

# The Threat of War and Psychological Distress Among Civilians Working in Iraq and Afghanistan

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## Abstract

*Research documents the mental health toll of combat operations on military personnel in Iraq and Afghanistan, but little research examines civilians who work alongside members of the military. In this research, we argue that a sense of threat is an “ambient stressor” that permeates daily life among civilians who work in these war zones, with mastery likely to both mediate and moderate the mental health effects of this stressor. Using a unique probability sample of Department of Army civilians, we find that threat is positively related to distress, but mastery mediates this relationship nonlinearly, with the indirect relationship between threat and distress strengthening as threat increases. The moderating function of mastery is also nonlinear, with moderate levels of mastery providing maximum stress buffering. This research suggests that contextual conditions of constraint can create nonlinearities in the way that mastery mediates and moderates the effects of ambient stressors.*

## Keywords

mental health, self and identity, stress, military sociology, mastery, distress, anger

In the wake of American military engagements in Iraq and Afghanistan, research has increasingly examined how serving in these wars affects the mental health of military personnel (e.g., Maguen et al. 2010; Milliken, Auchterlonie, and Hoge 2007; Riddle et al. 2008). Surprisingly, though, little research has examined civilian personnel who often work quite closely with members of the military in active war zones. For example, in a recent review on the health effects of military combat, a section on noncombatants was included that addressed such populations as refugees and children (Levy and Sidel 2009) but did not even acknowledge

civilians working for the various federal military services, such as the Department of the Army. This is surprising in part because civilians are often directly employed by the military to work in potentially dangerous settings. For example, in the same year as this review, there were almost a quarter of a million U.S.

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civilians directly employed by the U.S. Army, with over 6,000 civilians deployed to support the U.S. military operations in Iraq and Afghanistan (U.S. Department of the Army 2010).<sup>1</sup>

The lack of attention to civilians is also surprising because research on military personnel shows that deployment to a war zone can incur a greater mental health cost than deployment to non-combat conditions (Peterson et al. 2010; Wells et al. 2010). Additional research indicates that a sense of threat is a substantial stressor for those exposed to the war zone (Bartone 2006; Kelly and Vogt 2009; La Bash et al. 2009). Furthermore, the influence of threat on psychological problems is independent of serving in a combat role (Iversen et al. 2008; Mulligan et al. 2010; Nissen et al. 2011; Vasterling et al. 2010). Thus, irrespective of whether one directly engages in combat, immersion within a war setting can create a sense of prevailing hazardous conditions in the larger environment, which can be termed an “ambient stressor” (Pearlin 1999). This stressor is likely to be especially salient for civilians because individuals who are less experienced with war settings have a greater tendency to perceive or recall life-threatening experiences (Browne et al. 2007). Consequently, even

among civilians who are not directly involved in combat, deployment to a war zone is likely to result in a sense of ambient threat.

Despite evidence showing that a sense of threat from war is likely to be associated with higher levels of psychological distress, research on the stress process suggests that stressors are likely to *indirectly* influence mental health (Pearlin and Bierman 2013). One way these indirect effects can occur is through a reduction in psychological resources, and in particular mastery (Avison and Cairney 2003). This view is relevant to research on ambient stress because longitudinal research shows that reductions in mastery explain the relationship between ambient stress and increases in depression (Bierman 2009). Mastery is therefore likely to mediate the relationship between a sense of threat and psychological distress. However, a stress process perspective also suggests that psychological resources can weaken or “buffer” the adverse consequences of stressors (Pearlin and Bierman 2013). Research in fact highlights that mastery is efficacious in buffering the effects of ambient stressors (Schieman and Meersman 2004). Mastery is therefore likely to not only mediate the relationship between a sense of threat and distress, but moderate it as well. This simultaneous process of mediation and moderation has been termed *structural amplification* because the stressor strengthens its deleterious mental health effects by reducing a buffering agent (Ross and Mirowsky 2006).

In the current study, we synthesize research on military experiences in war zones with literature on the stress process to analyze data from a probability sample of Department of Army civilians (DACs) working in Iraq and Afghanistan during active hostilities. A central contribution of this research is to show how the relationship between ambient threat and

<sup>1</sup>Civilians were deployed in support of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF), with the primary focus of OEF military operations in Afghanistan. Although deployment could include locations outside of direct hostilities, such as Qatar and Kuwait in the case of OIF, it should also be noted that this figure likely underestimates the population of civilians subject to deployment to combat areas. For example, the subsequent year’s report indicates that over 7,000 civilians were deployed in support of OIF and OEF (U.S. Department of the Army 2011), and it is likely that there is little overlap between the deployed groups in the two years. Thus, over the course of U.S. military engagements, a substantial number of civilians will be deployed in a support capacity to potentially threatening conditions.

distress is contingent on the role of mastery as both a mediator and moderator, thereby demonstrating that attention to structural amplification is important for understanding how stressors experienced in war influence mental health. Further, as is described in more detail below, we also delineate how military constraints can create nonlinearities in these mediating and moderating properties. Thus, an additional contribution of this research is in presenting a more complex model of structural amplification than has been acknowledged in previous research by demonstrating how a restrictive structural context may create supplemental contingencies in processes of structural amplification.

## BACKGROUND

### *The Modern Context of Civilians in War*

The American military has historically relied on civilians to support military efforts at home and abroad (Avant 2005; Singer 2003). This is no more so than in the Twentieth Century, when civilians began to increase their participation in military efforts, in part due to a dramatic qualitative and quantitative shift that occurred in the early 1990s as a result of the end of the Cold War. Increased operation tempo in support of humanitarian and peacekeeping missions combined with a rapidly technologizing military to conduce the involvement of a significantly larger number of civilians into working for and with the U.S. military (Kelty 2009). Civilian roles also expanded, as civilians were no longer only (or even primarily) tasked with rear echelon support functions; they were now integrated with military units to support the core war-fighting missions of uniformed military personnel. Since this turning point, the use of civilians both as contractors and as federal (Department of Defense)

employees has grown to the point of where many analysts and practitioners contend that it is impossible to mobilize our military for any hostile or peaceful engagement without the support of the civilian component (Avant 2005). Civilians provide expertise in a variety of capacities, including not only “softer” functions that have analogues in civilian occupations, such as information technology and logistics, but also roles that many would consider the backbone of military functioning, such as intelligence and weapons platform maintenance. The Department of Defense now officially refers to civilians working for and with the military as “force multipliers” in formal recognition of their essential contributions in completing military missions around the globe (Department of Defense 2010; Quadrennial Defense Review 2012). Furthermore, the most recent Quadrennial Defense Review (2012:xiii) states as an express goal to “improve the Civilian Expeditionary Workforce, which provides deployable civilian experts to Afghanistan, Iraq, and other theaters.”

The role of civilians working for the Department of Army (referred to as Department of Army civilians or DACs) in Iraq and Afghanistan can be understood in contrast to the role of civilian contractors because DACs differ from contractors structurally in several important ways. In particular, DACs are much more comprehensively encompassed by and constrained within the strictures of the military system. DACs are considered integrated into military units, with concomitant benefits not permitted for civilian contractors (e.g., included in formal social events and eligible for awards and commendations). DACs are also integrated into the formal chain of command within the military structure, are found throughout the leadership structure, and can supervise military

personnel.<sup>2</sup> Consequently, DACs in Iraq and Afghanistan were integrated across a hierarchy of roles. These included administration and coordination roles with a relatively large supervisory component (e.g., support operations officers, oversight of logistics missions, and coordination of supplier packages), as well as lower ranking “mission execution” jobs (e.g., maintenance of vehicles in the motor pool). Conversely, contractors report to and are evaluated by their superiors within their own company and are not in positions of leadership or supervision within the chain of command. Contractors were therefore almost exclusively employed in mission execution jobs in the two units we study in this research.<sup>3</sup> Perhaps most importantly, civilian contractors are limited in what kind of work they perform and how many hours they work by the specifications in the contract under which they are hired. DACs, however, can be compelled by military leaders to extend work hours and/or the scope of their work in order to accomplish a given mission, with the result that DACs are much more liable to the constraints and needs of the military system. The regular use and broader integration of DACs within the military system in Iraq and Afghanistan underscores the need to include a focus on their experiences in understanding the mental health consequences of military activities.

