Examining the dimensionality of the Deployment Risk and Resilience Inventory (DRRI) and examining if religion/spirituality/religious attendance buffers the impact combat exposure has on mental health symptomatology

by

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Abstract

Through the lens of religious coping theory, the aims of this study were multifaceted. First, the dimensionality of the Deployment Risk and Resilience Inventory (DRRI; RQ1; King et al., 2006), the combat exposure measure used in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS), was examined among a sample of 13,155 Soldiers. It is important to examine the dimensionality of measures to determine if any interrelationships among items exist, and practically this is important to better understand the nuance of complex constructs such as combat exposure. For example, less is known about how diverse combat experiences (e.g., conducting regular patrols, engaging the enemy, using deadly force) affect a Service members' mental health. Therefore, it is important to investigate these different experiences as to better understand what specific aspects of combat are associated with adverse mental health outcomes. A Principal Components Analysis (PCA) was implemented to determine dimensionality of the DRRI. Next the direct effects of combat exposure on anxiety and depressive symptoms (H1) were examined; note that if multiple constructs emerged from the PCA of the DRRI, they were included in the remaining analyses. Then, a Latent Profile Analysis (LPA) was conducted to examine whether different groups of Soldiers emerged based on indicators of religiosity, spirituality, and religious attendance (RQ2). Some strengths of employing a LPA are the ability to identify various sub-groups of participants with similar religion/spirituality/religious attendance profiles based on their responses and that it uses a person-centered approach. The final analysis that was conducted examined if the groups that emerged from the LPA moderated the relationship between combat exposure and the mental health symptomatologies (RQ3).

Findings suggest that the DRRI does have multiple components (RQ1). These components were named: *Expected combat experiences* and *Responsible for non-enemy deaths*. The names are indicative of how the items from the DRRI loaded according to the results from the LPA where an approximately 0.20 difference in the factor loading between the two components determined which items loaded on which component. Both *Expected combat experiences* and *Responsible for non-enemy deaths* were uniquely associated with higher levels of anxiety and depressive symptomatologies (H1). Results from the LPA suggest that five groups emerged (RQ2). These five groups were labeled according to their varying levels of religiosity, spirituality, and religious attendance. The labels are: *Non-religious/spiritual & Non-attenders* (n=2,601; 20%), *Slightly religious/spiritual & Non-attenders* (n=3,328; 26%)*, Moderately religious/spiritual & Frequent attenders* (n=1,775; 14%)*, Moderately religious/spiritual & Infrequent attenders* (n=4,183; 30%), and *Very religious/spiritual & Frequent attenders* (n=1,268; 10%)*. The final analysis, conducting a multigroup path analysis, revealed that none of these groups significantly moderated the relationships between the two combat exposure components and the mental health symptomatologies (RQ3).

Important implications can be derived from these findings. First, researchers may consider implementing a Principal Components Analysis (PCA) with their scales/inventories before moving forward with their main analyses to determine whether there are multiple factors that underlie a given construct. Second, the diversity of how participants identified regarding religiosity, spirituality, and religious attendance speaks to the importance of continuing to examine these constructs, but also to the importance of specifically examining *how* Service members use them (i.e., to positively or negatively cope). From there practitioners will be able to better intervene and address coping behaviors appropriately.

Future directions include implementing more comprehensive measures of religiosity, spirituality, and religious attendance to examine the more nuanced aspects of these constructs. Longitudinal research would also help indicate directionality regarding the relationship between the two combat exposure components that emerged from the DRRI and the mental health symptomatologies.

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List of Abbreviations

CDC	Center for Disease Control
U.S.	United States
ACE	adverse childhood experiences
PTSD	posttraumatic stress disorder
CES	Combat Experiences Scale
DRRI	Deployment Risk and Resilience Inventory
PDHA	Post Deployment Health Assessment
DRRI-2	Deployment Risk and Resilience Inventory-2
Army STARRS	Army Study to Assess Risk and Resilience in Servicemembers
AAS	All Army Study
POC	Point-of-Contact
NIMH	National Institute of Mental Health
USUHS	Uniformed Services University of the Health Sciences
CONUS	continental United States
CIDI-SC	Composite International Diagnostic Interview Screening Scale
GAD	Generalized Anxiety Disorder
MDE	Major Depressive Episode
KMO	Kaieser-Meyer-Olkin
PCA	Principle Component Analysis
LPA	Latent Profile Analysis
AIC	Akaike Information Criterion
BIC	Bayesian Information Criterion

SEM   Structural Equation Model

RMSEA   Root Mean Square Error of Approximation

CFI   Comparative Fit Index

TLI   Tucker-Lewis Index

Chapter 1

Review of the Literature

Introduction

Recent estimates found that more than 193,000 U.S. military Service members experienced a deployment in a single year (Bialik, 2017). Deployments are not strictly combat missions; Service members may be deployed for a myriad of reasons such as peace keeping missions, humanitarian aid, training missions, and increased security (U.S. Department of Veteran Affairs, 2018). Although deployments may occur for different reasons, many Service members are specifically deployed for combat missions and are exposed to combat. Combat is fighting between two or more armed forces and is a major stressor that can affect an individual both mentally and physically as it is not uncommon for there to be direct and indirect threats to one's life and exposure to traumatic experiences during these missions (Griffith, 2019). Although there is mounting evidence that examines the relationship between combat exposure and mental health symptomatology, less is known about how diverse combat experiences (e.g., conducting regular patrols, engaging the enemy, using deadly force) affect a Service members' mental health. Therefore, it is important to investigate these different experiences as to better understand what specific aspects of combat are associated with adverse mental health outcomes. As of now, most combat exposure measures are conceptualized as composite constructs, meaning that these diverse combat experiences are characterized and measured as a single experience. In knowing this, one aim of this study was to investigate the psychometric properties, specifically the dimensionality of a common measure of combat exposure, the Deployment Risk and Resilience Inventory (DRRI; King et al., 2006), and to understand how different aspects of deployment

experiences are related to two common mental health challenges, symptoms of anxiety and depression.

Another aim of this study was to examine coping resources that may mitigate the relationship between combat exposure and adverse mental health outcomes. Specifically, this thesis focused on the role of religion/spirituality given the prevalence of Service members who deem religion as an important element in their life. It also aligns with calls from researchers and practitioners to identify coping resources that may be "readily available" to Service members, particularly while they are deployed and/or in active combat zones (Hoge et al., 2006; Rodrigues & Renshaw, 2010). In the United States, over 76% of individuals practice some form of religion or identify themselves as religious (e.g. Christian, Jewish, Muslim, Buddhist, or Hindu; NW, Washington, & Inquiries, 2019), and the religious diversity in the U.S. military is similar to that of the civilian population where the military is considered a "strikingly religiously diverse institution" (Shalf, 2019, p. 8). In 2010, approximately 70% of military personnel identified themselves as Christian (Military Leadership Diversity Commission, 2010), which is similar to that of the civilian population. With such a large percentage of Service members identifying as religious, the needed next step in the literature is to determine if religion/spirituality may serve as a coping resource for U.S. Service members. Through the lens of Pargament's religious coping theory (1997), this study examined if religion/spirituality acted as a buffer, or moderator, between combat exposure and negative mental health symptomatology (i.e., anxiety and depression) for U.S. Service members.

To begin, a review of the literature is provided to examine the interrelationships between combat exposure, mental health symptomatologies, and indicators of religiosity and spirituality as well as religious attendance. Then, the hypotheses and research questions of this study are

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presented, which are guided by the extant literature and suppositions of religious coping theory. Next, a description of the secondary dataset that will be used is provided as well as a discussion of the analytic sample and the measures. Finally, the plan of analysis and the analytical process are presented.

Stress Exposure and Mental Health Symptomatologies

Traumatic events are quite common, and there is a well-established link between experiences of stress and trauma and a range of adverse mental and physical health symptomatologies for those of all ages. According to the Center for Disease Control and Prevention (CDC), approximately 61% of adults who were surveyed across twenty-five states reported experiencing at least one adverse childhood experience (ACE) and, of these adults, one in six of them (17%) reported experiencing four or more ACEs (*Preventing Adverse Childhood Experiences*, 2020). ACEs are traumatic events that have occurred to children between the ages of 0-17, and include events like experiencing violence, abuse, or neglect, witnessing violence, and having a family member attempt or die by suicide, amongst others. ACEs have been linked to long-term health problems such as mental health and substance misuse, additionally ACEs have been shown to negatively impact career and education opportunities (*Preventing Adverse Childhood Experiences*, 2020). ACEs have been studied with military populations, and this research has found that military populations have, on average, higher ACE scores as compared to civilian populations (Campbell et al., 2020; McLafferty et al., 2019). This can been seen in a study where, on average, female Service members had an ACE score of 2.2 as compared to civilian females' 1.7 ACE score, and, on average, male Service members had a total ACE score of 1.6 as compared to 1.3 for male civilians (Katon et al., 2015).

Similar to ACEs, research also suggests that in civilian populations, early and adulthood life stress tend to be strongly associated with a range of both mental and physical health problems where poorer mental health, in turn, can lead to increased rates of physical illness (Cohen et al., 2007; Link et al., 2018). General life stressors, such as negative events and trauma after the age of 17 in civilian populations, have been shown to induce a myriad of issues such as anxiety and depression and cause physical manifestations, such as sleeplessness, trembling, and headaches (Hourani et al., 2012; Koenig et al., 2019; Thoits, 2010). Furthermore, in a civilian sample of 148 young adults, greater stress severity exposure over the lifespan was associated with decreases in mental and physical health, but for those who exhibited higher levels of forgiveness, the associations between stress and mental health were not as robust, meaning that forgiveness served to buffer the impact of stress exposure (Toussaint et al., 2016). It appears that individuals with adaptive coping resources, such as forgiveness, religion, and social support, tend to exhibit better mental health outcomes even in the context of stressful and traumatic life events (Cox et al., 2018; Tix & Frazier, 1998; Toussaint et al., 2016).

Deployment-Related Stress

When examining a military population, elevated levels of stress are not uncommon. This review focuses primarily on the stresses experienced *during* the course of a deployment, but it is important to remember that stressful events can occur at each stage of the deployment cycle: pre-deployment, deployment, and post-deployment. For example, pre-deployment stressors, such as family duties, household responsibilities, and deployment preparations with the military, affect mental health and increase stress before the deployment occurs and may even carry over into deployment (Collins et al., 2017). Additionally, returning home from deployment also presents challenges at both the individual-level (e.g., mental health challenges) and within the context of

family reintegration (e.g., re-establishing previous or new responsibilities, such as parenting and household duties; O'Neal et al., 2018).

During deployment, the stress of being away from family, answering to unit leaders, and not knowing what to expect also has the potential to negatively impact mental health, such as elevated levels of anxiety, depression, and PTSD and in some cases suicide attempts (Ramchand et al., 2015; Sayer et al., 2014), and this stress appears to be exacerbated when Service members are deployed to areas of combat (Hoge et al., 2006; Maguen et al., 2010; Reed-Fitzke & Lucier-Greer, 2019).

Specifically, studies have examined the relationship between combat stressors experienced during deployment and mental health outcomes and have found that combat stressors are related to negative mental health outcomes. For example, Hoge and colleagues (2006) measured combat experience through three items: (1) "Have you seen anyone wounded, killed or dead during this deployment?," (2) "Have you engaged in direct combat where you discharged your weapon?," and (3) "During this deployment did you ever feel you were in great danger of being killed?" (p. 1025). They found that of the 21,822 Service members who screened positive for PTSD after deployment to a combat zone, 79.6% of them witnessed persons being wounded or killed or engaging in direct combat where weapons were fired as compared to Service members who screened negative for PTSD (Hoge et al., 2006). In a sample of 2,797 U.S. Soldiers, Maguen and colleagues (2010) also assessed combat exposure through three items, similar to that of Hoge and colleagues (2006), and the items included: (1) "During combat operations did you become wounded or injured?," (2) "During combat operations, did you see the bodies of dead Soldiers or civilians?," (3) "During combat operations, did you personally witness anyone being killed?," and participants responses were dichotomous, either a yes or no

(p. 87). They found that 40% of Soldiers reported killing or being responsible for killing during their deployment, and this was associated with increased levels of PTSD, alcohol abuse, anger, and relationship problems (Maguen et al., 2010). Finally, Reed-Fitzke and Lucier-Greer (2019) had similar findings where higher levels of combat exposure were related to higher levels of depressive symptoms and anxiety in a sample of 5,283 active duty, U.S. Soldiers from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS) dataset. They assessed combat exposure through the 14-item DRRI where items were summed to create a composite score for combat exposure (Reed-Fitzke & Lucier-Greer, 2019). In the following section, more information is provided regarding the effects of combat exposure on mental health as well as a more specific focus on the measurement of combat exposure.

In seeing that combat exposure affects many different aspects of mental health (i.e., symptoms associated with PTSD, anxiety, depression), this study examined the relationship between combat exposure and anxiety/depressive symptomatology, thus, replicating earlier work. This paper also adds to this important body of literature by examining the psychometric properties and dimensionality of a common measure of combat exposure (i.e., the DRRI) and by examining how distinct aspects of combat exposure are associated with adverse mental health symptomatology. For the purposes of this paper, anxiety symptomatology can be understood as an individual's ability to recognize possible manifestations of anxiety through symptoms, such as feeling uneasy or nervous, worry about different things, having trouble controlling anxiety or worry, having trouble relaxing, or having muscle aches (Kessler et al., 2013). Depressive symptomatology can be understood as an individual's perception of their mood based on symptoms such as feeling sad or depressed, discouraged about how things were going in life, taking little to no interest in things, or allowing low mood to interfere with work and personal

life (Kessler et al., 2013). PTSD, while very important in this area of research, is not being included as a mental health outcome due to its' measurement being at clinical levels and because the area of interest is not of diagnoses, but rather, mental health symptomatology of Service members.

Considerations for the Measurement of Combat Exposure

Combat exposure has been examined quite extensively, and while examining the existing literature, a major theme emerged: combat exposure has typically been examined as a composite measuring reflecting a single construct. In a review of the literature, 17 studies and one meta-analysis were identified that examined the relationship between combat exposure and mental health outcomes using survey data. In many of these studies, combat exposure was measured as a composite construct; this means that all the items on the combat exposure scale were averaged or summed to reflect one collective combat experience score, normally where higher scores indicated more combat exposure. Some of the articles used a scale or inventory that has been previously verified to have good internal consistency and reliability (i.e., Combat Experiences Scale [CES] and Deployment Risk and Resilience Inventory [DRRI]; Bryan et al., 2013; Dillon et al., 2018; Koffel et al., 2016; Reed-Fitzke & Lucier-Greer, 2019; Renshaw et al., 2009; Taft et al., 1999). Others created their own scales by modifying or abbreviating (e.g., using on a few items) previously verified measures (Bartone & Homish, 2020; Gade & Wenger, 2011; Griffith, 2015; Jones et al., 2019; Kinney et al., 2019; Morgan et al., 2019; Woodhead et al., 2012). This section provides a review of studies that have examined the relationship between combat exposure and mental health with a focus on the way in which each study measured combat exposure. The purpose of this was to determine if, and when, researchers utilized measures of combat exposure as either a composite measure or as a multi-dimensional measure. We begin

first by exploring the studies that have used a non-traditional measure and then examine those that used one of the two most common, standardized measures of combat exposure, the CES or the DRRI.

Non-standardized Assessments of Combat Exposure

In Gade and Wenger's (2011) measure of combat exposure, they focused on both "the effects of a Service member in a combat zone [and] the effects of being exposed to dead, dying, or wounded people" and the combination of these two experiences (p. 407). Approximately 4,000 Vietnam and Gulf War Veterans responded to the two items to indicate whether or not they had (1) experienced service in a combat zone, or (2) were exposed to dead, dying, or wounded people; these items were dichotomized (yes/no), and examined where a higher score reflected more combat exposure (Gade & Wenger, 2011). They found that service in combat and exposure to dead, dying, or wounded individuals were each unique predictors of adverse mental health, meaning that these experiences were significant determinants of poorer mental health outcomes (Gade & Wenger, 2011).

