's life and everyday experiences are perceived to be coherent and predictable; that is, comprehension reflects how much one's life makes sense. *Purpose* refers to the extent to which one's life is experienced as being directed by important, personally-valued goals and life aims. *Significance/mattering* refers to the extent to which one's life is experienced as worthwhile or of value to the wider world.

Because traumatic events are often characterized by ambiguity and a lack of control, factors that support the perception of control may mitigate their adverse effects. Those with a stronger sense of understanding regarding their life in general (i.e., those higher in comprehension) may be better equipped to navigate the uncertainty that can emerge alongside traumatic events. Indeed, there is evidence demonstrating that those who are higher in meaning in life perceive fewer violations to certain global beliefs, such as personal control, following a traumatic event than those who are lower in meaning (Steger, Owens, & Park, 2015).

Moreover, higher levels of meaning in life may reduce the impact of negative emotions during times of crisis (Fredrickson, Tugade, Waugh, & Larkin, 2003) and render individuals less vulnerable to the development of severe posttraumatic stress and depressive symptoms. For example, higher levels of meaning in life are usually accompanied by higher levels of self-esteem and self-worth (George & Park, 2016). When events occur that challenge individuals' (positive) views of self, those higher in meaning may be better equipped to handle these threats. For example, higher levels of significance or mattering may act as a source of comfort and

equanimity during situations that challenge one's personal value (George & Park, 2016). This may, in turn, facilitate adaptive coping, perhaps by lowering physiological arousal and preserving cognitive flexibility, which enable perspective taking and problem-solving (Fredrickson, 1998). This would be in line with existing research suggesting that social interactions and positive emotionality following traumatic events are directly associated with resilience (Bonanno, 2005). It would also be consistent with research demonstrating individuals with higher levels of PTSD exhibit higher levels of avoidant coping (Pineles et al., 2011) and lower levels of psychological flexibility (i.e., the ability to accept emotional experiences without avoidance and continue to pursue goals despite negative experiences; Bryan, Ray-Sannerud, & Heron, 2015), two factors that can maintain symptoms (Badour et al., 2012; Boden, Bonn-Miller, Vujanovic, & Drescher, 2012; Meyer et al., 2019).

Higher levels of meaning in life may also enable individuals to move on more easily after a traumatic event occurs. Rather than dwelling on the event, individuals higher in meaning may be more likely to look toward the future and the establishment of alternative goals (Blackburn & Owens, 2015). Individuals who possess clearly defined goals and life aims that are in line with their values (i.e., purpose in life) may be better able to adjust their goals when traumatic events compromise existing pursuits. The ability to move forward and remain adaptive in the face of traumatic events may reduce the likelihood that distress continues to increase over time. In support of this idea, Krause (2007) found in a large sample of older adults that purpose in life moderated the relationship between the experience of trauma and depressive symptoms such that, for those who reported high levels of purpose, this relationship was negative. The results also indicated that high levels of meaning in general led to reductions in depressive symptoms over time, but not the other way around. This suggests that meaning in life is not simply an artifact of feeling good but may instead be a driver of psychological well-being.

In support of these ideas, a recent meta-analysis of the relationship between meaning in life and posttraumatic stress symptoms found a moderate, negative association (r = -0.41; Fischer et al, 2020). This effect is similar to, and in many cases potentially larger than, all of the identified correlates of posttraumatic stress symptoms found in meta-analyses of civilian adults (e.g., perceived life threat; prior trauma; post-trauma support; Ozer et al., 2003b) and civilian and military adults (e.g., gender; psychiatric history; trauma severity; Brewin et al., 2000a). Thus, meaning in life may be associated with less severe symptoms when traumatic events occur.

Self-efficacy and meaning in life

Self-efficacy may also be indirectly associated with posttraumatic stress and depressive symptoms through meaning in life. As mentioned, Park (2010) suggests global beliefs and global goals, such as self-efficacy, inform people's sense of subjective meaning in life. This idea has also been promoted by Baumeister (1991), who identified self-efficacy as one of the four "needs" for meaning. Baumeister suggests it is unlikely people will develop a robust sense of meaning in life without the perception of personal control or the understanding that they can exert influence over various outcomes. Accordingly, high levels of self-efficacy may contribute to the perception that one's life is meaningful, which could attenuate the negative sequelae of trauma.

For example, as a belief related to one's ability to produce desired outcomes, self-efficacy may lead to perceptions of predictability and comprehension. Indeed, appraisals of success should contribute to an understanding of how future events will (or, at least, should) unfold. Moreover, because self-efficacy is related to goal pursuits and largely acts as a source of fuel that promotes and sustains goal-directed efforts, it likely facilitates the pursuit of valued goals (i.e., purpose in life). Finally, insofar as self-efficacy may be an integral component of the generation of purpose in life, it also likely contributes to appraisals of significance. People who are clearly moving toward desired aims and valued goals tend to view their lives as mattering in the grand scheme (George & Park, 2017), and appraisals of generativity often act as a source of meaning in life (Aubin, 2013). Thus, self-efficacy and meaning in life may operate in tandem to reduce posttraumatic stress and depressive symptoms.

CURRENT STUDY

The overall goal of the current study is to examine the ways in which particular aspects of global meaning (i.e., general self-efficacy and subjective meaning in life) relate to posttraumatic stress and depressive symptoms in US military personnel, both cross-sectionally and longitudinally.[1] Grounded in Park's (2010) meaning-making model and the previously discussed research, several aims and accompanying hypotheses have been developed.

The first aim of this study was to replicate and extend existing research on how self-efficacy and meaning in life relate to posttraumatic stress and depressive symptoms. To the best of my knowledge, only one study has examined these associations concurrently (Blackburn & Owens, 2015), and it did so using only cross-sectional data. In that study of US military personnel, when modeled together, both general self-efficacy and subjective meaning in life were significant correlates of depressive symptoms. In contrast, only self-efficacy was a significant correlate of posttraumatic stress symptoms. Accordingly, the robust association found between meaning in life and posttraumatic stress symptoms (Fischer, Shanahan, Hirsh, Stewart, & Rand, 2020) may be attenuated when self-efficacy is controlled for. Nevertheless, this finding is preliminary, and the sample from which it was generated was relatively small (N = 93), suggesting limited power. Thus, additional research is needed to clarify these findings and to determine whether these associations are present longitudinally.

The second aim was to expand on existing research by exploring the nature of the relationships between self-efficacy, meaning in life, and posttraumatic stress and depressive symptoms. This study examined how self-efficacy and meaning in life relate to the four PTSD symptom clusters and identified depressive symptom clusters (i.e., cognitive-affective and somatic-vegetative; Dozois et al., 1998), both cross-sectionally and longitudinally. To the best of my knowledge, no existing research has examined these relationships. This study also looked at

[1] It should be noted the current study did not include a measure of moral injury, which is a potential consequence of certain traumatic events that is associated with, but distinct from, PTSD (Griffin et al., 2019; Koenig, Youssef, & Pearce, 2019). Moral injury may develop in response to traumatic events that violate a person's deeply-held moral beliefs (Litz et al., 2009); it is associated with feelings of guilt, shame, and/or remorse, as well as a loss of meaning in life. This suggests that the results of this study could be related to moral injury in particular, rather than PTSD per se. The implications of this possibility are addressed in the discussion section.

the extent to which self-efficacy and meaning in life predict the unique aspects of posttraumatic stress and depressive symptoms (i.e., their unshared variance).

The final aim of this study was to determine whether the relationships between self-efficacy and posttraumatic stress and depressive symptoms are mediated by meaning in life, both cross-sectionally and longitudinally. As mentioned, global beliefs, like self-efficacy, are thought to inform people's sense of meaning in life (Park, 2010), and self-efficacy is theorized to be one of the four "needs" for meaning (Baumeister, 1991). In other words, self-efficacy may be needed in order to develop a sense of meaning in life. Nevertheless, to my knowledge, no study has examined whether this process is present when predicting posttraumatic stress and depressive symptoms.

Research questions and hypotheses

Aim 1: Examine the associations among self-efficacy, meaning in life, posttraumatic stress, and depressive symptoms in US military personnel, both cross-sectionally and longitudinally.

Hypothesis 1a: Higher levels of self-efficacy and meaning in life will be associated with lower levels of posttraumatic stress and depressive symptoms.

Hypothesis 1b: When modeled together (i.e., when accounting for their association), higher levels of self-efficacy and meaning in life will both continue to be associated with lower levels of posttraumatic stress symptoms, both cross-sectionally and longitudinally.

Hypothesis 1c: When modeled together (i.e., when accounting for their association), higher levels of self-efficacy and meaning in life will both continue to be associated with lower levels of depressive symptoms, both cross-sectionally and longitudinally.

Aim 2: Examine whether self-efficacy and meaning in life are differentially associated with the symptom clusters of PTSD and MDD, as well as their unique aspects, both cross-sectionally and over time.

Hypothesis 2a: The inverse association between self-efficacy and cluster C symptoms of PTSD (i.e., avoidance) will be larger than the association between self-efficacy and the other symptom clusters (i.e., Clusters B, D, and E).

Hypothesis 2b: The inverse association between meaning in life and cluster D symptoms of PTSD (i.e., alterations in cognitions and mood) will be larger than the association between meaning in life and the other symptom clusters (i.e., Clusters B, C, and E).

Hypothesis 2c: Both self-efficacy and meaning in life will be inversely associated with the cognitive-affective symptom cluster (i.e., mood symptoms) of depressive symptoms cross-sectionally and longitudinally. Self-efficacy, but not meaning in life, will also be inversely associated with the somatic-vegetative cluster of depressive symptoms cross-sectionally and longitudinally.

Hypothesis 2d: Higher levels of self-efficacy, but not meaning in life, will be inversely associated with the unique aspects of posttraumatic stress, both cross-sectionally and longitudinally.

Hypothesis 2e: Higher levels of self-efficacy and meaning in life will be inversely associated with the unique aspects of depressive symptoms, both cross-sectionally and longitudinally.

Aim 3: Examine whether meaning in life mediates the relationships between self-efficacy and posttraumatic stress and depressive symptoms, both cross-sectionally and longitudinally.

Hypothesis 3: *Meaning in life will partially mediate the relationships between self-efficacy and posttraumatic stress and depressive symptoms, both cross-sectionally and longitudinally. Self-efficacy will continue to have a direct effect on these outcomes.*

METHODS

Study design and sample

The current study is a secondary analysis of data collected as part of a VA-funded trial (Davis et al., 2020) that was approved by the Indiana University Institutional Review Board (IRB) and the Indianapolis Veterans Affairs Medical Center Research Committee. That 16-week randomized controlled trial compared the effects of a yoga intervention to that of a wellness lifestyle intervention on PTSD symptom severity. In order to participate in the study, participants needed to have a diagnosis of PTSD confirmed using the Clinician-Administered PTSD scale for the DSM-5 (CAPS-5; Weathers et al., 2018; see Davis et al., 2020, for a full list of inclusion/exclusion criteria). In total, the study included 209 participants, 91.4% (N = 191) of which were veterans. Data were collected at four time points: baseline (week 1), mid-treatment (week 8), treatment end (week 16), and treatment follow-up (week 28). The current study used a subset of measures from that study and analyzed data from the veteran subsample using only the first three time points.

Measures

Demographics

Participants reported their sex, race/ethnicity, educational level, relationship status, and index trauma.

General self-efficacy

General self-efficacy was measured using the New General Self-Efficacy scale (NGSES; Chen, Gully, & Eden, 2001), an 8-item self-report measure of self-efficacy. All eight items tap either a person's estimate of his/her overall ability to perform successfully in a variety of tasks (e.g., "I will be able to achieve most of the goals I have set for myself") or how confident a person is that he/she can perform effectively across different tasks or situations (e.g., "I am confident that I can perform effectively on many different tasks"). Respondents are asked to rate the extent of their agreement with these items using a 5-point Likert-type scale ranging from 1

(*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate higher levels of general self-efficacy. The NGSES has been shown to be temporally reliable and valid (Chen et al., 2001).

Meaning in life

Subjective meaning in life was measured using the meaning subscale of the Functional Assessment of Chronic Illness Therapy-Spirituality (FACIT-Sp; Peterman, Fitchett, Brady, Hernandez, & Cella, 2002), a 12-item self-report measure of spiritual well-being. The FACIT-Sp was originally developed with two subscales, a meaning/peace scale and a faith scale. However, more recent research using US military personnel recommends separating these out into three separate subscales (i.e., meaning, peace, and faith), as a 3-factor model best fits the data in this population (Johnson, Bormann, & Glaser, 2015). Accordingly, the total score for the meaning subscale was extracted for this study. All four items of the meaning subscale tap a person's overall judgment of meaning and purpose in life (e.g., "I feel a sense of purpose in my life"). Respondents are asked to rate the extent of their agreement with these items using a 5-point Likert-type scale ranging from 0 (*not at all*) to 4 (*very much*). After reverse-scoring one item, higher scores indicate higher levels of meaning in life. The FACIT-Sp subscales have demonstrated evidence of reliability and validity in US military personnel (Johnson et al., 2015).

PTSD

Posttraumatic stress symptoms were measured in two ways: *clinician-rated* using the Clinician Administered PTSD Scale for the Diagnostic and Statistical Manual of Mental Disorders (DSM) 5th Edition and *participant self-report* using the PTSD Checklist for DSM-5.

Clinician administered PTSD scale for the DSM-5

Clinician Administered PTSD Scale for the DSM-5 (CAPS-5; Weathers, Blake, et al., 2013) is a structured clinical interview containing 30 items that assess PTSD symptoms. Items are divided into four symptom clusters consistent with DSM-5 diagnostic criteria (American Psychiatric Association, 2013), and the CAPS-5 provides two pieces of information: the presence or absence of a PTSD diagnosis and the severity of symptoms. PTSD is considered to be "present" if all diagnostic criteria are met. To meet this threshold, item responses must have a

severity rating of 2 or higher. Symptom severity is rated on a 5-point Likert-type scale, including from 0 (*absent*), 1(*mild/subthreshold*), 2 (*moderate/threshold*), 3 (*severe/markedly elevated*), and 4 (*extreme/incapacitating*). Total symptom scores are based on 20 items[2] and range from 0 to 80, with higher scores indicating more severe symptoms. The CAPS-5 has demonstrated evidence of reliability and validity in US military personnel (Weathers et al., 2018). In the original study (Davis et al., 2020), trained raters who were blind to group assignment conducted the CAPS-5 interviews. Interrater reliability was considered to be very good (Intraclass correlation = 0.94 for CAPS-5 total). The CAPS-5 was used to assess symptom clusters of PTSD based on the structure of the DSM-5. See table 1 for an overview of each cluster.

