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TRAUMATIC HEALTH SHOCKS AND SPIRITUAL CAPITAL

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ABSTRACT

While the relationship between adverse health shocks and health care utilization has been studied extensively, next to nothing is known about the effect of health shocks on religiosity, which may serve as an alternative to secular psychological services and interventions. Filling this gap in knowledge is important given that religious-based psychological counseling services have grown substantially in recent decades, and the relative mental health benefits of religion as compared to secular counseling services are not well-known. This study uses the setting of war to study the impact of health trauma on religiosity. Exploiting the administrative procedures by which U.S. Armed Forces senior commanders conditionally randomly assign active-duty servicemen to war deployments as a natural experiment, we find that post-9/11 combat exposure substantially increases the probability that a serviceman subsequently attends religious services and engages in private prayer. Estimated effects are largest for enlisted servicemen, those under age 25, and servicemen wounded in combat. The physical and psychological health effects of war, as well as the presence of military chaplains in combat zones, emerge as partial mechanisms to explain increases in religiosity. We find only weak evidence that combat service differentially affects servicemen's demand for religious counseling as compared to secular psychological services.

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1. Introduction

“[F]or many trauma survivors, spirituality may be a resource that can be associated with resilience and recovery. However, for some, the circumstances of the trauma may lead to the questioning of important and previously sustaining beliefs. This can lead to spiritual struggle or even loss of faith.” – U.S. Department of Veterans Affairs (2012)

The United States is the most religious developed nation in the world, with nearly 90 percent of adults claiming a belief in God, 44 percent attending religious services at least once per month, and 73 percent asserting a belief in life after death (Smith et al. 2016). Learning to cope with traumatic life events, including illness and death, is common to the doctrines of the world’s major religions (Bouso et al. 2010). Doctrinal promises of an afterlife for those who practice good works, obey religious law, and are faithful to God provide believers with a psychological framework for coping with adverse health shocks (Pargament and Brant 1998). By providing public goods, encouraging social capital development, and insuring against (financial and psychological) risks from health shocks (Iannaccone 1992b; Berman 2000; Gruber 2005; Iyer 2016; Fruehwirth et al. 2016), religion may provide important mental health benefits to adherents.^{1,2} While causal evidence is limited, a handful of studies that have accounted for the endogeneity of religiosity find evidence that religious participation is associated with

¹ Economists have also studied how religiosity is impacted by the level of competition in the market for religion (Bisin and Verdier 2000; Iannaccone and Berman 2008), including secular forces (Gruber and Hungerman 2008; Cesur and Mocan 2018; Hungerman 2014; Becker et al. 2017), population diversity (Cesur and Yildirim 2020), income (Chen, 2010; Buser 2015), and welfare generosity (Hungerman 2005).

² There is also evidence that religiosity is associated with increased educational attainment and earnings (Gruber 2005), improved physical health (Deaton 2009; Mellor and Freeborn 2011; Fruehwirth et al. 2016), lower crime rates (Gruber and Hungerman 2008), reduced welfare receipt (Gruber 2005), and greater trust among citizens (Smidt 1999; Daniels and von der Ruhr 2010).

improved mental health of both U.S. adults (Cohen-Zada and Sander 2011) and adolescents (Fruehwirth et al. 2016).³

A wide body of research has examined the impacts of adverse health shocks on health care utilization and the demand for health insurance.⁴ In contrast, very little is known about how negative health shocks affect religiosity. This gap in knowledge is important to fill for a number of reasons. First, most of the world's religious doctrines and practices purport to help adherents cope with health trauma, including mortality (Slater et al. 2016). Moreover, the rise of religious counseling services as an alternative to professional, secular psychological counseling services (Besterman-Dahan et al. 2012; Paul and Kelly 2005) has raised some concern among mental health professionals because the relative psychological benefits of religious as compared to secular counseling is unclear (Pargament et al. 2013; Koenig 2012; Sloan 2006; Sloan et al. 2000), as is whether their joint use could augment the effectiveness of each (Post et al. 2009). Finally, those who experience a negative health shock may be in a particularly vulnerable psychological state as they select among a variety of secular and religious services advertising important mental health benefits.

Much of public health and social psychology literatures that have studied the relationship between health-related trauma and religiosity has treated health as exogenous to other determinants of religiosity (see, for example, Ter Kuile 2014; McIntosh 2011; Koenig et al. 2012; VanderWeele et al. 2016). This may be problematic to the extent that exposure to traumatic health events may be non-random. For example, adverse health conditions may be related to economic circumstances of the household (Fox et al. 2014; Mock et al. 2003), access

³ A recent survey of members of the American Psychological Association found that 82 percent agreed with the statement, “[B]eing religious is beneficial to mental health” (Park et al. 2017, p. 7).

⁴ See, for example, Feldstein 1973; McGure 2011; Malani and Jaffe 2018; Doyle 2005; 2011; Liu 2016.

to quality, affordable medical care (Hadley and Reschovsky 2012; Mays and Smith 2011; Miller et al. 2019; Orsini 2019) or job characteristics (Gonzalez-Mule and Cockburn 2017), each of which may also be correlated with religiosity (Guiso et al. 2003; Deaton 2009).⁵ Thus, an important challenge in estimating the causal impact of health-related trauma is isolating exogenous variation in health events.

This study improves upon the prior literature by using the setting of modern war to explore the causal impact of combat-induced traumatic health shocks on veterans' religiosity. War is a life-and-death struggle that generates substantial health trauma to servicemembers and their families (Tanielian and Jaycox 2008; Cesur and Sabia 2016). Servicemen deployed to combat face imminent-threat of physical injury and death (Sabia and Skimmyhorn 2019; Shen et al. 2009) and may witness or participate in the deaths of enemy combatants, civilians, and comrades-in-arms (Fontana and Rosenheck 2004; Drescher et al. 2011; Steenkamp et al. 2011). In part due to these traumatic events, post-9/11 war deployments have been linked to Post-Traumatic Stress Disorder (PTSD), Traumatic Brain Injury (TBI), and over 50,000 combat-related injuries (McKee and Robinson 2014; Zarembo 2014; Cesur et al. 2013; Okie 2005), estimated to cost over \$150 billion in health care costs to the Department of Veterans Affairs (Sabia and Skimmyhorn 2019).⁶

⁵ To take another example, victims of crime-related health trauma may be targeted because they are financially, socially, or psychologically vulnerable (Nunziata 2015; Bateson 2012), traits that are difficult to measure and may be related to religiosity (Schieman 2010; Bjorck and Thurman 2007).

⁶ The U.S. Department of Veterans Affairs has identified the provision of mental health services to combat veterans as a top policy priority (Litz and Schlenger 2009; Marx 2009). In January 2018, President Donald Trump issued Executive Order 13822, which mandated the Secretaries of Homeland Security, Defense, and Veterans Affairs develop a Joint Action Plan to provide psychological services to combat veterans more effectively.

The effect of war-induced health trauma on religiosity is theoretically ambiguous.⁷ On the one hand, fear of death, battlefield injury, and war-related psychological harm may cause combat veterans to question, or even abandon, religious faith, as life-and-death experiences challenge religious doctrines of good and evil (Fontana and Rosenheck 2004; Falsetti et al. 2003; Ogden 2011). In addition, health trauma may cause combat veterans to substitute away from religion and toward secular counseling or, less healthily, toward risky behaviors, such as illicit drug use, to numb emotional pain (Cesur et al. 2016; Cesur et al. 2019). Alternatively, the adverse physical and mental health effects of warfare, including fear of death, could increase religiosity by increasing the demand for social support networks or doctrinal philosophies that promise life after death (Bentzen 2019). Moreover, because seeking religious counseling for mental health problems is perceived to carry less military career risk and less social stigma than seeking professional psychological counseling services (Morgan et al. 2016; Besterman-Dahan et al. 2012), combat service could increase religiosity. In addition, war could create tighter bonds among combat units that generate religious peer effects. Finally, military chaplains stationed in war zones may affect religiosity by proselytizing in environments where competition from secular counselors is relatively limited.

This study is the first to study the causal impact of war deployments on religion. We exploit administrative procedures carried out by senior commanders in the U.S. Armed Forces that conditionally randomly assign active-duty servicemen to war deployments to estimate the causal impact of combat service on religious participation, private prayer, and spiritual salience among servicemen. Our analysis focuses on modern warfare waged in Afghanistan and Iraq in

⁷ For example, in a mental health production framework (Grossman 1972), life-and-death trauma may affect the marginal product of religiosity, the marginal rate of technical substitution between religious and other mental health-generating inputs (such as secular counseling) and the marginal utility of religiosity.

the Global War on Terrorism (GWOT). Using data from the military module of the National Longitudinal Study of Adolescent and Adult Health (NLSAAH), we find that servicemen deployed to combat zones are 7.9 percentage-points more likely to attend religious services weekly and 8.6 percentage-points more likely to engage in private prayer than their counterparts assigned to non-combat overseas deployments. Then, using data from the Department of Defense Survey of Health and Related Behaviors (HRB) Among Active-Duty Personnel, we find that exposure to enemy firefight during combat deployments substantially increases the probability of both public and private expressions of religion. The magnitudes of the impacts are largest for enlisted servicemen as compared to officers, junior servicemen under age 25, and those physically injured in combat.

Descriptive evidence suggests that the psychological and physical burdens of war deployments as well as the presence of military chaplains in war zones help to explain combat-induced increases in religiosity. However, we find only weak evidence that combat service differentially affects the likelihood that veterans seek religious as compared to secular psychological counseling. We conclude that traumatic health shocks have important impacts on religiosity.

2. Background

2.1 The Global War on Terrorism

The Global War on Terrorism (GWOT) was launched by the United States in response to the September 11, 2001 terrorist attacks and included major combat operations in Afghanistan and Iraq, chiefly Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), respectively. More than 2.5 million U.S. servicemen were deployed in OEF and OIF, with peak deployments at over 100,000 in Afghanistan and nearly 60,000 in Iraq (Marx 2009; Epstein and

Williams 2016). In contrast to prior wars, multiple deployments for longer durations were more common in both OEF and OIF (Marx 2009). Thirty-seven percent of servicemembers deployed to Iraq and Afghanistan were deployed on multiple occasions (Litz and Schlenger 2009) and the duration of combat tours was, on average, 28 percent higher relative to prior conflicts (Baiocchi 2013). As of January 2020, OEF and OIF resulted in 5,390 servicemembers killed in action and over 52,000 wounded (Defense Manpower Data Centers Defense Casualty Analysis System 2016).