Griffith (2015) also created a composite combat exposure measure that he suggested was similar to that of other combat experience scales which have been previously developed; Griffith's scale included five items about having experienced combat trauma, engaging in combat, seeing another individual wounded or killed, having lost a friend in combat, and having killed anyone. His study consisted of utilizing data from 2010 which included 4,567 Soldiers from 50 units, and findings suggest that cumulative combat experiences were associated with suicidal thoughts (Griffith, 2015).

In Albanese and colleagues (2019) article, a military sample of 161 Service members located at a military hospital in Iraq who were suspected to have had a traumatic brain injury

(TBI) completed the 23-item Walter Reed Army Institute of Research Combat Experiences Scale (WRAIR-CES). Responses were summed to index the extent of combat exposure, and higher levels of combat exposure were related to increased levels of PTSD symptom severity (Albanese et al., 2019).

Bartone and Homish's (2020) study was unique in that it utilized five-items from the U.S. Department of Defense PDHA – Post Deployment Health Assessment – to create their own combat exposure measure. Interestingly, after they found that their composite combat exposure measure was related to depressive symptoms, they regressed depressive symptoms onto each of the five combat exposure items individually. Four items were significant predictors, where the strongest association was between the item, "Did you ever feel you were in great danger of being killed?" and depressive symptoms. The item that was not significantly associated with depressive symptoms asked, "Were you engaged in direct combat where you fired a weapon?" (Bartone & Homish, 2020, p. 516). These studies provide a few examples of research that has adapted previously validated scales and used their new combat exposure measure as a composite construct.

Standardized Assessments of Combat Exposure: The CES and DRRI

As mentioned above, two of the most common self-report combat exposure scales are the CES (Keane et al., 1989) and DRRI (King et al., 2006; D. S. Vogt et al., 2008). The CES, originally published in 1989, was one of the primary scales used to systematically examine combat exposure, and it was reflective of the experiences of previously deployed cohorts, such as the Vietnam era. The seven items in the original scale included questions about combat patrols, being under enemy fire, being surrounded by the enemy, percent of men in your unit who were killed, being wounded or missing in action, firing rounds at the enemy, seeing someone get hit

by incoming or outgoing rounds, and were in danger of being injured or killed in the line of duty (Keane et al., 1989). It is unclear the extent to which the psychometric properties of the CES were evaluated in early work, yet in 2013 Guyker (2013) and colleagues revised the CES and examined its' psychometric properties. The revised CES scale comprised 33-items, and includes questions asking whether the Service member had experienced being attacked or ambushed, witnessing violence, taking enemy fire, knowing someone who was killed or injured, disarming civilians, firing at the enemy, being responsible for death of an enemy combatant, witnessing mistreatment toward noncombatants, and clearing homes/buildings/caves/bunkers. This revised scale was determined to be both reliable and valid, and the research team went on to assess dimensionality of the measure (Guyker et al., 2013). From this assessment of dimensionality, three unique scales emerged. One scale had 17-items and was labeled, "Exposure to Combat Environment." The next had seven items and was labeled, "Close Physical Engagement," and the final scale had four items and was labeled, "Nearness to Serious Injury or Death." Five items from the original 33-item scale did not produce adequate loadings and were dropped. All three of these deployment related experiences scales were highly correlated with PTSD, depression, and anxiety symptomologies (Guyker et al., 2013).

Bryan and colleagues (2013) used a 23-item version of the Combat Experiences Scale in their study of 348 Airmen as a composite construct. Their scale included items, such as being attacked or ambushed, shooting or directing fire at the enemy, seeing injured or dead people, and handling dead bodies or body parts. Findings from this study suggest that combat exposure was not directly or indirectly related to suicide risk, but that combat exposure was associated with increased PTSD and depressive symptoms. The increased symptoms of PTSD and depression were then, in turn, directly or indirectly related to suicide risk (Bryan et al., 2013).

In another study, Dillon and colleagues (2018) also used the CES as a composite construct but adapted it to a 7-item measure of combat exposure when administering the survey to 3,238 Iraq/Afghanistan Veterans. Example items were not given in this study, but findings were akin to that of Bryan et al.'s (2013) study where combat exposure was significantly associated with PTSD and depression, which in turn was associated with suicidal behavior, but there were no direct links between combat exposure and suicidal behavior.

Finally, Koffel and colleagues' (2016) longitudinal study utilized an adapted 15-item CES in their study of 522 National Guard Soldiers as a composite construct. Some of the items in the scale they used included questions regarding being wounded, seeing someone wounded or killed, and engaging in assaults/battle. Their findings suggest that some aspects of personality and disconstraint predicted combat exposure, and combat exposure was associated with both internalizing (i.e., depression and PTSD) and externalizing (i.e., alcohol use, substance abuse, and disinhibition) factors (Koffel et al., 2016).

A second common self-report combat exposure scale, as stated previously, is from a suite of 14 scales called the DRRI, and it was developed to understand the experiences of returning war Veterans from contemporary deployments; the suite of 14 scales to create the DRRI was released in 2006 (King et al., 2006) and it assessed factors including: pre-deployment life events, childhood experiences, training and deployment preparation, deployment environment, life and family concerns, unit support, relationships within unit, deployment concerns, combat experiences, post-battle experiences, exposure to nuclear/biological/chemical agents, post-deployment support, and post-deployment life events. Within the DRRI is a scale labeled, "Combat Experiences," composed of 15-items after the second psychometric study was completed (King et al., 2006). Then in 2013, a second, holistic iteration of the DRRI was

released. This new set of measures is a suite of 17 scales and became the DRRI-2 (i.e., the Deployment Risk and Resilience Inventory-2), and it also has a "Combat Experiences" scale, but this scale has 17-items. The DRRI-2 measures pre-deployment, deployment, and post-deployment factors, and the three additional scales that were added to create the DRRI-2 which include: support from family/friends, family events, and post-deployment family experiences (U.S. Department of Veteran Affairs, 2019). The purpose of the DRRI-2 was to update the original DRRI by adding the coverage of warfare related stressors, including family factors across the deployment cycle, and shortening the scale where possible (Vogt D. et al., 2013).

The DRRI and DRRI-2 are very similar, but a few exceptions do exist. First the combat experiences scale of the DRRI consists of 15-items and the combat experiences scale of the DRRI-2 consists of 17-items. Second, the DRRI has three items that are not on the DRRI-2 and those items are: "I or members of my unit were attacked by terrorists or civilians," "I took part in an invasion that involved naval and/or land forces," and "My unit engaged in battle in which it suffered casualties" (King et al., 2006). The DRRI-2 has five items that are not on the DRRI and those items are: "I personally witnessed civilians being seriously wounded or killed," "I was involved in locating or disarming explosive devices," "I was involved in searching or clearing homes, buildings, or other locations," "I participated in hand-to-hand combat," and "I was involved in searching and/or disarming potential enemy combatants" (U.S. Department of Veteran Affairs, 2019). The current study draws from the Army STARRS dataset which used the original, brief "Combat Experiences" scale from the DRRI given that data collection for this study began in 2009, before the creation of the DRRI-2 in 2013.

Several published studies have used a version of the DRRI's combat experiences measure. For example, Armistead-Jehle and colleagues (2011) used a shortened version of the

DRRI and their scale consisted of 14-items. These 14-items were utilized as a composite construct to measure combat exposure in their study examining Marines and Corpsmen's mental health after deployment. They found that combat exposure and unit cohesion predicted anger, depression, and posttraumatic stress, and that unit cohesion may act as a protective buffer of mental health symptomatologies for Service members who experience combat (Armistead-Jehle et al., 2011). In another study, Reed-Fitzke and Lucier-Greer (2019) also used the Army STARRS dataset which provides data collected by way of the 14-item DRRI. Reed-Fitzke and Lucier-Greer (2019) utilized the 14-items from the DRRI as a composite construct to measure combat exposure in their study examining 5,283 emerging adult Soldiers' mental health after combat. They found that higher levels of cumulative combat experience were related to greater likelihood of anxiety, depression, and PTSD (Reed-Fitzke & Lucier-Greer, 2019).

Overall, these studies examining combat exposure utilized their respective measures, typically as composite constructs with a few notable exceptions (e.g., Bartone & Homish, 2020; Guyker et al., 2013). In seeing this gap in the literature, I examined the psychometric properties, specifically the dimensionality of combat exposure with the DRRI.

Protective Factors

As discussed, there is an established relationship between stress and adverse mental health symptoms. Importantly, there is also an extensive body of research examining factors that buffer stress, including research specific to military populations. Evidence suggests factors, such as unit cohesion (Kanesarajah et al., 2016; Reed-Fitzke & Lucier-Greer, 2019; Williams et al., 2016), unit morale (Dyches et al., 2017), social support (Muse et al., 2019), marital status (Watkins et al., 2017), and interpersonal relationships (Reed-Fitzke & Lucier-Greer, 2019)

moderate, or serve as a protective factor, in the relationship between general military stress and mental/physical health.

For example, in Reed-Fitzke and Lucier-Greer's (2019) study with a sample of 5,283 emerging adult Soldiers from Army STARRS, two moderators were identified: unit cohesion and interpersonal relationships. The relationship between combat exposure and mental health was buffered when unit cohesion was high and relationship disruptions were low (Reed-Fitzke & Lucier-Greer, 2019). In Dyches and colleagues (2017) study of 592 Soldiers, it was found that unit morale moderated the relationship between combat exposure and PTSD symptoms where higher levels of unit morale mitigated the relationship between combat exposure and PTSD symptoms. In a Canadian sample of 14,624 military personnel, findings suggest that marital status moderated the relationship between combat exposure and mental health where those who were unmarried (i.e., single) were less negatively psychologically impacted by combat exposure as compared to those who were married (Watkins et al., 2017). By understanding which factors buffer negative effects on mental health, researchers are better able to help people find coping resources that support the variety of needs that people have. Therefore, one logical, and often overlooked, coping mechanism that Service members may find helpful is religion/spirituality (Berg, 2011).

Religion and Spirituality Defined

Since the 1940s, the term spirituality has emerged as a distinct construct in the literature and in research—branching away from the concept of religion (Zinnbauer et al., 1999). Due to these terms overlapping conceptually, a basic way to understand their crossover is by picturing faith as an umbrella under which both religion and spirituality fall (Newman, 2004; Paloutzian & Park, 2005). For example, in several studies conducted from the late 1980s through the 2000,

Marler and Hadaway (2002) deduced that "being religious" and "being spiritual" are most often seen as distinct but interdependent concepts; therefore, while it is possible to tease them apart, this is not commonly done. This point is illustrated via Marler and Hadaway's (2002) findings where 74% of Americans viewed themselves as both spiritual and religious (Marler & Hadaway, 2002).

In line with other research, spirituality is defined as the search for universal truth and as a personal relationship with a Higher Power; it is also a way for an individual's belief to relate them to the world and give them meaning and purpose for existence (Marler & Hadaway, 2002). Higher Power tends to be utilized as an inclusive term that can be understood as the belief, usually within the context of religion or spirituality, in God, Christ, the Divine, gods, or the supernatural (Schlehofer et al., 2008), thus, this term could reflect the religious/spiritual beliefs of diverse groups. There is also acknowledgment that the term 'Higher Power' is most closely associated with monotheistic religious and spiritual practices, and therefore, may be better understood and interpreted by those with a monotheistic religious/spiritual background, such as Judaism, Christianity, and Islam. The sample being utilized for the current study reflects the broader military and estimates are that approximately 72% of the participants identify as Christian (i.e., Baptist, Catholic, Episcopal, Lutheran, Methodist, Mormon, Presbyterian, and Other), 5% identify as non-Christian religions (i.e., Buddhist, Hindu, Jewish, Muslim, and Other), and 29% identify as having no religious preference or agnostic/atheist (Military Leadership Diversity Commission, 2010).

Conversely to spirituality, religion is associated with a formal belief system, and group practices, that can be used to connect and foster a personal relationship with a Higher Power (Paloutzian & Park, 2005). Religion is also multipurpose in that it may provide comfort,

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stimulate growth, enhance intimacy with a Higher Power, facilitate closeness with others, or offer meaning and purpose to life (Koening, 1998).

The distinction between these concepts is that spirituality is considered a personal relationship between the individual and the Higher Power and has become more commonly accepted by society, whereas religion is considered to be a more systematic set of beliefs or practices often practiced alongside others who hold a similar set of beliefs (Paloutzian & Park, 2005). Although both spirituality and religion are similar in their belief about a Higher Power, these constructs are distinct in the practices and behaviors (i.e., through a formal belief system [religion] or a personal journey with a Higher Power [spiritual]) in which individuals choose to encounter the Higher Power. The current study examined both constructs—religion and spirituality—given their overlap in understanding the concept of faith and in light of their differences. In her article, Newman (2004) created a visual where religion can be understood as the 'doing' and spirituality can be understood as the 'being,' and often there is significant overlap (Figure 1). This is important because the goal of this study was to capture how Service members identified (i.e., as religious, spiritual, or both) as well as to identify the behaviors or practices of these Service members (i.e., religious attendance) because research suggests that both identity and behavior are important for implementing positive religious coping (Tix & Frazier, 1998).

In discussing the existing research on the use of religion and spirituality in relation to mental health symptomatologies, the term 'religion/spirituality' will be used, unless otherwise specified by a given study. These concepts will be referenced in this way due to how interconnected they are and given that both concepts were assessed in the present study.

Figure 1

A recreation of understanding religion/spirituality by Newman (2004)

Movement may occur along each each arrow. It
may move in and out of sync with each other.

Spirituality
"Being" in faith

Religion
"Doing" in faith

Faith
"Knowing" of faith foundational for
Religion and/or Spirituality
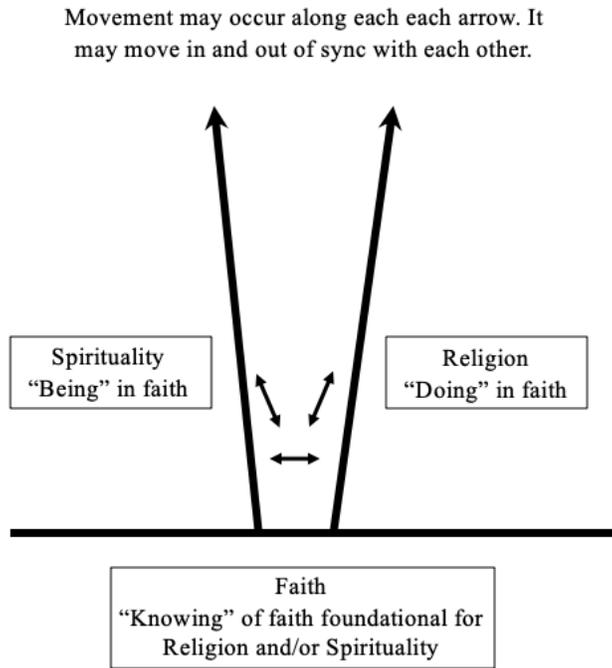
Note. Understanding the interrelationship between spirituality and religion recreated from

Newman (2004).

Religious Coping Theory

In this study, religious coping theory (K. I. Pargament, 2001) was used as a framework to

help explain the role religion/spirituality may play in the relationship between combat exposure

and mental health symptomatology. Religious coping theory posits that religion provides a

schema for understanding physical and emotional difficulties and can help facilitate perseverance

or acceptance in the face of adversity (Pargament, 2001). It is important to note that religion and

spirituality are both encompassed in this theory such that religion and spirituality are used

interchangeably—both alluding to the belief or faith in a Higher Power.