PTSD checklist for DSM-5

PTSD Checklist for DSM-5 (PCL-5; Weathers, Litz, et al., 2013) is a 20-item self-report measure based on DSM-5 diagnostic criteria. Respondents are asked to rate the extent to which they are bothered by each item using a 5-point Likert-type scale ranging 0 (*not at all*) to 4 (*extremely*). Total scores range from 0 to 80, with higher scores indicating more bothersome symptoms. The PCL-5 has demonstrated evidence of reliability and validity in US military personnel (Wortmann et al., 2016).

Depressive symptoms

Depressive symptoms were measured using the Beck Depression Inventory-II (BDI-II; Beck et al., 1996), a 21-item self-report measure of cognitive, affective, and somatic depressive symptoms. Each question on the BDI-II has an ordered-response format that ranges in severity (e.g., 0 = *I do not feel sad* to 3 = *I am so sad or unhappy I can't stand it*). Respondents are asked to choose which statement best describes how they have been feeling over the last two weeks. Higher scores indicate more severe depressive symptoms. The BDI-II has demonstrated evidence of reliability and validity in US military personnel (Bryan, Gonzales, et al., 2015). For the analysis of symptom clusters, the current study uses the factor structure identified by Dozois and

[2] The remaining ten items either assist with diagnosis (e.g., delayed onset) or help to inform overall ratings of severity.

colleagues (1998), which has been analyzed in other published research (e.g., Khambaty et al., 2014). See table 2 for an overview of each cluster.

Analytic plan

Preliminary analyses

Descriptive statistics were used to characterize sample demographics and study variables. The data were also examined for normality, linearity, homoscedasticity, and missingness. Assumptions of normality were assessed using Kline's guidelines, which define a normal distribution as being +-< 3.0 and +-< 10.0, respectively, for skew and kurtosis (Kline, 2015). Linearity and homoscedasticity were assessed using P-P plots, which display the distributions of the residuals. Potential patterns of missingness were examined by conducting a series of t-tests ($p < .01$) and chi-square tests, which compared those with and without missing data on relevant variables (e.g., age, meaning in life). This process enabled a determination of whether the data were missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR). When data are MCAR, it means that the probability of missing data on variable Y is not related to any of the other measured variables (Enders, 2010). When data are MAR, it means the probability of missing data on variable Y is related to one or more of the measured variables within the dataset (e.g., race) but *not* to variable Y itself. When data are MNAR, the probability of missing data on variable Y is related to the values of that variable, *even after controlling for other variables*. Missing data at mid-treatment and treatment end was estimated using full information maximum likelihood (FIML; Enders & Bandalos, 2001). Analyses were run once using only complete data and once using this estimation strategy as a way to assess the robustness of the findings and ensure that the estimation procedure did not unduly affect the results.

Base model for planned analyses

Sex is consistently associated with posttraumatic stress and depressive symptoms (e.g., Haskell et al., 2010; Nolen-Hoeksema, 2002; Xue et al., 2015), with women typically reporting more severe symptoms. Accordingly, all analyses examining the associations between self-efficacy and meaning in life on distress (i.e., posttraumatic stress or depressive symptoms)

included sex in the initial model. When significant associations were found between a predictor variable (i.e., self-efficacy or meaning in life) and distress, other factors that have been shown to influence this distress (i.e., race, relationship status, education level, and trauma type; Alcántara, Casement, & Lewis-Fernandez, 2013; Brewin, Andrews, & Valentine, 2000b; Karimi, Bakhtiyari, & Arani, 2019; Kessler et al., 1995; Ozer, Best, Lipsey, & Weiss, 2003a; Xue et al., 2015; Yehuda et al., 2015) were introduced one by one into this base model to assess the robustness of the findings. As an example, the relationship between self-efficacy and meaning in life on depressive symptoms was first examined with sex as a covariate. Subsequently, this analysis was examined with race also included. This step-wise approach is a commonly-used method to rule out the effects of potential confounding variables (e.g., Stewart, Rand, Muldoon, & Kamarck, 2009).

Longitudinal analyses

Before running longitudinal analyses, I also assessed whether the intervention to which participants were assigned had an influence on distress (i.e., posttraumatic stress or depressive symptoms). Because the data were extracted from an intervention study, I wanted to ensure that I controlled for the effects of treatment. When significant associations were found, I included treatment group as a covariate. Finally, when significant longitudinal associations were found, after implementing the covariate plan discussed above, I proceeded to test whether any significant effects of my predictor variables persisted after including Time 1 distress (e.g., Time 1 depressive symptoms). This enabled me to examine whether self-efficacy or meaning in life led to changes in distress (e.g., depressive symptoms) over time.

Analyses for aim 1

A correlation table was created using SPSS (version 27) to examine how self-efficacy and meaning in life relate to posttraumatic stress and depressive symptoms at the bivariate level. Multiple regression analyses were then run in SPSS to examine 1) whether self-efficacy and meaning in life were independently associated with posttraumatic stress symptoms (both clinician-rated and self-report) and 2) whether self-efficacy and meaning in life were independently associated with depressive symptoms. These analyses were first conducted using

baseline data and then followed up using Time 3 data (i.e., treatment end) in Mplus Version 8 (Muthén & Muthén, 2017). Mplus was used for longitudinal analyses because the analyses were run twice, once with complete data and once with the full sample estimated using FIML. For longitudinal analyses, Time 3 measures of distress (i.e., posttraumatic stress and depressive symptoms) were regressed onto Time 1 meaning in life, Time 1 self-efficacy, and the aforementioned covariate(s).

Analyses for aim 2

SPSS was also used to examine whether self-efficacy and meaning in life were differentially associated with posttraumatic stress and depressive symptom clusters, both cross-sectionally and longitudinally. To do this, individual symptom clusters (e.g., Cluster C of PTSD) were regressed onto self-efficacy, meaning in life, and covariate(s). This was first done using baseline data and then again using Time 3 symptom clusters in Mplus.

SPSS was also used to determine the associations between meaning in life and self-efficacy when predicting the unique aspects of posttraumatic stress and depressive symptoms (i.e., their unshared variance), both cross-sectionally and longitudinally. To do this, either posttraumatic stress or depressive symptoms was included as a predictor variable alongside meaning in life and self-efficacy.

Analyses for aim 3

Mplus was used to test whether meaning in life mediated the relationship between self-efficacy and posttraumatic stress and depressive symptoms both cross-sectionally and longitudinally. Bias-corrected 95% confidence intervals using 10,000 bootstraps were planned to generate total, direct, and indirect effects for those with complete data. However, because auxiliary variables were used to estimate the full sample, it was not possible to do bootstrapping when using FIML (Muthén & Muthen, 2017). Analyses tested for mediating effects using the total scores for posttraumatic stress and depressive symptoms.

Model fit

When models were not saturated (i.e., when running Aim 3), model fit was planned to be evaluated using the following criteria: (1) a non-significant chi-square statistic; (2) comparative fit index (CFI) ≥ 0.95; (3) Tucker Lewis fit index (TLI) ≥ 0.95; (4) root mean square error of approximation (RMSEA) < 0.06; (5) standardized root mean square residual (SRMR) < 0.08 (Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003).

Power analysis

Kline (2015) suggests that a minimum of 10 participants per estimated parameter is required for sufficient power to estimate accurately the individual parameters. The most complex initial analysis in this study (i.e., examining the mediating effect of meaning in life on the relationship between self-efficacy and distress controlling for sex and group assignment in those with complete data at Time 2 and 3) contains 10 parameters and includes 97 participants. Accordingly, it has a 9.7 subject-to parameter-ratio, indicating slightly suboptimal power. With the inclusion of additional covariates, statistical power for this analysis reduced further, implying an increased risk of type II error. All other proposed analyses were determined to have sufficient power based on Kline's guidelines.

RESULTS

Data cleaning and screening

In the parent study (Davis et al., 2020), 191 veterans participated in baseline data collection. Of these, 104 participants (54.44%) provided complete data at both baseline (Time 1) and mid-treatment (Time 2; see figure 1 for a flowchart of data collection at each time point for the full sample). Out of the 87 participants who did not complete all measures at Time 2, 84 (96.5%) did not complete any of the measures. Three of the participants (3.4%) completed the PCL-5. T-tests were used to compare groups (i.e., those with and without any missing data) on age, education, and baseline measures of posttraumatic stress symptoms (i.e., CAPS and PCL-5), depressive symptoms, meaning in life, and general self-efficacy. The results of these analyses show age was associated with missingness at Time 2, with younger participants being less likely to complete self-report measures at Time 2, $t(189) = 3.08$, $p = 0.002$. Chi-square tests were also used to compare those with and without missing data at Time 2 on group assignment (i.e., Yoga vs. Wellness group), race, sex, and marital status. No significant differences were found. Accordingly, the data at Time 2 were considered to be missing at random (MAR; Enders, 2010), and analyses using Time 2 data for those with complete data controlled for the effect of age. When estimating the full sample using FIML, age was included as an auxiliary variable.

Out of the 191 veterans who provided baseline data, 123 (64.39%) provided complete data at baseline and treatment end (Time 3). Out of the 68 participants who did not complete all measures at Time 3, 59 (86.7%) did not complete any of the measures. Of the remaining, five (7.4%) completed the CAPS-5 but none of the self-report measures. In addition, three completed the CAPS-5 and at least some of the self-report measures (4.4%), while one person (1.5%) did not complete the CAPS-5 but did complete all of the self-report measures. Data collection procedures in the parent study (Davis et al., 2020) may explain this differential dropout. In that study, collection of CAPS-5 data was prioritized. Participants were contacted several times at the end of treatment to provide their responses to this measure.[3] Consequently, there may be differences between those participants who completed some measures at Time 3 and those who

[3] If participants failed to show up to one or two scheduled in-person CAPS-5 interviews, a phone interview was then scheduled. In contrast, for self-report measures (i.e., PCL-5, BDI-II, FACIT-Sp, and NGSES), participants were simply emailed a link and asked to respond.

completed no measures at Time 3. Nevertheless, due to the small number of participants who completed some, but not all, measures, potential patterns of missingness were explored by comparing those who completed all measures with those who completed none.

Independent samples t-tests and chi-square tests were again run. Based on these analyses, age was again associated with missingness at Time 3, with younger participants were less likely to complete study measures, $t(189) = 3.18$, $p = 0.002$. In addition, those with higher levels of Time 1 PTSD scores (CAPS-5 38.12 vs. 35.23) were also less likely to complete measures at Time 3, $t(189)$, $p = 0.025$. Because these results suggested that the data may be MNAR, I next ran a regression analysis with both age and Time 1 CAPS-5 scores predicting missingness at Time 3 (Enders, 2010). Based on this analysis, only age was significantly associated with missingness at Time 3 ($\beta = -.21$, $p = 0.004$; see table 3). Consequently, I determined the data at Time 3 to be MAR (Enders, 2010). Nevertheless, when running analyses using Time 3 data, I chose to include both age and baseline PTSD as auxiliary variables as a way to generate the most accurate estimation.

The data at all time points were then examined for univariate and multivariate outliers. Standardized scores were created for all variables; z-scores above the absolute value of 3.29 were considered to be outliers (Tabachnick, Fidell, & Ullman, 2007). No univariate outliers were identified. Next, the data were examined for the presence of multivariate outliers. Based on guidelines presented in Tabachnick, Fidell, and Ullman (2007), the probability estimate for cases being multivariate outliers was set at $p < 0.001$ for the χ^2 value. Based on this criterion, no multivariate outliers were identified.

Subsequently, I examined the skew and kurtosis of all continuous variables to assess for normality. Based on the aforementioned criteria, all continuous variables were determined to be approximately normally distributed. Next, linearity and homoscedasticity were determined by examining P-P plots of the residuals of the predictor and outcome variables. Evaluation of these plots suggested that the residuals were normally distributed and homoscedastic, implying linearity.

Finally, because I am using longitudinal data, the assumption of sphericity—essentially the assumption of homogeneity of variance for repeated measures—was also examined. Mauchly's test of sphericity indicated that this assumption was not violated $\chi^2(2) = 2.197$, $p = .333$ for meaning in life. However, this assumption was violated for self-efficacy, $\chi^2(2) =$

8.498, $p = .014$, posttraumatic stress symptoms $\chi^2(2) = 12.451$, $p = .002$, and depressive symptoms $\chi^2(2) = 9.564$, $p = .008$. These violations suggest a positive bias in the *F*-statistic that may increase the risk of type I error (Haverkamp & Beauducel, 2017). Accordingly, all analyses involving these variables have been interpreted with caution. In all instances, effect sizes rather than significant p-values (< .05) have been prioritized when discussing the results.

Descriptive analyses

The baseline sample consisted of 191 veterans (72% male), a majority of whom identified as White (63%). See Table 1 for an overview of sample demographics.

Total scores were calculated to examine means, standard deviations, and correlations between study variables at Time 1, Time 2, and Time 3. These are presented in Table 5, along with the Cronbach's alpha for each variable at each time point. For an overview of how study variables changed over the course of the intervention, including whether these changes were significant, see Tables 6, 7, and 8.

Aim 1

Aim 1 examined whether self-efficacy and meaning in life relate to posttraumatic stress and depressive symptoms cross-sectionally and longitudinally, as well as whether these variables predict changes in distress. For an overview of these findings, see Table 9.

Baseline analyses

In partial support of my hypotheses, hierarchical linear regression analyses indicated that greater meaning in life, but not self-efficacy or sex, was significantly associated with less severe posttraumatic stress symptoms ($\beta = -.39$, $p < 0.001$; $\beta = -.32$, $p = 0.001$, for CAPS-5 and PCL-5, respectively) at baseline. Analyses also indicated that both meaning in life ($\beta = -.50$, $p < 0.001$) and self-efficacy ($\beta = -.19$, $p = 0.013$) were significantly associated with fewer depressive symptoms at baseline. Female participants were also more likely to experience higher levels of depressive symptoms ($\beta = -.14$, $p = 0.011$).