While casualty rates in post-September 11 wars were about 70 percent lower than in draft-era conflicts —due, in part, to improvements in battlefield medicine, increased use of body armor, and the rise of unmanned drones — modern warfare also altered the nature of injuries among those who survived (Sabia and Skimmyhorn 2019). The waging of asymmetric warfare, characterized by enemies’ use of improvised explosive devices, roadside bombs, and mines resulted in Traumatic Brain Injury (TBI) being the distinctive injury of GWOT (McKee and Robinson 2014; Okie 2005).

War experiences in GWOT also generated substantial “invisible wounds of war,” or psychological scars, for combat veterans (Tanielian and Jaycox 2008). Such invisible wounds have taken the form of increased risk of PTSD (Tanielian and Jaycox 2008), suicide ideation (Cesur et al. 2013), and substance use (McFall et al. 1992; Price et al. 2004). Estimates from RAND suggest that nearly one-quarter of returning deployed servicemembers suffered from depressive symptomatology, substance use, homelessness, or PTSD (Tanielian and Jaycox 2008).

The sources of war-related psychological trauma has been studied extensively by both military health researchers (McFarlane 2010) and health economists (Cesur et al. 2013). Combat

experiences such as (i) witnessing deaths and injuries to unit members, coalition members, or civilians, (ii) engaging the enemy in firefight (including rocket or mortar fire), and (iii) killing others, are associated with substantially increased levels of trauma (Litz and Schlenger 2009; Steenkamp et al. 2011), which is often manifest in the form of PTSD (Fontana and Rosenheck 2004; Litz and Schlenger 2009; Cesur et al. 2013; Gubkin 2016). Moreover, there is evidence that the fear and guilt associated with the threat of trauma, even if they do not materialize, may generate symptoms of PTSD (Steenkamp et al. 2011; Cesur et al. 2013).

The rise of TBI, PTSD, and physical wounds of war (Polimanti et al. 2017; Ling and Ecklund 2011; Tanielian and Jaycox 2008), in conjunction with liberalization of eligibility standards (Angrist et al. 2011; Autor et al. 2016), have driven a nearly threefold increase in spending on the Veterans Disability Compensation (VDC) program for veterans (U.S. Congressional Budget Office 2014).

2.2 Theory on Effects of Traumatic Health Shocks on Religion

Both economic and socio-psychological theories inform the expected impact of traumatic health shocks on religiosity. Adverse health shocks may induce greater religiosity as a response to the fear of death, injury, or psychological harm in battle. This may come from newly induced demand for services provided by religious institutions or via "withdrawals" on prior investments in religious capital (Berman 2000; Chen 2010; Hungerman 2005). Such religious investments could increase combat veterans' net present discounted utility, which may include the afterlife. Moreover, the increase in religiosity may be transitory and pass after the imminent threat of death has receded.

The demand for religion may also rise if religiosity aids in the production of mental health, perhaps dampening the adverse mental health effects of war-related trauma (De Castella and Simmonds 2013; Harris et al. 2015).⁸ This could occur, for example, through the provision of social support networks (Iannaccone 1992a; Iyer 2016) such as the Knights of Columbus, informal weekly prayer groups, or counseling sessions with pastoral agents. Moreover, doctrinal philosophies may provide meaning in the wake of trauma (De Castella and Simmonds 2013), leading to a strengthening of personal faith. For example, prior work has found that individuals may turn to religion to cope with unpredictable natural disasters such as earthquakes (Bentzen 2019). Combat veterans may also turn to religion because of the adverse impacts of combat on family life, including increased risk of divorce (Negrusa, Negrusa, and Hosek 2014) and domestic violence (Cesur and Sabia 2016).

On the other hand, some psychological theories, including the shattered assumptions hypothesis, suggests that trauma could reduce religiosity. Adverse health shocks may lead some to abandon religious faith because it has shattered their notions of how their lives were promised to unfold (Overcash et al. 1996; De Castella and Simmonds 2013; Ter Kuile and Ehring 2014; Harris et al. 2015). That is, individuals may turn away from religion because of perceived doctrinal promises of delivering outcomes that are just (Lyons 1991; McLaughlin 1994; Falsetti et al. 2003; Fontana and Rosenheck 2004).⁹

In addition, the effects of health trauma on religion could differ by dimensions of religiosity (Glock 1962; Glock and Stark 1965; Koenig et al. 1997).^{10,11} For example, if

⁸ See also Overcash et al. (1996); Shaw et al. (2005); Peres et al. (2007); and Koenig (2009).

⁹ Along these lines, Falsetti et al. (2003) argue that combat veterans with wartime trauma may substitute away from religion and toward secular mental health services to improve their mental health.

¹⁰ Glock (1962) and Glock and Stark (1965) classify religiosity into five dimensions: belief, ritual, experience, knowledge, and consequence.

¹¹ For a detailed overview of the literature, see Koenig et al. (2001). See also Egbert et al. (2004), Bjarnson (2007), and Berry (2005) for a discussion of several different measures of religiosity.

participation in religious services, but not private religious beliefs are affected by life-and-death shocks, this could suggest that the insurance function of religion may be the primary channel. On the other hand, if combat trauma impacts the strength of belief, but not religious-based social interactions, this could suggest that doctrinal philosophies drive increased demand for religion.

2.3 Other Mechanisms

War service could also affect religiosity through channels unrelated to fear of death or trauma, at least directly. Peer effects have been documented to be quite important among those serving in the military (Lyle 2007; Carrell et al. 2009; 2011). Those who select into military service have, at least historically, been more likely to identify with religion than their non-serving counterparts (Burdette et al. 2009). Combat experiences could intensify bonds among comrades-in-arms and increase the likelihood that religious doctrines spread through peers (Fontana and Rosenheck 2004). Furthermore, the buildup of spiritual capital in combat may incentivize the members of the armed forces to seek connections with religious communities when they transition to civilian life and therefore increase religiosity. Consistent with this explanation, time away from former peers in servicemembers' stateside religious communities could lead to a loosening of religious ties, leading to less engagement upon return. Alternatively, peer effects may operate in the opposite direction and lead to a reduction in piousness if peers of servicemembers are composed of less religious individuals.

There may be other "supply-side" channels at work as well, including military chaplain availability, which advocates claim are indispensable in improving servicemembers' mental health and healing invisible wounds of war (Litz et al. 2009; Drescher et al. 2011; Worthington and Langberg 2012). The Armed Forces Chaplains Board appoints chaplains to each service

branch with the charge of tending to the religious, spiritual, and overall personal well-being of servicemembers and their families. The primary focus of the chaplaincy is “religious ritual, instruction, and counseling: for example, ‘religious services, rites, sacraments, ordinances, and religious ministrations,’ as well as religious pastoral care and teaching” (Waggoner 2014, p. 14). A 2006 Congressional report concluded that there were 2,859 regular duty chaplains and 1,740 reserve chaplains serving as members of the Armed Forces (Jindal 2006). Each chaplain may have over 1,500 servicemembers entrusted to his care (Johns 2017).

In 2012, there were over 1,400 military chaplains deployed to combat zones. Military chaplains are employed as staff officers and are considered non-combatants, as they do not possess the duties and responsibilities of military command and are prohibited from bearing arms. Their roles include ensuring freedom of religion for servicemembers, facilitating dialog with civilian organizations on religious issues, and promoting joint military endeavors.¹² While the Armed Forces Uniform Code of Conduct and the First Amendment to the U.S. Constitution prohibit military chaplains from promoting or establishing a religion, military chaplains are encouraged to form close relationships with servicemembers and to provide psychological support as needed.¹³ There is evidence that servicemembers may be more likely to approach chaplains than secular mental health counselors to treat the psychological impacts of war because there is less social stigma attached to such services (Besterman-Dahan et al. 2012).

Despite prohibitions against proselytizing, the presence of chaplains could encourage such behaviors (Astore 2010), including among soldiers with prior religious exposure, which

¹² A description of the role of military chaplains in the Armed Forces is provided by the U.S. Department of Defense here: <http://prhome.defense.gov/M-RA/MPP/AFCB/>.

¹³ Historically, the military chaplaincy has been viewed as a strategic asset that aids in the successful prosecution of military operations (Waggoner 2012).

could increase religious adherence.¹⁴ Furthermore, there is evidence suggesting that religion has been employed as an ingroup coordination tool during intergroup violence (Kurzban and Christner 2011; MacNeill 2004; Johnson and Reeve 2013). As such, religion may aid success in war by promoting within-group cohesion, self-sacrifice, and heroism, as well as justifying killing (Reeve 2013).

2.4 Existing Literature on War and Religiosity

The literature on the relationship between war service and religiosity is thin and mostly descriptive.¹⁵ One set of studies describes the characteristics of those who select into the all-volunteer U.S. Armed Forces.¹⁶ While military personnel are more religious, on the whole, than the civilian population (Burdette et al. 2009), it is unclear whether this association is causal given the self-selection of military personnel into the U.S. Armed Forces.¹⁷

Descriptive evidence suggests that servicemembers with mental health problems frequently turn to clergy (often military chaplains) for mental health services. Besterman-Dahan et al. (2012) find that nearly one-third of active-duty servicemembers utilize mental health services offered by military chaplains compared to 44 percent who seek support from non-religious healthcare professionals. Along the same lines, Kopacz et al. (2017) find that about one-third of suicide attempt survivors received chaplaincy services in the 30 days following their

¹⁴ This issue is of some concern to civil libertarians, who worry that government-sanctioned zealous proselytizing could violate the First Amendment's Establishment Clause. Supporters of chaplains argue that they are indispensable to servicemembers' mental health and the achievement of military objectives.

¹⁵ While the causal evidence on the link between war service and piety is sparse, Henrich et al. (2019) find that exposure to war increases the religious participation of Christian and Muslim civilians using data on 1,709 individuals in Uganda, Sierra Leone and Tajikistan. The authors attribute these findings to religion's ability to foster cooperation in intergroup conflict. In return, the associated increases in religious adherence generate a feedback loop that promotes subsequent religiosity.

¹⁶ US Draft was abolished on January 27th, 1973.

¹⁷ There is evidence of increasing diversity in religions in recent years, mirroring diminished religiosity in the millennium generation (Military Leadership Diversity Commission 2010).

suicide attempt. Moreover, there is evidence that those who seek out chaplain services are often most in need of psychological services (Morgan et al. 2016).

Several other studies have explored the relationship between symptoms of war trauma and religiosity, with mixed findings.¹⁸ A study of 120 Bosnian-Herzegovinian veterans of the Bosnian war finds that PTSD is negatively related to religiosity (Hasanović and Pajević 2015). On the other hand, Tran et al. (2012) evaluated a sample of 449 U.S. veterans from veterans Administration (VA) hospitals who had experienced military-related health trauma and sought mental health treatment. The authors find that veterans who turned to religion for “socially motivated reasons” were less likely to suffer severe symptoms of PTSD or depressive symptomatology. They conclude that “evaluating religiosity in patients may be an important area to address in PTSD and depression treatment” (Tran et al. 2012, p. 313).