The need for greater attention to DACs is especially the case because civilians working with the military in Iraq and Afghanistan assumed a significant

amount of risk, even if they did not directly engage in combat operations. Among civilians working with the logistics brigades in this study, risk was predominantly of two forms: rocket/mortar attack while inside the base perimeter and IED or ambush attack while traveling via ground transport outside of a secure military base.<sup>4</sup> Since DACs could be compelled to travel on ground convoys, whereas contractors could volunteer but not be compelled, the risk of exposure to IEDs was actually greater for DACs than contractors working with the logistics brigades in this study. Risk of rocket/mortar attack is more democratic because all personnel on base, regardless of employment status, are at equal risk, and it was in fact not uncommon to hear a base siren indicating incoming hostile fire. The threat posed by such attacks was potent for civilian personnel because the standing order upon the siren’s signal was to collect personal protection gear (i.e., helmet, Kevlar plated vest) and head straight to a designated bunker until the all-clear signal.

Thus, although they did not engage in combat, DACs working in Iraq and Afghanistan were likely to be presented with recurrent and trenchant reminders of the precarious nature of their work conditions and in multiple situations were powerless to avoid these threats. Such threatening conditions may lead to psychological distress among civilians working in these environments. We next turn to this question by describing how a process of structural amplification is likely to help to explain the relationship between threatening conditions and psychological distress, and in particular the

<sup>2</sup>It is of interest to note that the Deputy Brigade Commander in Iraq was a GS15 DAC. GS stands for the General Schedule, which is the pay scale used by federal civil service agencies, covering a majority of federal civilian employees. GS levels range from 1 to 15.

<sup>3</sup>The civilians in these units excluded private security contractors, those carrying weapons and capable of both defensive and offensive tactics.

<sup>4</sup>Brigade is the specific term for the tactical units from which we were surveying. “Unit” is a generic term for any size from platoon and larger. Brigades are large tactical units comprised of two to six battalions. Battalions can range in size from several hundred to over a thousand personnel.

role of mastery in this process of structural amplification. Because structural amplification consists of two components—a mediating and a moderating component—we first describe how mastery is likely to mediate the effects of threatening conditions on distress and then describe how mastery is likely to moderate these effects.

### **Mastery as Mediator**

Mastery is “the extent to which one regards one’s life chances as being under one’s control in contrast to being fatalistically ruled” (Pearlin and Schooler 1978:5). Figure 1 describes how mastery is expected to act as a mechanism in the mediation component of structural amplification. This figure shows that mastery is expected to be inversely related to distress, with lower mastery related to higher distress, and mastery is also expected to be reduced by threat, so that higher levels of threat create greater distress by lowering mastery. Mastery is a focal mediator in this model because a pervasive and consistent danger to one’s life is inherently harmful to a sense of mastery by creating a sense that one is powerless to achieve a fundamental goal of living in a safe environment free from danger (Ross 2011). Supporting this argument, research shows that a greater sense of vulnerability to attack is related to lower levels of mastery (Adams and Serpe 2000). Reductions in mastery can in turn have substantial consequences for mental health because the sense that one cannot influence successes and that outcomes are purely random can evoke a great deal of distress (Mirowsky and Ross 2003). The potency of mastery for mental health is reflected in research showing that a sense of control is inversely related to a variety of indicators of distress, including depression, anger, and anxiety (Avison and Cairney 2003; Mabry and Kiecolt

2005; Pudrovska et al. 2005). Reductions in mastery due to threat are therefore likely to increase psychological distress, which will fulfill the mediation component of structural amplification.

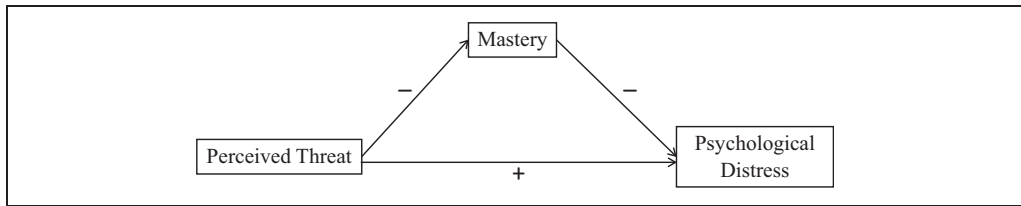
Some research also suggests that there may be limits to the inverse relationship between mastery and distress. At particularly high levels, “perceptions of control may become so pervasive that they are universally applied even in situations which obviously do not suggest control is possible” (Wheaton 1985:148). The result is likely to be frustration and self-blame for failure to affect adverse circumstances that are beyond individual control (Kiecolt, Hughes, and Keith 2009; Wheaton 1985). Problems caused by an excessive sense of control can offset the salutary effects of a high level of perceived control, thereby weakening the benefits of high levels of mastery for distress (Kiecolt et al. 2009; Mirowsky and Ross 2003).<sup>5</sup> The result will be a nonlinear relationship between mastery and distress, with the inverse relationship weakening as mastery increases.

Figure 2 illustrates several important ramifications of this potential non-linear relationship by conceptually depicting the non-linear relationship between mastery and distress. First, this figure shows that the slope of the relationship between mastery and distress is *positive* at the

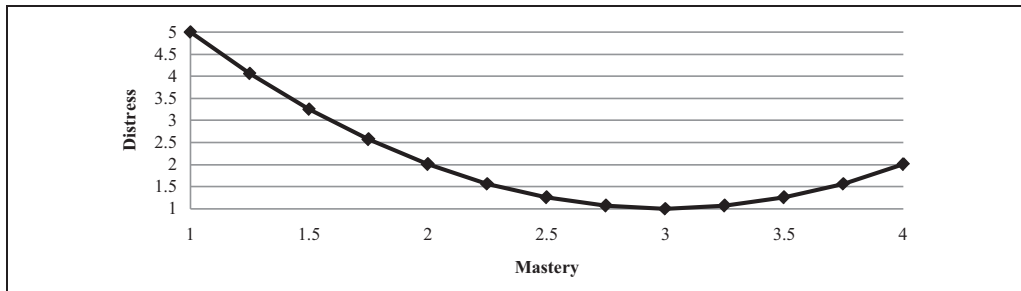
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<sup>5</sup>Some research makes a distinction between illusory and non-illusory forms of control, with non-illusory control predicted by social statuses and illusory control the sense of control not accounted for by status placement (e.g., Mirowsky and Ross 1990). However, because our study is based on a working population from a specific occupational field, differentiating between status and non-status sources of perceived control is less germane than in studies with much greater disparity in status placement. In addition, research on structural amplification has generally employed perceived control as an overall construct, rather than differentiating between illusory and non-illusory control.