To assess the robustness of these findings, relevant covariates were first added into the model one by one.[4] Following this, all covariates were added into the model simultaneously. In all instances, the effects remained approximately the same, with meaning in life being associated with posttraumatic stress symptoms and both meaning in life and self-efficacy being associated with depressive symptoms. However, the association between sex and depressive symptoms became non-significant (See Tables 10-12 for results).

Longitudinal analyses

Before running any longitudinal analyses, I first examined whether the intervention to which individuals were randomized (i.e., wellness lifestyle program or yoga program) influenced distress. The results indicated that group assignment had a significant influence on some aspects of distress over time, with those in the yoga group experiencing greater reductions in posttraumatic stress (β = -.24, p = 0.016; β = -.21, p = 0.042, for CAPS-5 and PCL-5, respectively) but not depressive symptoms (β = .05, p = 0.627). Accordingly, the base model for the longitudinal analyses predicting posttraumatic stress symptoms controlled for the influence of both sex and group assignment. Longitudinal analyses examining those with complete data at Time 1 and Time 3 (N = 123) also controlled for age and posttraumatic stress symptoms considering their associations with missingness.

For those with complete data, the results indicated that Time 1 meaning in life, but not Time 1 self-efficacy, age, or sex, may be significantly associated with Time 3 posttraumatic stress symptoms. However, this association only trended toward significance when predicting symptoms as measured by the CAPS-5 (β = -.23, p = .052; see table 13), not when measured by the PCL-5 (β = -.11, p = .338; see Table 14). Accordingly, covariates were then introduced into the model predicting the CAPS-5 to assess the robustness of the association. In all instances, the results remained approximately the same, and the association between Time 1 meaning in life and Time 3 posttraumatic stress symptoms became statistically significant (β = -.25, p = .037; see table 15). However, the effect of Time 1 meaning in life on Time 3 posttraumatic stress

[4] Covariates were coded as follows: race (White vs. non-White), relationship status (in a relationship vs. not in a relationship), education level (1 = high school or less; 4 = at least some graduate education), and trauma type (combat vs. non-combat related trauma).

symptoms reduced in strength and became nonsignificant when controlling for Time 1 posttraumatic stress symptoms (β = -.09, p = .416).

For those with complete data, the results indicated that neither age, sex, Time 1 meaning in life, nor Time 1 self-efficacy were associated with Time 3 depressive symptoms (see table 16). As such, analyses were not run with any additional covariates added in.

These longitudinal analyses were then run using FIML to estimate the parameters in the full sample (N = 191). In this case, the results indicated, again, that Time 1 meaning in life was associated with Time 3 posttraumatic stress symptoms (β = -.25, p = .026), but only when measured by the CAPS-5, even with the inclusion of covariates (See Tables 17 and 18). However, this association reduced in strength and was no longer significant when controlling for Time 1 posttraumatic stress symptoms (β = -.09, p = .426).

Of note, when estimating the results using the full sample, Time 1 meaning in life was also significantly associated with Time 3 depressive symptoms (β = -.22, p = .046), but this association became non-significant with the inclusion of additional covariates. However, the effect size remained approximately the same (β = -.20, p = .075; see table 19).

In summary, the results of Aim 1 indicate that general self-efficacy is cross-sectionally associated with depressive symptoms but not posttraumatic stress symptoms. They also indicate that meaning in life is cross-sectionally associated with both posttraumatic stress and depressive symptoms and that it may be longitudinally associated with the posttraumatic stress symptoms measured by the CAPS-5. Neither self-efficacy nor meaning in life predicted changes in distress.

Aim 2

Aim 2 explored whether self-efficacy and meaning in life were differentially associated with the four PTSD symptom clusters (i.e., intrusions [Cluster B], avoidance [Cluster C], negative alterations in cognitions and mood [Cluster D], and alterations in arousal and reactivity [Cluster E]) and a priori depressive symptom clusters (i.e., cognitive-affective and somatic-vegetative). Aim 2 also explored whether self-efficacy or meaning in life were associated with the unique aspects of posttraumatic stress or depression, cross-sectionally and longitudinally. For an overview of these findings, see Table 20. For a graphical summary, see Figures 2 and 3.

Analyses of symptom clusters

In order to determine the utility of predicting symptom clusters, I first assessed the variability of each of the clusters. Specifically, I examined each cluster for severe restrictions in range, which were identified by cases where skew and kurtosis were considered to be extreme (i.e., absolute values of 3 and 10, respectively, Kline, 2015). I also examined the correlations of each of the clusters to assess whether multicollinearity was present (i.e., correlations higher than 0.9; Tabachnick et al., 2007). While confirmatory factor analyses would have also been informative, I determined that my sample was not large enough to confirm the proposed factor structures.[5]

Descriptive analyses demonstrated that the four PTSD symptom clusters at Time 1 and Time 3 were approximately normally distributed and not measuring the same construct (i.e., collinear; see tables 21 and 22). However, the alphas for these clusters, particularly those at Time 1 but also those at Time 3, were poor, indicating the presence of considerable measurement error and potentially attenuated effects.[6] The implications of this will be addressed in the discussion.

Results also indicated that the two depressive symptom clusters at Time 1 and Time 3 were also approximately normally distributed and not measuring the same construct (See Tables 23 and 24). Cronbach's alphas were acceptable for these clusters.

Multiple regression analyses indicated that meaning in life, but not general self-efficacy, was significantly associated with Cluster B (β = -.20, p = .038), Cluster D (β = -.45, p < .001), and Cluster E (β = -.22, p = .024) symptoms at baseline, even with the inclusion of covariates. Moreover, the relationship between meaning in life and Cluster C symptoms trended toward significance and had a similar effect size (β = -.19, p = .056) (See tables 25-28). Nevertheless, in the majority of cases (i.e., for Clusters B, C, and E), predictive ability was not greatly improved by the inclusion of self-efficacy and meaning in life (R^2 change of 0.026, 0.020, and 0.031, respectively). As such, meaning in life may only be clinically relevant for Cluster D symptoms where it explained almost 20% of the variance (R^2 change = 0.186).

[5] In order to perform a CFA, Kline (2015) suggests an overall sample of 300 or more and a subject-to-parameter ratio of, ideally, 10 to 1, but at least 5 to 1. For the CFA of PTSD symptom clusters, there are 50 parameters suggesting a ratio of 3.82 to 1.

[6] One explanation for the low alphas may be the number of items in each cluster: Cluster B (.54, 5 items); Cluster C (.39, 2 items); Cluster D (.65, 7 items); Cluster E (.52, 6 items). However, other measures with few items (e.g., the LOT-R, a six-item measure of optimism) have shown excellent reliability (Scheier, Carver, & Bridges, 1994). Thus, this may not have played a significant role. Additional explanations are explored in the discussion section.

Both meaning in life and general self-efficacy were associated with the cognitive-affective symptom cluster of depression (β = -.53, p < .001 and β = -.23, p < .001, respectively), with meaning in life showing a potentially stronger effect. In contrast, while it was hypothesized that self-efficacy, but not meaning in life, would be associated with the somatic-vegetative symptom cluster, the opposite occurred, and only meaning in life was significantly associated (β = -.36, p < .001). Similar results were found after including relevant covariates (see tables 29 and 30).

These same analyses were then run predicting posttraumatic stress and depressive symptom clusters at Time 3 in those who had complete data, controlling for age and sex (as well as group assignment when predicting posttraumatic stress). Time 1 meaning in life was a significant predictor of Time 3 Cluster D posttraumatic stress symptoms (β = -.37, p = .002) but not any of the other symptom clusters (see table 31). However, this association attenuated and became non-significant (β = -.19, p = .083) when controlling for Time 1 Cluster D symptoms (β = -.41, p < .001). For depressive symptoms, only Time 1 meaning in life was a significant predictor of Time 3 cognitive-affective depressive symptoms (β = -23, p = .054; see table 32). However, this association became non-significant (β = -.03, p = .843) when controlling for Time 1 cognitive-affective symptoms (β = .52, p < .001). Neither Time 1 meaning in life nor Time 1 general self-efficacy was a significant predictor of Time 3 somatic-vegetative symptoms.

These analyses were then run again using FIML. Like before, Time 1 meaning in life was a significant predictor of Time 3 Cluster D posttraumatic stress symptoms (β = -.35, p < .001; see table 33) but not any of the other symptom clusters. This effect attenuated (β = -.16, p = .120) when controlling for Time 1 Cluster D symptoms (β = .42, p < .001). Time 1 meaning in life was again a significant predictor of Time 3 cognitive-affective depressive symptoms (β = -.26, p = .046; see table 34) when controlling for covariates, although this effect reduced in strength by half (β = -.14, p = .299) when controlling for Time 1 cognitive-affective symptoms (β = -.38, p < .001). Neither self-efficacy (β = .03, p = .754) nor meaning in life (β = -.09, p = .340) were predictive of somatic-vegetative symptoms longitudinally.

In summary, symptom cluster analyses showed that, cross-sectionally, meaning in life is similarly associated with all four symptom clusters of PTSD and both depressive symptom clusters, whereas self-efficacy was only associated with the cognitive-affective symptom cluster of depression. Moreover, meaning in life was associated with both clinician-rated Cluster D

symptoms and cognitive-affective depressive symptoms longitudinally. However, neither variable predicted changes in these clusters.

Predicting the unique aspects of posttraumatic stress and depressive symptoms

After controlling for sex and Time 1 depressive symptoms, neither self-efficacy (β = .16, p = .061; β = .11, p = .222) nor meaning in life (β = -.15, p = .120; β = -.05, p = .581) was significantly associated with the unique aspects of Time 1 posttraumatic stress symptoms, as measured by the CAPS-5 or the PCL-5, respectively. In contrast, when controlling for sex and posttraumatic stress symptoms as measured by the CAPS-5, both self-efficacy (β = -.24, p = .004) and meaning in life (β = -.40, p < .001) were associated with the aspects of depression that are unique from posttraumatic stress.

These analyses were then run predicting Time 3 posttraumatic stress or depressive symptoms in those with complete data. After controlling for age, sex, and Time 1 depressive symptoms, neither self-efficacy (β = .08, p = .520; β = .03, p = .789) nor meaning in life (β = -.11, p = .414; β = .06, p = .671) was a significant predictor of the unique aspects of Time 3 posttraumatic stress symptoms, as measured by the CAPS-5 and PCL-5. Similarly, after controlling for sex and Time 1 posttraumatic stress symptoms as measured by the CAPS-5, neither self-efficacy (β = -.11, p = .245) nor meaning in life (β = -.08, p = .444) was a significant predictor of the unique aspects of Time 3 depressive symptoms. Non-significant results were also found when estimating these associations in the full sample using FIML.

In summary, the results of Aim 2 showed that meaning in life was most strongly associated with the Cluster D symptoms of PTSD and the cognitive-affective symptoms of depression. Both self-efficacy and meaning in life were associated with the unique aspects of depression, but only cross-sectionally. Neither meaning in life nor self-efficacy was associated with the unique aspects of PTSD (i.e., the symptoms of PTSD and that are not shared with depression).

Aim 3

The purpose of Aim 3 was to examine whether meaning in life mediated the relationship between self-efficacy and distress (i.e., posttraumatic stress or depressive symptoms; see figure 4

for a model of the analyses). As a preliminary test, this model was run using cross-sectional data. However, because none of the associations between Time 1 general self-efficacy and Time 3 distress (i.e., posttraumatic stress and depressive symptoms) were significant, longitudinal mediation analyses were not run.

At baseline, bootstrapped 95% CIs revealed an indirect effect of self-efficacy on posttraumatic stress symptoms through meaning in life (*b*s = -.29 and -.34, respectively for the CAPS-5 and PCL-5). Of note, the confidence intervals for the direct associations between self-efficacy and posttraumatic stress symptoms contained zero, suggesting full mediation. The results also revealed an indirect effect of self-efficacy on depressive symptoms through meaning in life (*b* = -.45). However, in this case, the 95% confidence interval for the direct association between self-efficacy and depressive symptoms did not contain zero, suggesting meaning in life only partially mediated this relationship.

DISCUSSION

The current study was grounded in Park's (2010) meaning-making model and cognitive theories of PTSD (Brewin & Holmes, 2003; Cahill & Foa, 2007; Dalgleish, 2004), which suggest that traumatic events influence important beliefs and goals related to the self, other people, and the world (i.e., global meaning). The purpose of this study was to further test these theories by examining the associations between general self-efficacy, meaning in life, and distress (i.e., posttraumatic stress and depressive symptoms and symptom clusters) in US military personnel. Meaning in life was identified as an indicator of global meaning and general self-efficacy was identified as a global belief. It was hypothesized that both of these constructs would be associated with less severe symptoms. The results provide some support for these ideas; however, they also reveal nuances and inconsistencies that complicate existing findings and emphasize the importance of ongoing replication and exploration.

The cross-sectional findings of the current study partially contradict the existing literature (i.e., Blackburn & Owens, 2015). Blackburn and Owens (2015) found that, when meaning in life and general self-efficacy were modeled together, only self-efficacy was associated with posttraumatic stress symptoms, whereas both were associated with depressive symptoms. The current study found that, when modeled together, only *meaning in life* was associated with posttraumatic stress symptoms, while both meaning in life and self-efficacy were associated with depressive symptoms. There are likely several explanations for these seemingly conflicting findings.[7] For example, baseline regression analyses in the Blackburn and Owens (2015) study included 93 veterans, whereas the current study included data from 191 veterans, suggesting the latter had greater statistical power. Thus, the associations found in the current study may be a more accurate representation of the true nature of affairs. Moreover, Blackburn and Owens (2015) controlled for rank and combat exposure, while the current study controlled for other factors (e.g., education level). Inclusion of different covariates could have altered the strength or direction of the manifest associations. Finally, Blackburn and Owens (2015) did not assess whether a Criterion A stressor was present, whereas the current study did. Symptoms of

[7] Unfortunately, Blackburn and Owens (2015) did not report the nonsignificant regression coefficients. As such, it is not possible to know the strength of these associations or if they were in the same direction as those reported in the current study.

posttraumatic stress reported in that study could have been based on events that were stressful (e.g., divorce) but not traumatic per se. Meaning in life may be associated with events that are considered traumatic based on DSM-5 criteria, and beliefs about one's ability to achieve outcomes in general (i.e., self-efficacy) may be less relevant.