Developments in religious coping theory that may be more applicable for military populations are the use of cognitive and behavioral strategies during stressful life circumstances that emerge out of one's religion (Sanchez et al., 2015). For those who value religion, religion can be a very important part of their orienting system which is a general frame of reference that serves as an anchor during stressful or unsettling times (K. I. Pargament, 2001). Yet, the salience of religion as an orienting system differs among individuals. That is, religion might be one part of an individual's frame of reference (i.e., spiritual) or it might be *the* frame of reference (i.e., religion) of the individual, and this is why many researchers have begun breaking religion down into internal (i.e., spiritual or a belief in a Higher Power) and external parts (i.e., frequency of prayer, church attendance). Where simply being spiritual (i.e., being in relationship with a Higher Power) may not be enough to buffer the effects of distress when experiencing different life stressors or vice versa whereby engaging in religious behaviors (e.g., attending services) without spirituality (i.e., being in relationship with a Higher Power) may not be enough; however, through the actions brought forth through being religious (i.e., religious attendance), religion may help buffer the effects of life stressors.

Considering the large percentage of U.S. military Service members (~70%) who identify as religious/spiritual, it is important to investigate the extent to which religion is associated with mental health outcomes (i.e., anxiety and depressive symptoms; Military Leadership Diversity Commission, 2010). Therefore, religious coping theory suggests that religion/spirituality may shape Service members' perspectives of combat exposure by promoting adaptive cognitive processes that may hinder the escalation of anxiety and depressive symptomatology commonly observed among those exposed to combat (Fabricatore et al., 2004).

Religion/Spirituality as a Buffer

As suggested by religious coping theory, there is a considerable amount of research that supports religion/spirituality having protective effects for mental health, including mood disorders, such as depression and anxiety, in adult populations (Levin, 2010; Schnittker, 2001; Crawford, Handal, & Wiener, 1989). Where in Levin's (2010) article reviewing research on psychiatric and mental health research on religion, he found that much of the literature focuses on mood disorders (i.e., anxiety and depression) and that many of the studies reviewed found a health-promoting effect of religion on life satisfaction, happiness, and positive affect. Schnittker (2001) found, in a sample of 2,836 civilian participants, that those who reported religious service attendance, positive social support, and spiritual help seeking in moderate levels also reported being less depressed than those who reported religion as being 'very important' or 'not at all important.' Similar results were found in Crawford and colleagues' (1989) study of 226 civilian participants across the United States where participants who reported being religious were significantly less distressed and better adjusted psychologically, but only when reporting high religiosity; those who reported medium to low religiosity had no significant relationships.

It is also important to note that a protective effect buffers some of the negative impacts of a stressor, in this case we looked at combat exposure, but it is not a "cure all" for mental health disorders. It is suggested that what religion/spirituality may do is offer a response for human insufficiency. Human insufficiency acknowledges that humans are not all powerful or all-knowing and that they do not possess the characteristics of a Higher Power; therefore, they may respond by relying on a Higher Power as opposed to themselves (Koening, 1998). The literature on religion/spirituality and mental health also suggests that for one to receive the benefits of their

religion, they would need to both identify as religious/spiritual and also practice aspects of their religion or spirituality (Levin, 2010).

Religion/spirituality can play many roles in an individual's life, but its role is dependent on the person and how that individual chooses to use religion/spirituality. For example, in a study examining negative religious coping (i.e., feel they are going to hell, are judged, or cannot forgive) and life stressors with a sample of 2,140 racially and religiously diverse civilians, findings suggest that religion does act as a buffer for different mental health symptomatologies. This means that religion buffered, or moderated, the relationship between negative religious coping and higher levels of depressive symptoms (Abu-Raiya et al., 2016). Further, this means that as religious commitment increased it buffered the association between the religion/spirituality struggle and depressive symptomatology (Abu-Raiya et al., 2016). In another study of recently bereaved parents (high stress) and parents who lost a child over two years ago (low stress), measures of religious coping and adjustment were completed, and results suggested that religious support (i.e., church members, religious leaders) was related to higher levels of adjustment where parents experienced lower levels of depression, and this was seen among the group of more recently bereaved parents (high stress; Maton, 1989). Seeing this relationship within a civilian populations raises the question if similar findings would be found within military populations. Therefore, studies that utilized military samples and investigated religion/spirituality as moderators are examined.

In a study by Israel-Cohen and colleagues (2016), a sample of 54 Israeli Soldiers completed measures that included a 20-item PTSD scale, a 3-item social support scale, and a 10-item self-efficacy scale. Findings from this study suggest that religiosity moderated the relationship between self-efficacy and PTSD, and that religious Soldiers were less vulnerable to

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PTSD as compared to the non-religious Soldiers (Israel-Cohen et al., 2016). In Park and colleagues (2017) article, they examined 630 Veterans returning from combat, positive and negative religious/spiritual coping was examined as a moderator between the relationship of combat exposure, PTSD, and perceived posttraumatic growth. Results suggest that religious/spiritual coping did buffer the negative impacts of higher levels of combat exposure on higher levels of PTSD, and positive religious coping was associated with higher levels of perceived posttraumatic growth (Park et al., 2017). In another military study with 208 Service members and Veterans, findings suggest that positive religious coping may serve as a protective factor (i.e., moderator) for Service members and Veterans who are struggling with mental health symptomatologies such as suicidal desire (Carroll et al., 2019). Most recently published was a study using the Army STARRS dataset, where Muse and colleagues (2019) examined the relationship between religiosity, physical health, and social support on deployment and mental health outcomes with a sample of 21,449 active duty military personnel. Findings suggest that there was a significant relationship between deployment stress and mental health (i.e., anxiety, depression, and posttraumatic stress), but that this relationship was moderated by physical health, social support, and religiosity (Muse et al., 2019). One limitation of Muse and colleagues (2019) article is that they refer to the variable "spirituality" throughout their paper and in the title, but in reality, are measuring "religiosity." When reading their measures, they used the variable, "How religious are you?," and this is problematic because, like defined earlier, religion and spirituality are unique but interdependent concepts. Therefore, this study fills a gap by having examined both religion and spirituality as moderators as opposed to aggregating them.

There is strong evidence suggesting that religion/spirituality can act as a buffer against stressors, and evidence also suggests that there is a strong relationship between combat exposure

and mental health outcomes; therefore, it is imperative to identify the conditions under which specific coping resources, such as religion/spirituality, are beneficial or harmful to an at-risk population such as Service members.

The Present Study

The current study was multipurpose. First, the dimensionality of the Deployment Risk and Resilience Inventory (DRRI; King et al., 2006), the combat exposure measure used in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS) was examined. Then, if different dimensions of combat exposure emerged, I examined how they were associated with symptoms of anxiety and depression. Finally, guided by religious coping theory, I investigated if religion/spirituality moderated the associations between combat exposure and the mental health outcomes, specifically, anxiety symptomatology and depressive symptomatology. Therefore, my first research question (RQ1) was:

Research Question 1 (RQ1): Is the Deployment Risk and Resilience Inventory (DRRI) comprised of different dimensions that explain the nuances of combat exposure?

I examined dimensionality by using a Principal Components Analysis (PCA) approach. Then, I examined the direct effect of combat exposure on anxiety and depression symptoms by way of a path analysis. Based on theory and previous research, I hypothesized that:

Hypothesis 1 (H1): Higher levels of Soldiers' combat exposure will be associated with higher levels of adverse mental health (i.e., anxiety, depression) symptoms.

Next, I examined if different groups emerged, by way of a latent profile analysis (LPA), from three indicators: religiosity, spirituality, and religious attendance variables. Therefore, my second research question (RQ2) was:

Research Question 2 (RQ2): Do different groups of Soldiers emerge from indictors of religiosity, spirituality, and religious attendance?

Finally, a moderated path model was fit by using a multigroup analysis approach and it examined whether religiosity/spirituality/religious attendance moderated the relationship between combat exposure and mental health. The religiosity/spirituality/religious attendance groups were based on the findings that emerged from the LPA. Regarding the multigroup moderation analysis, my final research question was:

Research Question 3 (RQ3): Does religiosity/spirituality/religious attendance moderate the relationship between combat exposure and mental health?

This study provided novel contributions to the existing literature by investigating the psychometric properties of the DRRI and by examining if religiosity/spirituality/religious attendance acted as a buffer for combat exposed Soldiers who were experiencing anxiety and depression symptoms. This study also accounted for relevant contextual variables including gender, age, education, marital status, and race. Gender was accounted for given that men and women generally experience different mental health symptoms and at different severities, such that women experience more internalizing disorders such as anxiety and depression, and men experience more externalizing behaviors such as substance abuse and antisocial behavior (Rosenfield & Mouzon, 2013). Similarly to gender, age was accounted for given that younger individuals tend to display more symptoms of anxiety and depression as compared to older individuals (Jones, 2013). Additionally, education was used as a proxy for rank given that one of the eligibility requirements for being an officer is to hold a 4-year degree, and rank has been systematically associated with well-being among Service members, such that officers tend to report higher levels of well-being and mental health (O'Neal et al., 2020). Furthermore, marital

status has also been shown to affect well-being among Service member populations where some literature suggests that marital status is associated with better health and well-being (Shapiro & Keyes, 2008), but other literature suggests that being single is better for mental health and well-being (Watkins et al., 2017). Finally, race has been to shown to effect mental health, such that minorities tend to report higher levels of negative mental health outcomes (Singh & Burns, 2006), and higher levels of religiosity/spirituality (Woodhead, 2012), and thus, was accounted for in this study. Gender, age, education, marital status, and race were accounted for by having included them as inputs across models so that they did not act as confounders while examining the research questions and hypotheses.

Chapter 2

Method

Participants and Procedures

This study is a secondary data analysis of the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS; Ursano, Stein, Kessler, Heeringa, & Wagner, 2015), specifically from the All Army Study (AAS; 2011-2012) component. AAS has a total sample of 21,449 active-duty U.S. Army Soldiers, Guardsmen, and Reservists. An active-duty Service member is someone who has full-time responsibilities in the armed forces, usually where this is their full-time job (*Military REACH Dictionary*, 2020). Active Guardsmen and Reservists include National Guard and Reserve members who were called to active duty status and provide full-time support to National Guard, Reserve, and Active Component organizations in the U.S. military (*Military REACH Dictionary*, 2020).

The overall purpose of the Army STARRS data collection was to gather information to "generate actionable evidence-based recommendations to reduce Army suicides and increase knowledge about risk and resilience factors for suicidality and its psychopathological correlates" (Ursano et al., 2014, p. 107). The target sample for the AAS was 50,000 participants and no neurocognitive tests or blood tests were collected for this study. The data for the AAS are cross-sectional and were collected from Soldiers who were serving on active duty for the United States Army between 2011 and 2012.

For the original sample, participants were recruited by Army unit where units that were stationed across the continental United States were probability sampled in order to be selected to potentially participate in the study. Once an Army STARRS team was approved to come collect data, an Army Point-Of-Contact (POC) at that location was appointed to select a sample of

Soldiers that equaled the number of seats in the assigned room the Army STARRS team was allotted. Army STARRS worked with the POCs to prevent bias in selection procedures. Once the participants were seated in the room, the informed consent presentation was given to everyone simultaneously and each individual decided whether to participate after learning about the study. More specifically, study purposes, procedures, and confidentiality protections were explained, and the research team clarified that participation was voluntary; then, questions were answered. After that, written informed consent was then obtained from each participant who chose to participate. Those who consented and took the survey were allotted 90 minutes of time for completion, but in some cases Soldiers came late or had to leave early; therefore, not all participants were given the full 90 minutes. Surveys were taken either by computers provided by the All Army Study data collection team or by way of pencil-paper survey; this depended upon how large the group was and the availability of computers. Participants answered a battery of questions and measures related to demographics, health, injuries, history of emotional problems, tobacco/alcohol/drug use, attention and concentration, depression, high mood, anxiety, irritability and anger, panic, anger attacks, self-harm, deployment experiences, stressful experiences, treatment, unit experiences, ownership of weapons, social networks, spirituality, how you see yourself, and their childhood (Heeringa et al., 2013). Participants were also asked for consent to link their Army administrative records to their survey responses and to see if they would be willing to participate in the longitudinal follow-up data collections. If participants consented, identifying information was obtained from them, but this data remained separate from the survey and was never merged with the All Army Study (AAS) survey data; therefore, those who access the dataset do not have access to any identifying information or administrative records (Heeringa et al., 2013).

These recruitment, consent, and data protection procedures were approved by the Human Subjects Committees of all collaborating organizations, including the National Institute of Mental Health (NIMH), the U.S. Army, Uniformed Services University of the Health Sciences (USUHS), the University of California San Diego, Harvard Medical School, and the University of Michigan through the Henry M. Jackson Foundation (Kessler et al., 2013).

Data from new participants were then collected quarterly through one 90 minute survey that was either on paper or by computer depending upon the area and size of the unit (Heeringa et al., 2013). The surveys were taken by many active-duty, Army units in the continental United States (CONUS) and these data are representative of all Soldiers stationed in CONUS (Heeringa et al., 2013; Kessler et al., 2013). More details on AAS sampling and field procedures can be found elsewhere (Heeringa et al., 2013; Kessler et al., 2013).

For the current study, inclusion criteria required that participants had experienced at least one deployment (5,041 participants reported that they had not experienced a deployment). Additionally, they had to answer all 12 of the combat exposure items and all 3 of the religion/spirituality items given that each item was essential to the measurement of these constructs (3,253 participants did not answer all of these items). This left an analytic sample of 13,155 Soldiers (more detail about inclusion criteria and missingness is provided below in the Analytic Plan section).

Measures

Portions of the survey that were relevant to the purposes of the present study appeared in the stressful experiences, anxiety, depression, and spirituality sections of the AAS survey. Responses to several questions served to test the research questions and hypotheses concerning if religiosity/spirituality would buffer the relationship between combat exposure and mental health

symptomatology. The following further explains the variables that were used in added detail. All items can be found in the Appendices and descriptive statistics for each variable can be found in Table 1.

Cumulative Combat Exposure

The predictor of this study was combat exposure. Twelve items from the Deployment Risk and Resilience Inventory (DRRI; King et al., 2006; Vogt et al., 2008) were used to assess previous experiences of combat exposure. Soldiers were asked to think back on all the deployments they have undergone and answer how many times, if any, they have had different experiences. They answered on a scale from 0 (no experience) to 4 (10 or more experiences). Sample items include, "Get wounded by the enemy," and "Have a close call (that is, equipment shot off body, IED exploded near you)." Soldiers had to respond to all 12 items to ensure an accurate measurement. Responses were then sum scored (0-48) to create a cumulative combat exposure score, also known as an index measure, where higher scores indicate greater stress (α = .85).

Anxiety Symptomatology

One of the mental health outcomes of this study was anxiety symptomatology. Anxiety was not evaluated as a diagnosis, but rather, as symptoms that the Soldiers self-reported. The World Health Organization Composite International Diagnostic Interview Screening Scale (CIDI-SC; Kessler et al., 2010) Generalized Anxiety Disorder Scale (GAD) was used to assess self-reported symptoms of anxiety in the past 30 days. Five items were used, and Soldiers were asked to indicate on a scale from 1 (all or almost all of the time) to 5 (none of the time). Sample items include, "feel anxious or nervous," and "have trouble controlling your worry or anxiety."

These five items were reverse coded and mean scored where higher scores represented more experience with anxiety symptoms ($\alpha = .94$).