**Figure 1.** Conceptual Model of Mediated Relationship Between Threat and Distress



**Figure 2.** Conceptual Figure of Nonlinear Relationship Between Mastery and Distress

highest levels of mastery. This illustrates how particularly high levels of mastery may actually be detrimental for mental health, although the overall level of distress predicted at high levels of mastery is relatively low, thereby reflecting the expected benefits of a strong sense of control. More importantly, if we follow this figure from low to moderate levels of mastery, we see that distress does decrease, but also the extent to which distress decreases as mastery increases changes across levels of mastery: There is a much greater drop in distress as mastery increases from value of one to two than from a value of two to three. Thus, the inverse relationship between mastery and distress is *stronger* at *lower* levels of mastery. To put it another way, decreases in mastery are more powerfully associated with increases in distress as mastery weakens. As a result, influences that reduce mastery will have progressively stronger indirect effects on distress as these influences grow and mastery is more greatly diminished.

These potential ramifications are relevant for the current research because

the military is a “total institution” that is by definition inflexible to individual demands (Caforio 2002; Lundquist 2004). Furthermore, while some have argued that the U.S. military is becoming less characteristic of a total institution (e.g., Moskos, Williams, and Segal 2000), the pervasive and encompassing nature of the total institution especially characterizes military operations in combat zones. The life-threatening context of the war zone permits the military institution to enact greater control over daily life of individuals living and working on the military installation than may occur in non-hostile settings. For example, military and civilian personnel are constrained by rules and laws in combat zones that do not exist outside of active theaters of operations. These formal constraints are in place to protect personnel from harm, to maintain functional relationships with the local population, and to guard sensitive intelligence information and material assets. Consequently, civilians working within a military setting who possess a high degree of perceived control

are likely to experience frustration in attempting to ameliorate or manage characteristics of the situation that are imperious to individual efforts. These frustrations will offset the benefits of mastery for distress, likely leading to a non-linear relationship between distress and mastery similar in form to the relationship depicted in Figure 2.

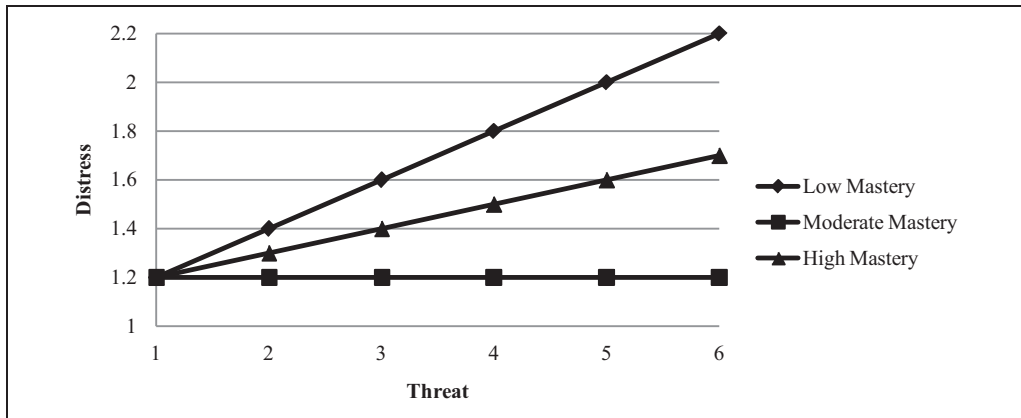
The result will be a pernicious process: Threat depletes mastery, and the deleterious effects of decrements in mastery intensify as mastery decreases. Thus, the indirect relationship between threat and distress is likely to progressively strengthen at greater levels of threat. These nonlinear indirect effects will therefore provide an additional avenue for the stressor to amplify its relationship with distress because, simply by exhausting mastery, the deleterious consequences of threat for psychological distress will increase in strength. Yet, previous research on the mediating component of structural amplification has not taken the possibility of nonlinear amplification into account, instead primarily examining linear relationships between mastery and distress in these mediating processes. Although examination of linear mediation can help explain how threat influences distress, it does not acknowledge the possibility that threat may amplify its consequences for distress because tolls on mental health grow stronger as mastery is progressively reduced by threat.

### ***Mastery as Moderator***

The second component of structural amplification is focused on whether the mediating resource buffers the effects of the stressor, meaning that higher levels of the resource weaken the relationship between the stressor and mental health (Pearlin and Bierman 2013; Ross and Mirowsky 2006). Perceptions of control have in fact been shown to buffer the

effects of a wide number of stressors (Thoits 1995), including the effects of ambient stressors (e.g., Becker et al. 2005; Schieman and Meersman 2004). Mastery buffers the effects of stressors because individuals with a strong sense of control are likely to see stressors as unusual and avoidable in the future, and also because individuals with a strong sense of mastery are more likely to engage in problem-focused coping (Ben-Zur 2002; Mirowsky and Ross 2003). Enhanced problem-focused coping may especially be important in war settings as, for example, a strong sense of control can strengthen hazard preparedness (Norris, Smith, and Kaniasty 1999), and such preparedness is likely to blunt the stress of threatening war conditions. These findings reinforce how the threat of war may relate to psychological distress through structural amplification: Mastery is likely to buffer the effects of threat on psychological distress, but a sense of threat is also likely to reduce the availability of this psychological resource.

The buffering effects of mastery may, however, also be nonlinear. This is because many of the threats posed by modern warfare have a certain degree of randomness that hinders individual efficacy—the opposition often engages in “asymmetric warfare,” including guerilla and other tactics where strategy often has a basis in the unexpected (Knoops 2009). For example, the types of threats DACs were most likely to face—roadside improvised explosive devices or rocket/mortar attacks—are imprecise and often belie predictability, thereby nullifying personal efforts to alter their threat. Yet, individuals with a high sense of control are likely to blame themselves for even uncontrollable experiences, thereby exacerbating the stress of these experiences (Lachman and Weaver 1998). Individuals with a high degree of personal control may therefore assume



**Figure 3.** Conceptual Figure of Nonlinear Moderating Effects of Mastery

responsibility for ambient threats or assume that such threats are avoidable, even though they cannot be wholly addressed or avoided through individual ameliorative efforts. These attributions of personal responsibility will enhance the stress caused by a constant sense of threat from the environment, thereby detracting from buffering effects achieved through mastery. The result will be a nonlinear form of moderation in which higher and lower levels of mastery are less likely to prevent the deleterious effects of ambient threats than are moderate levels of mastery.

Figure 3 illustrates a conceptual model of these non-linear buffering effects. This figure shows that, at low levels of mastery, there is a steep incline in the relationship between threat and distress, indicating that higher levels of threat are strongly associated with greater distress. At moderate levels of mastery, the slope is flat; this indicates a buffering effect of mastery because there is little change in distress associated with an increase in threat. At high levels of mastery, we also see a flatter slope than at low levels of mastery, again indicating a buffering effect; however, this slope is substantially steeper than at moderate levels of mastery, demonstrating that high levels of mastery provide only

a partial buffering effect because maladaptive behaviors and cognitions spurred by a strong sense of control enhance the stress of threat and weaken these buffering effects. It is important to specify that these buffering effects are non-linear because higher levels of mastery do not consistently provide greater protection from the effects of threat. Thus, the non-linearity comes in the form of the moderation, rather than the effects of threat. For this reason, Figure 3 depicts linear relationships between threat and distress, but this figure also shows that the relationship between threat and distress is weakest at moderate levels of mastery, thereby displaying a non-linear buffering pattern.

Although nonlinear buffering effects of mastery have seldom been examined in the literature, Krause (1986) reports nonlinear moderating effects between stress exposure and perceived control, and Hoffmann and Su (1998) indicate that high levels of perceived control can exacerbate the effects of stressful life events in some cases. Hence, just as with the mediating function of mastery, it is important to consider whether the role of mastery in the moderating component of structural amplification is also non-linear. Overall, then, the purpose of this research is to examine whether mastery



mediates and moderates the relationship between ambient threat and psychological distress in a process of structural amplification among Department of Army Civilians, but we also pay careful attention to whether mastery plays a nonlinear role in this stress process.