The cross-sectional findings also add to the existing literature by providing preliminary evidence on how meaning in life and general self-efficacy relate to posttraumatic stress and depressive symptom *clusters*. Continued research of this kind could help to guide the development and use of more precise interventions that yield greater reductions in the distress. However, before discussing the associations found and their potential implications, it should be noted that the reliability estimates for some of the symptom clusters were suboptimal. Specifically, the Cronbach's alphas for the PTSD symptom clusters, particularly those measured at baseline, were poor, ranging from .39 - .65. Low alphas place limits on the size of correlations that will be detected and can reduce statistical power. Thus, the significant associations found (and not found), as well as the interpretations provided, should be considered with caution. Moreover, even though low alphas for these clusters is not entirely surprising based on previous research (Weathers et al., 2018), they indicate the presence of substantial measurement error and could signal poor construct validity. In fact, there is emerging evidence to suggest that the symptom clusters listed in the DSM-5 for PTSD may not optimally capture its latent structure (e.g., Armour et al., 2015). Thus, additional research examining how meaning in life and general self-efficacy relate to alternative dimensional structures of PTSD (Tsai et al., 2014) may yield important information that could improve treatment precision.

Self-efficacy and distress

In the current study, general self-efficacy was cross-sectionally associated with the cognitive-affective symptoms of depression (e.g., depressed mood) but not the somatic-vegetative symptoms (e.g., fatigue). This suggests that higher levels of general self-efficacy may be associated with the frequency with which individuals experience negative and positive emotions and self-appraisals. One way this might occur is through the pursuit of goals. It is known that goal success, or even progress toward valued goals, increases the experience of positive emotions (Carver & Scheier, 1998). The experience of accomplishment, or even the recognition that one *could* succeed across various domains (i.e., general self-efficacy) may also

increase positive appraisals of self and reduce negative appraisals by minimizing experiences of failure in everyday life. Together, this may reduce the frequency and severity of self-critical thoughts or feelings of worthlessness. General self-efficacy may also be associated with more positive expectations about the future that reduce thoughts of hopelessness or suicide that can characterize the cognitive-affective symptoms of depression. In fact, individuals who report higher levels of general self-efficacy tend to actively plan for their future, consider possible consequences, and experience high levels of life satisfaction (Azizli, Atkinson, Baughman, & Giammarco, 2015). Conversely, those who are actively suicidal or have attempted suicide often report lower life satisfaction and the experience of a foreshortened future (Davis, Witte, & Weathers, 2014; Koivumaa-Honkanen et al., 2001; Selaman, Chartrand, Bolton, & Sareen, 2014).

Nevertheless, if it is true that general self-efficacy promotes energetic goal pursuits, it is not clear why it was not associated with the somatic-vegetative symptoms. Behavioral activation (Martell, Dimidjian, & Herman-Dunn, 2013) is one common therapeutic approach for treating somatic (and other) symptoms of depression that has been shown to be effective in both civilian and military populations (Cuijpers, Van Straten, & Warmerdam, 2007; Jakupcak, Wagner, Paulson, Varra, & McFall, 2010). And, one of the key ingredients of behavioral activation is the establishment and pursuit of valued goals, which self-efficacy ordinarily facilitates (Bandura & Cervone, 1983; Luszczynska et al., 2005). Thus, one potential explanation for the lack of significant associations is certain somatic symptoms (e.g., overeating, difficulty concentrating) are not associated with goal pursuits or appraisals of goal-related abilities in the same way that others (e.g., fatigue, loss of pleasure) may be. This might indicate that the clusters of symptoms used in the current study (Dozois et al., 1998) were not precise enough to detect the influence of general self-efficacy. This may be why some researchers have differentiated between typical (appetite loss) and atypical (e.g., hypersomnia) somatic-vegetative symptoms (Fournier et al., 2013). Related to this, only certain somatic symptoms of depression may be associated with appraisals of general self-efficacy. For example, decreases in lethargy might influence appraisals of one's overall ability to accomplish a variety of outcomes. Indeed, increases in energy often lead to increased behavioral engagement, which tends to influence how a person views their ability to accomplish goals (Snyder et al., 1991). At the same time, changes in appetite may not have any bearing on appraisals of general self-efficacy.

Contrary to my hypotheses, when controlling for meaning in life, general self-efficacy was not associated with any of the four PTSD symptom clusters. This suggests that efforts designed to increase general self-efficacy may have limited therapeutic value when working with US military personnel suffering from posttraumatic stress. This is surprising for two reasons. For one, self-efficacy in particular, and positive expectancies in general, tend to be inversely associated with the use of avoidant coping (Carver & Connor-Smith, 2010; Rand, 2018), which is integral to the maintenance of posttraumatic stress symptoms. For another, self-efficacy is similar to many of the foundational beliefs theorized to be disrupted by traumatic events (Janoff-Bulman, 1989; Park, 2010) and is similar to beliefs that evidence-based treatments for PTSD try to promote or reconstruct (e.g., competence, esteem; Foa, 2011; Resick et al., 2016).

One interpretation of these findings is that traumatic events do not always disrupt general beliefs about perceived abilities. Indeed, it may depend on the nature of the event. Consider, for example, the experience of a US military personnel being involved in a roadside ambush while on patrol at night in an unfamiliar area of a combat zone. This event could undermine their perceived ability to maintain safety in specific situations (e.g., driving at night or in certain areas) but not influence the overall perception of their ability to maintain safety (e.g., on base; post-deployment). Moreover, maintaining confidence in one's general abilities may not influence distress related to the event in question. This would be in line with Bandura's (1982) original conceptualization of self-efficacy, which posited that the perceived ability to perform *specific* behaviors in a *specific* context is what is most relevant for distress and well-being (Bandura, 1982). General self-efficacy may not be specific enough to motivate the precise behaviors required to reduce symptoms (e.g., revisiting areas similar to the attack). Consistent with this idea, a recent meta-analysis (Gallagher et al., 2020) found coping-specific self-efficacy to have a larger association with posttraumatic stress symptoms than general self-efficacy.

Another possibility is that traumatic events have less influence on beliefs about the self than they do on beliefs about other people or the world. Again, depending on the nature of the trauma, beliefs about one's abilities to successfully operate in the world may remain unchanged, even when beliefs about the world and other people have been altered. Consider, as another example, the experience of physical assault. This event may not alter a person's general assessment of their own abilities (e.g., "I can still accomplish my goals"), even if it does contribute to changes in their understanding of other people (e.g., they cannot be trusted) or how

the world works (e.g., it is dangerous and unpredictable). This may explain why, after accounting for its shared association with general self-efficacy, meaning in life was associated with posttraumatic stress symptoms and symptom clusters. In addition to positive self-appraisals, perceptions of meaning in life are grounded in adaptive beliefs about the world and other people (George & Park, 2016; Martela & Steger, 2016).

Meaning in life and distress

In support of my hypotheses, results showed that meaning in life was cross-sectionally associated with all four symptom clusters of PTSD and both depressive symptom clusters. The results also indicated that meaning in life was longitudinally associated with the cognitive-affective symptoms of depression and the clinician-rated Cluster D symptoms of PTSD. To date, the vast majority of studies examining the associations between meaning in life, self-efficacy, and distress have been cross-sectional (e.g., Blackburn & Owens, 2015; Fischer et al., 2020; Gallagher et al., 2020; Owens, Steger, Whitesell, & Herrera, 2009; Steger et al., 2015). As such, the stability of these associations over time has been unclear, as has the possibility, for example, that meaning in life or self-efficacy contribute to changes in distress. Notably, the current study adds to the existing literature by providing preliminary insight into both of these processes. However, before discussing the potential implications of these associations, it will be important to first consider the various explanations for their emergence.

One explanation for the significant longitudinal associations between meaning in life, cognitive-affective symptoms of depression, and Cluster D symptoms of PTSD is that these were due to chance. The current study employed a large number of analyses, which should underscore the need for skepticism.[8] Moreover, the nature of the data increased the risk of generating false positive results. Several of the variables used in the longitudinal analyses violated the assumption of sphericity. When this assumption is violated, type I error tends to inflate (Haverkamp & Beauducel, 2017). Accordingly, it is possible that the significant findings were illusory.

[8] Because analyses introduced covariates one by one, and because analyses were first performed on those with complete data and then followed by estimations using the entire sample, the total number of analyses run in the current study was 106. Employing a Bonferroni correction, this would suggest an appropriate significance level of $p < 0.0005$. At this level of alpha, only the following associations would remain significant (all baseline analyses): meaning in life and depressive symptoms and both depressive symptom clusters; meaning in life and posttraumatic stress symptoms and Cluster D symptoms (both measured by the CAPS-5).

An alternative possibility is that the relative lack of significant longitudinal associations (as compared to cross-sectional associations) is a product of restricted range. In the parent study, Davis and colleagues (2020) only included participants who had confirmed diagnoses of PTSD. This decision, although understandable within the context of a clinical intervention, restricted the range and variability of posttraumatic stress symptoms (and, along with it, the other study variables). This could have artificially reduced the size of the measured associations. Moreover, because range restriction is also known to reduce statistical power (Miciak, Taylor, Stuebing, Fletcher, & Vaughn, 2016), the ability to detect an effect may have been limited. In fact, there is meta-analytic evidence to support the longitudinal association between general self-efficacy and posttraumatic stress symptoms (Luszczynska et al., 2009). Therefore, with a larger sample, general self-efficacy may have emerged as a significant predictor, even when controlling for its shared association with meaning in life.

Related to this, the significant, longitudinal associations that did emerge in the current study may have been particularly robust. Moreover, the weaker associations that were detected cross-sectionally (e.g., between meaning in life and the somatic-vegetative symptoms of depression) may have been diluted by the context in which they were measured. As a reminder, the data used in the current study were extracted from a RCT designed to reduce symptoms of posttraumatic stress and related symptoms. These efforts were successful, and sizable reductions in symptoms occurred (Davis et al., 2020). These changes in distress may have reduced the effect sizes to undetectable levels.

Finally, it is also important to consider the longitudinal associations found may represent the true nature of affairs. In other words, meaning in life may, in fact, be associated with clinician-rated Cluster D symptoms of PTSD and cognitive-affective symptoms of depression. As mentioned, appraisals of meaning in life are commonly theorized to be informed by three dimensions: a sense of comprehension or understanding that the world makes sense, an awareness that one's life is driven by valued aims, and a feeling that one's life is significant or matters in the grand scheme (George & Park, 2016; King & Hicks, 2021; Martela & Steger, 2016). Each of these dimensions may influence these symptoms of distress, and vice versa.

Meaning in life and depressive symptoms

High levels of comprehension may help to maintain a sense of control, which promotes feelings of pleasure and worthiness, as well as a sense of optimism, that reduces distress. For example, in a study of adults with congestive heart failure, George and Park (2017) showed higher levels of baseline meaning in life were related to fewer perceived violations to personal beliefs, such as personal control, over time. In other words, those with higher levels of meaning were less likely to appraise the diagnosis of a serious illness as eroding their overall the sense of control. Lower levels of comprehension—perceptions that one does not fit in the world, or that one's sense of self is poorly defined (Martela & Steger, 2016)—could maintain feelings of sadness and disconnection, as well as thoughts of self-criticism or worthlessness. In addition, higher levels of purpose in life may sustain action and an ongoing feeling of self-worth as individuals move toward valued actions. In support of this, Hooker and Masters (2014) showed higher levels of purpose in life were associated with more frequent physical activity, both self-reported and objectively measured with an accelerometer. Higher levels of purpose in life may also allow people to preserve a sense of pleasure while also reducing the severity of negative affect. For instance, Hill and colleagues (2018) demonstrated that purpose in life moderated the relationship between daily stressors and wellbeing such that those with high levels of purpose experienced significantly smaller increases in negative affect on stressful days than those who reported low levels of purpose. Lower levels of purpose may generate a sense of inertia or aimlessness that leads to feelings of apathy or guilt, as well as negative expectations for the future. Finally, higher levels of personal significance/mattering may also generate positive feelings (e.g., pride) and reduce self-criticism. Conversely, when people see their lives as having little value to themselves or others, this may lead to feelings of worthlessness or guilt. In line with this, higher levels of significance have been theorized to reduce the risk of suicide in US military personnel (Bryan, Graham, & Roberge, 2015).

Depressive symptoms have been theorized to emerge alongside the perception of blocked goal pursuits (Nesse, 2000), and there is evidence that traumatic events can be experienced as disrupting, or tarnishing, valued goals. For example, Park, Mills, and Edmonson (2012) showed that posttraumatic stress symptoms were positively correlated with the belief that one would be less likely to accomplish various important goals (e.g., those related to companionship and ongoing physical health). Moreover, depressive symptoms are often characterized by negative

perceptions of the self, the future, and the world (Beck, Rush, Shaw, & Emery, 1979). Thus, it possible to see how higher levels of depressive symptoms might remain associated with lower levels of meaning in life longitudinally. Depressed individuals, or those at risk for depression, are less likely to engage with others or attain important goals, potentially due to negative biases and anticipations of failure, as well as indecisiveness and a lack of motivation (Elmer, Geschwind, Peeters, Wichers, & Bringmann, 2020; Johnson, Carver, & Fulford, 2010; Wenzlaff & Grozier, 1988). For example, Nezlek and colleagues (1994) demonstrated that college students at risk of depression are less likely to engage with others and, when they do, they report lower quality interactions. If tendencies toward self-criticism, isolation, and inertia go unchallenged, evaluations of personal insignificance and purposelessness are likely to fester, and perceptions of meaning in life may remain limited.