Finally, Harris et al. (2011) examine a small sample (54) of veterans who had suffered from psychological trauma. They estimate the impact of a group intervention therapy designed to utilize veterans' pre-existing religious beliefs to improve the management of combat-related trauma and find that religiosity mitigates the adverse psychological consequences of war.

3. Data and Measures

Our analysis uses data drawn from two national datasets, which include data on military servicemen, their combat assignments, and religiosity.

3.1 The National Longitudinal Study of Adolescent to Adult Health (NLSAAH)

¹⁸ See also Chen and Koenig (2006) for a review of the broader literature on trauma, including exposure to domestic violence, and religiosity.

The NLSAAH is a nationally representative longitudinal survey that began by collecting information on high school students in the 1994-1995 academic year. Three follow-up surveys were conducted and the last to date, collected in 2007-2008, contains information on respondents ages 24 to 34. These data are useful for our purposes because, at Wave IV, the NLSAAH includes a military module with a broad set of military characteristics and war experiences from current active-duty personnel and prior service veterans. Servicemembers' war experiences mainly include post-9/11 GWOT deployments to Iraq and Afghanistan.

Our NLSAAH analysis sample focuses on 482 active-duty overseas-deployed servicemen who, at the time of the Wave IV survey, provided information on their current religiosity, and reported that their military service began after the Wave I survey interview.¹⁹ Among these 482 deployed servicemen, 298 (59.3 percent) completed their military service before the Wave IV survey interview, while 196 (40.7 percent) were currently serving in the military.

Our primary measure of combat, *Combat Assignment*, is a dichotomous variable generated from self-reports of combat deployments.²⁰ *Combat Assignment* is set equal to 1 if the respondent reported being deployed overseas to a combat zone and set equal to 0 for deployments to non-combat zones.

We also exploit additional information collected in the NLSAAH military module to capture war theatre experiences among those deployed to combat zones. We generate the variable *Enemy Engagement*, set equal to 1 if the respondent reported “engaging the enemy in

¹⁹ Because the NLSAAH does not provide information on the age of high school completion, we exclude survey respondents for whom the start of military service precedes the Wave I interview. Including these 13 individuals in the analysis does not affect our estimates.

²⁰ This variable is constructed using the following survey questions in the Wave IV of NLSAAH.

“Was your military service in the US, outside the US, or both?”
“What is the total amount of time you (have) served in a combat zone?”

firefight” while in a combat zone and set equal to 0 otherwise.²¹ This allows us to estimate the independent effect of combat exposure.

We generate three measures of religiosity at the time of the Wave IV interview to capture both public and private expression of religion. First, respondents are asked:

“How often have you attended church, synagogue, temple, mosque, or religious services in the past 12 months?”

We generate a dichotomous variable, *Weekly Religious Attendance*, set equal to 1 if the respondent reported attending his place of worship or religious services at least once per week in the last year, and set equal to 0 otherwise.²² In addition, servicemen are asked:

“How often do you pray privately, that is, when you're alone, in places other than a church, synagogue, temple, mosque, or religious assembly?”

The variable *Prayer* is coded as 1 if the respondent reports praying outside of a religious service and 0 otherwise. Finally, respondents are asked:

“How important (if at all) is your religious faith to you?”

Religious Importance is set equal to 1 if the respondent reported that his faith was “very important” or “more important than anything else,” and set equal to 0 otherwise.

A key advantage of the NLSAAH data is its inclusion of information on a wide set of military characteristics (e.g., military rank, the branch of service, the timing of military service, occupation), which is vital for the “conditional random assignment” identification strategy

²¹ The following questionnaire item from the Wave IV NLSAAH is used to construct *Enemy Engagement*.

“During your combat deployment, how many times did you engage the enemy in a firefight?”

²² We also experimented with alternative measures of frequency of church attendance, including whether the respondent had ever attended religious services to gauge the extensive margin of behavior. The results from this definition of religious service attendance appear in Appendix Table 1.

described in *Section 4* below.²³ Moreover, because the data are longitudinal in nature, we are able to test the robustness of findings to controls for pre-enlistment religiosity.

Despite these important advantages, the NLSAAH data set also has some shortcomings. Small sample sizes limit both the power of our research design and our ability to examine heterogeneous impacts of combat, such as by branch of service or specific combat experiences.

3.2 Department of Defense (DOD) Health and Related Behaviors (HRB) Survey, 2008

To compensate for limitations with the NLSAAH data, we next turn to the HRB survey. Administered by RTI International, the HRB survey collects information on the health and well-being of active-duty military personnel, measured at nearly the same time as Wave IV of the NLSAAH. The survey is designed to be representative of active-duty servicemembers across all branches and pay grades of the U.S. Armed Forces. Individuals who were absent without official leave (AWOL), incarcerated at the time of data collection, or attending a service academy were excluded from the interview.

Our analysis sample is comprised of 11,598 active-duty servicemen between the ages of 18 and 50 who were deployed overseas and provided non-missing information on religiosity. Included are 2,563 soldiers, 2,563 marines, 3,374 sailors, and 3,098 airmen. While the HRB survey does not contain information on lifetime combat and non-combat zone deployments that would allow us to construct a measure analogous to *Combat Service*, we can use the information available in the survey to construct an analogous measure of *Enemy Engagement*. Respondents were asked:

²³ In fact, the NLSAAH contains information on the military observables available to Human Resources Command when making unit assignments.

“Thinking about all of your deployments, [have you] or members of [your] unit, received incoming fire from small arms, artillery, rockets, or mortars...or [has your] unit fired on the enemy?”

Enemy Engagement is set equal to 1 for those who reported exposure to enemy firefight while they were deployed, either through incoming fire or firing on the enemy, and 0 otherwise.

To capture the intensity of war experiences that may explain the potential mechanisms between combat and religion in the HRB survey, we take advantage of more specific measures of combat experiences, which can help explain the mechanisms through which combat exposure affects religiosity. These measures include *Combat Injury* and *Witness Death*, dichotomous variables that capture whether the respondent was injured in combat and witnessed deaths in war, respectively.²⁴

Outcomes in the HRB survey are measured analogously to the NLSAAH military module. Religious attendance is measured using responses to the following survey item:

“During the past 12 months, how many times did you attend religious/spiritual services? (Please do not include special occasions, such as weddings, christenings, funerals, or other special events in your answer.)”

Frequent Religious Attendance is set equal to 1 if the respondent attends services 25 or more weeks per year and is set equal to 0 otherwise.²⁵

²⁴ These measures were generated using servicemen’s responses to the following questionnaire items:

“Thinking about all of your deployments, how many times have you had each of the following experiences? I was wounded in combat.”

“Thinking about all of your deployments, how many times have you had each of the following experiences? I saw dead bodies or human remains.”

²⁵ Responses to this survey item do not allow us to distinguish between biweekly and weekly church attendance as each is contained in the same category of possible responses. Therefore, our measure of religious attendance in the HRB survey is slightly different than in the NLSAAH. Analyses using alternate measures of religious service

While the HRB data does not ask whether the respondents pray on their own in an identical fashion to the NLSAAH, it asks the following survey question to measure if the respondents pray under stressful circumstances:

“When you feel pressured, stressed, depressed, or anxious, how often do you engage in each of the following activities: Say a prayer”

Prayer is set equal to 1 for those who frequently pray when they are stressed, depressed or anxious and 0 if they do so only sometimes, rarely or never. Finally, servicemen were asked to agree or disagree along a Likert scale with the following statement:

“My religious/spiritual beliefs are a very important part of my life.”

We generate an indicator, *Religious Importance*, set equal to 1 if the respondent agrees or strongly agrees that religious beliefs are a very important part of his life and 0 otherwise.

As is the case with the NLSAAH data, the HRB data has strengths and weaknesses. The relatively larger sample allows us to more precisely estimate branch-specific effects of combat. In addition, because the HRB survey is a representative sample of the active-duty military personnel, the estimates obtained from the sample are more generalizable to all active duty service members, including those older and younger than surveyed in the NLSAAH. On the other hand, if previous combat exposure influences the likelihood of remaining in the military, estimates using only those who are currently on active duty may suffer from sample selection bias. An additional limitation of the HRB data is the lack of information on religious denomination affiliation either before or after deployment; thus, we cannot conduct heterogeneity analysis by religious sect. Finally, due to confidentiality requirements, the HRB

attendance, including ever attending services or attending services more than weekly, produced a qualitatively similar pattern of results.

survey lacks data on some important military observables (such as primary military occupation), though it does include other reasonable proxies, which we discuss below.²⁶

4. Identification

4.1 Natural Experiment

An extensive body of literature estimating the impact of military service on labor market outcomes (Angrist 1990; 1998; Angrist et al. 2011; Angrist and Chen 2011) or other measures of socioeconomic wellbeing (Angrist et al. 2010; Angrist and Johnson 2000; Price et al. 2004; McFall et al. 1992a,b; Rohlfs 2010; Lindo and Stoecker 2014) has relied on the draft lottery as a natural experiment to identify the causal impact of war. The absence of conscription in the U.S. following the abolition of the draft in 1973 makes such an identification strategy impossible for service during GWOT. Instead, we rely on an alternate natural experiment that identifies a very different local average treatment effect. We exploit the administrative procedures by which U.S. Armed Forces Human Resources Command (HRC) assigns active-duty servicemen to deployment duties to generate variation in combat assignment that is plausibly exogenous to religiosity.

First, senior commanders rarely issue deployment orders to individual servicemembers independent of the branch-specific units in which they serve (Lyle 2006; Engel et al. 2010). Senior commanders assign individuals servicemen to their units (i.e., battalion) and then issue deployment orders to these units. For the purposes of these assignments, HRC treats branch-

²⁶ These covariates include the branch of service, rank, the timing of service, detailed measures of educational attainment, and installation level Major Command (MAJCOM), a subdivision for a particular military installation responsible for a specific combat/support mission. MAJCOMs include U.S. Army Training and Doctrine Command, U.S. Army Europe, U.S. Army Pacific, 8th Army, U.S. Fleet Forces Command, Commander Pacific Forces, Naval Medical Command, Commander Naval Installations Command, Marine Corps Installations East, Marine Corps Installations West, Air Combat Command, Air Education and Training Command, Air Force Materiel Command, Air Force Space Command, Air Mobility Command, Pacific Air Forces, and U.S. Air Forces Europe.

specific servicemen of identical military rank and primary military occupation specialty as perfect substitutes.²⁷ As a rule, senior commanders do not consider personal preferences, religious practices, or family background in assigning servicemen to units or deploying units overseas (Engel et al. 2010). We know of no evidence that senior commanders issue deployment orders to military units based on non-military characteristics of its members (Carter and Skimmyhorn 2017; Sabia and Skimmyhorn 2019).