## METHODS

### Sample

Data for this study were obtained using a web-based survey administered to two logistics brigades deployed in Iraq and Afghanistan (Kelty and Bierman 2013).<sup>6</sup> The primary purpose of the survey was to examine attitudes toward the military's use of contractors, but in an attempt to maximize the utility of this unique sampling opportunity, the end of the survey included a series of questions dealing with mastery, psychological distress, and perceived threat. Respondents were invited to participate based on random selection through a computer

program with a full list of all federal civilians working with each brigade, with this list provided by each brigade's personnel office.<sup>7</sup> Because of security concerns, each brigade's command disseminated links to the web survey to those selected for inclusion in the study. Surveys were completed anonymously and data were encrypted for transmission via the Internet. Participation was voluntary and each respondent was provided with an informed consent form and a debriefing form upon completion (or refusal) of the survey.

Three hundred federal civilians working with the brigade in Iraq were invited to participate, and 242 (81 percent) responded to the survey. Of the 300 federal civilians in the brigade in Afghanistan invited to participate, 205 (68 percent) responded. Subsequent examination of responses showed that 43 of these respondents were contractors or did not indicate being regular civilian employees and were subsequently dropped from the sample, leaving a sample size of 404.<sup>8</sup>

Respondents were permitted to leave items blank and continue on with the survey, with two important exceptions. The first was a required answer for an informed consent question asking for consent to participate. Second, because of anonymity rules required by the Department of Defense, if a respondent logged

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<sup>6</sup>A small minority of those assigned to the Afghanistan logistics command was stationed in Kuwait and Qatar. *Unit* is a generic term for any size from platoon and larger. *Brigade* is the more specific term for the tactical units from which we were surveying. Brigades are large tactical units comprised of two to six battalions. Battalions can range in size from several hundred to over a thousand personnel.

<sup>7</sup>Although the sampling strategy was intended to target DACs, inspection of the sample indicated the possibility that it may encompass Department of Defense civilians (DoDCs), but the distinction between the two may at times be nebulous, particularly in wartime operational conditions, in which the emphasis is on filling needed roles over positional specification. This, combined with the use of probability sampling methods, lends confidence that this sample is roughly representative of the brigades' civilian component. Moreover, in subsequent discussions, unit representatives indicated that DACs were the primary basis of the civilian component, supporting our terminological specification to civilians in our sample as DACs.

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<sup>8</sup>Information obtained from command authorities indicates an estimate of between 900 and 1,050 for each unit's regular civilian component. Even using the highest estimate, this sample is almost 20 percent of the civilian component, indicating a substantial portion of potential respondents. Thus, although this sample is somewhat small by sociological standards, larger samples are more important for ensuring representativeness when there is a much larger population encompassing greater diversity. Although an additional concern in regards to this sample size may be whether it provides sufficient statistical power, that we establish a number of statistically significant results even with the size of this sample underscores the strength of these findings.

off before completing the survey, he or she could not log on and complete the survey at a later time. This second exception is especially important because in war zone conditions, emergencies can often arise that require the respondent to cease participation in the survey. Nonresponse is therefore unlikely to be due to the nature of the questions themselves and is instead due to the exigencies of studying a population in which demanding circumstances can arise quite suddenly. Inspection of the data confirmed this pattern, as a majority of nonresponses were due to incomplete surveys, and discontinuation largely occurred prior to the presentation of this study's focal measures. This is important for the current research because since values on neither the independent nor dependent variables determine missingness, the missing responses

are essentially "missing completely at random" (MCAR), and under such conditions there is no bias in parameter estimation due to missingness (Enders 2010).<sup>9</sup> Consequently, 45 cases are not included in these analyses because they are missing on all focal measures due to incomplete surveys, and an additional respondent was dropped because data cleaning indicated a response set in which the respondent provided identical responses regardless of the question, thereby producing an analytic sample of 358.<sup>10</sup>

### **Focal Measures**

*Psychological distress.* Within this research, we examined both internalizing and externalizing forms of distress.<sup>11</sup> Our

<sup>9</sup>To support this argument, preliminary analyses examined relationships between the focal variables while including multiple variables from the beginning, middle, and last part of the first half of the survey as "auxiliary variables." Auxiliary variables are measures that are not part of the analyses but can lend information to improve estimates in the presence of missing data (Enders 2010). The measures used as auxiliaries primarily involved attitudes toward the military's use of contractors and were not of focal interest in the current study. Inclusion of these earlier responses as auxiliaries should therefore adjust analyses if respondents interrupted the latter half of the survey due to the nature of the previous questions. No substantive differences were found with the inclusion of these auxiliary variables, supporting our argument that nonresponses to the focal measures in this study were due to exigencies external to the survey and were therefore essentially completely at random.

<sup>10</sup>Approximately a third of the analytic sample indicated having experienced less than 5 months of deployment in the previous 12 months, while another quarter indicated 5 to 6 months of deployment, and the remainder indicated between 7 and 12 months of deployment. Deployment time was not significantly related to any focal measure in this study, and there was no significant difference in deployment time between those stationed in Iraq and Afghanistan. That deployment time was unrelated to threat indicates a relatively persistent sense of threat in the environment that did not diminish over time.

<sup>11</sup>Distress is often measured in research on the mental health effects of job conditions using a combination of symptoms of anxiety and depression (e.g., Hilton et al. 2008), which are considered indications of "internalizing" because they are inwardly focused. Conversely, indications of emotional distress such as anger are considered "externalizing" because they are outwardly focused (Lucas and Gohm 2000; Nolen-Hoeksema and Rusting 1999). Alcohol abuse is also often used to measure externalizing, but is less germane to the current research because access to alcohol was severely curtailed in the setting under study. A sociological approach to mental health encourages attention to both internalizing and externalizing mental health outcomes. Because the intention of the sociological study of mental health is to understand the consequences of social conditions, a focus on only one type of outcome fails to appropriately delimit the contours of the ramifications of these social conditions (Aneshensel 2005). In some cases, this is important because the consequences of stressors may differ across internalizing and externalizing outcomes (e.g., Bierman 2012). Even if relationships are similar across outcomes though, attention to both internalizing and externalizing outcomes provides a more comprehensive understanding of the effects of lived experiences. This latter point is especially important to consider because mastery has been linked to not only depression and anxiety but also anger (Avison and Cairney 2003; Mabry and Kiecolt 2005; Pudrovska et al. 2005). Because research suggests that mastery's effects extend across mental outcomes, a full test of mastery's mediating role should examine both externalizing and internalizing, and it is for these reasons that we examine both internalizing distress and anger in this study.

internalizing measure of distress was adapted from the K6, a commonly used scale that validly measures “non-specific psychological distress” by examining a core set of symptoms that are common to many psychological disorders (Drapeau et al. 2010; Kessler et al. 2002). Four indications of anxiety and depression were included: so sad nothing could cheer you up, nervous, hopeless, and restless or fidgety.<sup>12</sup> Respondents indicated the frequency they experienced each symptom in the previous 30 days on a scale of 1 (never) to 5 (all the time). The mean of these items was used as the indicator of internalizing aspects of distress (Cronbach’s alpha = .75). Anger was measured based on two symptoms with the same response format: angry and irritable.<sup>13</sup> The mean of these items was used as the indication of anger (Cronbach’s alpha = .82).

**Mastery.** Mastery was measured using a set of four items adapted from Pearlin

and Schooler’s (1978) mastery scale, and this set of items has previously been used to document the consequences of ambient stress for mastery (Bierman 2009). The four items are: I have little control over the things that happen to me; there is really no way I can solve some of the problems I have; I often feel helpless in dealing with problems of life; sometimes I feel that I am being pushed around in life. Responses were coded on a scale of 1 = agree strongly to 4 = disagree strongly, with the mean of responses used as the indication of mastery (Cronbach’s alpha = .77).