Meaning in life and posttraumatic stress symptoms

It is not obvious why meaning in life would only be longitudinally associated with posttraumatic stress symptoms as measured by the CAPS-5. In fact, considering the potential for self-report method effects and the fact that the CAPS-5 and the PCL-5 were strongly associated at Time 3 (r = .72), one may have expected meaning in life to also be associated with the PCL-5. This raises the question of whether there is something unique about the CAPS-5 vis-à-vis meaning in life. As a way to begin to answer this, it may be worth considering the differences between the CAPS-5 and the PCL-5. While both measure posttraumatic stress symptoms, their ratings assess somewhat distinct phenomena. The PCL-5 taps, exclusively, subjective distress—how bothered a person is by their symptoms. Scores on the CAPS-5 represent clinicians' ratings of the frequency and intensity of a person's symptoms, along with a consideration of the nature and pervasiveness of those symptoms (Moshier et al., 2018). In other words, CAPS-5 ratings reflect the person's distress but also take into account other ways their lives may have been detrimentally affected by symptoms (e.g., disconnection from others). Therefore, the manifest association between Time 1 meaning in life and Time 3 CAPS-5 scores could indicate that meaning in life is more strongly associated with adaptive behaviors and improved functioning (e.g., less symptom interference) than it is perceived distress. However, because there is also evidence to suggest the CAPS-5 and the PCL-5 relate similarly to measures of psychosocial functioning, this interpretation may only be somewhat valid (Weathers et al., 2018).

Higher levels of posttraumatic stress symptoms could maintain lower levels of meaning in life both directly and indirectly. For example, ongoing feelings of guilt and irritability, as well the use of avoidant coping, could limit engagement with others, which is a common source of meaning in life (Schnell, 2009). Moreover, posttraumatic stress symptoms could promote the use of substances, which might also contribute to low levels of meaning in life. It is common for people to use substances as a way to self-medicate symptoms of PTSD (Leeies, Pagura, Sareen, & Bolton, 2010), and this style of coping may negatively affect sources of meaning in life (Csabonyi & Phillips, 2020; Martin, MacKinnon, Johnson, & Rohsenow, 2011) and increase the risk of suicide (Darvishi, Farhadi, Haghtalab, & Poorolajal, 2015; Norman, Haller, Hamblen, Southwick, & Pietrzak, 2018; Schneider, 2009). For example, in an experience sampling study of veterans with PTSD and alcohol use, Gaher and colleagues (2014) showed that, on days when participants experienced higher levels of PTSD symptoms, they also consumed higher amounts of alcohol and experienced greater alcohol-related problems (e.g., negative interactions with loved ones). When clinicians are rating symptoms of posttraumatic stress with the CAPS-5, this sort of information may inform their overall ratings of symptom severity, which could explain the associations found.

Meaning in life and negative cognitions and affectivity

The longitudinal findings of this study provide preliminary support for the idea that meaning in life is primarily associated with the negative cognitions and emotions (i.e., cognitive-affective depressive symptoms and cluster D posttraumatic stress symptoms) that can develop or worsen in the aftermath traumatic events. Indeed, the fact that meaning in life was *not* associated with the aspects of posttraumatic stress that are unique from depression (Aim 2) only bolsters this point. Together, these findings suggest the relevance of meaning in life for the experience of PTSD may be largely due to the depressive symptoms that are built into that diagnosis (e.g., loss of pleasure). Consequently, the moderate association found between meaning in life and posttraumatic stress symptoms in a recent meta-analysis of US military personnel (Fischer et al., 2020) may be explained by the association between meaning in life and depressive symptoms. Accordingly, interventions or techniques designed to enhance individuals' sense of meaning in life (e.g., setting values-congruent goals) may not be suitable for reducing symptoms of posttraumatic stress or depression that are not obviously mood-related (e.g., appetite,

nightmares). Meaning in life may only be clinically-relevant for certain clinical problems and presentations.

For example, appraisals of meaning in life may be implicated in suicidality. In fact, there is research showing meaning in life predicts decreases in suicidal ideation and suicide attempts over time (Kleiman & Beaver, 2013; Sinclair, Bryan, & Bryan, 2016). Moreover, suicidal ideation is uniquely associated with the cluster D symptoms of PTSD (Horwitz et al., 2019). Accordingly, the results of the current study suggest increases in meaning in life may reduce the risk of suicide. Related to this, there is meta-analytic evidence to suggest that interventions designed to increase meaning in life in certain populations (e.g., advanced cancer) also reduce symptoms of depression (Vos, Craig, & Cooper, 2015). Accordingly, it may be useful to examine whether interventions that increase meaning in life also decrease suicidality.

One explanation for the consistent associations between meaning in life and negative cognitions and affectivity is *moral injury*. While no single definition of moral injury exists (Hodgson & Carey, 2017) and its uniqueness from PTSD has been debated (see Griffin et al., 2019; Koenig et al., 2019 for reviews), moral injury is typically described as a consequence of committing, witnessing, or failing to prevent acts that go against deeply-held moral beliefs (Litz et al., 2009), where people develop feelings of guilt, shame, and/or remorse, as well as a loss of meaning in life. Cluster D symptoms have been shown to be bidirectionally associated with perceptions of moral injury over time (Currier, McDermott, Farnsworth, & Borges, 2019), and moral injury is associated with depression and a loss of meaning in life (Koenig et al., 2018). Thus, moral injury may account for the associations found between meaning in life, cognitive-affective symptoms of depression, and cluster D symptoms of PTSD.[9] This would suggest helping people with moral injuries to reconstruct a sense of meaning in life may reduce symptoms and improve well-being. It might also explain efforts to develop a spiritually-oriented version of Cognitive Processing Therapy that explicitly targets moral injury (Koenig et al., 2017;

[9] In the current study, however, it is not possible to determine whether these symptoms were related to a morally injurious event in particular or a traumatic event per se. Moreover, in general, it is difficult to tease apart symptoms of posttraumatic stress from moral injury (Barnes, Hurley, & Taber, 2019). Nevertheless, as suggested by Farnsworth, Drescher, Evans, & Walser (2017), one way to do so in clinical practice may be by considering their function. For example, increased isolation from others is a symptom of both PTSD and moral injury. However, the motivations for this behavior may differ. For someone with PTSD, isolation may be pursued as a way to avoid further harm or danger. For someone suffering from a moral injury, isolation may be sought as a way to prevent further shame (e.g., by reducing the likelihood that other people will find out about the transgression).

Pearce, Haynes, Rivera, & Koenig, 2018). For many, meaning in life is integral to the experience of religion/spirituality (Fischer & Secinti, 2020; Park, Edmondson, & Hale-Smith, 2013).

Changes in distress

Even though the longitudinal associations suggest meaning in life is relevant for various clinical problems, it is important to keep in mind that the results of the current study do not suggest that meaning in life leads to improvements in symptoms or functioning. To be clear, neither meaning in life nor general self-efficacy was associated with *changes* in distress. In other words, even though it may be possible to anticipate a person's level of posttraumatic stress in the future based on their current level of meaning in life, changes in meaning in life may not affect the trajectory of those symptoms. Thus, while it has been suggested that increases in meaning in life may lead to reductions in distress, this possibility awaits further study. Indeed, the current sample may have provided a poor test for this particular idea. The design of the parent study likely limited the ability of meaning in life and self-efficacy to predict changes in distress. As mentioned, both intervention conditions (i.e., a yoga group and a physical wellness group) accounted for significant reductions in symptoms (Davis et al., 2020). After also accounting for the association with Time 1 distress, there may not have been a significant amount of variance left for meaning in life and self-efficacy to predict. Accordingly, it is still possible that meaning in life and self-efficacy lead to changes in distress in more real-world scenarios. In line with this, there is evidence that meaning in life leads to changes in depressive symptoms over time in a general sample of older adults (Krause, 2007).

Additional explanations

In addition to the interpretations above, it is possible that unmeasured third variables account for the associations found. As one example, higher levels of general self-efficacy and meaning in life are both associated with higher levels of positive emotion (King, Hicks, Krull, & Del Gaiso, 2006; Luszczynska et al., 2005). In contrast, posttraumatic stress and depressive symptoms are often characterized by low levels of positive emotion (American Psychiatric Association, 2013). Accordingly, the associations found could be explained by differences in positive emotionality. Another potential third variable that may explain the current associations

is experiential avoidance. Experiential avoidance (EA) refers to an unwillingness to remain in contact with distressing internal experiences, such as shame or uncomfortable bodily sensations (Hayes-Skelton & Eustis, 2020) that can accompany disorders like PTSD and MDD. Evidence suggests individuals reporting higher levels of posttraumatic stress and depressive symptoms tend to engage in more frequent EA (Hayes et al., 2004; Orcutt, Reffi, & Ellis, 2020), whereas those who report higher levels of meaning in life tend to utilize this strategy with less frequency (Kashdan & Kane, 2011; Pavlacic, Schulenberg, & Buchanan, 2021). Although there is a dearth of research examining the relationship between general self-efficacy and EA in particular, general self-efficacy is ordinarily inversely associated with other forms of avoidant coping (Carver & Connor-Smith, 2010), suggesting it relates similarly to EA. Therefore, the findings of the current study may be due to differences in EA. This possibility would support one of the strategies of Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2009), which is to decrease the use of EA in service of establishing a more meaningful and values-driven life. The efficacy of ACT in reducing distress for individuals with PTSD and MDD (A-Tjak, Morina, Topper, & Emmelkamp, 2018; Orsillo & Batten, 2005) could be related to increases in general-self-efficacy or meaning in life.

Limitations

The current study has several limitations worth noting. To begin, the data were taken from a RCT of US military personnel with confirmed diagnoses of PTSD. As such, meaning in life and general self-efficacy cannot be considered protective factors per se. Moreover, as mentioned, this design likely resulted in a restriction of range and a loss of statistical power, which may have affected the results. In addition, even though longitudinal data were used, all analyses were correlational. Thus, I am unable to posit claims of causality. Ideally, future research would assess levels of meaning in life and general self-efficacy prior to, and following, the experience of trauma. An additional limitation of using data from an RCT is the possibility that the participants differed in important ways from those commonly treated in clinical practice (Norcross, Beutler, & Levant, 2006). This possibility threatens the generalizability of findings and should be considered a concern. At the same time, it should be emphasized that the parent study (Davis et al., 2020) employed fewer exclusions (e.g., substance abuse) than has been

typical of treatments of PTSD (Bradley, Greene, Russ, Dutra, & Westen, 2005). Therefore, the current findings may approximate typical clinical presentations.

Another limitation of this study regards the analysis of symptom clusters. I did not run factor analyses to confirm the proposed models, choosing instead to rely on the DSM-5 definition of PTSD and a particular conceptualizations of depressive symptoms (Dozois et al., 1998) that have been used in previous research (e.g., Khambaty et al., 2014). However, alternative classifications for depressive symptoms have been proposed (e.g., Fournier et al., 2013), and there is emerging evidence to suggest that the four symptoms clusters of PTSD identified in the DSM-5 do not best represent the underlying structure of that disorder (Armour et al., 2015; Tsai et al., 2014). Moreover, as mentioned, Cronbach's alpha for several of these clusters were suboptimal, suggesting the influence of considerable measurement error. Accordingly, the results found may have minimal clinical relevance if research continues to support conceptualizations different from the ones analyzed in the current study.

Demographic characteristics may have also limited the utility of findings. Even though the current sample was relatively diverse, containing a higher percentage of female (28% female) and minority US military personnel (e.g., 29% Black/African American) than the US military as a whole (CFR, 2020), its relative homogeneity placed restrictions on the design of particular covariates. For example, race was coded as White vs. non-White, which may have masked important aspects of diversity, increasing the likelihood that important differences went undetected. Consequently, even though emerging research suggests meaning in life may have similar, positive effects on distress over time for certain minority groups in the general population (e.g., African Americans; Park et al., 2020), future research should oversample racial minorities in the US military to determine whether the relationships between meaning in life, self-efficacy, and distress differ in strength for particular subgroups.

Another limitation of the current study concerns the measures used to assess meaning in life and self-efficacy. Regarding self-efficacy, a measure of general self-efficacy was used, rather than a measure tapping a specific aspect of efficacy (e.g., coping). Specific measures of self-efficacy appear to have stronger relations with distress than do general ones (Gallagher et al., 2020) and different associations may have emerged if a different measure had been administered. The FACIT-Sp assesses meaning in life as a unidimensional construct, despite predominant theories suggesting meaning in life is likely multidimensional (George & Park, 2016; Martela &

Steger, 2016). Accordingly, this study was unable to determine whether posttraumatic stress or depressive symptoms differentially relate to the theorized dimensions of meaning in life (i.e., comprehension, purpose, and significance/mattering). Nevertheless, there has been some suggestion that the four items of the FACIT-Sp meaning subscale[10] used in this study primarily tap the purpose in life dimension of meaning in life (Czekierda, Banik, Park, & Luszczynska, 2017). As such, the significant associations found could be driven by the experience of having valued aims in life that provide direction and motivation. Use of new measures that separately assess these dimensions of meaning in life (i.e., Costin & Vignoles, 2020; George & Park, 2017) could identify important correlates of distress, potentially illuminating targets for treatment. For example, research and theory suggest a robust, inverse association between meaning in life and suicidality (Bryan, Graham, et al., 2015; Kleiman & Beaver, 2013). Confirming whether particular aspects of meaning in life (e.g., personal significance) disproportionately influence suicidal thoughts and behaviors could inform existing suicide prevention methods designed to alleviate this ongoing problem.

Related to this, another limitation is the possibility that participants' report of their meaning in life (e.g., "I feel a sense of purpose in life") was *not* informed by the dimensions just mentioned. In fact, other biological, psychological, environmental, or circumstantial factors (e.g., employment, recent success) could have driven the responses (Prinzing, De Freitas, & Fredrickson, 2021). For example, inducing positive affect has been shown to increase perceptions of meaning in life (King et al., 2006) Thus, the theoretical interpretations regarding the relations between meaning in life and distress should be taken with caution. Despite these limitations, however, the current study has several clinical implications.

Implications for clinical practice and intervention research

When working with US military personnel coping with posttraumatic stress and depressive symptoms, clinicians may want to include measurements of meaning in life and self-efficacy in their initial assessment. Doing so may produce a more comprehensive conceptualization that leads to greater treatment response. For example, if a veteran presents with low general self-efficacy, it may not be effective to introduce behavioral experiments

[10] The four items are as follows: ("I have a reason for living"; "My life has been productive"; "I feel a sense of purpose in life"; and "My life lacks meaning and purpose" (reverse-scored).

immediately (e.g., engaging in more frequent social interaction). This may increase the likelihood that the person avoids the assignment due to the anticipation of failure, which could, in turn, exacerbate symptoms. Instead, what may be more helpful is to first spend time attempting to elicit strengths and previous accomplishments. This kind of history-taking could elevate the veteran's general efficacy (Bandura, 1986, 1997) and increase the likelihood that they will engage in, and benefit from, treatment. Modifying clients' views in such a way that a realistic understanding[11] of their personal efficacy emerges may be crucial for the success of evidence-based treatments that rely on the completion of assignments outside of session (Kazantzis et al., 2016; Martell et al., 2013).