Senior commanders decide when, where, and for how long to deploy units based largely on exogenous factors, such as (i) the state of operational environment, which is dictated by world events, and (ii) the readiness and availability of suitable units, determined by equipment availability, timing of training completion, and the occupational composition of unit members (Army Regulation 220-1; Lyle 2006; Engel et al. 2010). Thus, the administrative procedures of senior commanders mimic conditional random assignment of active-duty deployed servicemen to overseas deployment duties. That is, conditional on military rank, year of enlistment, and occupation (within service branch), deployment assignments among active-duty personnel are exogenous to veteran religiosity.²⁸

The main threats to identification in this conditional random assignment framework are (i) *stay-back selection*, whereby some members of a unit may be non-randomly selected to remain at the stateside military base, and (ii) *non-deployability* of some servicemembers due to health conditions. With regard to stay-back selection, Sabia and Skimmyhorn (2019) note that less than 5 percent of active-duty soldiers stay back. Moreover, in studies of the health and

²⁷ Lyle (2006) and Engel et al. (2010) test for so-called “stayback selection” bias by using unit-level deployment orders as an instrumental variable (IV) for individual deployment. A comparison of IV and ordinary least squares (OLS) estimates suggest that potential stay-back selection is an unimportant source of bias.

²⁸ While a servicemember can affect the likelihood he is assigned a combat deployment by his choice of occupation specialty, year of enlistment, and tenure in the military (rank), conditional on these military characteristics, deployment assignments are orthogonal to other determinants of veteran religiosity.

socioeconomic effects of post-September 11 combat service, instrumental variables (IV) estimates that rely on unit-level deployment orders as an instrument for individual deployment produce estimates that are very similar to OLS estimates that treat individual deployment as conditionally randomly assigned (Lyle 2006; Sabia and Skimmyborn 2019). Conditional random assignment of active-duty personnel to overseas deployments has been exploited by previous scholars examining the impacts of deployments on servicemembers' children (Lyle 2006; Engel et al. 2010), servicemen's risk of Post-Traumatic Stress Disorder (Cesur et al. 2013), as well as domestic violence (Cesur and Sabia 2016).

Data from the NLSAAH are particularly valuable for carrying out this natural experiment because they include information on the military observables available to HRC when making deployment decisions. Therefore, we are able to provide descriptive tests of whether, conditional on these observables, deployment assignment is orthogonal to an extensive set of personal and family background characteristics, including pre-enlistment religiosity. While the HRB data do not include information on military occupation, there is prior evidence that these missing data do not contaminate the natural experiment described above in the presence of controls for the branch of service, military rank, the timing of service, educational attainment, and installation-level Major Command (Cesur and Sabia 2016). We explore similar tests below.

4.2 Estimating Equations

We begin with data on active-duty overseas-deployed servicemen from the NLSAAH and estimate the following estimating equation to test whether combat assignment is related to pre-enlistment observables after controlling for military observables available to HRC:

$$\text{Combat Assignment}_i = \beta_0 + \beta_1 \mathbf{M}_i + \beta_2 \mathbf{X}_i + e_i \quad (1)$$

where $Combat Assignment_i$ measures whether serviceman i was deployed to a combat or non-combat zone, \mathbf{M}_i is a vector of military controls for serviceman i , including military rank, branch of service, timing of service, and occupation, and \mathbf{X}_i is set of covariates capturing pre-enlistment (Wave I) individual- and family-level characteristics: age, race, cognitive ability, height, weight, parental income, parental marital status, parental religiosity, as well as the respondent's own pre-enlistment religiosity. Also included in the vector \mathbf{X}_i are controls for the respondent's maternal educational attainment and own educational attainment. If, conditional on \mathbf{M}_i , combat assignment should be orthogonal to individual and family background characteristics, we hypothesize that the estimate of β_2 should be 0.

Next, we estimate the impact of combat assignment on religiosity in equation (2):

$$R_i = \gamma_0 + \gamma_1 Combat Assignment_i + \gamma_2 \mathbf{M}_i + \varepsilon_i \quad (2)$$

where R_i measures the religiosity of serviceman i . In alternate specifications, we add $Enemy Engagement_i$ as an additional right-hand-side variable to isolate the effects of combat exposure and combat zone assignment without exposure. If the assumptions underlying the natural experiment described above hold, then γ_1 will be an unbiased estimate of the impact of combat zone assignment on religiosity. As another descriptive test of this assumption, we add the vector \mathbf{X}_i to the right-hand side of equation (2):

$$R_i = \gamma_0 + \gamma_1 Combat Assignment_i + \gamma_2 \mathbf{M}_i + \gamma_3 \mathbf{X}_i + \varepsilon_i \quad (3)$$

If the estimate of γ_1 remains unchanged in equations (2) and (3), this is evidence consistent with the hypothesis that $Combat Assignment$ is orthogonal to religiosity.

A similar estimating equation is used for the HRB survey:

$$R_i = \theta_0 + \theta_1 Enemy Engagement_i + \theta_2 \mathbf{M}_i + \theta_3 \mathbf{X}_i + \mu_i \quad (4)$$

where *Enemy Engagement* indicates if respondent i was deployed to a combat zone with an enemy firefight, \mathbf{M}_i includes a set of military variables available in the HRB survey, including military rank, the branch of service, Major Command (MAJCOM), and frequency of deployments. Additionally, the vector \mathbf{X}_i includes controls for age, race, marital status, and educational attainment, which are present in all models. While we do not have specific controls for military occupation in the HRB survey, the set of controls available in the DOD data appear to be sufficient to not contaminate the natural experiment described above.²⁹ Finally, we note that the effects of war obtained from equation (4) may be biased downward to the extent that some who are not exposed to enemy engagement, but are assigned to combat zones may have their religiosity affected by their deployment assignment.

5. Results

5.1 NLSAAH Results

Descriptive statistics for the NLSAAH in Table 1 show that 15.4 percent of active-duty deployed servicemen attend religious services weekly. Approximately three-quarters (75.1 percent) report praying outside of their house of worship and just over half (51.1 percent) report that religion is an important aspect of their lives. Concerning deployment assignments, two-thirds (76 percent) of servicemen were assigned to combat zones, and 37 percent reported engaging the enemy in a firefight.

²⁹ To descriptively test the validity of this assumption, we estimated the effect of combat on our outcomes in the NLSAAH sample (where the natural experiment is “clean”) by only controlling for the covariates that are available in the DOD data. As shown in Appendix Table 2, results obtained from this exercise are very similar to the clean natural experiment from the NLSAAH sample. These findings lend support to the hypothesis that estimates from the DOD data are unbiased.

In Table 2, we present estimates from equation (1) to test if predetermined covariates in the vector \mathbf{X}_i predict combat assignment.³⁰ Specifically, we examine whether deployment assignment is related to own pre-deployment religiosity, height and weight, age and race, educational attainment, cognitive ability, and parental household income, marital status, educational attainment, and religiousness.³¹ Our results show little evidence that these characteristics predict whether servicemen are deployed to combat zones as compared to non-combat zones (column 1), to combat zones with enemy firefight as compared to combat zones without enemy firefight (column 2), or to combat zones with enemy firefight versus non-combat zones (column 3). Out of 78 coefficients estimated, only three are statistically distinguishable from zero at conventional levels, and no single category of related variables (e.g., income) is jointly statistically different from zero. This descriptive balancing test supports the assumption that deployment assignment is orthogonal to religiosity.

Table 3 shows estimates of γ_1 from equation (2). In Panel I, we find that servicemen assigned to combat zones are 7.9 percentage-points more likely to attend weekly religious services in the past year than their counterparts deployed to non-combat zones (Panel I, column 1). Those assigned to combat are also 8.6 percentage-points more likely to engage in private prayer (Panel I, column 2), and 4.5 percentage-points more likely to report religion is important to them (Panel I, column 3), though this latter estimate is not statistically different from zero at conventional levels. These estimates, which are economically substantial (relative to their

³⁰ While we estimate equations (1) through (4) via linear probability models, marginal effects obtained from probit specifications are very similar to the results presented below.

³¹ Each (set of) coefficient(s) is(are) obtained from a separate regression; p-values pertain to the joint significance of mutually exclusive categories providing information on pre-existing characteristics, such as race, income, and maternal schooling. We also estimate regression models, including all of these right-hand side variables in a single model. The results from this specification are similar to those presented in Table 2. For example, in column (1), a test of the joint significance of the variables in the vector \mathbf{X} yields an F-statistic of 0.97 and a p-value of 0.52.

means), are consistent with the hypothesis that life-and-death shocks induce increases in both public religious expression as well as private religious practices.

In Panels II and III of Table 3, we explore whether the effects differ by whether the combat serviceman had separated from the military at the time of the Wave IV survey. We find that the impact of combat assignment on religious attendance and private prayer is statistically equivalent for those whose active-duty service was ongoing at the time of the Wave IV survey (Panel II) and those who had separated from the military (Panel III). This could suggest that the impact of combat on religious practices persists over time. Interestingly, however, the impact of combat on self-reported religious salience (column 3) is much larger for those whose service is current as compared to veterans who had previously separated from the U.S. Armed Forces. This finding could suggest that combat generates transitory increases in the importance of religion in one's life but that this salience dissipates as faith serves its purpose in helping servicemen to cope with immediate trauma. However, these findings could be explained by heterogeneity in soldier characteristics or the nature of combat across periods.³²

In the final two panels of Table 3, we examine whether religiosity effects of combat differ across pre-enlistment religious affiliation. In Panel IV, we restrict the sample to those who reported a Christian affiliation (e.g., Catholics, Protestants, and Other Christians) at the time of

³² For example, those serving in the armed forces at the time of the Wave IV survey are younger than those who had separated from the military. Younger individuals may have fewer alternative means to cope with life-threatening stress, be more susceptible to proselytizing, or be more likely to be impacted by peers. Moreover, the observed differential impact could represent a cohort effect, whereby current active-duty servicemen may have been involved in more recent intense combat during the time of the so-called surge in Iraq in 2007 during which more than 20,000 additional servicemembers were deployed to Baghdad and Al Anbar Province. However, it is important to note that whatever the source of the differential impact of combat assignment on the importance with which servicemen place on religion, this difference does not translate into religious behavior differences. Combat veterans who have separated are also more likely to attend religious services regularly and pray than their non-combat veteran counterparts. We also explore whether the religious effects differ by the prior religiosity of servicemen, which we have documented is orthogonal to deployment assignment. The results show that combat has the largest impact on weekly religious service attendance for those who reported some degree of religiosity prior to deployment.

the Wave I interview, while Panel V examines all other affiliations or a non-affiliation. We find that our results in Panel II are driven by the effect of combat on those with a Christian affiliation before deployment. This finding is consistent with the hypothesis that those with Christian affiliations had accumulated greater religious capital investments at the time enlistment, and hence were more likely to draw on this religious capital as a coping mechanism in response to traumatic health shocks.³³ Alternatively, this result is also consistent with the majority of military chaplains being drawn from Christian denominations (Dao 2011).³⁴

Next, in Table 4, we explore whether combat exposure, measured by engaging the enemy in a firefight, has an independent effect on religiosity. We find that servicemen deployed to combat zones where they engaged the enemy in a firefight were significantly more likely to attend religious services and engage in private prayer than those deployed to non-combat zones. However, the magnitude of this effect was not significantly different from the estimated effect of combat deployments without such exposure. This result could suggest that fear of combat exposure, and whether or not enemy engagement materializes, may have significant effects on religiosity. This result is also consistent with a supply-side mechanism such as combat zone-specific, unit-level peer effects in religiosity or increased presence of military chaplains in combat zones. In the HRB data below, we empirically explore channels that might be at work.