**Threat.** A sense of threat to one’s life was measured using the question, “In your current deployment, how often have you felt your life was threatened?” Responses were coded as: 1 = never, 2 = less than once a month, 3 = once a month, 4 = a few times a month, 5 = once a week, 6 = a few times a week or more.<sup>14</sup>

<sup>12</sup>The K6 contains two additional items that were dropped primarily due to issues of questionnaire length. We compared the four- and six-item measures of distress using the National Survey of Midlife Development in the United States (MIDUS) and found an extremely high overlap between the two scales ( $r > .9$ ), thereby strongly indicating that, much like the six-item measure, the four-item measure is useful as an overall gauge of psychological dysfunction.

<sup>13</sup>The anger items were adapted from the second wave of the MIDUS and are similar to other scales of anger used in ambient stress research, which include self-reports of anger and irritation (e.g., Schieman and Meersman 2004). A confirmatory factor analysis supported measuring anger as distinct from symptoms of anxiety and depression. This model indicated a nonsignificant chi-square statistic ( $\chi^2 = 7.483$ ,  $df = 7$ ,  $p > .10$ ), as well as strong fit indices (Comparative Fit Index = .999, root mean square error of approximation = .014, standardized root mean square residual = .017), with the internalizing distress items loading on one factor and the anger items loading on a second correlated factor. Standardized loadings were all quite strong, at approximately .6 or above for all items.

### Control Measures

Criteria for inclusion of control measures was based on social statuses or job statuses that could influence both exposure to threat and either the mediators or distress, thereby creating the possibility of a spurious relationship. Education was controlled using a series of dichotomous variables in which high school diploma was compared to associate’s degree, college degree, and more than a college degree. Marital status was controlled

<sup>14</sup>Although a single item, previous research establishes that single-item measures of perceived threat are powerful predictors of psychological well-being (e.g., Gil and Caspi 2006; Holbrook et al. 2001). Additional military-specific research shows that single-item and multi-item measures of threat are similar predictors of psychological well-being (e.g., Mulligan et al. 2010; Renshaw 2011), further indicating little loss of reliability or validity through the use of a single-item measure.

using a dichotomous variable in which 1 = nonmarried. Gender was controlled using a dichotomous variable in which 1 = woman. Because age contained a great deal of variability but few observations at specific ages, preliminary analyses showed that statistical models were more stable when age was coded as a series of dummy variables, in which a relatively low age for the sample (under 39) and a higher age (age 55 and over) was contrasted to a middle-age group (age 40–54). Unit location was also taken into account with a dichotomous variable in which 0 = Afghanistan and 1 = Iraq.

### Plan of Analysis

Because this study examines both mediation and moderation, analyses are conducted in two stages. First, path analysis is used to test the extent to which mastery mediates the relationship between threat and each aspect of psychological distress.<sup>15</sup> In linear path analysis, mastery is regressed on threat and, simultaneously, a measure of distress is regressed against both threat and mastery. Following this, two coefficients are multiplied together—the coefficient for the relationship between threat and mastery and the coefficient for the relationship between mastery and the measure of distress. This product is the *indirect effect*, which is the estimate of the relationship between threat and the distress outcome *through* mastery (Preacher and Hayes 2008). Conversely, the relationship between threat and the distress outcome indicates the *direct effect*, which is the aspect of the relationship that remains *after* the indirect effect is

partialed out. Thus, if the relationship between threat and distress is not significant, this does not mean that threat is unrelated to the distress outcome, only that the relationship that remains after the indirect effect is held constant is not significant.<sup>16</sup>

Recent innovations describe how path analysis can be broadened to encompass nonlinear relationships between a mediator and an outcome (Hayes and Preacher 2010). Within this framework, mastery is still regressed against threat as in a linear path analysis, but the distress outcomes are then regressed against both the linear and quadratic mastery terms, as well as threat.<sup>17</sup> A significant quadratic term indicates nonlinearity, in which the relationship between mastery and distress varies across levels of mastery. Because the relationship between mastery and distress comprises part of the indirect effect, a quadratic relationship between mastery and distress implies that the indirect relationship between threat and distress will vary across levels of mastery. In this case, the indirect relationship will be presented at the predicted level of mastery associated with each level of threat, thereby demonstrating how the indirect effect varies in response to

<sup>16</sup>Traditionally, mediation has been tested by examining whether the relationship between focal independent variable and dependent variable weakens when the mediator is controlled; however, research has shown that testing mediation through the product of coefficients is superior to this multistep method (Hayes 2013).

<sup>17</sup>Within the nonlinear path model, the quadratic term for mastery is allowed to covary with the exogenous variables, but this does not alter the estimation of the linear relationship between the exogenous variables and mastery. The quadratic term is also allowed to covary with the error term for mastery, which allows the quadratic relationship between mastery and each distress outcome to be tested as in a conventional quadratic model (Hayes and Preacher 2010).

<sup>15</sup>Although structural equation modeling (SEM) is often used to test indirect effects, the tandem functioning of nonlinearity and moderation in the focal relationships prevented the application of SEM in this study.

differences in mastery associated with threat (Hayes and Preacher 2010).

In a second set of analyses, the buffering effects of mastery are tested by interacting mastery with the threat variable. A significant interaction indicates that mastery modifies the relationship between threat and a distress outcome. These tests can also be broadened to examine nonlinear forms of moderation by interacting both linear and quadratic terms for mastery with the threat variable. A significant interaction between threat and a quadratic term indicates nonlinear buffering; in other words, the extent to which mastery moderates the relationship between threat and distress varies across levels of mastery. When non-linear moderation occurs, the relationship between threat and distress at different levels of mastery will be presented to explicate how this relationship changes across levels of mastery.

All models are estimated using Mplus 5.21, with missing data in the analytic sample taken into account using full information maximum likelihood (FIML) estimation techniques, which provide unbiased, efficient parameter estimates in the presence of missing data (Enders 2010). Because standard hypothesis tests for indirect effects that assume normality may be particularly problematic in smaller samples (Hayes and Preacher 2010), bias-corrected bootstrapping is employed for all hypothesis tests. Confidence intervals are built based on parameter estimates obtained through replicated subsamples, with significance indicated by an interval not containing zero (Preacher and Hayes 2008). The software permits significance levels of .05 and .01. To avoid variations in results due to resampling, 5,000 resamples are used for all bootstrap estimates. Threat and mastery were also mean-centered prior to

**Table 1.** Study Descriptives

	M	SD
Internalizing distress	1.504	0.538
Anger	1.844	0.825
Threat	2.706	1.760
Mastery	3.126	0.503
More than college degree	0.138	0.345
Associate's degree	0.315	0.465
College degree	0.264	0.440
Nonmarried	0.332	0.470
Women	0.193	0.395
Low age	0.156	0.363
High age	0.217	0.412
Stationed in Iraq	0.508	0.500

Note: N = 358

creation of quadratic and interaction terms to enhance interpretability.