Depressive Symptomatology

The second mental health outcome evaluated in this study was depressive symptomatology; again, depression was not evaluated as a diagnosis, but rather, as symptoms that the Soldiers self-reported. The items used are from CIDI-SC Major Depressive Episode Scale (MDE; Kessler et al., 2010) where, for this study, four items were used to screen for depressive symptomatology. Soldiers indicated in the last 30 days how often they experienced depressive symptoms; responses ranged from 1 (all or almost all of the time) to 5 (none of the time). Sample items include, "feel sad or depressed," and "feel down on yourself, no good, or worthless." These four items were reverse coded and mean scored where higher scores represented more experience with depressive symptoms ($\alpha = .94$).

Religiosity

One of the moderating variables used for this study was religiosity. Religiosity was assessed through one item, "How religious do you consider yourself to be?" Soldiers indicated their response on a scale from 1 (very) to 4 (not at all). This item was reverse coded where higher scores represented more religiousness.

Spirituality

Another moderating variable used for this study was spirituality. Spirituality was assessed through one item, "How spiritual do you consider yourself to be?" Soldiers indicated their response on a scale from 1 (very) to 4 (not at all). This item was reverse coded where higher scores represented more spirituality.

Religious Attendance

The final moderating variable for this study was religious attendance. Religious attendance was assessed through one item, "About how often do you usually attend religious services when you can?" Soldiers indicated their response on a scale from 1 (more than once a week) to 6 (never). This item was reverse coded where higher scores represented more religious attendance.

Demographic Variables

In this study, we controlled for five variables: gender, age, education, marital status, and race. Gender was coded as 1 = men and 0 = women, thus men will be the referent group throughout; 88.7% of the sample were men. Age was a continuous variable where the participants' ages ranged from 18 to 61 with a mean of 30.00 ($SD = 7.35$), and the majority of the sample were in their twenties. Education was coded as 1 = 4-year degree or higher and 0 = less than a 4-year degree. Education was used as a proxy for rank (all officers must have a 4-year degree); 20.6% of the sample had a 4-year degree or higher, thus this portion of the sample met some of the eligibility requirements for being an officer. Marital status was coded as 1 = married and 0 = never married, divorced, separated, and widowed. Race was dummy coded where 1 = white and 0 = all other, and the majority, 69.4%, of the sample was White.

Table 1

Correlation table

	1	2	3	4	5	6	7	8	9	10	11
1. Cumulative combat exposure	--										
2. Anxiety Symptoms	.117***	--									
3. Depressive Symptoms	.072***	.669***	--								
4. Religiosity	-.032***	-.045***	-.065***	--							
5. Spirituality	-.031***	-.004	-.028***	.715***	--						
6. Religious Attendance	-.033***	.041***	-.044***	.559***	.478***	--					
7. Men	.194***	-.103***	-.068***	-.039***	-.080***	-.063***	--				
8. Age	.108***	-.041***	-.037***	.162***	.209***	.194***	.013	--			
9. College education	-.030***	-.050***	-.053***	.130***	.170***	.202***	-.050***	.332***	--		
10. Married	.121***	-.009	-.065***	.072***	.066***	.105***	.130***	.281***	.055***	--	
11. White	.107***	.017*	-.019*	-.165***	-.166***	-.122***	.110***	-.074***	.037***	.037***	--
N	13,155	13,099	13,119	13,155	13,155	13,155	13,081	13,106	13,064	12,790	12,931
Mean	11.215	1.735	1.575	2.291	2.512	2.249	.89	30.00	.208	.617	.706
Standard Deviation	9.585	.901	.826	.994	1.020	1.585	.311	7.345	.406	.486	.456
Alphas	.862	.929	.913	--	--	--	--	--	--	--	--
Range	0-4	1-5	1-5	1-4	1-4	1-6	0-1	18-61	0-1	0-1	0-1
Skewness (SE)	.60(.021)	1.64(.021)	1.87(.021)	.17(.021)	-.05(.021)	1.06(.021)	-2.52(.021)	.87(.021)	1.44(.021)	-.48(.021)	-.90(.021)
Kurtosis (SE)	-.52(.043)	2.28(.043)	3.38(.043)	-1.06(.043)	-1.12(.043)	-.30(.043)	4.36(.043)	.31(.043)	.08(.043)	-1.77(.043)	-1.19(.043)

Note: Men (1=men, 0=women), college education (1=4+ Year Degree, 0=No Degree), married (1=married, 0=never married, divorced, separated, widowed), and White (1=White, 0=All Other); *p < .05, **p < .01, ***p < .001

Analytic Plan

Determining the Analytic Sample

To better understand how the final, analytic sample was obtained, the process of omitting participants is provided here. The original, AAS dataset from Army STARRS consists of 21,449 and then participants were omitted based on the following inclusion criteria. As mentioned, 16,408 participants met the first inclusion criteria, such that they experienced one or more deployments. The second inclusion criteria was related to survey completion. Specifically, two of the primary study variables required that all items be answered, the combat exposure measure and the religion/spirituality/religious attendance items.

For the combat exposure measure, responses to all 12 items were required (1) to create a comprehensive index score that was comparable across all participants and (2) to be able to analyze the psychometric properties and dimensionality of the measure. Accordingly, patterns of missingness were examined from the sample of participants who had experienced at least one deployment: 5.6% was missing from combat exposure item 1, 5.8% from combat exposure item 2, 6.3% from combat exposure item 3, 6.0% from combat exposure item 4, 5.9% from combat exposure item 5, 6.6% from combat exposure item 6, 6.5% from combat exposure item 7, 6.4% from combat exposure item 8, 6.6% from combat exposure item 9, 6.3% from combat exposure item 10, 6.4% from combat exposure item 11, and 6.6% from combat exposure item 12. Then, I examined how many participants answered one combat exposure item, two combat exposure items, etc. to twelve combat exposure items; the majority of the sample either answered all 12-items (90.6%) or did not answer any items at all (5.1%). See the Figure 2 below to see the number of participants who answered none, one, two, etc. of the combat exposure items.

Figure 2

Number of combat experience items completed
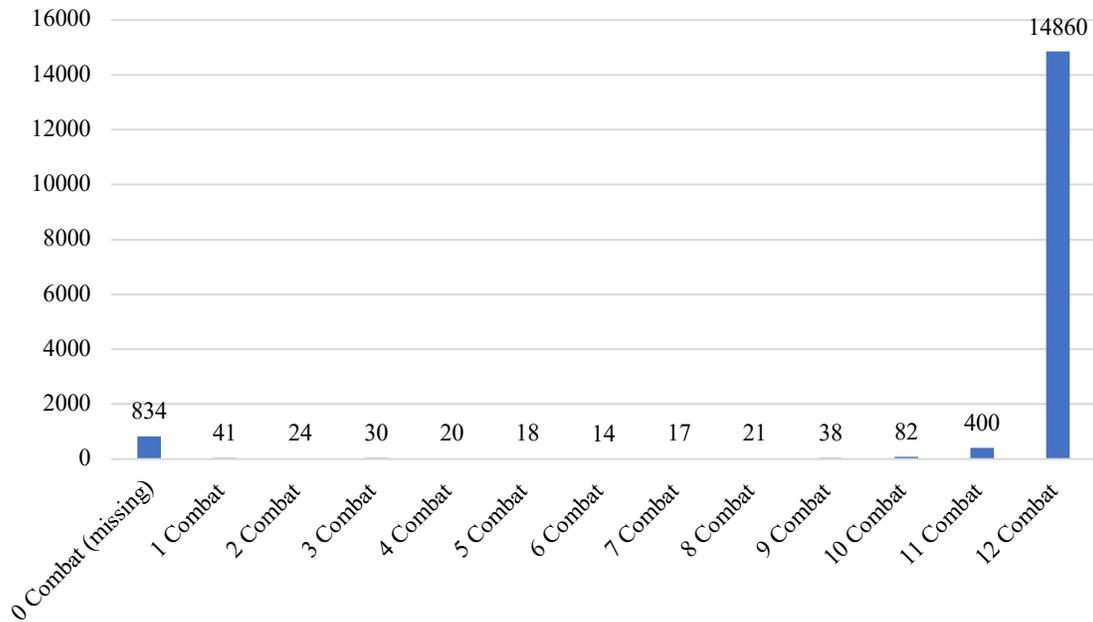
Note. Number of combat exposure items answered by participants who had experienced at least one deployment.

For the religion, spirituality, and religious attendance items, patterns of missingness were also examined: 13.8% did not answer the question about religion, 14.1% did not answer the question about spirituality, and 13.6% did not answer the question about religious attendance. These items were also analyzed to determine how many participants answered one, two, or all three items. The majority (85.6%) answered all three items, 0.6% answered two items, 0.4% answered one item and 13.3% did not answer any of the three items. See Figure 3 below to see the number of participants who answered none, one, two, or three of the religion, spirituality, and religious attendance items.

Figure 3

Number of religion, spirituality, and religious attendance items completed
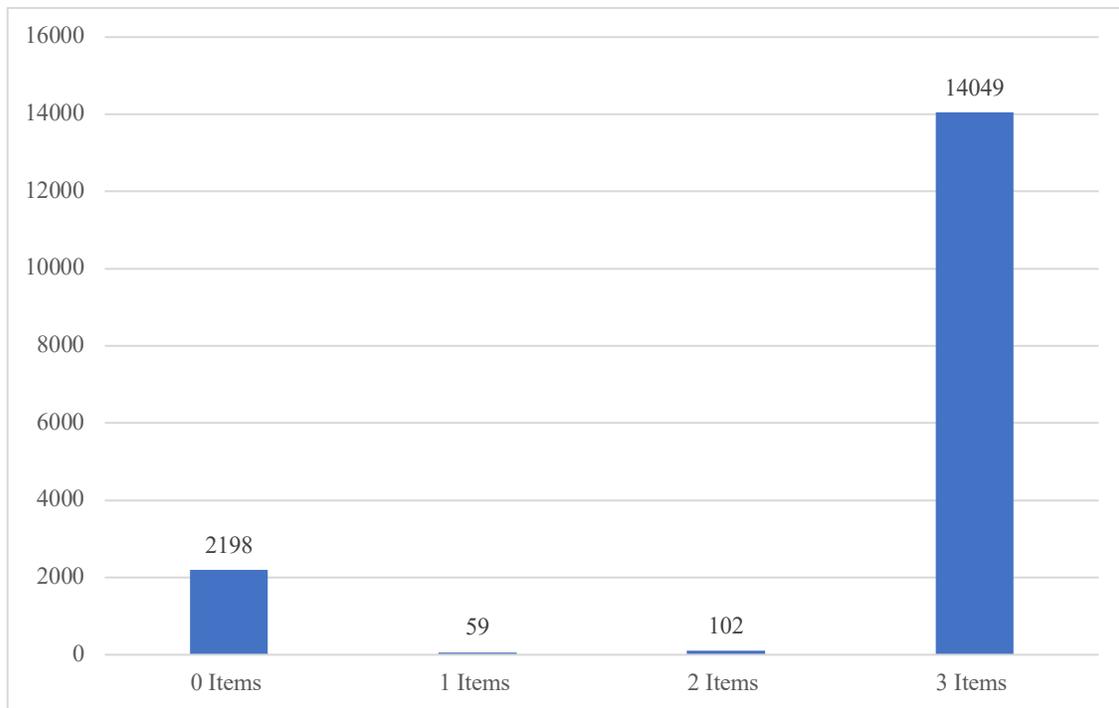
Note. Number of religion, spirituality, and religious attendance items answered by participants who had experienced at least one deployment.

In total 90.6% of the participants answered all 12 combat items and 85.6% answered all three religion, spirituality, and religious attendance items. Participants were omitted from the analyses if they did not provide responses for one or more of the twelve combat exposure items, the spirituality item, the religiosity item, or the religious attendance item. Before omitting participants with missing items, there were 16,408 participants, and after there were 13,155 participants in the analytic sample. See Table 2 for an overview of the original, omitted, and analytic samples.

The analytic sample was then compared to the omitted sample across various demographic variables, specifically, age, gender, race, education, and marital status, in order to examine if there were differences between these groups. Two types of analyses were run to compare these groups: an independent samples t-test and the χ^2 difference test. The independent samples t-test was used to analyze age given that it was measured as a continuous variable as well as the anxiety and depressive symptoms variables that were mean scored in order to better understand which groups had higher and lower levels, respectively. All other demographic variables were examined by way of the χ^2 test due to their categorical nature. The results suggest some group differences between those who answered all of the questions (the analytic sample) and those who did not (omitted sample) in regard to gender, race, education, and age. Participants who did not fill out one or more of the combat exposure, religion, spirituality, and religious attendance survey items were, on average, somewhat more likely to be men, slightly younger, less educated, less likely to report being White, and reported higher anxiety and depressive symptomatologies (Table 2). There were statistically significant differences between the omitted sample (90.7% men, 29.98 years old) and analytic sample (89.2% men, 30.00 years old) for men and age, but practically there was very little difference. Statistically significant and practical differences did emerge between samples regarding race, education, and mental health.

Most demographic variables were examined as categorical (gender, education, marital status, and race) except for age which remained a continuous variable. These demographic variables were examined to see if any significant associations exist with the mental health outcomes; where correlations were significant, demographic factors were controlled for in the regression (H1) and moderation analyses (RQ3). The variables of interest (i.e., anxiety and

depression) were mean-centered; this allowed for a clearer, more easily understood,

interpretation of the results.

Table 2

Datasets comparisons

	Inclusion Criteria Dataset	Omitted Participants	Analytic Sample	χ^2	df	p-values
	N=16,408	n=3,253	n=13,155			
Gender				6.24	1	.012*
Male	14,585 (89.5%)	2,920 (90.7%)	11,665 (89.2%)			
Female	1,716 (10.5%)	300 (9.3%)	1,416 (10.8%)			
Missing	107 (.7%)	33 (1.0%)	74 (.6%)			
Race						
White	11,496 (71.4%)	2,004 (63.5%)	9,492 (73.3%)	121.18	1	<.001*
Black	2,671 (16.6%)	725 (23.0%)	1,946 (15.0%)	115.19	1	<.001*
American Indian/Alaskan Native	458 (2.8%)	120 (3.7%)	338 (2.6%)	12.98	1	<.001*
Asian	622 (3.9%)	128 (4.1%)	494 (3.8%)	.38	1	.536
Pacific Islander	210 (1.3%)	54 (1.7%)	156 (1.2%)	5.03	1	.025*
Other	1,325 (8.2%)	292 (9.2%)	1,033 (8.0%)	5.39	1	.020*
Missing	306 (1.9%)	95 (2.9%)	211 (1.6%)			
Marital Status				5.31	4	.257
Married	8,672 (61.5%)	777 (59.3%)	7,895 (61.7%)			
Never Married	3,459 (24.5%)	341 (26.0%)	3,118 (24.4%)			
Divorced	1,254 (8.9%)	130 (9.9%)	1,124 (8.8%)			
Separated	706 (4.3%)	62 (4.7%)	644 (5.0%)			
Widowed	9 (.1%)	0 (0%)	9 (.1%)			
Missing	2,308 (14.1%)	1,943 (59.7%)	365 (2.8%)			
Education				226.17	6	<.001*
GED or equivalent	1,099 (6.8%)	274 (8.6%)	825 (6.3%)			
High School Diploma	4,557 (28.0%)	1,102 (34.5%)	3,455 (26.4%)			
Some post high school education, but no degree/certificate	4,703 (28.9%)	866 (27.1%)	3,837 (29.4%)			

				t	df	p-values
Post high school/tech school/certificate or degree	1,008 (6.2%)	228 (7.1%)	780 (6.0%)			
2-year college Associate Degree	1,832 (11.3%)	379 (11.9%)	1,453 (11.1%)			
4-year college degree (BA, BS, or equivalent)	2,152 (13.2%)	262 (8.2%)	1,890 (14.5%)			
Graduate or professional study	910 (5.6%)	86 (2.7%)	824 (6.3%)			
Missing	147 (.9%)	56 (1.7%)	91 (.7%)			
Age				.18	16,330	.009*
Mean	30.00	29.98	30.00			
SD	7.39	7.57	7.35			
Missing	76 (.5%)	27 (.8%)	49 (.4%)			
Anxiety Symptoms				-14.51	16,134	<.001
Mean	1.79	2.01	1.74			
SD	.94	1.05	.90			
Missing	272 (1.7%)	216 (6.6%)	56 (.4%)			
Depressive Symptoms				-16.73	16,215	<.001
Mean	1.63	1.86	1.58			
SD	.87	.98	.83			
Missing	191 (1.2%)	155 (4.8%)	36 (.3%)			

Note. Missing values are reported, and the valid percentages are included. Anxiety symptom and depressive symptom scales ranged

from 1 to 5.