Finally, in Table 5, we examine the sensitivity of estimates to the addition of controls for individual and personal background characteristics (columns 2, 5, 8), and pre-deployment religiosity (columns 3, 6, 9), following equation (3). The stability of estimates of γ_1 are

³³ Consistent with this view, our unreported cross tabulations show that Christian service members exhibited a higher degree of religious participation prior to enlistment.

³⁴ See, for example: <https://www.nytimes.com/2011/04/27/us/27atheists.html>

consistent with findings of Table 2 and suggest that deployment assignment is conditionally exogenous to religiosity.

5.2 HRB Results

Given the above-discussed limitations with the NLSAAH survey, we next turn to the HRB sample. Descriptive statistics, shown in Table 6A, reflect that 18.9 percent of active-duty members of the armed forces in our sample reported frequent religious attendance in the prior year, 22.0 percent reported that they turned to prayer in stressful situations, and approximately two-thirds (69.5 percent) indicated that religion was important to them.

In Table 6B, we show descriptive tests of the exogeneity of deployment assignment in the HRB sample. Given that the HRB data do not include information on occupation specialty, as is available in the NLSAAH, we first ensure that there is common support on the detailed military characteristics that are provided (i.e., branch of service, rank, timing of service, enlisted versus officer, and Major Command), as well as sociodemographic characteristics. We find no evidence that the likelihood of an overseas combat deployment is related to sociodemographic characteristics available in the HRB survey, including age, race/ethnicity, marital status, and educational attainment.

Table 7 presents the results from equation (4). In Panel I, we find that engaging the enemy in firefight is associated with a 1.9 percentage-point increase in the probability of frequent religious attendance (column 1), a 1.4 percentage-point increase in the likelihood of prayer at times of stress or depression (column 2), and a 1.9 percentage-point increase in the probability that a serviceman reports that religion is important (column 3). The magnitudes of these estimates are smaller than those obtained from the NLSAAH, which may be explained, in

part, by an increase in religiosity for those deployed to combat zones who are not exposed to enemy firefight (see Table 4).³⁵

In Panel II, we explore the sensitivity of OLS estimates in Panel I (which do not include occupation controls) to requiring common support on the military characteristics available in the DOD data, including Major Command, a measure not available in the NLSAAH. Using a nearest neighbor matching estimator, we produce estimates that are quite similar to those shown in Panel I, albeit less precisely estimated.³⁶ This adds to our confidence that the religion effects of combat are unbiased.

In Panels III through VI, we examine heterogeneous impacts of combat exposure by branch of service. In the main, we find that the effect of combat on religiosity is generally larger for soldiers, marines, and sailors as compared to airmen. This finding is consistent with evidence that the psychological costs of combat are largest for those in the Army and Marines, for whom the nature of combat is quite different as compared to the Air Force (Cesur et al. 2013). However, we do find that combat exposure is associated with a 2.4 percentage-point increase in the probability that airmen turn to prayer in stressful situations.

Next, we attempt to disentangle the effects of combat exposure from the effects of time spent deployed. In Table 8, we use data from the HRB survey on the number of post-9/11 combat deployments and average deployment length and add constructed measures of these variables to the right-hand side of equation (4). The results in Table 8 suggest that length of deployments and number of deployments are *negatively* related to weekly religious attendance

³⁵ Recall that those deployed to non-combat zones without enemy engagement are included in the 0s when *Enemy Engagement* is defined in the HRB survey.

³⁶ We employ a nearest neighbor matching with non-replacement. In the common support sample, the estimated propensity scores between enemy engagement and non-enemy engagement samples must be within 0.001 to generate a match.

(Panel I), which may be due to reduced opportunities to attend religious services while deployed overseas. However, in our fully specified model (column 4), we confirm that, conditional on number and length of combat deployments, combat exposure leads to substantial increases in religiosity, suggesting that life-and-death trauma rather than simply length of possible exposure to such trauma is important. This pattern of results on the impact of combat exposure persists for private religious prayer (Panel II) and religious salience (Panel III).

5.3 Heterogeneous Impacts of Combat

Next, we examine whether the effects of combat differ across enlisted servicemen and officers. Our results in the first two panels of Table 9 show that religious effects are concentrated among enlisted servicemen. We find that for enlisted servicemen (Panel I), enemy engagement is associated with a 2 to 3 percentage-point increase in public and private expressions of religiosity. However, for officers (Panel II) there is no such impact. This result is consistent with prior evidence showing that the adverse psychological impacts of war, including effects on Post-Traumatic Stress Disorder, are larger for enlisted servicemen as compared to officers (Lyle 2006; Engel et al. 2010; Cesur and Sabia 2016). This finding may also be due to differences across enlisted servicemen and officers in social support networks, socioeconomic well-being, and occupation role.

In Panels III through V of Table 9, we explore heterogeneity in the effects of war by age. Again, consistent with prior work on the adverse psychological effects of war (Cesur and Sabia 2016), we find that the largest religiosity effects of combat are observed for young servicemen under the age of 25. Estimated religiosity effects of combat for younger servicemen are around 6 percentage-points, while estimates are smaller for those ages 25 to 34, a comparably aged sample

as that examined in the NLSAAH, and smaller still for those ages 35 to 55. Thus, junior enlisted servicemen are differentially impacted relative to junior or senior NCOs. However, an alternative explanation for the variation in age-specific estimates may be due to survivor bias. As such, if those who are more resilient to combat are more likely to remain in active service and vice versa, estimates of the impact of combat on a variety of outcomes as well as religiosity may be lower among older servicemembers.

Next, in Panel VI of Table 9, we explore whether religious effects of combat extend to women. At the time of the 2008 HRB Survey, women were prevented from serving in many front-line combat roles, a regulation changed by the Department of Defense in 2013 (Burelli 2013; Kamarck 2015). However, during this period, women could still be exposed to combat via enemy fire on military bases overseas, the ambush of their units, and witnessing war casualties experienced by their comrades. The results in Panel VI show that combat has comparably sized religiosity effects for women, though these effects are imprecisely estimated.

In the final two panels of Table 9 (Panels VII and VIII), we examine the impact of particular combat experiences: whether the serviceman was wounded in combat (Panel VII) or witnessed deaths in battle (VIII). Our findings suggest that being wounded in combat has the largest positive impact on religiosity. Injury in war is associated with a 7.9 percentage-point increase in weekly religious service attendance, and a 5.4 percentage-point increase in the probability of turning to prayer in stressful situations, effect sizes that are substantially larger than the average impact of enemy engagement. We find less evidence, at least in the HRB survey, that witnessing deaths or injuries of others impacts religiosity. These findings suggest that personal physical trauma and the consequences that flow from such trauma may be a particularly important reason why servicemen turn to religiosity.

5.4 Mechanisms and Secular vs Religious Counseling

The results presented above provide consistent evidence that combat service increases religiosity, particularly when such combat results in physical injuries. In the remaining tables, we empirically explore the mechanisms through which this increase in religiosity may occur. One channel may be coping with psychological trauma (Bentzen 2019). The adverse mental effects of military deployments have been well-documented (Taneilian and Jaycox 2008; Cesur et al. 2013). In Appendix Table 4, we also confirm that assignment to combat zones with enemy fire is associated with substantial increases in the risk of PTSD (column 1), suicide ideation (column 2), psychological distress (column 3), and being wounded in combat (column 4).

In addition to mental and physical health channels, supply-side mechanisms related to peers and chaplains may also be important. While we are unable to link supply-side shocks to the number of chaplains stationed in combat zones to the location and timing of deployments, we are able to measure the extent to which servicemen turned to military chaplains to treat the mental health effects of combat, though such visits may certainly be due to demand-side reasons.

In Table 10, we estimate the impact of combat on the probability of seeking counseling services from secular and religious sources, including military chaplains (Panel I).³⁷ We find

³⁷ Respondents to the DOD HRB Survey are asked:

“In the past 12 months, did you receive counseling or therapy for mental health or substance abuse from the following?”

- *Military chaplain*
- *Civilian pastor, rabbi, or other pastoral counselor*
- *Mental health professional at a military facility (e.g., psychologist, psychiatrist, clinical social worker or other mental health counselor).*
- *General medical doctor at a military facility*
- *General medical doctor at a civilian facility*
- *Civilian mental health professional (e.g., psychologist, psychiatrist, clinical social worker or other mental health counselor)”*

that combat exposure is associated with a 7.2 percentage-point increase in the likelihood of receipt of some type of counseling services (column 1), including from secular sources (e.g., medical or psychological professionals) (column 2), civilian clergy (column 3), and military chaplains (column 4). We fail to detect evidence that combat service increases use of military chaplains to a greater degree than secular sources.

Finally, in Panel II of Table 10, we find some evidence that, among those who seek out any type of counseling, servicemen are more likely to turn to civilian clergy than secular counseling, consistent with the hypothesis that there may be less social stigma associated with religious-based counseling.³⁸ However, caution should be taken in interpreting these estimates given that those who select into counseling are a select sample of servicemen.

Having established that combat generates adverse health effects, as well as increases the use of psychological counseling services, we descriptively explore the importance of these channels in explaining the impact of combat on religiosity. In odd-numbered columns on Table 11, we show baseline estimates from equation (4), while in even-numbered columns we add endogenous measures of psychological well-being, wounding in battle, and (unconditional) use of chaplain services (unconditionally) to the right-hand side of the estimating equation. Note that these channels may not be independent of one another. For example, the adverse physical health effects of war could affect psychological health, which could, in turn, affect the likelihood of visiting a chaplain.³⁹ The results of our descriptive mediating exercise show that the physical and psychological consequences of war, as well as use of chaplain counseling, may explain up to 40 percent of the impact of war on religiosity. These channels appear more important in explaining

³⁸ Results from a multinomial logit model, shown in Appendix Table 3, show a qualitatively similar pattern of results. However, given that categories of counseling are not independent, the IIA assumption is unlikely to be met.