Assessing veterans' dimensions of meaning in life (i.e., comprehension, purpose, and significance/mattering) may also have clinical utility by identifying areas to focus treatment. For example, if a veteran presenting for PTSD treatment reports relatively low levels of purpose in life, they may benefit from supplemental activities designed to clarify their values (e.g., Values Assessment Rating Form; Harris, 2008) and increase their ability to accomplish goals (Cheavens, Feldman, Gum, Michael, & Snyder, 2006; Feldman & Dreher, 2012). These exercises may also be useful to incorporate near the end of particular evidence-based treatments, such as Cognitive Processing Therapy (Resick et al., 2016), that target symptom relief through the modification of foundational beliefs. The opportunity to generate more comprehensive change may be facilitated by working with clients to identify and pursue various "next steps" made possible by symptom reduction (e.g., enjoying a meal in a public place; attending an outdoor concert). Learning how to set consistent and reliable goals that are in line with identified values may be one of the keys to lasting recovery.

Even though the current study suggests general self-efficacy is not strongly associated with distress, it may be useful to continue to explore its potential ability to promote resilience. As mentioned, the current findings could be due to a lack of power or various other factors that masked effects. It may also be useful to examine whether other positive expectancies, such as optimism (Carver, Scheier, & Segerstrom, 2010), differentially influence posttraumatic stress and depressive symptoms. Unlike self-efficacy, which is grounded exclusively in beliefs about the self, optimism is considered to be informed by thoughts related to external factors, such as

[11] Of note, there is some evidence to suggest that high levels of self-efficacy may decrease treatment seeking in US military personnel (Keeling, Barr, Atuel, & Castro, 2020).

fate or luck, in addition to beliefs about the self (Rand, 2018). Different kinds of expectancies may be more or less adaptive in the wake of particular traumatic events (e.g., natural disasters; combat). Similarly, particular traumatic events may disproportionately influence certain expectancies. As mentioned, certain traumas may more strongly influence beliefs about others (e.g., optimism) than they do beliefs about the self (e.g., self-efficacy).

With regard to meaning in life, it may be useful to examine whether meaning-based interventions shown to decrease distress in other populations (Guerrero-Torrelles, Monforte-Royo, Rodríguez-Prat, Porta-Sales, & Balaguer, 2017; Vos et al., 2015) lead to decreases in posttraumatic stress and depressive symptoms. This could help to guide the development of novel interventions designed to decrease distress. Moreover, because there is some evidence to suggest that a strong sense of meaning in life may reduce the risk of suicide (Kleiman & Beaver, 2013; Sinclair et al., 2016), randomized controlled trials should assess this possibility. To my knowledge, no studies have explored this.

Examining whether meaning in life is a mechanism through which existing evidence-based treatments for trauma-related disorders reduce symptoms may also help to guide treatment and the development of future interventions. Moreover, exploring whether these effects occur in all cases or only for particular subgroups could help to facilitate more precise case conceptualizations. For example, increases in meaning in life may only lead to reductions in symptoms for those who have experienced interpersonal traumas (e.g., sexual assault), which are theorized to disproportionally affect meaning in life (Janoff-Bulman, 1989). Non-interpersonal traumas (e.g., natural disasters) may not require a reworking of a person's global meaning system to the same degree that interpersonal traumas might. Further exploration of this possibility could provide greater insight into which treatments may be best suited for particular patients. For example, the survivor of a serious car accident may only require a brief, exposure-based intervention (e.g., Written Exposure Therapy; Thompson-Hollands, Marx, & Sloan, 2019), whereas the survivor of sexual assault may require more intensive treatment that addresses interpersonal dynamics, such as trust (e.g., Cognitive Processing Therapy; Resick & Schnicke, 1992; cf. Sloan, Marx, Lee, & Resick, 2018). Related to this, it may also be clinically useful to examine whether increases in general self-efficacy or meaning in life are outcomes of existing treatments for MDD and PTSD. This seems likely considering the techniques often used to reduce symptoms of these disorders (e.g., exercise, behavioral experiments requiring interaction

with others, cognitive techniques designed to correct faulty appraisals). To my knowledge, this has not been formally assessed.

Additionally, it may also be worthwhile to determine whether meaning in life is more strongly associated with moral injury in particular than PTSD per se and whether meaning in life (or self-efficacy) is more strongly associated with particular kinds of moral injuries (e.g., perpetration vs betrayal based; Griffin et al., 2019; Litz et al., 2009). Further disentanglement of these associations may increase the effectiveness of treatment by facilitating greater precision and treatment matching.

Finally, continued exploration of how meaning in life relates to other clinical disorders characterized by problems with mood regulation and affective distress may lead to the development of new interventions that further enhance well-being and overall quality of life. For instance, there is some evidence that progress toward an identified purpose in life increases daily reports of well-being in people with social anxiety disorder (Kashdan & McKnight, 2013). There is also evidence that meaning in life is associated with less severe symptoms of borderline personality disorder (Marco, Pérez, García-Alandete, & Moliner, 2017). Future research may discover that meaning in life is a transdiagnostic construct that reduces the severity of many disorders.

Conclusion

Reducing the prevalence of trauma-related disorders in US military personnel remains an important task for clinicians and researchers. In partial support of cognitive theories of PTSD and several theories of stress and coping, the results of the current study suggest that higher levels of meaning in life, but not self-efficacy, are consistently associated with the mood aspects of posttraumatic stress and depressive symptoms. Continued exploration of these associations may enhance ongoing efforts to facilitate recovery from trauma.

Table 1. *Items within each PTSD symptom cluster based on the DSM-5.*

Cluster B symptoms	**Cluster C symptoms**	**Cluster D symptoms**	**Cluster E symptoms**
1. Recurrent, involuntary, and intrusive distressing memories of the event	*1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings*	*1. Inability to remember important parts of event*	*1. Irritable behavior and angry outbursts*
2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the event	*2. Avoidance of or efforts to avoid external reminders (e.g., people) that arouse distressing memories, thoughts, or feelings*	*2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world*	*2. Reckless or self-destructive behavior*
3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the event(s) were recurring.		*3. Persistent, distorted cognitions about the cause or consequences of the traumatic event*	*3. Hypervigilance*
4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s)		*4. Persistent negative emotional state (e.g., fear, guilt)*	*4. Exaggerated startle response*
5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the event(s).		*5. Markedly diminished interest or participation in significant activities*	*5. Problems with concentration*
		6. Feeling of detachment or estrangement from others	*6. Sleep disturbance (e.g., difficulty falling asleep)*
		7. Persistent inability to experience positive emotions (e.g., happiness)	

Table 2. *Items within each depressive symptom cluster identified by Dozois et al., 1998*

Cognitive-affective symptoms	**Somatic-vegetative symptoms**
Sadness	*Loss of pleasure*
Pessimism	*Crying*
Past failure	*Agitation*
Guilt feelings	*Loss of interest*
Punishment Feelings	*Loss of energy*
Self-dislike	*Changes in sleep*
Self-criticalness	*Irritability*
Suicidal thoughts	*Changes in appetite*
Indecisiveness	*Concentration*
Worthlessness	*Tiredness-fatigue*
	Loss of interest in sex

Table 3. *Multiple Regression Predicting Any Missingness at Time 3*

	B	SE	β	R^2	*df*	*F*	*p*
T3 Missingness				.261	2,188	6.844	.001
Age	**-.008**	**.003**	**-.206**				**.004**
T1 CAPS-5	.007	.004	.133				.064

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 4. *Demographics*

Baseline characteristics	*n*	%
Age, years, *M* (*SD*)	50.9	(13)
Sex		
Male	137	71.7
Female	54	27.7
Race		
White	120	62.8
Black	56	29.3
Other	15	7.9
Relationship status		
Partner	111	58.1
No partner	80	41.9
Education		
High school degree/GED or less	20	10.5
Some college / degree	97	50.7
4-year college degree	42	22
Some graduate / degree	32	16.8
Index trauma		
Combat trauma	122	63.9
Adult / Military sexual trauma	29	15.2
Other adult trauma	23	12
Childhood trauma	17	8.9

Table 5. *Correlations between study variables at Times 1, 2, and 3*

	M	SD	**α**	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Meaning in life (T1)	9.44	3.91	.87	-												
2. Self-efficacy (T1)	25.72	7.63	.96	.66**	-											
3. CAPS-5 (T1)	36.26	8.54	.78	-.34**	-.19*	-										
4. PCL-5 (T1)	44.91	12.38	.87	-.32**	-.21**	.69**	-									
5. BDI-II (T1)	24.91	10.52	.90	-.63**	-.53**	.48**	.51**	-								
6. Meaning in life (T2)	9.59	3.43	.82	.72**	.50**	-.36**	-.29**	-.51**	-							
7. Self-efficacy (T2)	25.15	7.26	.95	.53**	.71**	-.33**	-.35**	-.48**	.57**	-						
8. PCL-5 (T2)	40.31	15.58	.94	-.24*	-.16	.35**	.68**	.36**	-.36**	-.36**	-					
9. BDI-II (T2)	21.74	10.83	.91	-.47**	-.46**	.36**	.41**	.61**	-.63**	-.58**	.57**	-				
10. Meaning in life (T3)	10.80	3.84	.89	.63**	.44**	-.38**	-.27**	-.51**	.76**	44**	-.27**	-.54**	-			
11. Self-efficacy (T3)	27.49	7.30	.96	.44**	.63**	-.34**	-.35**	-.41**	.47**	.76**	-.37**	-.50**	.60**	-		
12. CAPS-5 (T3)	28.85	12.82	.88	-.20*	-.11	.45**	.53**	.24**	-.34**	-.29**	.60**	.48**	-.47**	-.43**	-	
13. PCL-5 (T3)	37.47	16.69	.95	-.12	-.11	.33**	.55**	.29**	-.35**	-.30**	.70**	.55**	-.45**	-.39**	.72**	-
14. BDI-II (T3)	18.54	11.57	.93	-.26*	-.23*	.30**	.33**	.46**	-.45**	-.30**	.45**	.69**	-.65**	-.46**	.58**	.65**

Note: * p <.05, ** p <.01, Meaning in life = Functional Assessment of Chronic Illness Therapy-Spirituality, meaning subscale, Self-efficacy = New General Self-Efficacy scale, CAPS-5 = Clinician-Administered PTSD Scale for DSM-5, PCL-5 = PTSD Checklist for DSM-5, BDI-II = Beck Depression Inventory – II

Table 6. *Summary of change in study variables from Time 1 to Time 2*

Variable	M (SD) Time 1	M (SD) Time 2	Time 1 → Time 2	Cohen's d
In total sample (*N* = 104)				
Meaning in life	9.38 (3.77)	9.59 (3.43)	+0.02	-.08
Self-efficacy	25.37 (7.64)	25.15 (7.26)	-0.02	.04
PCL-5	44.27 (13.18)	40.30 (15.27)	**-3.97**	**.36**
BDI-II	24.90 (10.84)	21.74 (10.83)	**-3.16**	**.35**
In wellness group (*N* = 53)				
Meaning in life	9.51 (4.02)	9.06 (3.46)	-0.45	.17
Self-efficacy	24.89 (7.75)	24.55 (7.34)	-0.34	.06
PCL-5	46.06 (13.90)	44.68 (13.31)	-1.38	.13
BDI-II	24.17 (10.35)	22.83 (10.51)	-1.34	.14
In yoga group (*N* = 51)				
Meaning in life	9.24 (3.53)	10.14 (3.35)	+0.90	-.36
Self-efficacy	25.86 (7.57)	25.78 (7.19)	-0.08	.013
PCL-5	42.89 (12.28)	36.02 (16.55)	**-6.87**	**.57**
BDI-II	25.67 (11.15)	20.61 (11.15)	**-5.06**	**.53**

Bold text indicates significant change a $p < .01$.

Table 7. *Summary of change in study variables from Time 2 to Time 3*

Variable	M (SD) Time 2	M (SD) Time 3	Time 2 → Time 3	Cohen's d
In total sample (*N* = 99)				
Meaning in life	9.58 (3.52)	10.73 (3.71)	**+1.15**	**-.44**
Self-efficacy	25.27 (7.37)	27.64 (7.12)	**+2.37**	**-.47**
PCL-5	40.95 (15.18)	37.63 (17.05)	-3.32	.26
BDI-II	21.70 (11.07)	18.28 (11.49)	**-3.42**	**.39**
In wellness group (*N* = 51)				
Meaning in life	9.02 (3.51)	10.43 (3.68)	**+1.41**	**-.50**
Self-efficacy	24.67 (7.42)	26.24 (7.51)	+1.57	-.31
PCL-5	44.86 (13.51)	41.12 (14.70)	-3.74	.37
BDI-II	22.76 (10.70)	17.75 (10.28)	**-5.01**	**.57**
In yoga group (*N* = 48)				
Meaning in life	10.19 (3.46)	11.06 (3.74)	+0.87	-.36
Self-efficacy	25.91 (7.33)	29.17 (6.39)	**+3.26**	**-.64**
PCL-5	36.10 (16.25)	33.25 (18.97)	-2.85	.19
BDI-II	20.55 (11.46)	18.85 (12.76)	-1.7	.19

Bold text indicates significant change a $p < .01$.

Table 8. *Summary of change in study variables from Time 1 to Time 3*

Variable	M (SD) Time 1	M (SD) Time 3	Time 1 → Time 3	Cohen's d
In total sample (*N* = 123)				
Meaning in life	9.76 (3.87)	10.78 (3.85)	**+1.02**	**-.31**
Self-efficacy	25.81 (7.63)	27.42 (7.30)	**+1.61**	**-.26**
CAPS-5	35.23 (8.70)	28.86 (13.04)	**-6.37**	**.54**
PCL-5	43.63 (12.80)	37.47 (16.48)	**-6.16**	**.43**
BDI-II	24.06 (10.55)	18.35 (11.58)	**-5.71**	**.50**
In yoga group (*N* = 61)				
Meaning in life	10.18 (3.69)	11.41 (3.70)	**+1.23**	**-.40**
Self-efficacy	27.13 (7.51)	29.05 (6.94)	+1.92	-.29
CAPS-5	34.75 (7.86)	25.69 (12.29)	**-9.06**	**.83**
PCL-5	42.05 (11.69)	34.25 (17.72)	**-7.80**	**.50**
BDI-II	24.08 (11.17)	17.97 (12.47)	**-6.11**	**.53**
In wellness sample (*N* = 62)				
Meaning in life	9.34 (4.03)	10.16 (3.93)	+0.82	-.23
Self-efficacy	24.52 (7.59)	25.82 (7.35)	+1.30	-.22
CAPS-5	35.69 (9.49)	31.98 (13.10)	-3.71	.31
PCL-5	45.18 (13.73)	40.65 (14.62)	**-4.53**	**.35**
BDI-II	24.03 (9.98)	18.73 (10.72)	**-5.30**	**.46**

Bold text indicates significant change a $p < .01$.