Plan of Analysis

The analyses for the current study were conducted in SPSS, Mplus, and Amos. Before examining the research questions and hypotheses, descriptive statistics were examined to evaluate normality, kurtosis, and skewness across all of the variables. The correlations between the variables were analyzed to better understand the relationships between the variables and to determine if multicollinearity presented challenges during the analyses.

Prior to evaluating the factor structure of the DRRI (RQ1), dimensionality was assessed to ensure that a factor analysis was appropriate. Initial testing of sampling adequacy and homoscedasticity was done with the 12 DRRI items. These tests included the Bartlett's test for sphericity which examined redundancy across matrices, and the Kaieser-Meyer-Olkin (KMO) coefficient which examined the proportion of the variance. If Bartlett's test for sphericity provided a significance level of less than 0.05 then this indicated that a factor analysis may be useful to examine dimensionality of the 12 DRRI items (*KMO and Bartlett's Test*, 2014). If the Kaieser-Meyer-Olkin (KMO) coefficient provided a high value (i.e., close to 1.0) then this indicated that a factor analysis may be useful to examine dimensionality of the 12 DRRI items, but if the values were less than 0.5 then a factor analysis was most likely not useful (*KMO and Bartlett's Test*, 2014).

Then, to examine the dimensionality of the DRRI, a Principal Components Analysis (PCA) with oblique rotation, specifically promax rotation, was conducted in SPSS. According to *SAS STAT User's Guide* (Vol. 1, 1990), one statistical rotation is no better than another and reasoning for each method (i.e., oblique versus orthogonal) must be made on nonstatistical grounds. Oblique rotation is best, and should be used, when factors are thought to be correlated, and when factors are thought to be uncorrelated then orthogonal is best (Brown, 2009). The

DRRI was originally created to assess combat exposure as a whole; therefore, made sense for the items to be correlated, and for oblique rotation to be implemented. Overall, the purpose of a PCA is to determine the interrelationships between items on a given scale and to identify underlying components of the scale (also termed factors or dimensions); the factors are made up of items that load onto a single factor. If distinct factors emerge, as determined by eigenvalues greater than 1, then items that load onto a single factor will be examined and appropriate names will be given to those factors. These factors will then be implemented into the remaining analyses as separate independent variables.

Once the dimensionality was established, the association between the combat exposure components that emerge, if any, and mental health symptomatologies (i.e., anxiety and depression) were examined to address Hypothesis 1 (H1) via a path analysis model conducted in Amos. As a reminder, H1 is that Soldier's combat exposure will be positively associated with anxiety and depressive symptoms, such that higher levels of combat exposure will be related to higher levels of anxiety and depressive symptoms. This was examined by creating a model where symptoms of anxiety and depression were regressed onto combat exposure. See Figure 4.

Figure 4

Hypothesis 1 (H1) model
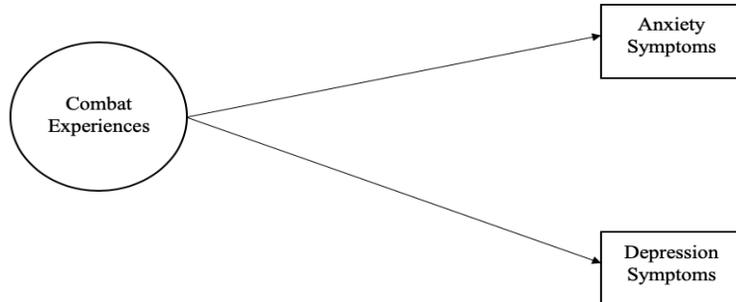
Note. Model of the symptoms of anxiety and depression being regressed onto combat exposure. There may be multiple components of combat exposure if these emerge from the PCA.

In order to address Research Question 2 (RQ2), a latent profile analysis (LPA) was conducted to examine if different groups emerged from the religion, spirituality, and religious attendance indicators, all of which are continuous variables. The person-centered approach of a LPA allows comparisons between different levels of religion/spirituality/religious attendance by asking participants to self-rate their experiences with these constructs. By using an LPA, participants were classified into groups based on their religion/spirituality/religious attendance profiles (for example, 'low religion/high spirituality/low religious attendance' profile versus a 'high religion/high spirituality/low religious attendance' profile). Compared to the variable-centered technique (i.e., LCA), LPA avoids the use of arbitrary cutoff points on the dimensions and makes it possible to keep the continuous nature of participant responses to the religion/spirituality/religious attendance variables. This is especially important in this particular study due to the single-item measures for religion, spirituality, and religious attendance. Therefore, a strength of employing LPA, which has been utilized in other religion/spirituality

based studies (Bravo et al., 2016), is the ability to identify various sub-groups of participants with similar religion/spirituality/religious attendance profiles based on their responses.

Religion, spirituality, and religious attendance are the three indicators that were included in the LPA. To begin, a one-profile LPA was conducted, which assumes that all participants are grouped together in one profile. Then, in order to fully test the possibility of multiple groups/profiles, successive LPAs estimating more profiles were tested (e.g., does the 2-profile solution fit better than the 1-profile solution? does the 3-profile solution fit better than the 2-profile solution? And so on). Multiple indices of relative model fit were examined to inform the number of latent profiles that emerged and best fit the data. The first was the Lo-Mendell-Rubin Likelihood Ratio Test of goodness fit; this test points to the 'best' model with the smallest number of profiles that is not significantly improved by an additional profile (Masyn, 2013). The second were information criteria called the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC); lower values for these criterion indicate better models (Masyn, 2013). Finally, entropy, which reflects classification quality, was assessed where higher values indicate better fit (Masyn, 2013). Based on theory and the indices of relative model fit, the number of profile(s) that best fit the data were selected. All profile(s) that emerged were included in the final moderation analyses.

Finally, Research Question 3 (RQ3) was tested. RQ3 examined if combat exposure component(s) and mental health symptoms were moderated by the religion/spirituality profiles that emerge from the LPA. This RQ was tested by way of a structural equation model (SEM) multigroup path analysis that was conducted in Amos. While conducting a multigroup path analysis, the purpose was to estimate separate structural models for each group in order to see if there were any substantive differences in their structural relationships. To do this, multiple

models were created for each group where in one model the paths were free to vary across all groups and in another model paths were constrained to be equal. The free and constrained models were then compared by their goodness-of-fit indices. These goodness-of-fit indices were reported for each model and included χ^2/df ratio, RMSEA, CFI, and TLI. The χ^2/df ratio was interpreted to have a reasonable fit if it was between 3 and 1 (Carmines & McIver, 1981). The Root Mean Square Error of Approximation (RMSEA) values of 0.08 or less indicated reasonable fit (Browne & Cudeck, 1993). If the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) are greater than or equal to 0.90 then fit was considered acceptable for the model (Little, 2013). After comparing the free and constrained models by way of a $\Delta\chi^2$ test and by examining the change in CFI, individual paths within the model were examined. See Figure 5.

Figure 5

Research Question 3 (RQ3) model
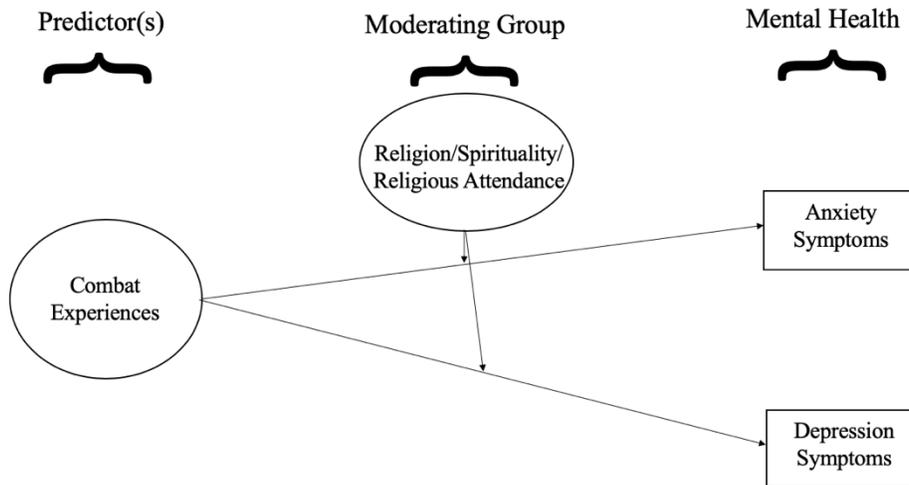
Note. Model examining if the combat exposure variable(s) and mental health symptoms will be moderated by the religion/spirituality/religious attendance profile(s) that emerge from the LPA, and there may be multiple profiles based on the findings of the LPA.

Chapter 3

Results

Preliminary Analyses

Descriptive statistics and bivariate correlations are presented in Table 1. All variables

were considered to be normally distributed or were considered within an acceptable range

regarding skewness and kurtosis.

Main Analyses

Dimensionality and Principal Components Analysis (RQ1)

To begin addressing Research Question 1 (RQ1), dimensionality was first assessed for

the 12 DRRI items in SPSS. The Bartlett's test for sphericity was significant ($\chi^2(66)= 57,292.83$,

$p<.001$) which indicates that a factor analysis is appropriate. The Kaieser-Meyer-Olkin

coefficient also indicated that a factor analysis was appropriate (KMO = .91). Given that these

tests of sampling adequacy and homoscedasticity indicated that a factor analysis was appropriate,

the Principal Component Analysis (PCA) with an oblique, promax rotation was conducted. The

PCA revealed that there were multiple interrelationships between the items on the DRRI and

identified underlying components of the scale (e.g., factors or dimensions). Specifically, two

components were identified by having eigenvalues greater than one; one component had nine

items load onto it significantly, and the other component had two items load onto it significantly.

Factor loadings for all items are presented in Table 3.

Based on a review of the items and consultation with other military family experts, the

component that had nine items load onto it was named, "Expected combat experiences." These

items describe anticipated or typical experiences associated with a deployment that Service

members expect and train for (e.g., patrolling, taking enemy fire). The component with the two

items that loaded onto it was named, "Responsible for non-enemy deaths." These items describe a Service member's direct responsibility of the deaths of non-combatants, fellow U.S. Soldiers, or U.S. allies; these items reflect deployment experiences that were likely unanticipated and may fall outside of the experiences that Soldiers prepare for when training. One indicator (item 3) did not clearly load onto either component; the factor loading was similar for both components. Best practices in PCA suggest that indicators should distinctly load onto one factor as indicated by an approximately 0.20 difference in the factor loading between the two components; accordingly, this item was dropped. A new correlation table was created where the two combat exposure components were added separately (Table 4) before moving forward with the remaining analyses.

Table 3

Results of principal components analysis (PCA) of the 12 items from the DRRI

The next questions are about events that might have happened to you during deployment. How many times did you ever have each of these experiences during deployment?	Component 1: Expected combat experiences	Component 2: Responsible for non-enemy deaths
A1. Go on combat patrols or have other dangerous duty (e.g., clearing buildings, disarming civilians, working in areas that had IEDs)	**.709**	-.343
B2. Fire rounds at the enemy or take enemy fire (either direct or indirect fire)	**.736**	-.187
C3. Get wounded by the enemy	.410	.402
D4. Have a close call (that is, equipment shot off body, IED exploded near you)	**.786**	-.059
E5. Have member(s) of your unit who were seriously wounded or killed	**.704**	-.051
F6. Have direct responsibility for the death of an enemy combatant	**.695**	.272
G7. Have direct responsibility for the death of a non-combatant	.431	**.624**
H8. Have direct responsibility for the death of U.S. or ally personnel	.205	**.655**
I9. Save the life of a Soldier or civilian	**.516**	.213
J10. See homes or villages that had been destroyed or people begging for food	**.719**	-.330
K11. Get exposed to the sights, sounds, or smells of severely wounded or dying people or see dead bodies	**.813**	-.111
L12. Witness violence within the local population or mistreatment toward non-combatants	**.705**	-.108

Note. The bolded and shaded numbers indicate which component each of the 12-items loaded onto

after running the PCA. Item 3, "Get wounded by the enemy," was removed because it did not load

well onto either factor.

Table 4

New correlation table with two combat exposure components

	1	2	3	4	5	6	7	8	9	10	11	12
1. Expected Combat Experiences	--											
2. Responsible for Non-Enemy Death	.304**	--										
3. Anxiety Symptoms	.112**	.091**	--									
4. Depressive Symptoms	.067**	.082**	.669**	--								
5. Religiosity	-.032**	-.005	-.045**	-.065**	--							
6. Spirituality	-.032**	-.002	-.004	-.028**	.715**	--						
7. Religious Attendance	-.033**	.002	-.041**	-.044**	.559**	.478**	--					
8. Men	.195**	.041**	-.103**	-.068**	-.039**	-.080**	-.063**	--				
9. Age	.109**	.035**	-.041**	-.037**	.162**	.209**	.194**	.013	--			
10. College education	-.031**	.018*	-.050**	-.053**	.130**	.170**	.202**	-.050**	.332**	--		
11. Married	.123**	.019*	-.009	-.065**	.072**	.066**	.105**	.130**	.281**	.055**	--	
12. White	.108**	.019*	.017	-.019*	-.165**	-.166**	-.122**	.110**	-.074**	.037**	.037**	--
N	13,155	13,155	13,099	13,119	13,155	13,155	13,155	13,081	13,106	13,064	12,790	12,931
Mean	11.050	.090	1.735	1.575	2.291	2.512	2.249	.892	30.00	.208	.617	.706
Standard Deviation	9.303	.494	.901	.826	.994	1.020	1.586	.311	7.345	.406	.486	.456
Alphas	.878	.386	.929	.913	--	--	--	--	--	--	--	--
Range	0-36	0-8	1-5	1-5	1-4	1-4	1-6	0-1	18-61	0-1	0-1	0-1
Skewness(SE)	.51(.021)	7.84(.021)	1.64(.021)	1.87(.021)	.17(.021)	-.05(.021)	1.06(.021)	-2.52(.021)	.87(.021)	1.44(.021)	-.48(.021)	-.90(.021)
Kurtosis(SE)	-.77(.043)	80.90(.043)	2.28(.043)	3.38(.043)	-1.06(.043)	-1.12(.043)	-.30(.043)	4.36(.043)	.31(.043)	.08(.043)	-1.77(.043)	-1.19(.043)

Note: Men (1=men, 0=women), college education (1= 4+ Year Degree, 0=No Degree), married (1=married, 0=never married, divorced, separated, widowed), and white

(1=white, 0=minority); *p < .05, **p < .01

Associations between the Combat Exposure Components and the Adverse Mental Health Symptoms (H1)

Regarding Hypothesis 1 (H1), regression analyses were completed in Amos. All regression coefficients were examined simultaneously in a path model with the control variables (i.e., gender, race, age, education, and marital status) included. In the model, anxiety symptoms and depressive symptoms were regressed onto the two combat exposure components that were identified from the PCA in RQ1 (i.e., *Expected combat experiences* and *Responsible for non-enemy deaths*). Model fit was acceptable (CFI = 1.00; TLI = .996; RMSEA[90% CI] = 0.01[.00, .03]; *p*<.001***), and results suggest that both components of combat exposure were significantly and positively associated with anxiety and depressive symptoms. Specifically, exposure to more *Expected combat experiences* was related to more anxiety symptoms (*β*=.12, *SE*=.009, *p*<.001) and more depressive symptoms (*β*=.07, *SE*=.009, *p*<.001), and higher levels of the *Responsible for non-enemy deaths* component were related to more anxiety symptoms (*β*=.06, *SE*=.009, *p*<.001) and more depressive symptoms (*β*=.07, *SE*=.009, *p*<.001).