³⁹ Also, because chaplain use is endogenous, it may be that their use is positively related to religiosity due to religious individuals being more likely to use chaplain services.

religious attendance and prayer than religious salience. Our results also suggest that residual unmeasured mechanisms such as coping with the fear of death and unit-level peer influence may be important in understanding the religious effects of war deployments.

6. Conclusions

Despite a wide body of literature in health economics on the impact of negative health shocks on health care utilization, very little is known about how traumatic health shocks affect religiosity. Given that the major religions of the world promote doctrines and practices designed to help adherents cope with traumatic life shocks — including illness and mortality — this remains an important gap to be filled, particularly given uncertainty over the relative benefits of secular and religious counseling.

This study is the first to estimate the impact of post-9/11 war deployments, which generated substantial physical and psychological trauma for servicemembers, on veterans' religiosity. We exploit the administrative procedures by which senior commanders in the U.S. Armed Forces conditionally randomly assign active-duty servicemen to their deployment duties to isolate the impact of combat deployments religiosity.

Across two national datasets, the National Longitudinal Study of Adolescent to Adult Health and the Department of Defense Health and Related Behaviors Survey Among Active-Duty Personnel, we find that post-9/11 combat service is associated with substantial increases in religious attendance and prayer. The strongest and largest religious effects of combat exposure are found among younger enlisted servicemen and those who are physically injured in combat. We find that these effects may not be transitory, appearing to persist following separation from the military. Our findings are consistent with religion both playing a “social insurance” role (i.e.,

increased frequency of church attendance) as well as serving as an individual-level psychological coping device (i.e., increased prayer and importance of religion).

Together, our findings suggest that combat-induced health trauma has important effects on spiritual capital development. We hypothesize several mechanisms at work, including (i) servicemen seeking out religious organizations and spiritual doctrines to cope with fear of death, adverse psychological effects of war, or physical wounding in war, (ii) peer effects forged by bonds created among religious combat veterans, and/or (iii) the role the U.S. military, wittingly or unwittingly, plays in nudging servicemen toward religiosity via chaplains or social stigma for seeking out secular psychological services. Finally, we find only weak evidence that combat assignment differentially affects the demand for religious as compared to secular psychological services.

We concede that an important limitation of our study is that the religious impacts of combat-related health trauma may not generalize to health trauma experienced by civilians. For instance, the religious effect of one's own cancer diagnosis or the sudden accidental death of a nuclear family member may differ from that of war-related trauma. Still, understanding the causal effect of health trauma on religiosity, which our military setting allows, has important value to the literature and key policy relevance. There is a vigorous policy debate about how well the U.S. Armed Forces has achieved a proper balance in making spiritual services available for those who demand them, which may be necessary for mission success, while not using publicly funded resources to proselytize for a particular religion.⁴⁰ While our findings suggest that

⁴⁰ Some advocates argue that the presence of chaplains in combat has led to unconstitutional proselytizing and endangered combat veterans' mental health. In a letter written to Secretary of Defense Robert Gates in 2010, the Military Religious Freedom Foundation wrote:

“Perhaps the most alarming...[is]...the widespread practice of ‘battlefield Christian proselytizing.’ When, on active duty, our service members sought urgently needed mental health counseling while on the battlefield and with the gun smoke practically still in their faces, they were instead sent to evangelizing

combat-induced religiosity is not solely, or even largely, attributable to chaplain-induced demand, the role of chaplains in providing counseling services — particularly in war theatres where there is more limited secular competition — remains an important military policy issue worthy of continued research.

In fact, we know relatively little about (i) the marginal rate of technical substitution of secular to religious counseling in the production of mental health capital among veterans, and (ii) whether presence of military chaplains enhances the effectiveness of secular psychological counseling has not been thoroughly studied. What is clearer is that some veterans turn to chaplains not because they necessarily perceive their health services are relatively more effective, but because religious counseling carries less military career risk and is accompanied by far less social stigma (Morgan et al. 2016). Research examining military policies and institutional cultural norms that reinforce this stigma, as well as work uncovering the relative mental health benefits of secular as compared to religious counseling, including how these effects may differ across servicemembers, will be important for designing military chaplain policies that maximize the welfare of veterans.

chaplains, who are apparently being used with increasing frequency to provide mental health care due to the acute shortage of mental health professionals.” (Astore 2010)

On the other hand, columnists at *National Review* have defended chaplains as indispensable not only to servicemembers’ emotional well-being, but also to the success of military operations:

“The more dangerous the mission, the more vital chaplains are to its success. The nearly 1,400 chaplains in the U.S. armed forces...must be on-the-spot counselors to men and women living through a kind of trauma that few civilians will ever experience. They prepare soldiers to kill and to die without losing their souls. They help soldiers reintegrate into the lives of their families. Chaplains ministering stateside help military families left behind get through months of emotional and sometimes financial hardship.” (Dreher, *National Review*, 2003)

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Table 1. Descriptive Statistics, NLSAAH

	<i>Mean</i>	<i>Standard Deviation</i>
	(1)	(2)
<i>Dependent Variables</i>		
Weekly Religious Attendance	0.154	(0.361)
Prayer	0.751	(0.433)
Religious Importance	0.511	(0.500)
<i>Combat Measures</i>		
Combat Assignment	0.755	(0.430)
Enemy Engagement	0.367	(0.483)
Combat Service without Engagement	0.388	(0.488)
<i>Military Controls</i>		
Army	0.41	(0.49)
Marine	0.20	(0.40)
Navy	0.25	(0.43)
Air Force	0.16	(0.37)
Rank E1-E3	0.06	(0.24)
Rank E4-E6	0.85	(0.36)
Rank E7-E9	0.02	(0.14)
Rank W1-W5	0.01	(0.08)
Rank O1-O3	0.06	(0.25)
Rank 04-O10	0.00	(0.00)
<i>Selected Background Characteristics</i>		
Age	28.68	(1.70)
Some College	0.66	(0.47)
College Education	0.16	(0.37)
White	0.70	(0.50)
Black	0.22	(0.42)
Other Race/Ethnicity	0.08	(0.26)
Hispanic	0.16	(0.37)
Observations	482	

Notes: Standard deviations in parentheses. The means are generated using data for males drawn from wave IV of the National Longitudinal Study of Adolescent Health. Branch of service is not mutually exclusive. The sample is composed of male servicemembers only. The indicators for rank are further disaggregated in the regression analysis (Rank E1–E2, Rank E3, Rank E4, Rank E5, Rank E6, Rank E7–E8, Rank O1–O2, Rank O3, Rank W1–W2).

Table 2. Non-Military Characteristics and Conditional Deployment Assignment, NLSAAH

	<i>Combat Assignment</i> <i>vs</i> <i>No Combat</i> <i>Assignment</i>	<i>Enemy Engagement</i> <i>vs</i> <i>No Enemy</i> <i>Engagement</i>	<i>Enemy Engagement</i> <i>vs</i> <i>No Combat</i> <i>Assignment</i>
	(1)	(2)	(3)
Weekly Religious Attendance	0.047 (0.041)	0.026 (0.050)	0.046 (0.060)
Prayer	-0.057 (0.043)	0.037 (0.058)	-0.014 (0.067)
Religious Importance	0.060 (0.041)	0.012 (0.052)	0.099 (0.065)
F-test (p-value)	1.279 (0.285)	0.406 (0.749)	1.313 (0.274)
Wave 1 Mother Religion is Very Important	0.012 (0.048)	-0.007 (0.052)	0.036 (0.061)
Wave 1 Mother Attended Service	0.005 (0.045)	-0.041 (0.044)	-0.012 (0.054)
Wave 1 Weight	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)
Wave 1 Height	-0.003 (0.005)	0.003 (0.006)	0.000 (0.007)
Wave 1 Protestant	-0.009 (0.067)	0.009 (0.087)	-0.013 (0.097)
Wave 1 Catholic	0.065 (0.072)	0.012 (0.087)	0.016 (0.104)
Wave 1 Other Religion	0.036 (0.125)	-0.004 (0.151)	0.085 (0.206)
F-test (p-value)	0.888 (0.450)	0.0134 (0.998)	0.169 (0.917)
Age in Years	0.173 (0.403)	0.111 (0.398)	0.302 (0.555)
Age in Years Squared	-0.003 (0.007)	-0.002 (0.007)	-0.006 (0.010)
F-test (p-value)	0.354 (0.702)	0.286 (0.752)	0.566 (0.570)
Race: Black	-0.010 (0.050)	-0.085 (0.059)	-0.062 (0.073)
Race: Other	0.098 (0.061)	-0.053 (0.067)	0.049 (0.119)

	<i>Combat Assignment</i> vs <i>No Combat</i> <i>Assignment</i>	<i>Enemy Engagement</i> vs <i>No Enemy</i> <i>Engagement</i>	<i>Enemy Engagement</i> vs <i>No Combat</i> <i>Assignment</i>
	(1)	(2)	(3)
F-test (p-value)	1.381 (0.255)	1.093 (0.339)	0.543 (0.583)
Ethnicity: Hispanic	-0.005 (0.049)	-0.158*** (0.053)	-0.080 (0.079)
Some College	0.032 (0.053)	-0.000 (0.055)	0.043 (0.069)
College	0.106 (0.081)	-0.008 (0.087)	0.068 (0.117)
F-test (p-value)	0.915 (0.403)	0.00531 (0.995)	0.228 (0.796)
Wave 1 PPVT	-0.001 (0.001)	0.000 (0.002)	-0.001 (0.002)
\$19K=<Parental Income <\$28K	-0.014 (0.087)	0.016 (0.093)	-0.028 (0.129)
\$28K=<Parental Income <\$36K	0.076 (0.072)	0.086 (0.097)	0.098 (0.110)
\$36K=<Parental Income <\$45K	0.062 (0.081)	0.036 (0.083)	0.076 (0.120)
\$45K=<Parental Income <\$56K	0.087 (0.073)	0.066 (0.079)	0.121 (0.099)
\$56K=<Parental Income <\$83K	0.165* (0.089)	0.106 (0.104)	0.195 (0.120)
\$83K=<Parental Income	0.117 (0.096)	0.184 (0.128)	0.257* (0.150)
F-test (p-value)	1.078 (0.380)	0.589 (0.739)	1.335 (0.249)
Parents: Married	-0.107 (0.070)	0.043 (0.129)	-0.127 (0.132)
Parents: Divorced, Separated or Widowed	-0.138 (0.087)	0.046 (0.145)	-0.172 (0.153)
F-test (p-value)	1.342 (0.265)	0.0568 (0.945)	0.638 (0.530)
Mothers Education: High School	0.035 (0.093)	0.020 (0.071)	0.039 (0.109)
Mothers Education: Above High School	0.033	0.057	0.090

	<i>Combat Assignment</i> vs <i>No Combat</i> <i>Assignment</i>	<i>Enemy Engagement</i> vs <i>No Enemy</i> <i>Engagement</i>	<i>Enemy Engagement</i> vs <i>No Combat</i> <i>Assignment</i>
	(1)	(2)	(3)
	(0.082)	(0.074)	(0.107)
F-test (p-value)	0.0832 (0.920)	0.421 (0.658)	0.581 (0.561)

Notes: Standard errors clustered on the school are in parentheses, *** p<0.01, ** p<0.05, * p<0.1 Each model includes controls for military-specific variables, including binary indicators for current active-duty military service status, total service length, military rank, branch of service, timing of service, and occupation. Each specification also includes missing dummy categories for each of the control variables with missing information. Estimates are obtained from a separate regression for each independent variable (or mutually exclusive independent variable category). P-values represent the joint significance of mutually exclusive categorical variables, e.g., race, income, and maternal schooling. The sample is comprised of male servicemembers only.