Table 9. *Summary of Aim 1 analyses including identified covariates*

	Time 1	**Time 3 (complete data; N = 123)**	**T1-T3 change (complete data; N = 123)**	**Time 3 (FIML; N = 191)**	**T1-T3 change (FIML; N = 191)**
Predicting CAPS-5					
Meaning in life	*	*	+	*	+
Self-efficacy	+	+	+	+	+
Predicting PCL-5					
Meaning in life	*	+	+	+	+
Self-efficacy	+	+	+	+	+
Predicting BDI-II					
Meaning in life	*	+	+	+	+
Self-efficacy	*	+	+	+	+

* $p < .05$

Table 10. *Hierarchical Regression Predicting Posttraumatic Stress Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
CAPS-5							
Step 1				.015	5,185	.55	.735
Sex	.43	1.70	-.02				.802
Race	-.03	.70	-.00				.965
Marital status	.77	1.30	.05				.551
Education level	-1.01	.70	-.11				.153
Trauma type	.82	1.56	.05				.601
Step 2				.134	2,183	4.060	<0.001
Self-efficacy	.10	.10	.09				.362
Meaning in life	**-.87**	**.20**	**-.40**				**<.001**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 11 *Hierarchical Regression Predicting Posttraumatic Stress Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
PCL-5							
Step 1				.023	5,185	.872	.501
Sex	-.92	2.46	-.03				.709
Race	.26	1.01	.02				.796
Marital status	2.28	1.87	.09				.224
Education level	-1.24	1.01	-.09				.226
Trauma type	-.82	2.25	-.03				.717
Step 2				.116	2,183	3.425	.002
Self-efficacy	.03	.15	.03				.870
Meaning in life	**-1.00**	**.29**	**-.32**				**<.001**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 12 *Hierarchical Regression Predicting Depressive Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
BDI-II							
Step 1				.049	5,185	1.911	.094
Sex	-3.35	2.06	-.14				.105
Race	-.33	.84	-.03				.698
Marital status	.89	1.57	.04				.570
Education level	-.96	.85	-.08				.263
Trauma type	-1.73	1.89	-.078				.360
Step 2				.442	2,183	20.724	<.001
Self-efficacy	**-.25**	**.10**	**-.19**				**.017**
Meaning in life	**-1.34**	**.20**	**-.50**				**<0.001**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 13 *Hierarchical Regression Predicting Posttraumatic Stress Symptoms at Time 3 in those with complete data (N = 123)*

	B	SE	β	R^2	*df*	*F*	*p*
CAPS-5							
Step 1				.063	3,119	2.647	.052
Age	.06	.09	.06				.511
Sex	-.71	2.61	-.024				.786
Group	**-6.26**	**2.31**	**-.24**				**.008**
Step 2				.101	5,117	2.636	.027
Self-efficacy	.10	.20	.05				.652
Meaning in life	-.77	.39	-.23				.052

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 14 *Hierarchical Regression Predicting Posttraumatic Stress Symptoms at Time 3 in those with complete data (N = 123)*

	B	SE	β	R^2	*df*	*F*	*p*
PCL-5							
Step 1				.036	3,119	2.497	.063
Age	.19	.11	.14				.108
Sex	-1.23	3.31	-.03				.711
Group	**-6.33**	**2.92**	**-.19**				**.032**
Step 2				.077	5,117	1.947	.092
Self-efficacy	-.06	.26	-.03				.811
Meaning in life	-.48	.50	-.11				.338

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 15 *Hierarchical Regression Predicting Posttraumatic Stress Symptoms at Time 3 in those with complete data (N = 123), controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
CAPS-5							
Step 1				.064	7,115	1.222	.297
Age	.06	.09	.06				.497
Sex	-1.10	3.01	-.034				.715
Group	**-5.91**	**2.24**	**-.23**				**.009**
Race	.49	2.36	.020				.838
Marital status	1.95	2.32	.077				.402
Education level	.54	1.23	.04				.662
Trauma type	1.25	2.84	.05				.662
Step 2				.116	9,113	1.640	.112
Self-efficacy	.13	.20	.08				.502
Meaning in life	**-.83**	**.39**	**-.25**				**.037**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 16 *Hierarchical Regression Predicting Depressive Symptoms at Time 3 in those with complete data (N = 123)*

	B	SE	β	R^2	*df*	*F*	*p*
BDI-II							
Step 1				.012	2,120	.713	.492
Age	-.09	.08	-.10				.300
Sex	-1.20	2.37	-.50				.614
Step 2				.093	4,118	3.010	.021
Self-efficacy	-.18	.18	-.12				.301
Meaning in life	-.57	.35	-.19				.105

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 17 *Hierarchical Regression Predicting Posttraumatic Stress Symptoms at Time 3 in the Full Sample (N = 191) using FIML.*

	B	SE	β	*p*
PCL-5				
Sex	-2.44	3.15	-0.07	.436
Group	**-6.31**	**2.84**	**-0.19**	**.023**
Self-efficacy	0.07	0.25	0.03	.317
Meaning in life	-0.48	0.49	-0.11	.770

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; p, probability. Bold text indicates significant relationship at $p < .05$. Note: age and Time 1 CAPS-5 scores were used as auxiliary variables. F statistics are not provided in Mplus when the model is saturated.

Table 18 *Hierarchical Regression Predicting Posttraumatic Stress Symptoms at Time 3 in the Full Sample (N = 191) using FIML, controlling for all covariates.*

	B	SE	β	*p*
CAPS-5				
Sex	-1.48	2.87	-0.05	.606
Group	**-5.62**	**2.15**	**-0.22**	**.007**
Race	1.82	2.31	0.13	.422
Marital status	1.87	2.21	0.07	.396
Education level	0.64	1.17	0.04	.585
Trauma type	2.35	2.74	0.09	.387
Self-efficacy	0.13	0.19	0.07	.487
Meaning in life	**-0.81**	**0.38**	**-.25**	**.026**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; p, probability. Bold text indicates significant relationship at $p < .05$. Note: age and Time 1 CAPS-5 scores were used as auxiliary variables. F statistics are not provided in Mplus when the model is saturated.

Table 19 *Hierarchical Regression Predicting Depressive Symptoms at Time 3 in the Full Sample (N = 191) using FIML, controlling for all covariates.*

	B	SE	β	R^2	*df*	*F*	*p*
BDI-II							
Sex	-1.02	2.59	-.04				.696
Race	-1.36	2.08	-.11				.510
Marital status	1.91	2.02	.08				.341
Education level	-.910	1.07	-.07				.394
Trauma type	-1.02	2.46	-.04				.679
Self-efficacy	-.09	.17	-.06				.587
Meaning in life	-.60	.34	-.20				.075

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; p, probability. Bold text indicates significant relationship at $p < .05$. Note: age and Time 1 CAPS-5 scores were used as auxiliary variables. F statistics are not provided in Mplus when the model is saturated.

Table 20 *Summary of Aim 2 analyses including identified covariates*

	Time 1	Time 3 (complete data; N = 123)	T1-T3 change (complete data; N = 123)	Time 3 (FIML; N = 191)	T1-T3 change (FIML; N = 191)
Predicting Cluster B					
Meaning in life	*	+	+	+	+
Self-efficacy	+	+	+	+	+
Predicting Cluster C					
Meaning in life	+	+	+	+	+
Self-efficacy	+	+	+	+	+
Predicting Cluster D					
Meaning in life	*	*	+	*	+
Self-efficacy	+	+	+	+	+
Predicting Cluster E					
Meaning in life	*	+	+	+	+
Self-efficacy	+	+	+	+	+
Predicting Cognitive-Affective					
Meaning in life	*	*	+	*	+
Self-efficacy	*	+	+	+	+
Predicting Somatic-Vegetative					
Meaning in life	*	+	+	+	+
Self-efficacy	+	+	+	+	+
Depressive symptoms (unique)					
Meaning in life	*	+	+	+	+
Self-efficacy	*	+	+	+	+
Posttraumatic stress symptoms (unique)					
Meaning in life	+	+	+	+	+
Self-efficacy	+	+	+	+	+

* $p < .05$

Table 21. *Skew, Kurtosis, Means, Standard Deviations, and Correlations of PTSD symptom clusters at Time 1*

	1.	2.	3.	4.
1. Cluster B	---	.34**	.41**	.48**
2. Cluster C		---	.39**	.20**
3. Cluster D			---	.40**
4. Cluster E				---
Mean	8.66	4.72	13.01	9.87
SD	2.70	1.30	4.27	3.08
Skew	.000	-.419	-.178	.148
Kurtosis	-.183	.038	-.718	-.311
α	.54	.39	.65	.52

Note: ** p <.01, Cluster B = intrusion symptoms (maximum score: 20), Cluster C = avoidance symptoms (maximum score: 8), Cluster D = negative alterations in cognitions and mood (maximum score: 28), Cluster E = marked alterations in arousal and reactivity (maximum score: 24). Items taken from the CAPS-5

Table 22. *Skew, Kurtosis, Means, Standard Deviations, and Correlations of PTSD symptom clusters at Time 3 (N = 132)*

	1.	2.	3.	4.
1. Cluster B	---	.57**	.54**	.61**
2. Cluster C		---	.46**	.37**
3. Cluster D			---	.60**
4. Cluster E				---
Mean	6.57	3.90	9.97	8.33
SD	4.32	1.90	5.64	3.76
Skew	.056	-.729	.052	.077
Kurtosis	-.954	-.334	-1.025	-.614
α	.79	.64	.79	.59

Note: ** p <.01, Cluster B = intrusion symptoms (maximum score: 20), Cluster C = avoidance symptoms (maximum score: 8), Cluster D = negative alterations in cognitions and mood (maximum score: 28), Cluster E = marked alterations in arousal and reactivity (maximum score: 24). Items taken from the CAPS-5

Table 23. *Skew, Kurtosis, Means, Standard Deviations, and Correlations of depressive symptom clusters at Time 1*

	1.	2.
1. Cognitive-Affective	---	
2. Somatic Vegetative		.67**
Mean	10.50	14.40
SD	5.81	5.71
Skew	.245	.163
Kurtosis	-.549	-.095
α	.88	.82
Note: ** p <.01, Cognitive-Affective = Items 1, 2, 3, 5, 6, 7, 8, 9, 13, 14 on BDI-II (maximum score: 30). Somatic-Vegetative = Items 4, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21 on the BDI-II (maximum score: 33). Dozois, Dobson, & Ahnberg, 1998.		

Table 24. *Skew, Kurtosis, Means, Standard Deviations, and Correlations of depressive symptom clusters at Time 3 (N = 126)*

	1.	2.
1. Cognitive-Affective	---	
2. Somatic Vegetative		.76**
Mean	7.82	10.70
SD	6.09	6.23
Skew	.704	.299
Kurtosis	-.195	-.615
α	.91	.86

Note: ** p <.01, Cognitive-Affective = Items 1, 2, 3, 5, 6, 7, 8, 9, 13, 14 on BDI-II (maximum score: 30). Somatic-Vegetative = Items 4, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21 on the BDI-II (maximum score: 33). Dozois, Dobson, & Ahnberg, 1998.

Table 25 *Hierarchical Regression Predicting Cluster B Posttraumatic Stress Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Cluster B							
Step 1				.016	5, 185	.619	.686
Sex	-.48	.54	-.08				.373
Race	-.11	.22	-.04				.621
Marital status	.13	.41	.02				.748
Education level	-.26	.22	-.09				.249
Trauma type	.58	.49	.10				.242
Step 2				.042	7,183	1.151	.333
Self-efficacy	.030	.03	.08				.407
Meaning in life	**-.14**	**.07**	**-.20**				**.038**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 26 *Hierarchical Regression Predicting Cluster C Posttraumatic Stress Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Cluster C							
Step 1				.010	5,185	.388	.857
Sex	-.17	.26	-.06				.506
Race	-.06	.11	-.04				.567
Marital status	.09	.20	.04				.641
Education level	.02	.11	.01				.854
Trauma type	-.09	.24	-.03				.698
Step 2				.030	7,183	.818	.573
Self-efficacy	.09	.02	.11				.286
Meaning in life	-.06	.03	-.19				.056