With regard to the control variables, mental health symptomatology was linked to several demographic factors. Gender was significantly associated with both anxiety and depressive symptomatology, such that men were less likely to experience both anxiety symptoms (*β*=-.13, *SE*=.026, *p*<.001) and depressive symptoms (*β*=-.08, *SE*=.024, *p*<.001). Age was significantly associated with anxiety symptomatology, such that older Soldiers were less likely to experience anxiety symptoms (*β*=-.04, *SE*=.001, *p*<.001). Education was significantly associated with both anxiety and depressive symptomatology, such that Soldiers who obtained a college education were less likely to experience both anxiety symptoms (*β*=-.04, *SE*=.020, *p*<.001) and depressive symptoms (*β*=-.05, *SE*=.019, *p*<.001). Marital status was significantly associated with depressive

symptomatology, such that those who were married were less likely to experience depressive symptoms (β=-.06, *SE*=.016, *p*<.001). Finally, race was not significantly associated with either anxiety or depressive symptomatology.

Therefore, H1 was accepted given that higher levels of combat exposure were related to higher levels of anxiety and depressive symptoms, even when accounting for gender, age, education, marital status, and race. See Figure 6.

Figure 6

Hypothesis 1 (H1) model results
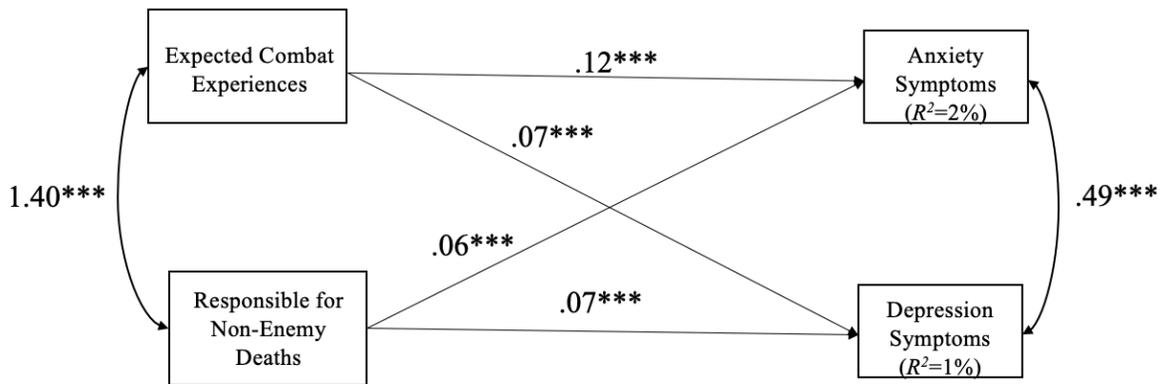
Note. Path analysis where symptoms of anxiety and depression were regressed onto the two components that emerged from the DRRI combat exposure scale. Gender, age, education, marital status, and race are accounted for in the model. Standardized coefficients are presented. CFI = 1.00; TLI = .996; RMSEA[90% CI] = 0.01[.00, .03]; *p*<.001***

Examination of different groups emerging by way if a latent profile analysis (LPA), from the

religion, spirituality, and religious attendance variables (RQ2)

Regarding Research Question 2 (RQ2), a latent profile analysis (LPA) was completed in

Mplus with three indicators of religion/spirituality (i.e., religiosity, spirituality, and religious

attendance) to examine if different profiles (or groups) emerged. Table 5 presents the fit statistics

for all profile solutions. AIC and BIC decreased for every solution over two profiles. The

entropy levels were high (>.95) for all profile solutions with the exception of the four-profile

solution.

In order to determine which number of profiles best fit the data, both fit statistics and

theory were considered. Fit statistics results from the LPA suggest that the five-profile solution is

appropriate for the study sample as indicated by lower AIC/BIC values than the two-, three-, and

four-profile solutions, a significant Lo-Mendell-Rubin test (LMRT), a significant Log Likelihood

Ratio test, and by the spread of the participants over the five-profiles.

Theory was also considered when determining which profile solution best fit the data.

According to religious coping theory (K. I. Pargament, 2001), both identity and behavior are

important when examining the buffering effects of stress on mental health. Therefore, when

determining the number of profiles, it was important to select profiles that were reflective of

individuals who both identified at varying levels of religiosity and spirituality as well as had

varying levels of religious attendance. Based on both theoretical considerations and fit statistics,

the five-profile solution was selected as the best-fitting model (AIC=97,571.202;

BIC=97,735.862; Entropy=0.963; LMRT=2,148.236, $p<.001$; Log Likelihood=2,204.861,

$p<.001$).

The five-profile solution allowed for five distinct, and statistically significantly different, groups to emerge (Table 5). Profile 1 was low on all three indicators. Profile 2 considered themselves to be slightly religious and spiritual but were low in religious attendance. Profile 3 reported moderate levels of religiosity and spirituality, but they were high in religious attendance. Profile 4 considered themselves to be moderate with regard to religiosity and spirituality, but they were low in religious attendance. Profile 5 was high in religiosity, spirituality, and religious attendance.

Table 5

Model of fit criteria for two-, three-, four-, and five- profile solution of the LPA

Profile Size	AIC	BIC	Entropy	Lo-Mendell-Rubin Adjusted (LMRT) test (p-value)	Log Likelihood Ratio Test (p-value)	Membership Class Percentages
1	124,509.062	124,5553.969	—	—	—	Profile 1= 100%
2	108,198.018	108,272.864	0.972	15,899.943 (p<.001)	16,319.044 (p<.001)	Profile 1 = 76% Profile 2 = 24%
3	106,368.087	106,472.871	0.957	1,790.730 (p<.001)	1,837.931 (p<.001)	Profile 1=72% Profile 2=11% Profile 3=17%
4	100,043.563	100,178.285	0.844	1,354.678 (p=.022)	1,390.385 (p<.001)	Profile 1=43% Profile 2=33% Profile 3=13% Profile 4=11%
5	**97,571.202**	**97,735.862**	**0.963**	**2,148.236 (p<.001)**	**2,204.861 (p<.001)**	**Profile 1=20%** **Profile 2=26%** **Profile 3=14%** **Profile 4=30%** **Profile 5=10%**
6	There was not enough within-class variation of the indicator "religiosity" for a 6-profile solution to be calculated.					

Note. **Bolded** = solution selected as best fit.

Figure 7 provides a visual display of the mean scores for all religion/spirituality/religious attendance indicators among the five identified profiles, and Table 6 provides the mean scores

for each profile. The distinctions between the profiles (i.e., the differences in how participants in each profile answered all three of the indicators of religion/spirituality/religious attendance) informed the naming of the profiles. Note that across all indicators on all profiles these groups are statistically different from one another (see Appendix F).

Profile 1 was the third largest profile (n=2,601; 20%). Those in this profile typically identified as low in religiosity, low in spirituality, and low in religious attendance. Soldiers in this profile were labeled as *Non-religious/spiritual & Non-attenders*.

Profile 2 was the second largest profile (n=3,328; 26%). Those in this profile typically identified as slightly religious, slightly spiritual, and low in religious attendance. Soldiers in this profile were labeled as *Slightly religious/spiritual & Non-attenders.*

Profile 3 was the second smallest profile (n=1,775; 14%). Those in this profile typically identified as moderate with regard to religiosity and spirituality and high in religious attendance. Soldiers in this profile were labeled as *Moderately religious/spiritual & Frequent attenders*.

Profile 4 was the largest profile (n=4,183; 30%). Those in this profile typically identified as moderate with regard to religiosity and spirituality, but unlike Profile 3, they were less frequent in their religious attendance. Soldiers in this profile were labeled as *Moderately religious/spiritual & Infrequent attenders.*

Profile 5 was the smallest profile (n=1,268; 10%). Those in this profile typically identified as high in religiosity, high in spirituality, and frequent in religious attendance. Soldiers in this profile were labeled as *Very religious/spiritual & Frequent attenders*.

Figure 7

Latent Profile Analysis (LPA) with five profiles
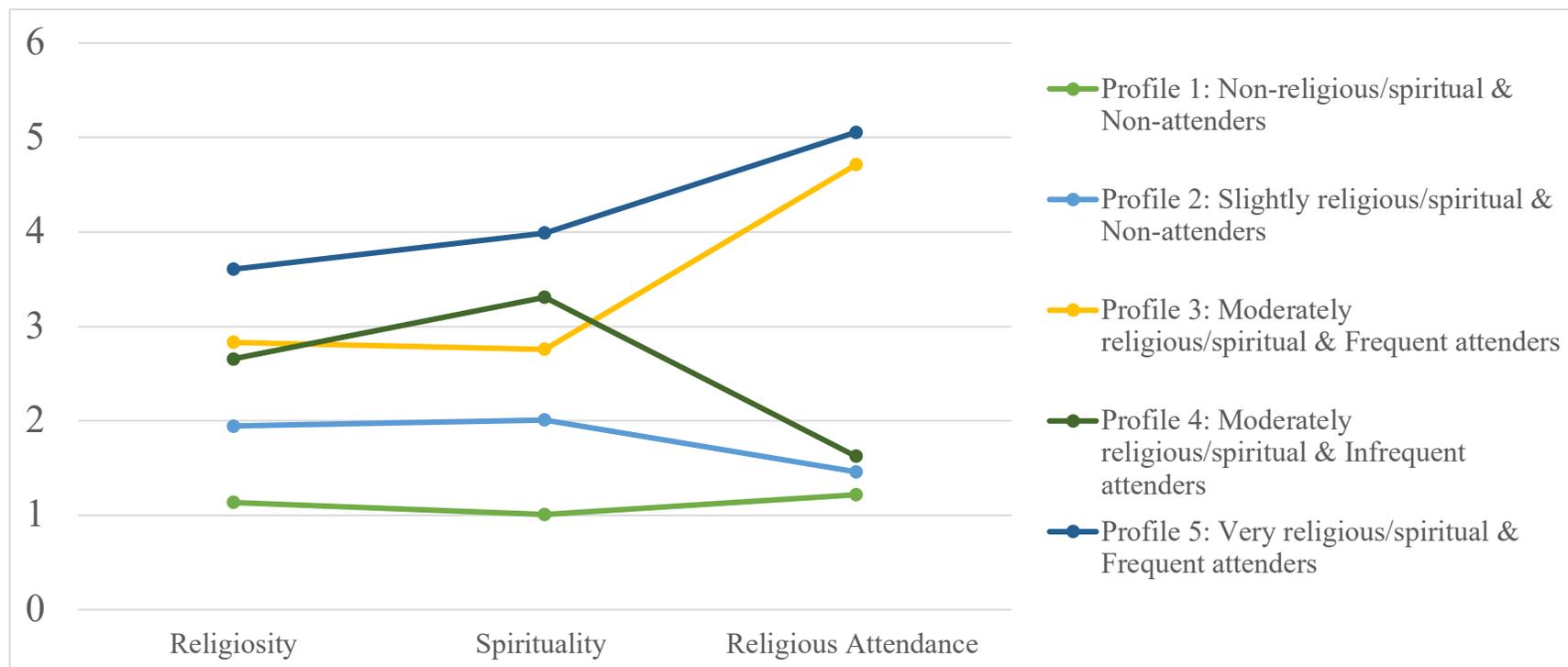
Note. Latent Profile Analysis results depicting the religiosity, spirituality, and religious attendance profiles among U.S. combat-exposed Soldiers. Soldiers were asked how (1) religious and (2) spiritual they considered themselves to be (scale ranged from 1=not at all to 4=very) and (3) how often they attend religious services (scale ranged from 1=never to 6=more than once a week).

Table 6

Table of means: Five profile solution

Indicator	Overall Item Means (SD)	Five Profile Solution				
		First Profile: Non-religious/spiritual & Non-attenders	*Second Profile: Slightly religious/spiritual & Non-attenders*	*Third Profile: Moderately religious/spiritual & Frequent attenders*	*Fourth Profile: Moderately religious/spiritual & Infrequent attenders*	*Fifth Profile: Very religious/spiritual & Frequent attenders*
Religiosity	2.29(.99)	1.14	1.94	2.83	2.66	3.61
Spirituality	2.51(1.02)	1.01	2.01	2.76	3.31	3.99
Religious Attendance	2.25(1.59)	1.13	1.46	4.71	1.62	5.06
N	13,155	2,601	3,328	1,775	4,183	1,268

Note. Means for the overall item and for each individual profile are presented. Across all indicators on all profiles, these groups were statistically different from one another.

Examination of the Five Unique Religion/Spirituality and Religious Attendance Profiles and

their Associations between the Two Combat Exposure Components and the Adverse Mental

Health Symptomatologies (RQ3)

Regarding Research Question 3 (RQ3), analyses were completed in Amos. All regression

coefficients were examined simultaneously in the path model where the control variables (i.e.,

gender, race, age, education, and marital status) were included. In the model, anxiety symptoms

and depressive symptoms were regressed onto the two combat exposure components that were

identified from the PCA in RQ1. The five unique profiles that emerged in RQ2 were also

included in the model to determine if the relationships between the two combat exposure

variables and two mental health outcomes differed for any of these groups using a multi-group

moderation approach.

Two models, an unconstrained and a constrained, were examined. In the unconstrained

model, paths were allowed to freely vary across the five groups, and model fit was acceptable

($\chi^2(10) = 79.54$, $p < .001$; CFI = .995; TLI = .883; RMSEA[90% CI] = 0.02[.02, .03]). In the

constrained model, paths were set to be equal across the five groups, and model fit was also

acceptable ($\chi^2(26) = 101.65$, $p < .001$; CFI = .994; TLI = .951; RMSEA[90% CI] = 0.02[.01,

.02]). A delta chi-squared analysis suggested that these models are not statistically different from

one another ($\Delta\chi^2(16) = 22.11$, $p = .14$), meaning that there were no overall differences across the

five different religiosity/spirituality/religious attendance groups; this was due to the equality

constraints being similar to that of the data. Thus, overall, religion/spirituality/religious

attendance does not appear to serve as a moderating effect in the relationship between combat

exposure and mental health, namely anxiety and depressive symptoms.

Individual paths were also examined for differences among the five groups. Using several $\Delta\chi^2$ tests, each primary path was examined separately to evaluate whether the significance and strength of the relationship differed as a function of varying levels of religiosity/spirituality/religious attendance. No significant path differences for the four paths were found across the five groups. In other words, the relationships between the combat exposure variables and mental health outcomes variables were similar regardless of the level of religiosity/spirituality/religious attendance displayed by each group. Therefore, at both the model level and at the individual path level, religiosity/spirituality/religious attendance did not significantly moderate these relationships.

Chapter 4

Discussion, Limitations, Practical Implications, and Conclusion

Discussion

Considering the large amount of Service members that are deployed in a single year (i.e., ~193,000; Bialik, 2017), it is important to investigate the impacts of combat exposure on Service members' mental health as well as different constructs that may mitigate the negative effects of combat exposure on mental health symptomatology. Although the literature is growing in this area, continuing to examine unique and more nuanced constructs is of the utmost importance (Dyches et al., 2017; Kanesarajah et al., 2016; Muse et al., 2019; Reed-Fitzke & Lucier-Greer, 2019; Watkins et al., 2017; Williams et al., 2016). To extend this literature, the current study had several aims, including efforts to examine: the dimensionality of the Deployment Risk and Resilience Inventory (RQ1), the direct effects of combat exposure on anxiety and depressive symptoms (H1), whether different groups of Soldiers emerged based on indicators of religiosity, spirituality, and religious attendance (RQ2), and finally, whether varying degrees of religion/spirituality/religious attendance moderated the relationship between combat exposure and mental health (RQ3). These hypotheses and research questions were examined with data from a sample of 13,155 Soldiers who had experienced one or more deployments and reported exposure to combat.