Table 3. The Effect of Combat on Religiosity, NLSAAH

	<i>Weekly Religious Attendance</i>	<i>Prayer</i>	<i>Religious Importance</i>
	(1)	(2)	(3)
<i>Panel I: All</i>			
Combat Assignment	0.079** (0.033)	0.086* (0.050)	0.045 (0.052)
N	482	481	481
<i>Panel II: Current Active Duty</i>			
Combat Assignment	0.124** (0.051)	0.090 (0.090)	0.198** (0.088)
N	196	196	195
<i>Panel III: Prior Service</i>			
Combat Assignment	0.083* (0.042)	0.117* (0.064)	0.019 (0.062)
N	286	285	286
<i>Panel IV: Pre-Enlistment Christian Identification</i>			
Combat Assignment	0.111** (0.045)	0.059 (0.042)	0.014 (0.064)
N	349	348	348
<i>Panel V: Pre-Enlistment Non-Christian Identification</i>			
Combat Assignment	-0.048 (0.043)	-0.014 (0.112)	-0.024 (0.071)
N	133	133	133

Notes: Standard errors clustered on the school are in parentheses, *** p<0.01, ** p<0.05, * p<0.1 Military controls include binary variables for current active-duty military service status, total service length, military rank, branch of service, timing of service, and occupation. Each regression also includes missing dummy categories for each of the control variables with missing information. The sample includes male servicemembers only.

Table 4. The Effect of Enemy Engagement on Religiosity, NLSAAH

	<i>Weekly Religious Attendance</i>	<i>Prayer</i>	<i>Religious Importance</i>
	(1)	(2)	(3)
Enemy Engagement	0.079* (0.043)	0.075 (0.051)	0.011 (0.059)
Combat Assignment without Engagement	0.079** (0.034)	0.095 (0.059)	0.075 (0.064)
N	482	481	481

Notes: Standard errors clustered on the school are in parentheses, *** p<0.01, ** p<0.05, * p<0.1 Military controls include binary variables for current active-duty military service status, total service length, military rank, branch of service, timing of service, and occupation. Each regression also includes missing dummy categories for each of the control variables with missing information. The sample includes male servicemembers only.

Table 5. Sensitivity of Estimated Combat Effects to Added Controls for Pre-Deployment Background Characteristics and Pre-Deployment Religiosity, NLSAAH

	<i>Weekly Religious Attendance</i>			<i>Prayer</i>			<i>Religious Importance</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Panel I: Combat Service</i>									
Combat Assignment	0.079** (0.033)	0.088** (0.042)	0.072* (0.041)	0.086* (0.050)	0.086* (0.051)	0.067 (0.049)	0.045 (0.052)	0.052 (0.054)	0.034 (0.055)
N	482	482	482	481	481	481	481	481	481
<i>Panel II: Enemy Engagement</i>									
Enemy Engagement	0.079* (0.043)	0.085 (0.053)	0.067 (0.052)	0.075 (0.051)	0.088* (0.052)	0.058 (0.050)	0.011 (0.059)	0.021 (0.057)	-0.009 (0.057)
Combat Assignment without Engagement	0.079** (0.034)	0.092** (0.040)	0.077* (0.040)	0.095 (0.059)	0.085 (0.060)	0.075 (0.057)	0.075 (0.064)	0.082 (0.066)	0.075 (0.066)
N	482	482	482	481	481	481	481	481	481
Military Variables & Occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual and Family Covariates	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Pre-Deployment Religiosity	No	No	Yes	No	No	Yes	No	No	Yes

Notes: Standard errors clustered on the school are in parentheses, *** p<0.01, ** p<0.05, * p<0.1 Military controls include dichotomous indicators for current active-duty military service status, total service length, military rank, branch of service, timing of service, and occupation. Each specification also includes missing dummy categories for each of the control variables with missing information. The sample is comprised of male servicemembers only. Full Controls include height, weight, religion indicators at Wave 1, age, age squared, race/ethnicity indicators, education dummies, Picture Vocabulary Test Score, parental income dummies, parental marital status indicators, and maternal education indicators. Pre-deployment religiosity measures include religious attendance weekly, private prayer, and religious importance.

Table 6A. Descriptive Statistics, HRB Survey

	<i>Mean</i>	<i>Standard Deviation</i>
	(1)	(2)
<i>Dependent Variables</i>		
Frequent Religious Attendance	0.189	(0.390)
Prayer	0.220	(0.414)
Religious Importance	0.695	(0.460)
<i>Combat Measures</i>		
Enemy Engagement	0.515	(0.500)
Combat Injury	0.050	(0.218)
Witness Death	0.322	(0.467)
<i>Selected Military Controls</i>		
Army	0.222	(0.416)
Marine	0.217	(0.412)
Navy	0.292	(0.455)
Air Force	0.268	(0.443)
Rank E1-E3	0.074	(0.262)
Rank E4-E6	0.526	(0.499)
Rank E7-E9	0.167	(0.373)
Rank W1-W5	0.040	(0.195)
Rank O1-O3	0.098	(0.297)
Rank O4-O10	0.096	(0.294)
Number of Post-9/11 Deployments	1.661	(1.205)
<i>Selected Background Characteristics</i>		
Age	31.609	(7.626)
Some College	0.475	(0.499)
College Education	0.268	(0.442)
White	0.744	(0.443)
Black	0.153	(0.360)
Other Race/Ethnicity	0.115	(0.319)
Hispanic	0.125	(0.331)
N	11,542	

Notes: Standard deviations in parentheses. Summary statistics are generated using data for male servicemembers from the 2008 Department of Defense Health and Related Behaviors Survey.

**Table 6B: Non-Military Characteristics and Conditional Deployment Assignment,
HRB Survey**

	<i>Enemy Engagement vs No Enemy Engagement</i>
Age	0.008 (0.008)
Age Squared	-0.000 (0.000)
<i>Joint F-test (p-value) for Age</i>	<i>0.560 (0.579)</i>
Black	-0.011 (0.023)
Race Other	-0.002 (0.020)
<i>Joint F-test (p-value) for Race</i>	<i>0.120 (0.883)</i>
Hispanic	-0.006 (0.020)
Married	0.006 (0.016)
Divorced	0.033 (0.022)
<i>Joint F-test (p-value) for Education</i>	<i>1.219 (0.314)</i>
High School	-0.019 (0.035)
Some College	-0.029 (0.036)
College Education	-0.036 (0.039)
<i>Joint F-test (p-value) for Education</i>	<i>0.560 (0.645)</i>
<i>Joint F-test (p-value) for all covariates</i>	<i>1.020 (0.459)</i>
Observations	8,574

Notes: Robust standard errors corrected for clustering on the stratum are in parentheses. Number of observations is in brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample consists of a sample in which each active-duty deployed serviceman is matched on military characteristics available in the HRB survey: military rank, branch of service, and branch specific major command. The final sample is that which has common support on these characteristics.

Table 7. The Effect of Combat Exposure on Religiosity, HRB Survey

	<i>Frequent Religious Attendance</i>	<i>Prayer</i>	<i>Religious Importance</i>
	(1)	(2)	(3)
Panel I: All			
<i>(Conditional on Military Observables)</i>			
Enemy Engagement	0.019** (0.008)	0.014** (0.006)	0.019* (0.010)
N	11,307	11,340	11,278
Panel II: All			
<i>(Common Support on Military Observables)</i>			
Enemy Engagement	0.014 (0.009)	0.024** (0.011)	0.025** (0.011)
N	8,659	8,574	8,545
Panel III: Army			
Enemy Engagement	0.029 (0.021)	0.016 (0.021)	0.039 (0.031)
N	2,517	2,518	2,513
Panel IV: Marines			
Enemy Engagement	0.039* (0.014)	0.005 (0.012)	0.033 (0.024)
N	2,449	2,460	2,444
Panel V: Navy			
Enemy Engagement	0.031 (0.022)	0.013 (0.013)	0.016 (0.013)
N	3,293	3,313	3,280
Panel VI: Air Force			
Enemy Engagement	0.002 (0.008)	0.024*** (0.006)	0.013 (0.024)
N	3,048	3,049	3,041

Notes: Standard errors in Panels I, III, IV, V and VI clustered on the stratum are in parentheses. Statistically significant at *10%, **5%, ***1%. Regressions in Panels I, III, IV, V, and VI control for military rank, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. The estimates in Panel II are drawn from a matching strategy using nearest neighbor matching. In Panel II, standard errors are bootstrapped. In the full sample (Panel I and II) we also control for branch of service. The sample includes male servicemembers only.