## RESULTS

### *Sample Characteristics and Prevalence of Threat*

As can be seen in Table 1, the mean for threat suggests that respondents experienced a sense of threat that was on average substantially greater than none. Additional analyses supported this interpretation, as almost two-thirds of the sample indicated experiencing some threat, with over a third indicating a few times a month or more. Threat was therefore a relatively common stressor experienced by even non-military personnel, but there was still a fairly noteworthy dispersion of frequency of threats. Furthermore, when we regressed threat against the control variables in ancillary analyses, there were few significant predictors: Women indicated lower levels of threat ( $b = -0.473$ ), as did those with greater than a college degree ( $b = -0.567$ ), and both of these relationships were significant at  $p < .05$ . Altogether then, threat was a fairly common stressor experienced



by DACs, and it was also largely random with respect to multiple background social statuses and deployment location.<sup>18</sup>

Table 1 also provides sample means of the study's additional focal and control variables. As a way of providing some context to these measures, we compared them to a smaller companion study of military personnel stationed in the same brigades.<sup>19</sup> These comparisons showed that DACs were older by an average of approximately seven years and less likely to be married (74 percent of the military reported being married, while 67 percent of DACs reported being married). DACs were also moderately less educated, in that approximately 20 percent of the military sample reported highest education of a high school degree and approximately 53 percent reported having at least a college degree, while approximately 28 percent of the DACs had a highest education level of a high school degree and approximately 40 percent had at least a college degree. In terms of the focal variables, members of the military reported lower levels of mastery ( $M_{MIL} = 2.94$   $M_{DAC} = 3.12$ ) and consequently higher levels of

distress (internalizing  $M_{MIL} = 1.81$   $M_{DAC} = 1.51$ ; anger  $M_{MIL} = 2.15$   $M_{DAC} = 1.85$ ), which is expected given the greater institutional constraints military personnel regularly face. Most importantly, civilians reported somewhat higher levels of threat ( $M_{MIL} = 2.59$   $M_{DAC} = 2.71$ ), which illustrates how the indiscriminate nature of threats to life that asymmetrical warfare presents also puts civilians at risk, as well as how these threats are likely to be particularly salient to nonmilitary personnel.<sup>20</sup>

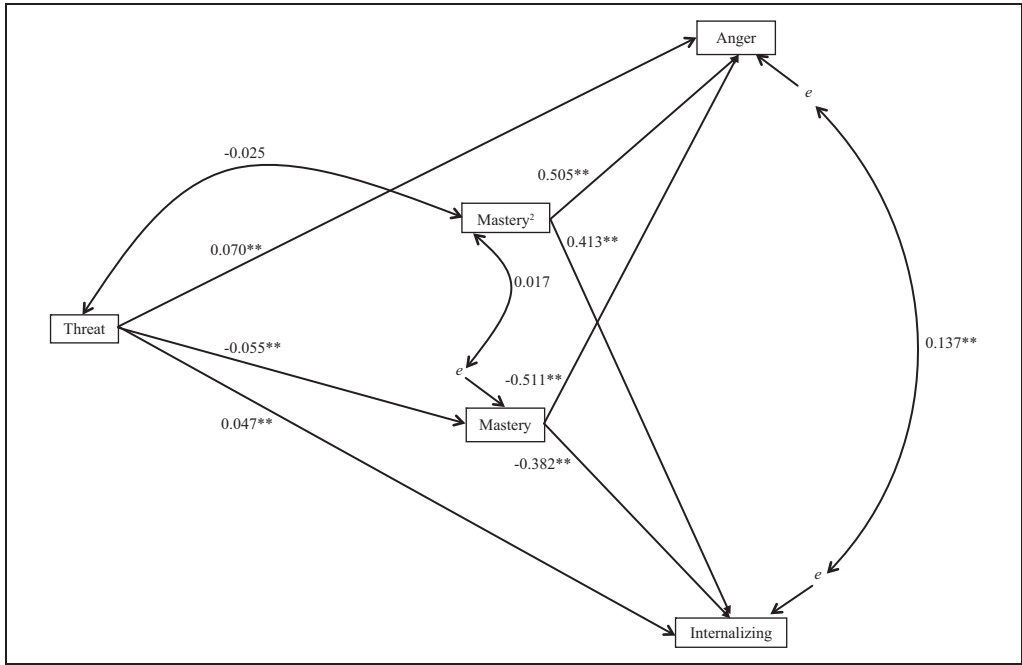
### Mediation Analyses

Figure 4 presents the results for the focal path analysis. Relationships with controls are presented in the appendix. Figure 4 shows that the quadratic term for mastery is significant in predicting internalizing aspects of distress, indicating that mastery has a nonlinear relationship with internalizing aspects of distress. Figure 5 illustrates this nonlinear relationship by graphing the adjusted predicted means for internalizing distress across the observed levels of mastery. This figure

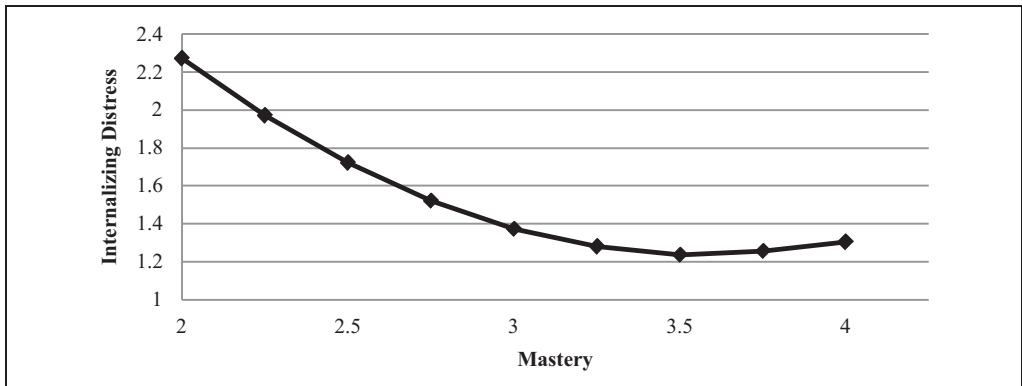
<sup>18</sup>In reflection of the threat that many respondents reported, distress was also noticeably elevated for many respondents. As Table 1 shows, the mean for both measures of distress is approximately a standard deviation above the minimum value. Additional analyses showed that for both measures of distress, between approximately 20 percent and 25 percent of the sample reported distress scores in the range of one standard deviation of the mean. That over a fifth of the sample reported distress scores more than a standard deviation above the minimum value demonstrates a substantially elevated risk of distress for many in this sample, underscoring the importance of exploring influences on distress in this population. It also should be noted that while the mean of mastery indicated a relatively strong sense of control, there was a fairly wide degree of variability around this mean. Approximately one standard deviation below this mean captured 50 percent of scores, while another 20 percent were approximately one and a half standard deviations above the mean.

<sup>19</sup>See Keltly and Bierman (2013) for details on the military study.  $N =$  approximately 158 for the military sample on relevant variables. It was not practical to fully compare stress processes between DACs and the military because power-curve analyses show that group comparisons are often underpowered when sample sizes are substantially different, especially in smaller samples (Whitefield et al. 2008), which is particularly a concern because statistical interaction analysis is already underpowered in non-experimental conditions (Marshall 2007; McClelland and Judd 1993).

<sup>20</sup>As an additional means of gauging DACs' mastery and distress, we also compared these measures to individuals with a high school degree or better in a community sample with similar measures, the MIDUS. These comparisons suggested that DACs had similar levels of distress. However, DACs were substantially lower in reporting strong mastery, likely because of both threatening conditions and military strictures more generally. Full results are available from the authors upon request.



**Figure 4.** Nonlinear Path Model of the Relationship Between Threat and Psychological Distress  
 $*p < .05$ .  $**p < .01$ . Metric coefficients are presented.



**Figure 5.** Adjusted Mean Levels of Distress Across Observed Levels of Mastery

shows an inverse relationship at low levels of mastery that flattens at higher levels of mastery. Thus, although greater

mastery is related to lower distress, this relationship also weakens at higher levels of mastery.<sup>21</sup> This is confirmed in Table 2, which presents the relationship between mastery and internalizing distress across levels of mastery. This relationship remains negative and significant across much of mastery, but its coefficient is markedly reduced as mastery increases.