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 27 *Hierarchical Regression Predicting Cluster D Posttraumatic Stress Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Cluster D							
Step 1				.040	5,185	1.535	.181
Sex	.20	.84	.02				.810
Race	.19	.34	.04				.581
Marital status	1.02	.64	12				.114
Education level	-.62	.35	-.13				.074
Trauma type	-.67	.77	-.07				.425
Step 2				.226	7,183	7.628	<.001
Self-efficacy	.02	.05	.03				.728
Meaning in life	**-.50**	**.10**	**-.45**				**<.001**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 28 *Hierarchical Regression Predicting Cluster E Posttraumatic Stress Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Cluster E							
Step 1				.033	5,185	1.264	.282
Sex	.02	.61	.00				.972
Race	-.05	.25	-.02				.839
Marital status	-.47	.46	-.08				.317
Education level	-.15	.25	-.04				.552
Trauma type	.95	.56	.15				.091
Step 2				.064	7,183	1.787	.092
Self-efficacy	.03	.04	.08				.419
Meaning in life	**-.17**	**.08**	**-.22**				**.024**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 29 *Hierarchical Regression Predicting Cognitive-Affective Depressive Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Cognitive-Affective							
Step 1				.043	5,185	1.664	.145
Sex	-.60	1.14	-.05				.603
Race	-.21	.47	-.03				.662
Marital status	.66	.87	.06				.448
Education level	-.40	.47	-.06				.398
Trauma type	-1.87	1.05	-.15				.076
Step 2				.518	7,183	28.132	<.001
Self-efficacy	**-.16**	**.05**	**-.22**				**.002**
Meaning in life	**-.79**	**.10**	**-.54**				**<.001**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 30 *Hierarchical Regression Predicting Somatic-Vegetative Depressive Symptoms at Time 1, controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Somatic-Vegetative				.052	5,185	2.027	.077
Step 1							
Sex	**-2.76**	**1.11**	**-.22**				**.014**
Race	-.12	.46	-.02				.787
Marital status	.23	.85	.02				.787
Education level	-.56	.46	-.09				.229
Trauma type	.14	1.02	.01				.894
Step 2				.258	7,183	9.072	<.001
Self-efficacy	-.08	.06	-.11				.200
Meaning in life	**-.55**	**.12**	**-.38**				**<.001**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 31 *Hierarchical Regression Predicting Cluster D Posttraumatic Stress Symptoms at Time 3 in those with complete data (N = 123), controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Cluster D				.075	7,115	1.339	.238
Step 1							
Age	.05	.04	.10				.258
Group	**-2.57**	**1.02**	**-.23**				**.013**
Sex	.37	1.35	.03				.783
Race	.45	1.07	.04				.673
Marital status	.71	1.05	.06				.503
Education level	.19	.56	.03				.733
Trauma type	-.71	1.27	-.06				.579
Step 2				.176	9,113	2.67	.007
Self-efficacy	.05		.06				.583
Meaning in life	**-.54**	**.17**	**-.37**				**.002**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 32 *Hierarchical Regression Predicting Cognitive-Affective Depressive Symptoms at Time 3 in those with complete data (N = 123), controlling for all covariates*

	B	SE	β	R^2	*df*	*F*	*p*
Cognitive-Affective							
Step 1				.038	6,116	.769	.596
Age	-.05	.04	-.11				.248
Sex	.74	1.48	.05				.618
Race	-1.23	1.176	-.10				.296
Marital status	.84	1.158	.07				.468
Education level	-.51	.614	-.08				.408
Trauma type	-1.72	1.39	-.13				.220
Step 2				.157	8,114	2.663	.010
Self-efficacy	-.13	.09	-.16				.155
Meaning in life	**-.36**	**.19**	**-.23**				**.054**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 33 *Hierarchical Regression Predicting Cluster D Symptoms at Time 3 in those with complete data (N = 191) using FIML, controlling for all covariates*

	B	SE	β	*p*
Cluster D				
Group	**-2.02**	**.88**	**-.18**	**.021**
Sex	-.44	1.09	-.04	.683
Race	.63	.93	.10	.498
Marital status	.51	.92	.05	.578
Education level	.57	.55	.09	.298
Trauma type	-.45	1.14	-.04	.690
Self-efficacy	.10	.08	.14	.181
Meaning in life	**-.51**	**.14**	**-35**	**<.001**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

Table 34 *Hierarchical Regression Predicting Cognitive-Affective Depressive Symptoms at Time 3 in those with complete data (N = 191) using FIML, controlling for all covariates*

	B	SE	β	*p*
Cognitive-Affective				
Sex	.27		.02	.815
Race	-.64		-.10	.552
Marital status	.70		.06	.482
Education level	-.41		.060	.457
Trauma type	-1.0		-.08	.372
Self-efficacy	-.08		-.11	.441
Meaning in life	**-.40**		**-.26**	**.046**

B, unstandardized coefficient; SE, standard error; β, standardized coefficient; R^2, variance explained, df, degrees of freedom; F, F statistic, p, probability. Bold text indicates significant relationship at $p < .05$

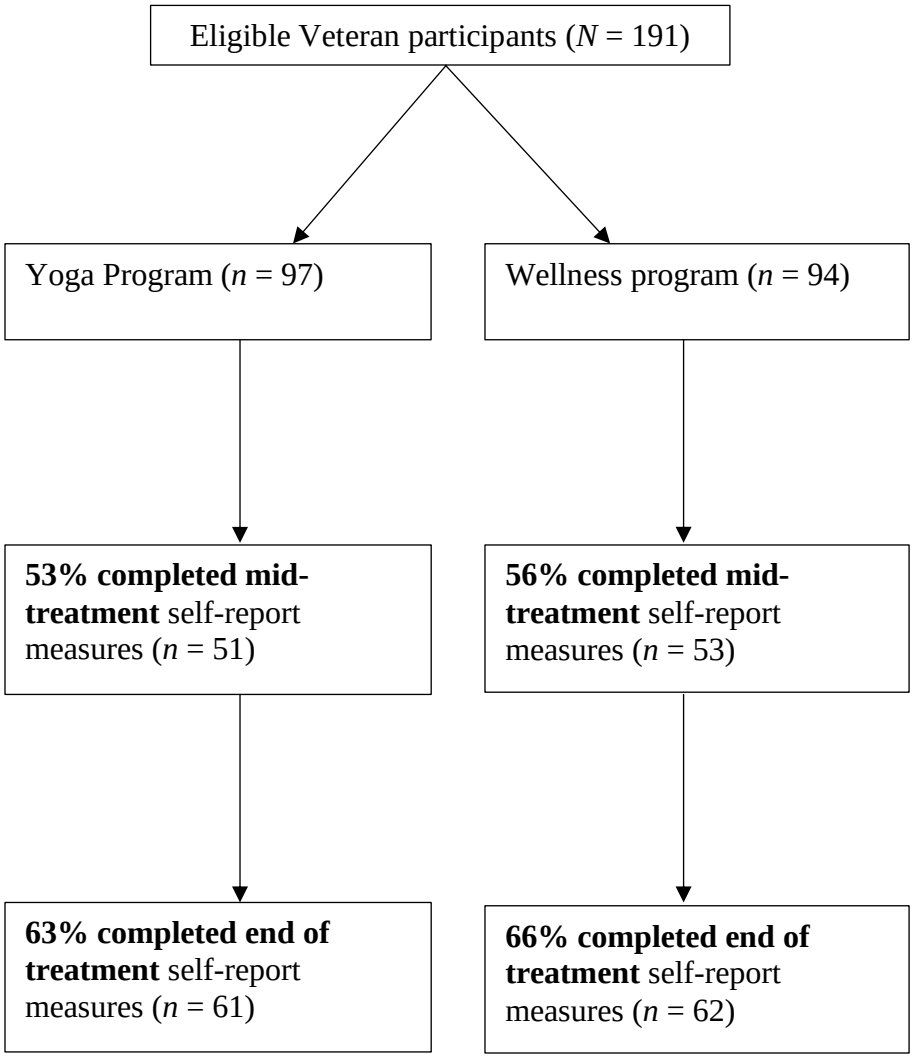

Figure 1. *Flowchart of the current study*

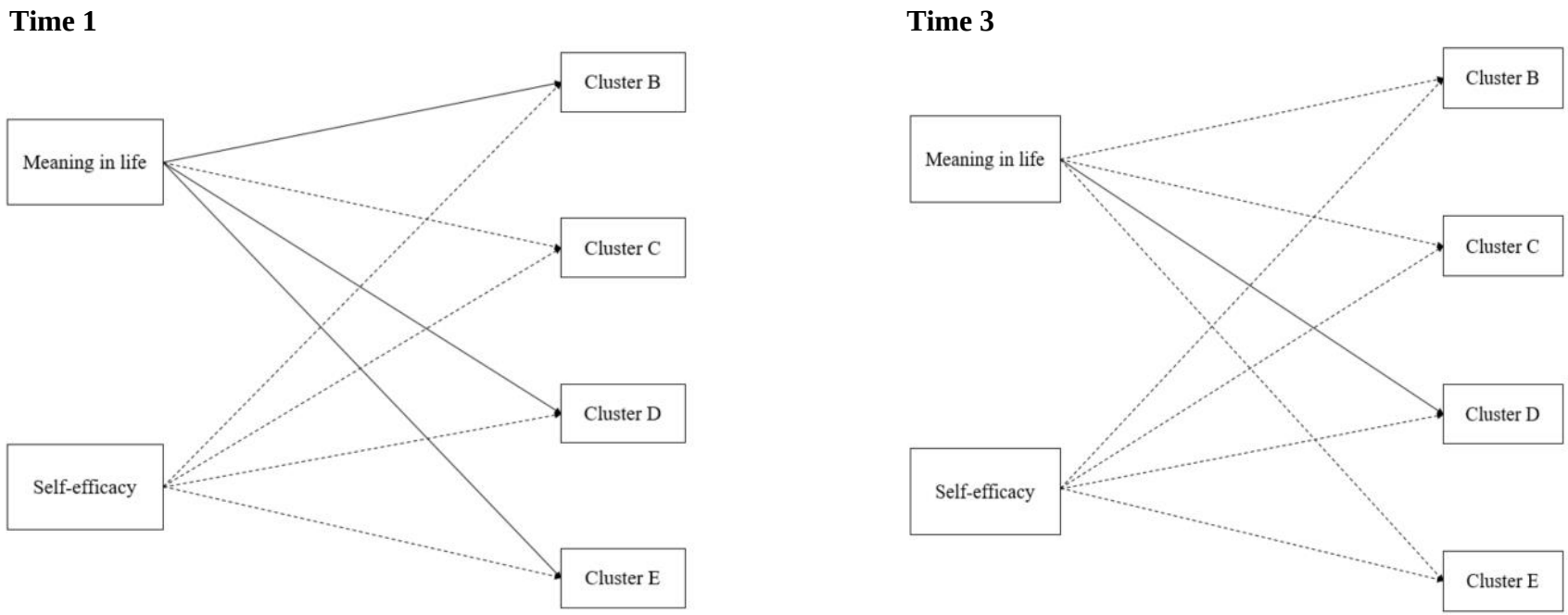

Figure 2. *A graphical summary of meaning in life and self-efficacy predicting posttraumatic stress symptoms clusters, both at baseline and at Time 3 using FIML. Each cluster was predicting separately by meaning in life and self-efficacy. Solid lines are significant paths at* $p < .05$.

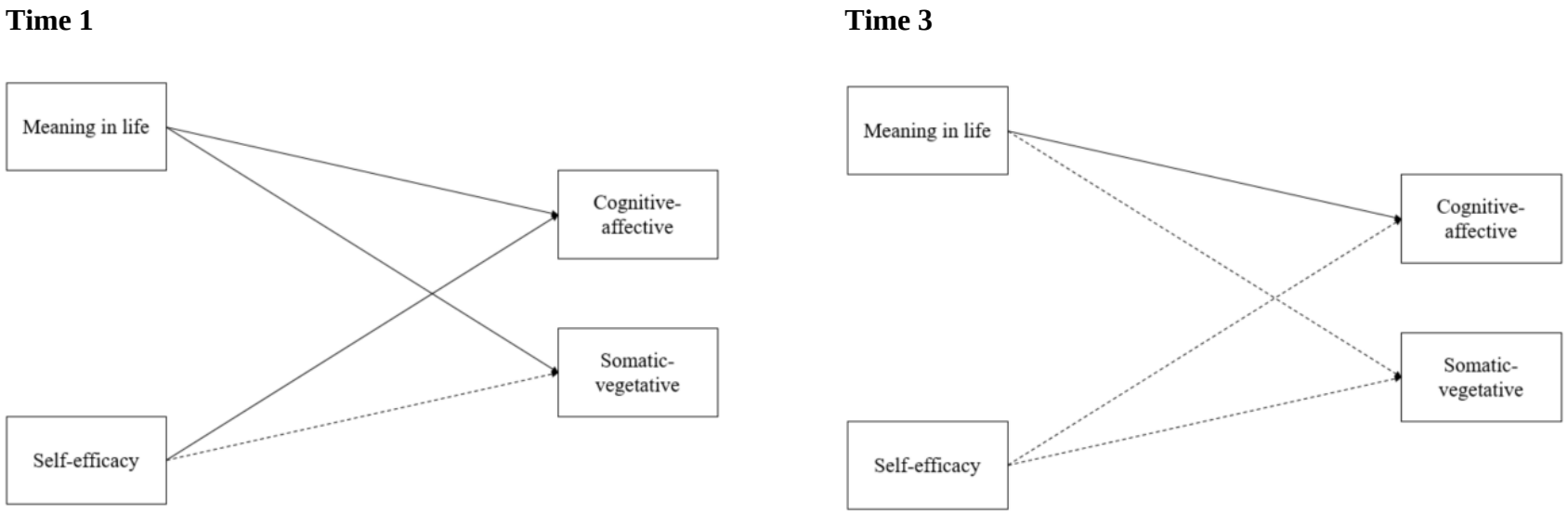

Figure 3. *A graphical summary of meaning in life and self-efficacy predicting depressive symptoms clusters, both at baseline and at Time 3 using FIML. Each cluster was predicting separately by meaning in life and self-efficacy. Solid lines are significant at* $p < .05$.

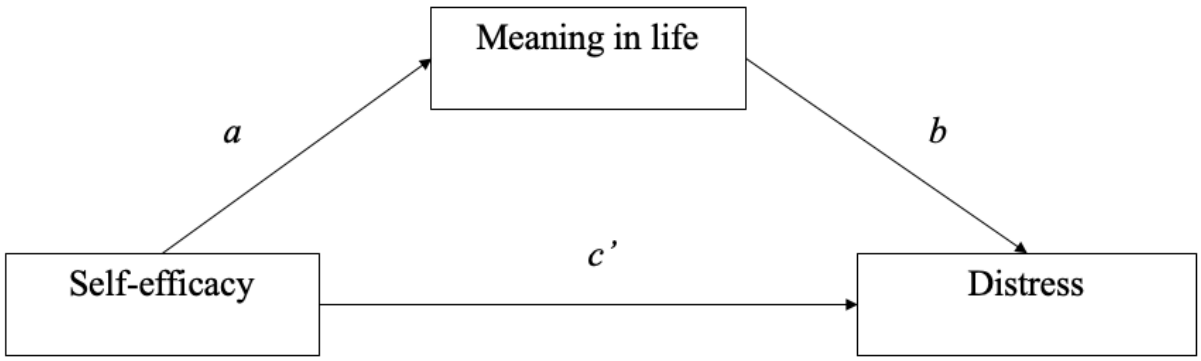

Figure 4. *Hypothesized mediation model examining the relationship between self-efficacy and distress*

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