Several meaningful findings emerged from this research. First, the DRRI does have multiple components (RQ1); therefore, these components were named and implemented into the remaining analyses. Next, there was a significant, positive relationship between the combat exposure components and anxiety and depression symptom outcomes (H1). In addition, results from the latent profile analysis suggest that five different profiles emerged from the three

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different religiosity/spirituality/religious attendance indicators that were included (RQ2).

Finally, of these five profiles, none of them mitigated the effects of combat exposure on mental

health symptomatologies (RQ3). Each of these findings are explored in the following sections,

where specific ties to previous research and theory are included. Furthermore, practical

applications of these findings are highlighted and future directions for researchers are also

discussed.

Dimensionality and Principal Components Analysis

The purpose of Research Question 1 was to investigate the dimensionality of the DRRI

by way of a Principal Components Analysis (PCA). Findings revealed that the DRRI has

multiple underlying components. The two components that emerged were named *Expected*

combat experiences and *Responsible for non-enemy deaths* based on the examination of specific

items that loaded onto each component. These components were then implemented in the

remaining analyses where applicable (i.e., H1 and RQ3) and each explained a unique part of the

variance in anxiety and depressive symptomatologies. This finding speaks to the importance of

examining established scales within different populations, rather than assuming that all items in a

given scale have one relationship and inform one construct.

The majority of scales and inventories that measure combat exposure are conceptualized

as a single composite structure (e.g., the Deployment Risk and Resilience Inventory, the

Deployment Risk and Resilience Inventory-II, and the Combat Exposure Scale). Therefore,

investigating the psychometric properties of the DRRI in this study was important not just for the

purposes of this paper, but it is also important for research as a whole. This idea was echoed in a

recent study by Bartone and Homish (2020) where the mental health outcome was regressed onto

each of their five combat exposure items after having first examined it as a composite structure.

Rather, they found that four of the items were significantly and uniquely associated with mental health. In other words, different combat experiences were uniquely associated with mental health outcomes, each playing a different role. Findings from the current study also suggest that combat exposure is a multifaceted experience, such that different experiences are uniquely related to mental health symptomatology. This trend of also emerged from the work of Guyker et al. (2013). Guyker and colleagues (2013) found that three main components emerged from their PCA of the Combat Experiences Scale (CES), specifically *Exposure to Combat Environment*, *Close Physical Engagement*, and *Nearness to Serious Injury or Death*. All three of these components were significantly correlated with PTSD, depression, and anxiety.

The current study's findings both fall in line and differ from the work of Guyker colleagues (2013). Similarly, combat exposure was determined to be a multi-component measure suggesting that combat exposure is a nuanced experience, but different components emerged in comparison to Guyker et al. (2012). In the current study, only two components emerged, and these components encompassed broader experiences. Therefore, the notion of examining the dimensionality of previously established scales appears to be rising as an interest of current researchers. Furthermore, continuously updating and modifying scales/inventories that measure constructs allows us to track how individuals, populations, and constructs themselves may evolve over time.

Another purpose for examining dimensionality is to assess the nuance that may be missed when examining a construct as a single composite structure. For example, the current study found that Soldiers have both 'expected' and 'unexpected' experiences while deployed. By teasing apart the role of expectation in Soldiers' combat experiences, specific actions can be taken to better equip U.S. Service members before they are deployed to areas of combat. One

point of intervention may be increasing the amount of training that Soldiers receive for the 'unexpected' events that may occur. This training may help to buffer the negative effects that combat exposure has on mental health. Future studies may implement a PCA before utilizing measures that reflect composite structures. Specifically, researchers who use the Army STARRS dataset may choose to recreate and utilize the components found in this study when examining combat experiences in future research.

With regard to the specific components that did emerge from this study, the *Expected combat experiences* encompassed a range of experiences that Service members prepare for and anticipate when deployed and in combat zones, including going on combat patrols, firing rounds or taking enemy fire, save the life of a civilian or Soldier, having members of your unit who were significantly injured or killed, etc. Therefore, these experiences may negatively impact mental health as much as events that are unanticipated. With that being said, the second component, *Responsible for non-enemy deaths,* was thoroughly examined, and these items reflect accountability on the part of the Service member in taking the life of a non-combatant (e.g., ally, civilian casualties). It is possible and even likely that these aspects of combat exposure were experiences that the Soldiers did not train for or anticipate. There may also be some connection between this construct and moral injury.

Moral injury can be understood as an accumulation of broad, negative psychosocial outcomes that can develop after an individual witnesses or acts in a way that is opposed his or her moral beliefs (which may encompass religious or spiritual views); morally injurious events can create clashes between commonly held beliefs about the goodness of self or others (Battles et al., 2019; Jinkerson & Battles, 2019; Litz et al., 2009). Moral injury is examined frequently within military populations because combat exposure may violate some Service members' moral

beliefs, and they may experience moral injury. Although moral injury was not the focus of this paper, it may provide some explanation as to why the second component (i.e., *Responsible for non-enemy deaths)* emerged from the PCA. This may be a place for future research to explore— the intersection of this newly found component and moral injury.

Future researchers may consider assessing the DRRI by way of a PCA and, if these same constructs emerge, utilize the names provided from this study (i.e., *Expected combat experiences* and *Responsible for non-enemy deaths)* when conducting their analyses.

Associations between the Two Combat Exposure Components and Adverse Mental Health Symptomatologies

Consistent with other literature (Hoge et al., 2006; Maguen et al., 2010; Reed-Fitzke & Lucier-Greer, 2019), findings revealed that both components of combat exposure were significantly and positively associated with anxiety and depressive symptoms while controlling for sex, age, race, education, and marital status. This means that higher levels of *Expected combat experiences* and *Responsible for non-enemy deaths* were associated with higher levels of anxiety symptoms and depressive symptoms. Of note are the small R^2 values provided from this analysis; this suggests that while combat exposure is explaining some of the negative effects of mental health, there are also other factors that are contributing to Soldiers' mental health that are not being assessed in this study.

In light of this, we did establish that two components emerged from the DRRI and the *Responsible for non-enemy deaths* component provides a more nuanced view of how 'unexpected' combat experiences may affect mental health. Previous literature has found that Service members who reported killing or being responsible for killing during a deployment was associated with worse mental health and relationship outcomes specifically depression and

broadly relationship problems (Maguen et al., 2010). This finding suggests there is additional information being explained through the *Responsible for non-enemy deaths* component that is separate from expected combat experiences. A next step in the literature would be to consider creating a scale that encompasses combat experiences that are 'unexpected.' Doing so would allow researchers and interventionists to pinpoint and provide targeted assistance to Service members who are experiencing negative mental health outcomes based on more specific combat experiences. Additionally, this information benefits those who train and prepare Service members for combat where spending time discussing 'unexpected' events that may occur while in combat may prepare Service members more than only focusing on 'expected' events.

Knowing the mental health risks linked to combat exposure in this population, and sample, it is important to continue investigating constructs that might buffer these negative effects. Although the research on the relationship between combat exposure and negative mental health outcomes is quite robust (Hoge et al., 2006; Maguen et al., 2010; Ramchand et al., 2015; Reed-Fitzke & Lucier-Greer, 2019; Sayer et al., 2014), continuing to identify factors that buffer or help mitigate the effects of combat exposure can help both Service members and their families thrive.

Latent profile analysis (LPA) with religion, spirituality, and religious attendance as indicators

Ongoing research on constructs that may help buffer the effects of combat exposure is important, and one of these constructs may be religion/spirituality. As previously mentioned, the literature regarding religion/spirituality has suggested that both identity and behavior are important for positive religious coping (Tix & Frazier, 1998). Therefore, in this study, three indicators of religiosity, spirituality, and religious attendance were included for the latent profile analysis (LPA) to identify different groups of Soldiers based on the importance they ascribe to

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religion/spirituality and their related behaviors (i.e., attending religious events). Five conceptually distinct groups emerged and were named: *Non-religious/spiritual & Non-attenders*, *Slightly religious/spiritual & Non-attenders, Moderately religious/spiritual & Frequent attenders*, *Moderately religious/spiritual & Low attenders,* and *Very religious/spiritual & Frequent attenders* to reflect the varying levels each group displayed on all three of the indicators.

The largest profile (30% of participants) was the *Moderately religious/spiritual & Low attenders* profile; they had moderate rates of both religiosity and spirituality, but low attendance. This means that how they identified was clear, but their behaviors did not reflect how they identified. The second largest profile (26% of participants) was the *Slightly religious/spiritual & Non-attenders*; they rated themselves as having slight religiosity, slight spirituality, and did not attend religious events. The *Non-religious/spiritual & Non-attenders* profile (20% of participants) had the lowest rates of religiosity, spirituality, and attendance behaviors of all five profiles. The fourth largest profile (14% of participants) was the *Moderately religious/spiritual & Frequent attenders* profile; they had moderate rates of identifying as having religiosity and spirituality and had frequent attending behaviors as well. Finally, the smallest profile (10% of participants) was the *Very religious/spiritual & Frequent attenders* profile; this profile both identified as having high religiosity and spirituality as well as rating their religious attendance behaviors as frequent. According to Tix and Frazier (1998) and their research on religion/spirituality buffering stressful life events, the *Very religious/spiritual & Frequent attenders* profile is the group that would be hypothesized to have the largest buffering effect between the relationship of combat exposure and mental health symptomatologies, but, as the results revealed, moderation did not occur at the model level or individual path level.

Additionally, the large number of groups (five) that emerged from this LPA suggests that these Soldiers were diverse in how/if they choose to identify and participate in religious/spiritual practices. The emergence of five classes was similar to findings from Bravo and colleagues (2016) who discerned four classes using a LPA with a military sample, based on self-identifying intrinsic and extrinsic religious motivations, and these four classes were named: *questioning* (high quest, low intrinsic/extrinsic), *intrinsically motivated* (high intrinsic), *high religiosity* (high on all religious orientations), and *low religiosity* (low on all religious orientations). Furthermore, all five of the groups from the current study were statistically different from one another on each dimension of religion/spirituality/religious attendance which means that either their identity (i.e., religious/spiritual) or behavior (i.e., religious attendance) set them apart from the other groups. This can also been seen in previous, civilian population research where Park and colleagues (2013) utilized four indicators (i.e., service attendance, amount of prayer, positive religious coping, and daily spiritual experience) for their latent profile analysis and found that four profiles emerged (i.e., highly religious, moderately religious, somewhat religious, and minimally religious). Their findings suggest that those in the highly religious group were more likely to be happy and less psychologically distressed (Park et al., 2013). Although the findings from this study did not perfectly align with previous research in regards to these profiles moderating the relationship between combat exposure and mental health; some similarities did arise where multiple groups were found by way of the LPA, and this population varies in both their identity and behavior regarding religion/spirituality. Future research may consider examining this relationship with more robust measures of religiosity, spirituality, and religious attendance.

Therefore, it appears that military populations are similar to civilian populations regarding how individuals identify and practice their religion/spirituality, but more research is

needed to examine how Service members identify and practice as well as how these beliefs and practices impact their mental health. Future research may consider delving further into how Service members and their families identify regarding religiosity and spirituality so that points of intervention can be determined and addressed appropriately. One point of intervention may be the encouragement of positively using religion/spirituality as a coping mechanism or encouraging Service members to look outside of their belief system when determining how to best cope.

Do differing levels of religiosity/spirituality/religious attendance buffer the negative impacts combat exposure has on mental health symptomatologies?

The final model examined the interplay of combat exposure and mental health when accounting for Soldiers' religiosity, spirituality, and religious attendance. Specifically, this model examined whether religiosity/spirituality/religious attendance moderated the relationship between the two combat exposure variables and the outcome variables, anxiety symptoms and depressive symptoms while controlling for sex, age, race, education, and marital status. Study findings reveal that the religiosity/spirituality/religious attendance groups did not significantly moderate the relationship between the two combat exposure components and two mental health outcomes. While this study did not find statistically significant results, previous research, within military populations, does suggest that Service members who report higher levels of religiosity/spirituality tend to experience religion/spirituality acting as a buffer between trauma and mental health outcomes (Carroll et al., 2019; Muse et al., 2019; Park et al., 2017). In Carroll and colleagues' (2019) study, the relationship between PTSD symptomatology and suicide was buffered by positive religious/spiritual coping. Religious/spiritual coping was assessed by way of the Brief RCOPE scale (Pargament et al., 2011) where 14 items were included and both positive

and negative religious coping were assessed (Carroll et al., 2019). Muse and colleagues' (2019) also found that physical health, social support, and religiosity moderated the relationship between deployment stress and mental health, such that when participants had reported less religiosity they had more mental health symptoms (i.e., anxiety and depression). In Park and colleagues' (2017) article, they found that religious/spiritual coping moderated the relationship between combat exposure, PTSD, and perceived posttraumatic growth. Specifically, religious/spiritual coping buffered the negative impacts of higher levels of combat exposure on higher levels of PTSD and positive religious coping was associated with higher levels of perceived posttraumatic growth.

Using religion/spirituality to cope is an important aspect of religion/spirituality research, but was not addressed in this study and thus can be seen as an important area of development to consider religious identity, behaviors, and coping together. Religious/spiritual coping was not addressed in this study. Measures of religious/spiritual coping were not assessed during the original data collection by the Army STARRS researchers, but, as stated, it is still an important concept that is similar to the study of religious identity and behaviors. Therefore, what we do know from existing research and theorizing, is that that religious coping is typically described in two ways: positive and negative coping (Paloutzian & Park, 2005; K. I. Pargament et al., 1998). Positive religious coping is characterized by an adaptive coping strategy such as religious forgiveness, seeking spiritual support, or reframing a negative or stressful situation into an opportunity for growth and learning. Conversely, negative religious coping is characterized by less adaptive strategies, such as blaming God for the occurrence of negative or stressful life events, being unable to forgive oneself, and pleading for direct intercession (Sanchez et al., 2015). Research has shown that positive and negative religious coping may coexist, such as in

the instance of a study of domestic abuse survivors, where the survivors reported religion as both helping and hurting them (K. I. Pargament, 2001). Although coexistence is possible, research has shown differential outcomes for positive and negative coping, such that negative religious coping is associated with decreased mental and physical health functioning, whereas positive religious coping is more often associated with increased mental and physical health functioning (K. I. Pargament et al., 1998). Negative religious coping has been examined within military populations as well (Sherman et al., 2018; Smigelsky et al., 2019). In Smigelsky and colleagues' (2020) study with 1,002 Veterans, findings suggested that those who utilized negative religious coping (i.e., had problems with self-forgiveness, felt they were being punished by God, or that their life lacked purpose) were at increased risk of experiencing suicidal ideation or having had attempted suicide. In Sherman and colleagues' (2018) study, findings suggest that religion/spirituality played different roles for different Service members. Some Service members reported that traumatic experiences reaffirmed their faith and used religion/spirituality to positively cope, but others reported questioning their beliefs in a Higher Power after participating in combat (Sherman et al., 2018). The literature suggests that there is an important theme regarding the use of religion/spirituality: the protective effects of religion/spirituality are only seen in individuals who use religion to positively cope (i.e., have hope, see God as good), if an individual uses religion to negatively cope (i.e., feel they are going to hell, are judged, or cannot forgive), then positive buffering effects are not seen, but rather, mental health symptoms are exemplified (Fabricatore et al., 2004).