<sup>21</sup>Although the linear term for mastery also significantly predicts both aspects of distress in Figure 4, this indicates only the relationship between mastery and distress at mean levels of mastery, and Figure 5 shows that this relationship differs substantially across levels of mastery.

**Table 2.** Relationship Between Mastery and Distress Across Levels of Mastery

Level of mastery	Internalizing	Anger
2.00	-1.309**	1.647**
2.25	-1.103**	-1.394**
2.50	-0.896**	-1.141**
2.75	-0.690**	-0.888**
3.00	-0.484**	-0.636**
3.25	-0.278**	-0.383**
3.50	-0.071	-0.130
3.75	0.135	0.122
4.00	0.341*	0.375

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

Metric coefficients are presented.

In addition, at higher levels of mastery, the relationship becomes nonsignificant and then turns positive and significant at the highest levels of mastery. For the DACs in this study then, high levels of mastery are detrimentally related to internalizing aspects of distress. It should also be noted, though, that mean levels of internalizing distress are substantially lower at the highest levels of mastery than the lowest levels of mastery; thus, despite a positive relationship at the highest levels of mastery, greater mastery is generally beneficial for internalizing distress, but the beneficial relationship between mastery and internalizing distress weakens as mastery increases.<sup>22</sup>

Figure 1 also shows that the quadratic term for mastery is significant in predicting anger, indicating that the relationship between mastery and anger is also nonlinear. Table 2 shows that the nonlinear relationship between mastery and anger is similar to the relationship between mastery and internalizing distress depicted in

Figure 5. There is a strong inverse relationship between mastery and anger at low levels of mastery that weakens at higher levels of mastery. The only substantial difference between the two outcomes is that the relationship between mastery and anger is not significant at the highest levels of mastery. Thus, there is little association between mastery and anger at high levels of mastery, but there is also not a detrimental relationship between the two. Overall then, the inverse relationship between mastery and both internalizing and externalizing aspects of distress is stronger at lower levels of mastery.

The inverse relationship between mastery and distress sets up the potential for an indirect relationship between threat and distress *through* mastery, but for this indirect relationship to occur, threat must be related to mastery. Figure 4 further supports the indirect association between threat and distress through mastery by showing that a sense of threat is significantly and negatively related to mastery. Civilians reporting greater threat therefore reported lower levels of mastery. Ancillary analyses demonstrated that this is a fairly substantial association, as predicted means for mastery at the lowest level of threat were over half a standard deviation greater than predicted means at the highest level of threat.

Since lower levels of mastery are associated with greater distress, higher levels of threat should be indirectly associated with greater distress through lower mastery. However, because the relationship between mastery and distress is stronger at lower levels of mastery, the indirect relationship between threat and distress should be progressively stronger as threat increases and mastery weakens. This contention is supported by examining Table 3, which presents the indirect relationship between a sense of threat and the distress

<sup>22</sup>More than 13 percent of the sample indicated the highest level of mastery, suggesting that the positive instantaneous rate of change at high levels of mastery is not due to model overfitting or sample outliers.

**Table 3.** Indirect Relationship Between Threat and Distress Across Levels of Threat

Frequency of Threat	Internalizing	Anger
Never	0.017**	0.023**
Less than once a month	0.019**	0.026**
Once a month	0.022**	0.029**
A few times a month	0.024**	0.032**
Once a week	0.026**	0.035**
A few times a week or more	0.029**	0.038**

\*\* $p < .01$ . Metric coefficients are presented.

outcomes at each level of threat.<sup>23</sup> We see here that the indirect relationship between threat and both aspects of distress is significant at all levels of threat; thus, higher levels of threat are indirectly related to higher levels of distress through lower levels of mastery. However, this indirect relationship increases in strength approximately 70 percent across the levels of threat for both outcomes. These analyses therefore show that escalations in threat are increasingly related to internalizing distress and anger because higher levels of threat are associated with lower levels of mastery, and mastery in turn has a stronger relationship with distress as it weakens.

It should also be noted that Figure 4 shows significant and positive direct relationships between threat and both measures of distress. These direct paths indicate that over and above the indirect relationships, a sense of threat is related to greater internalizing distress and anger. The presence of direct relationships between threat and the measures of

distress even after mastery is taken into account suggests that threat is related to distress through additional mediators not examined in this research. The potential mechanisms that likely provide additional explanatory power for associations between threat and distress will be addressed further in the discussion section.

Overall, these results present evidence showing that a sense of threat to life is a common experience for many DACs working in war zones. Individuals subject to these stressful experiences report greater internalizing distress and anger. These analyses also suggest that the relationship between threat and distress is in part indirect, with lower levels of mastery that are associated with higher levels of threat helping to explain the threat-distress relationship. Furthermore, the indirect association between threat and distress is stronger at higher levels of threat due to the nonlinear relationship between mastery and distress. These analyses therefore support the mediation component of structural amplification. They do not, however, examine the second component of structural amplification—whether mastery moderates the relationship between threat and distress—and this question is examined next.

### Moderation Analyses

Table 4 presents the results of tests of interactions between a sense of threat and both the linear and quadratic terms for mastery. The first model in Table 4 presents predictors of internalizing distress. Although the interaction between threat and the linear term for mastery is not significant, the interaction between threat and the quadratic term for mastery is significant. Thus, this model indicates that mastery does interact with threat in predicting internalizing distress, but it does so nonlinearly, meaning that the way that mastery moderates threat

<sup>23</sup>Since the relationship between mastery and distress changes across levels of mastery, the coefficient for the relationship between mastery and distress that is used to calculate the each indirect relationship in Table 3 is based on the level of mastery predicted by a corresponding level of threat.

**Table 4.** Tests of Moderation by Psychological Resources in Relationship Between Threat and Psychological Distress

	Internalizing	Anger
Threat	0.016	0.022
Mastery	-0.345**	-0.445**
Mastery <sup>2</sup>	0.369**	0.456**
Threat × mastery	-0.035	-0.023
Threat × mastery <sup>2</sup>	0.118*	0.199*
R <sup>2</sup>	0.243	0.218

\* $p < .05$ . \*\* $p < .01$ . Metric coefficients are presented. Models contain all control variables.

**Table 5.** Relationship Between Threat and Distress across Levels of Mastery

	Low mastery	Moderate mastery	High mastery
Internalizing	0.205*	0.022	0.076*
Anger	0.299*	0.028	0.155*

\* $p < .05$ . \*\* $p < .01$ . Metric coefficients are presented. Models contain all control variables.

differs across levels of mastery. A similar set of results is seen for the second model in Table 4, which presents predictors of anger. Again, the interaction between threat and the linear term for mastery is not significant, but the interaction between threat and the quadratic term is significant, indicating a nonlinear form of moderation. Threat does appear to interact with mastery in predicting both dimensions of distress, then, but the extent to which these moderating effects occur varies across levels of mastery.<sup>24</sup>

<sup>24</sup>When only linear interactions were tested in ancillary analyses, the interaction predicting anger was not significant. Taking the possibility of nonlinear forms of mastery into account therefore reveals a fuller extent of stress moderation by mastery than would be demonstrated if only linear moderation was examined.