Table 8. The Effect of Deployment Assignment, Number of Deployments, and Deployment Length on Religiosity, HRB Survey

	(1)	(2)	(3)	(4)
<i>Panel I: Frequent Religious Attendance</i>				
Enemy Engagement			0.014*	0.020**
			(0.008)	(0.008)
Number of Post-9/11 Deployments	-0.009***			-0.010***
	(0.003)			(0.003)
Deployed 3-6 Months in Last Year		0.005	0.003	0.009
		(0.007)	(0.006)	(0.007)
Deployed 7+ Months in Last Year		-0.033***	-0.036***	-0.031**
		(0.011)	(0.011)	(0.011)
N	11,307	11,278	11,278	11,250
<i>Panel II: Prayer</i>				
Enemy Engagement			0.015**	0.015**
			(0.006)	(0.006)
Number of Post-9/11 Deployments	0.002			-0.000
	(0.003)			(0.003)
Deployed 3-6 Months in Last Year		0.009	0.008	0.007
		(0.013)	(0.012)	(0.012)
Deployed 7+ Months in Last Year		0.007	0.004	0.004
		(0.010)	(0.010)	(0.010)
N	11,340	11,311	11,311	11,282
<i>Panel III: Religious Importance</i>				
Enemy Engagement			0.016*	0.018*
			(0.009)	(0.010)
Number of Post-9/11 Deployments	0.001			-0.002
	(0.003)			(0.003)
Deployed 3-6 Months in Last Year		0.030*	0.028*	0.029*
		(0.015)	(0.016)	(0.015)
Deployed 7+ Months in Last Year		0.010	0.007	0.008
		(0.013)	(0.013)	(0.012)
N	11,278	11,251	11,251	11,222

Notes: Standard errors clustered on the stratum are in parentheses. Statistically significant at *10%, **5%, ***1%. Regressions control for military rank, branch of service, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. The sample includes male servicemembers only.

Table 9. Exploring Heterogeneity in Effect of Combat on Religiosity, HRB Survey

	<i>Frequent Religious Attendance</i>	<i>Prayer</i>	<i>Religious Importance</i>
	(1)	(2)	(3)
<i>Panel I: Enlisted</i>			
Enemy Engagement	0.033** (0.012)	0.018** (0.008)	0.033** (0.012)
N	8,644	8,677	8,615
<i>Panel II: Officer</i>			
Enemy Engagement	-0.020 (0.016)	0.004 (0.017)	-0.018 (0.017)
N	2,663	2,663	2,663
<i>Panel III: Ages 18 to 24</i>			
Enemy Engagement	0.057** (0.026)	0.010 (0.024)	0.062** (0.028)
N	2,486	2,500	2,476
<i>Panel IV: Ages 25 to 32</i>			
Enemy Engagement	0.025 (0.015)	0.020 (0.013)	0.018 (0.024)
N	3,820	3,825	3,808
<i>Panel V: Ages 33 to 50</i>			
Enemy Engagement	-0.002 (0.013)	0.015 (0.011)	0.004 (0.017)
N	5,001	5,015	4,994
<i>Panel VI: Females</i>			
Enemy Engagement	0.035* (0.019)	0.016 (0.020)	0.025 (0.019)
N	3,137	3,132	3,123
<i>Panel VII: Wounding</i>			
Combat Injury	0.073** (0.029)	0.054*** (0.018)	0.033 (0.020)
N	11,182	11,212	11,152
<i>Panel VIII: Witnessing Death</i>			
Combat Witness Death	-0.007 (0.010)	-0.000 (0.008)	0.004 (0.007)
N	11,213	11,245	11,185

Notes: Standard errors clustered on the stratum are in parentheses. Statistically significant at *10%, **5%, ***1%. Regressions control for military rank, branch of service, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. Panels I to V includes male servicemembers, who are enlisted, officers, ages 18 to 24, ages 25 to 32, and ages 33 to 50, respectively. Panel VI is comprised of female servicemembers.

Table 10. The Effect of Combat on Religious and Secular Counseling Receipt, HRB Survey

	(1) <i>Any Counseling</i>	(2) <i>Secular Counseling</i>	(3) <i>Civilian Clergy Counseling</i>	(4) <i>Military Chaplain Counseling</i>
Panel I: Full Sample				
Enemy Engagement	0.072*** (0.011)	0.069*** (0.011)	0.034*** (0.006)	0.040*** (0.008)
Observations	11,361	11,361	11,361	11,361
Panel II: Sample Receiving Counseling				
Enemy Engagement	--	0.038** (0.016)	0.056** (0.026)	0.025 (0.031)
		1,952	1,952	1,952

Notes: Standard errors clustered on the stratum are in parentheses. Statistically significant at *10%, **5%, ***1%. Models control for military rank, branch of service, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. In Panels I to IV, the sample is comprised of male servicemembers only. In Panel V, the sample includes male servicemembers who received at least one form of secular and/or religious counseling.

Table 11. Descriptive Analysis of Mechanisms to Explain Effect of Combat on Religiosity

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Frequent Religious Attendance</i>		<i>Prayer</i>		<i>Religious Importance</i>	
Enemy Engagement	0.019** (0.008)	0.012 (0.008)	0.014** (0.006)	0.008 (0.006)	0.019* (0.010)	0.017* (0.010)
PTSD		0.010 (0.021)		0.004 (0.017)		-0.010 (0.022)
Suicide		-0.006 (0.020)		-0.027 (0.021)		-0.034 (0.021)
Psychological Distress		0.005 (0.014)		0.028* (0.014)		-0.022 (0.016)
Wounding		0.057** (0.025)		0.039* (0.019)		0.027 (0.022)
Military Chaplain		0.060*** (0.016)		0.060*** (0.015)		0.052*** (0.015)
N	11,307	11,307	11,340	11,340	11,278	11,278

Notes: Standard errors clustered on the stratum are in parentheses. Statistically significant at *10%, **5%, ***1%. Models control for military rank, branch of service, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. In Panels I to IV, the sample is comprised of male servicemembers only. In Panel V, the sample includes male servicemembers who received at least one form of secular and/or religious counseling. Models also control for missing observations indicators for PTSD, Suicide, Psychological Distress, Wounding, and Military Chaplain.

Appendix Table 1. The Effect of Combat on Any Religious Service Attendance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	<i>NLSAAH</i>		<i>HRB Survey</i>				
	<i>All</i>	<i>All</i>	<i>All</i>	<i>Army</i>	<i>Marines</i>	<i>Navy</i>	<i>Air Force</i>
Combat Assignment	0.094*						
	(0.052)						
Enemy Engagement		0.076	0.028**	0.045	0.051	0.037	0.010
		(0.063)	(0.011)	(0.034)	(0.032)	(0.023)	(0.010)
Combat Assignment without Engagement		0.109*					
		(0.058)					
N	482	482	11,307	2,517	2,449	3,293	3,048

Notes for *columns (1) and (2)*: Standard errors clustered on the school are in parentheses. Statistically significant at *10%, **5%, ***1%. Models control for military rank, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. In the full sample (Panel A) we also control for branch of service. The sample includes male servicemembers only.

Notes for *columns (3)-(7)*: Standard errors clustered on the stratum are in parentheses. Statistically significant at, *** p<0.01, ** p<0.05, * p<0.1 Number of observations in brackets. Military controls include dichotomous indicators for current active-duty military service status, total service length, military rank, branch of service, timing of service, and occupation. Regressions also includes missing dummy categories for each of the control variables with missing information. The sample includes male servicemembers only. Full controls include height, weight, religion indicators at Wave 1, age, age squared, race/ethnicity indicators, education dummies, Picture Vocabulary Test score, parental income dummies, parental marital status indicators, and maternal education indicators. Pre-deployment religiosity measures include religious attendance weekly, private prayer, and religious importance.

**Appendix Table 2. Estimating the Impact of Combat on Religiosity in the NLSAAH,
Using the Available Control Variables in HRB Survey**

	<i>Weekly Religious Attendance</i>	<i>Prayer</i>	<i>Religious Importance</i>
	(1)	(2)	(3)
<i>Panel I: Combat Assignment</i>			
Combat Assignment	0.093** (0.037)	0.084* (0.050)	0.046 (0.050)
	482	481	481
<i>Panel II: Enemy Engagement</i>			
Enemy Engagement	0.101** (0.044)	0.080 (0.053)	0.019 (0.058)
Combat Assignment without Engagement	0.085** (0.040)	0.088 (0.056)	0.070 (0.059)
N	482	481	481
<i>Panel III: Wounding</i>			
Combat Injury	0.127* (0.073)	0.165** (0.076)	0.053 (0.084)
Combat Assignment without Injury	0.088** (0.037)	0.074 (0.051)	0.045 (0.051)
N	482	481	481
<i>Panel IV: Witnessing Death</i>			
Witness Death	0.101** (0.045)	0.095* (0.055)	0.023 (0.054)
Combat Assignment without Witness Death	0.074* (0.038)	0.060 (0.054)	0.080 (0.064)
N	480	479	479

Notes: Standard errors clustered on the school are in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All models control for age, age squared, race/ethnicity indicators, education indicators, military rank, timing of military service, and branch of service. Each regression also includes missing dummy categories for each of the control variables with missing information. The sample includes male servicemembers only.

Appendix Table 3. Marginal Effects from Multinomial Logit Estimates of the Effect of Enemy Engagement on Types of Counseling

(1)	(2)	(3)	(4)
<i>Military Chaplain Counseling Only</i>	<i>Civilian Religious Counseling Only</i>	<i>Secular Counseling (Civilian or Military)</i>	<i>Counseling from Multiple Sources (Secular and Religious)</i>
Panel I: Enemy Engagement			
-0.0005 (0.0022) [11,381]	-0.0001 (0.0012) [11,381]	0.0276*** (0.0066) [11,381]	0.0473*** (0.0063) [11,381]
Panel II: Wounding			
(0.0057) (-0.0020) [11,252]	-0.0010 (0.0033) [11,252]	0.0553*** (0.0085) [11,252]	0.0850*** (.0082) [11,252]
Panel III: Witnessing Death			
0.0021 0.0027 [11,286]	0.0023* 0.00139 [11,286]	0.0309*** 0.0050 [11,286]	0.0431*** 0.0057 [11,286]

Notes: Standard errors clustered on the stratum are in parentheses. Number of observations is in brackets. Statistically significant at *10%, **5%, ***1%. Regressions control for military rank, branch of service, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. The sample includes male servicemembers only. The comparison group includes those with no reported counseling.

Appendix Table 4. The Effect of Combat Exposure on Selected Mechanisms through which Combat May Impact Religion, HRB Survey

	(1) <i>PTSD</i>	(2) <i>Suicide</i>	(3) <i>Psychological Distress</i>	(4) <i>Wounding</i>	(5) <i>Military Chaplain Counseling</i>
Combat Exposure	0.065*** (0.009)	0.013** (0.005)	0.040*** (0.008)	0.078*** (0.012)	0.039*** (0.008)
Observations	11,366	10,796	11,370	11,338	11,380

Notes: Standard errors clustered on the stratum are in parentheses. Statistically significant at *10%, **5%, ***1%. Models control for military rank, branch-specific major command indicators, number of combat deployments since September 11, education indicators, age, age squared, and race/ethnicity dummies. In the full sample (Panel A) we also control for branch of service. The sample includes male servicemembers only.