As mentioned, the current study did not explore religious coping, but rather tried to expand this literature by examining the role of religious identity and religious behaviors. Although, religious identity and religious behaviors did not moderate the relationship between

combat exposure and mental health in the current study it may still benefit Service members in other areas of their life. For example, religious/spiritual practices may serve as a uniting factor among their families, or it may be a way for Service members to relate to other Service members that they work with.

In examining the results of the current study, one potential reason why religiosity/spirituality/religious attendance may not have moderated the relationships between the two combat exposure items and two mental health outcomes could have been due, in part, to short comings of the measures. First, the measures asked for Soldiers to identify as religious or spiritual and identify the behavior of attending religious activities but did not account for the cognitive approach to using religion/spirituality for coping, or whether that coping was positive or negative. It also does not explicitly capture how religion/spirituality were evoked during times of stress, such as in the context of combat exposure. Furthermore, only one item was used to assess each of these constructs (three items total) which does not allow for a comprehensive understanding of how Service members holistically identify and behave regarding religiosity and spirituality.

Although these measures did not fully capture these Soldiers' religious/spiritual beliefs and behaviors, these items do provide important insights into the variety of ways that Service members identify and behave (i.e., five groups emerging from the LPA) which may be helpful in exploring religion/spirituality in the context of other studies related to Service members and family wellbeing. Especially in knowing that the majority of the sample (~77%) self-identified as Christian which is reflective of how the civilian population in the United States identifies according to previous literature (Military Leadership Diversity Commission, 2010).

In knowing this, future researchers may consider using more robust religion, spirituality, and religious attendance scales, but also may consider examining how these constructs are used to cope (i.e., positively or negatively) in order to get an all-encompassing understanding of how an individual utilized, or does not utilize, these constructs. Another area where researchers have already begun, but more research is needed, is in examining the relationship between religion/spirituality and moral injury. It would be important to continue to examine this relationship because moral injury may be a point of intervention for Service members who are experiencing negative psychosocial or psychological outcomes as a result of combat exposure.

In conclusion, this study provides novel insights into the study of combat exposure among Soldiers and contributes to the extant literature. Specifically, results suggest that there are multiple components of the DRRI, both of which are significantly associated with anxiety symptoms and depressive symptoms, and that Soldiers systematically vary in how they identify regarding their religious/spiritual identity and religious attendance. These findings are a meaningful step in the process of continuing to examine how exactly religion/spirituality impact Service members' mental health, which should continue to be a priority in future studies as we identify points of intervention for this at-risk population.

Limitations

The present findings are subject to limitations and caution is warranted in the interpretation of findings. First, the religiosity, spirituality, and religious attendance measures were single item indicators; they do not fully encompass the constructs of religious identity and behavior in their entirety. Future research should consider using more robust measures of these constructs and consider defining these terms when asking how frequently participants participate in religious activities or how strongly participants identify as religious/spiritual.

Second, Soldiers in this study did not provide their rank (officer or enlisted), so education served as a proxy variable (officers must have 4-year degree). Although this is considered an accurate proxy, more specific rank (e.g., private, captain, major, colonel) is still unidentified and results cannot be analyzed to look for patterns in outcomes based on rank. Rank is important to examine because it holds power and authority within the military context as well as job responsibilities and has implications for socioeconomic status and access to resources. For example, those who are higher-ranking may not experience the same amount of time in combat zones or have the same experiences while in a combat zones when compared to Service members who are lower-ranking. Furthermore, those who are higher ranking may have better access to mental health care than those lower ranking individuals may.

Third, this study is cross-sectional which does not allow for directionality to be assessed (i.e., does poorer mental health contribute to the perception of worsened combat experience or does combat experience relate to poorer levels of mental health?). Longitudinal research is an important future direction for this research, especially because religious/spiritual identity, as well as religious behaviors and even religious coping, can all evolve over time throughout an individual's lifetime and even across generations. Understanding when religious and spiritual factors are most prominent can help us pinpoint times when supportive interventions are most appropriate.

Fourth, mental health outcomes (i.e., anxiety and depressive symptomatologies) were assessed as symptoms and not as diagnoses; therefore, clinical inferences cannot be made with these measures and results. However, assessing symptoms rather than diagnoses is an important step because research has shown that mental health can be underdiagnosed and stigmatized against, especially in the military Service member population (Ben-Zeev et al., 2012).

Furthermore, assessing symptoms allows this research to understand individuals who may display symptoms at a threshold that is sub-clinical, but these symptoms are still meaningful for their lived experience.

Finally, Soldiers from the Army STARRS dataset completed combat exposure and mental health measures that required them to use recall from previous deployments and 'within the past 30 days' for their mental health variables; therefore, error while recalling this information is a possibility. The single-item religiosity, spirituality, and religious attendance measures were not recall items, but rather, assessed these constructs in the present; therefore, Soldiers responses to these items may not reflect how they identified or behaved during previous deployments or 'within the past 30 days' for their mental health variables.

Notwithstanding these limitations, this study provides novel insights to the importance of regular assessments of the dimensionality of commonly utilized inventories with a large, robust sample of participants, in this case, a sample of Soldiers who have experienced combat. The DRRI is one of the more recent and commonly used combat exposure scales and identifying that two components emerged from the PCA suggests that this inventory, and other inventories/scales, should be assessed for multiple components before assuming they are unidimensional; this should be done with different samples, such as with Service members post-9/11 and with Service member across different service branches, moving forward. This study also extends the literature regarding the relationship between combat exposure and mental health symptomatologies.

Finally, although results were non-significant, this study considered religion/spirituality as a moderating variable. Examining any and all constructs that have the potential to buffer the negative impacts of combat exposure on mental health and that may benefit Service members in

the future is always valuable. It is also important to examine religion/spirituality for negative coping purposes as well; it appears that religion/spirituality could be positive or negative depending on the individual. Therefore, continuing to examine these constructs and finding points of intervention for Service members and their families is of the utmost importance.

Practical Implications

Moving forward, this study suggests that researchers may consider implementing a Principal Components Analysis (PCA) with their scales/inventories before moving forward with their main analyses. They may also consider utilizing the most robust and up-to-date scales/inventories so that their variables of interest are best understood as well as consider implementing the two combat exposure components that emerged in this study for their work, when applicable.

Practitioners and helping professionals who work with military populations will continue to see mental health symptoms that often arise within combat exposed Service members and Veterans. Although this study does not speak to how religion/spirituality may affect the relationship combat exposure and mental health symptoms, existing literature does show some promising results. Findings from previous literature (Abu-Raiya et al., 2016; Carroll et al., 2019; Israel-Cohen et al., 2016; Muse et al., 2019) suggests that practitioners and other service providers, such as military Chaplains, need to consider that religion/spirituality may be used to cope, but that this can take negative and positive forms. Practitioners and Chaplains, can play a role in guiding the religious coping of Service members to be positive, and also help identify and address maladaptive cognitions that can drive negative religious coping.

This study suggests that policy makers and military leadership may consider implementing more training and preparation for Service members before they deploy to combat

zones. As seen by the second component that emerged from the PCA, *Responsible for non-enemy deaths,* Service members may not expect to be responsible for a non-enemy death (i.e., non-combatant, civilian, or U.S. Service member or personnel); therefore, implementing the possibility of this happening into training may be beneficial. Also taking time to debrief after combat exposure, especially intense combat exposure, within Units may benefit the mental health of Service members.

Conclusion

In conclusion, through the lens of religious coping theory, the aims of this study were multifaceted. First, the dimensionality of the Deployment Risk and Resilience Inventory (DRRI; RQ1; King et al., 2006) was examined among a sample of 13,155 Soldiers by way of a Principal Components Analysis (PCA). Results from the PCA suggested that the DRRI does have multiple components, and these components were named: *Expected combat experiences* and *Responsible for non-enemy deaths*. Next, the direct effects of combat exposure on anxiety and depressive symptoms (H1) were examined where both *Expected combat experiences* and *Responsible for non-enemy deaths* were uniquely associated with higher levels of anxiety and depressive symptomatologies. Then, a Latent Profile Analysis (LPA) was conducted to examine whether different groups of Soldiers emerged based on indicators of religiosity, spirituality, and religious attendance (RQ2). Results from the LPA suggest that five groups emerged (RQ2). These five groups were labeled according to their varying levels of religiosity, spirituality, and religious attendance. The final analysis, a multigroup path analysis, was conducted to examine whether the groups that emerged from the LPA moderated the relationships between combat exposure and mental health symptomatologies (RQ3). For the final analysis, results revealed that none of these

groups significantly moderated the relationships between the two combat exposure components and the mental health symptomatologies (RQ3).

The findings from this study are subject to limitations and caution is warranted in the interpretation of findings. Some of these limitations include: the measures of religiosity, spirituality and religious attendance were single items; the cross-sectional nature of the study where directionality cannot be assessed; and the fact that mental health symptomatologies were assessed as symptoms as opposed to clinical levels. Future studies may improve upon this research by (1) using more robust measures of religiosity, spirituality, and religious attendance; (2) conducting longitudinal research to better examine how religiosity, spirituality, and religious attendance fluctuates and impacts Service members' mental health over time; and (3) assessing mental health variables at clinical levels as opposed to symptoms.

In lieu of these limitations, important implications can be derived from these findings. First, researchers may consider implementing a Principal Components Analysis (PCA) with their scales/inventories before moving forward with their main analyses to determine whether there are multiple factors that underlie a given construct. Second, the diversity of how participants identified regarding religiosity, spirituality, and religious attendance speaks to the importance of continuing to examine these constructs, but also to the importance of specifically examining *how* Service members use them (i.e., to positively or negatively cope). From there, practitioners and service providers, such as Chaplains, will be able to better intervene and address coping behaviors appropriately.

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Appendices

Appendix A — DRRI Measure of Combat Exposure

The next questions are about events that might have happened to you during deployment. How many times did you ever have each of these experiences during deployment?	0	1	2-4	5-9	10 or more
a. Go on combat patrols or have other dangerous duty (e.g., clearing buildings, disarming civilians, working in areas that had IEDs)	0	1	2	3	4
b. Fire rounds at the enemy or take enemy fire (either direct or indirect fire)	0	1	2	3	4
c. Get wounded by the enemy	0	1	2	3	4
d. Have a close call (that is, equipment shot off body, IED exploded near you)	0	1	2	3	4
e. Have member(s) of your unit who were seriously wounded or killed	0	1	2	3	4
f. Have direct responsibility for the death of an enemy combatant	0	1	2	3	4
g. Have direct responsibility for the death of a non-combatant	0	1	2	3	4
h. Have direct responsibility for the death of U.S. or ally personnel	0	1	2	3	4
i. Save the life of a Soldier or civilian	0	1	2	3	4
j. See homes or villages that had been destroyed or people begging for food	0	1	2	3	4
k. Get exposed to the sights, sounds, or smells of severely wounded or dying people or see dead bodies	0	1	2	3	4
l. Witness violence within the local population or mistreatment toward non-combatants	0	1	2	3	4

Appendix B — Measures of Religiosity and Spirituality

How religious (your faith in a higher power or practice of religious beliefs) or spiritual (your value of the spiritual aspect of life) do you consider yourself to be?	Very	Moderately	Slightly	Not at all
How religious do you consider yourself to be?	4	3	2	1
How spiritual do you consider yourself to be?	4	3	2	1

Appendix C — Measure of Religious Attendance

	More than once a week	About once a week	2-3 times a month	Once a month	Less than once a month	Never
About how often do you usually attend religious services when you can?	6	5	4	3	2	1

Appendix D — Measure of Anxiety

How often in the past 30 days did you...	All or almost all the time	Most of the time	Some of the time	A little of the time	None of the time
a. feel anxious or nervous?	5	4	3	2	1
b. worry about a number of different things?	5	4	3	2	1
c. feel more anxious or worried than other people in your same situation?	5	4	3	2	1
d. worry about things that most other people wouldn't worry about?	5	4	3	2	1
e. have trouble controlling your worry or anxiety?	5	4	3	2	1

Appendix E — Measure of Depression

How often in the past 30 days did you...	All or almost all the time	Most of the time	Some of the time	A little of the time	None of the time
a. feel sad or depressed?	5	4	3	2	1
b. feel discouraged about how things were going in your life?	5	4	3	2	1
c. take little or no interest or pleasure in things?	5	4	3	2	1
d. feel down on yourself, no good, or worthless?	5	4	3	2	1

Appendix F—Table indicating mean differences between the five profile solution

Indicator	Profile	Profile Comparisons	Mean Difference	Standard Error	95% Confidence Interval
Religiosity	1	2	-.803*	.018	-.851, -.755
		3	-1.686*	.021	-1.74, -1.63
		4	-1.506*	.017	-1.55, -1.46
		5	-2.451*	.023	-2.51, -2.39
	2	1	.803*	.018	.755, .850
		3	-.883*	.020	-.937, -.829
		4	-.703*	.016	-.746, -.660
		5	-1.648*	.022	-1.709, -1.687
	3	1	1.686*	.021	1.629, 1.742
		2	.882*	.020	.829, .937
		4	.180*	.019	.128, .232
		5	-.765*	.025	-.833, -.698
	4	1	1.506*	.017	1.460, 1.552
		2	.703*	.016	.660, .746
		3	-.180*	.019	-.232, -.128
		5	-.945*	.022	-1.004, -.886
	5	1	2.451*	.023	2.388, 2.514
		2	1.648*	.022	1.587, 1.709
		3	.765*	.025	.698, .833
		4	.945	.022	.886, 1.004
Spirituality	1	2	-.998*	.008	-1,021, -.976
		3	-1.750*	.010	-1.777, -1.234
		4	-2.310*	.007	-2.329, -2.264
		5	-3.000*	.011	-3.029, -2.971
	2	1	.998*	.008	.976, 1.021
		3	-.752*	.009	-.777, -.727
		4	-1.309*	.007	-1.329, -1.289
		5	-2.001*	.010	-2.030, -1.973
	3	1	1.750*	.010	1.724, 1.777
		2	.752*	.009	.727, .777
		4	-.557*	.009	-.582, -.533
		5	-1.250*	.012	-1.281, -1.218
	4	1	2.308*	.008	2.286, 2.239
		2	1.309*	.007	1.289, 1.329
		3	.557*	.009	.533, .581
		5	-.692*	.010	-.720, -.665
	5	1	3.000*	.012	2.971, 3.029

		2	2.002*	.010	1.973, 2.030
		3	1.250*	.012	1.218, 1.281
		4	.692*	.010	.665, .720
Religious Attendance	1	2	-.327*	.016	-.369, -.284
		3	-3.617*	.018	-3.668, -3.567
		4	-.508*	.015	-.549, -.468
		5	-3.981*	.020	-4.037, -3.925
	2	1	.327*	.016	.284, .369
		3	-3.291*	.018	-3.339, -3.243
		4	-.182*	.014	-.220, -.144
		5	-3.655*	.020	-3.708, -3.601
	3	1	3.617*	.018	3.567, 3.668
		2	3.291*	.018	3.243, 3.339
		4	3.109*	.017	3.063, 3.155
		5	-.364*	.022	-.424, -.304
	4	1	.508*	.015	.468, .549
		2	.182*	.014	.144, .220
		3	-3.103*	.017	-3.155, -3.063
		5	3.473*	.019	-3.525, -3.421
	5	1	3.981*	.020	3.925, 4.037
		2	3.655*	.020	3.601, 3.703
		3	.364*	.022	.304, .424
		4	3.473*	.019	3.421, 3.525

Note. Names of the profiles include: Profile 1-*Non-religious/spiritual & Non-attenders*; Profile 2-*Slightly religious/spiritual & Non-attenders*; Profile 3-*Moderately religious/spiritual & High attenders*; Profile 4-*Moderately religious/spiritual & Infrequent attenders*; Profile 5-*Very religious/spiritual & High attenders*. All profiles are statistically different from one another for all three indicators. *p*<.05