The meaning of these non-linear interaction terms is clarified in Table 5. Table 5 presents the coefficients for the relationship between threat and both aspects of distress across the range of mastery for the sample.<sup>25</sup> The first column in Table 5 shows the relationship between threat and distress at low levels of mastery. For both internalizing distress and anger, threat is significantly and positively related to distress; at low levels of mastery then, higher levels of threat are associated with higher levels of distress. A different set of relationships is observed in the second column, which displays the coefficients for threat at moderate levels of mastery. Here, we see that neither coefficient is significant, indicating that threat is not associated with the measures of distress at moderate levels of mastery. This therefore indicates the buffering effects of mastery, as moderate levels of mastery weaken the relationship between threat and distress. However, the third column in Table 5 illustrates the nonlinear nature of these buffering effects. This column shows that at high levels of mastery, the relationship between threat and both aspects of distress is significant and positive. That threat is not related to distress at moderate levels of mastery but is significant at high levels of mastery shows that the buffering effects of mastery are weakened at high levels of mastery; however, some buffering continues to occur at high levels of mastery because coefficients for the relationships between threat and the measures of distress are smaller than at

<sup>25</sup>Because the intention of Table 5 is to demonstrate how the relationship between threat and distress changes across the full extent of the sample's observed values of mastery, the minimum and maximum observed values of 2 and 4 are used for respective low and high mastery scores, while the midpoint of 3 is used for the moderate score.



low levels of mastery, thereby indicating a weaker relationship.

These analyses therefore show that mastery does buffer the relationship between threat and distress. However, these buffering effects are not consistent across levels of mastery. As a result, mastery most unambiguously weakens the relationship between threat and distress at moderate levels of mastery, with only partial buffering effects observed at high levels of mastery. In general though, our analyses show that mastery both mediates and moderates the relationship between threat and distress, thereby indicating that the dual mediating and moderating components of structural amplification can help explain how threat is related to distress in DACs in Iraq and Afghanistan.

## DISCUSSION

Although research has examined the mental health toll of serving in Iraq and Afghanistan among military personnel, far less research has examined civilians who work alongside military personnel. The current research shows that civilians are often exposed to important adversities when working in these conditions, as almost two-thirds of DACs examined in this study reported experiencing a sense of threat during their deployment, and over a third indicated a fair degree of regular exposure to this stressor in terms of experiencing it at least a few times a month. Furthermore, this research suggests that exposure to this stressor has important ramifications for mental health, as greater levels of threat are related to higher levels of distress across internalizing and externalizing dimensions of emotional distress.

This research further suggests that a process of structural amplification can help to explain how threat is associated with distress among civilians in a military

combat environment. Structural amplification occurs when a resource both mediates and moderates the effects of a stressor, so that the stressor depletes a resource that would otherwise offset its effects (Ross and Mirowsky 2006). The current analyses show that threat is associated with lower levels of a psychological resource in the form of mastery, thereby substantially explaining the relationship between threat and both forms of distress, which fulfills the mediation component of structural amplification. These analyses also show that mastery buffers the effects of threat, in turn satisfying the moderation component of structural amplification. Together then, these analyses not only suggest that greater threat leads to greater psychological distress through reductions in mastery, but also that threat amplifies its effects on distress by depriving individuals of a psychological resource that would otherwise offset its negative mental health effects.

One important caution that should be taken in this study is the use of a cross-sectional sample, as the potential for reverse-causation and spurious association cannot be ruled out. It is possible that individuals with lower levels of mastery or greater distress may perceive or recall greater threats in the environment, and it is also possible that individuals with lower levels of perceived control may less actively attempt to avoid situations or work roles that expose them to greater levels of threat. However, previous research on ambient threat demonstrates that processes of structural amplification established in cross-sectional analyses are reproduced in longitudinal research. In particular, research indicates that perceptions of ambient stressors are associated with psychological distress not only longitudinally (Christie-Mizell, Steelman, and Stewart 2003; Latkin and Curry 2003), but even when different samples are used to measure perceived

ambient conditions and mental health problems (Mair et al. 2009). Furthermore, longitudinal research shows that declines in mastery are associated with baseline ambient stress (Bierman 2009) and also shows that interactive effects between ambient stressors and perceptions of control demonstrated in cross-sectional analysis are replicated when an indicator of subsequent change in sense of control is used as the moderator (Ross, Mirowsky, and Pribesh 2001). This research therefore supports a causal interpretation of these analyses, in which threat increases distress by depleting mastery, and in depleting mastery reduces a resource that would otherwise offset threat's effects on distress. Yet, because these analyses are based on data gathered at one point in time, they can only be taken as suggestive of the processes that are likely to occur for civilians working in war zones. Additional research should consider how these processes occur longitudinally, especially by examining statuses prior to and during deployment, which would help to establish that mastery is reduced as a result of exposure to deployment-related perceived threats to life and that this in turn leads to increases in distress.<sup>26</sup>

At the same time, this research strongly suggests that additional attention should be paid to the mental health costs incurred by this overlooked segment of the United States's military efforts. Quite literally thousands of civilians a year have been deployed with military

personnel, and this research shows that many of these civilians are exposed to a potent stressor that may have long-term mental health costs. We did not examine post-traumatic stress disorder (PTSD) in this research because by definition PTSD is exhibited subsequent to the stressful environment, and research shows that it may take several months after withdrawing from a stressful environment for symptoms of PTSD to be exhibited (Bliese et al. 2007). However, the degree to which DACs are exposed to and appear to be affected by threatening conditions suggests that they may be at increased risk for PTSD when withdrawn from the field. Furthermore, even if PTSD is not formally incurred, long-term immersion within threatening conditions may carry over into a more general sense of risk and lack of security that can affect social relationships and result in greater distress (Ross and Mirowsky 2009), as well as possibly harm work productivity. Both researchers and public policymakers should therefore pay greater attention to the potential long-term mental health effects of working in war conditions among civilians, as well as the extent to which stress exposure among civilians may inhibit functioning during deployment to these war conditions. Longitudinal research that considers changes in functioning from pre- to post-deployment would be especially useful for providing an understanding of the permanency of the effects of adverse deployment experiences. In the absence of these data, it is important to take research on trauma into account, as this research suggests that the sum total of highly stressful experiences is to shatter the individual's "assumptive worlds," leaving a persistent residual effect on future psychological well-being (Herman 1992; Janoff-Bulman 1992).

These analyses support an indirect model of the relationship between threat

<sup>26</sup>It should also be noted that the sample size was relatively small by sociological standards, and additional research should examine these relationships in larger samples. However, the probability sampling of a fairly large proportion of potential cases helped to mitigate the extent to which a smaller sample size may influence these results, as did the use of bootstrapping methods to address potential issues with tests of indirect effects.

and distress, in which a sense of threat is indirectly related to higher levels of distress through lower levels of mastery. The inverse relationship between threat and mastery provides additional substantiation for previous arguments that a sense that one is constantly at risk from hazards in the environment strikes at the heart of beliefs that opportunities and outcomes are amenable to personal control (Ross 2011). This pattern of results implies that one means of minimizing the effects of threat on distress among civilians is by preventing losses in mastery, possibly through enhanced opportunities for self-efficacy in additional components of the work role. More broadly, research repeatedly emphasizes that mastery and related constructs are a primary mechanism for the effects of ambient stressors, but the majority of this research has concentrated on ambient stress in the form of perceptions of one's neighborhood (e.g., Bierman 2009; Mirowsky and Ross 2003). However, Downey and Van Willigen (2005) indicated that this pattern may extend beyond disordered neighborhoods by showing that threatening environmental conditions in the form of the concentration of industrial facilities are related to greater levels of distress through powerlessness, even when perceptions of neighborhood disorder are taken into account (see also Boardman et al. 2008). The current research suggests that these findings can be expanded to threatening environments more generally and that reductions in a sense of control are likely to be a primary means by which dangerous conditions lead to increases in psychological distress. Additional research, especially using longitudinal designs, should therefore examine how dangerous or threatening conditions in a variety of contexts are likely to influence psychological distress through reductions in mastery. In particular, although in recent years there has

been a wealth of research on how deployment-related experiences can affect the mental health of members of the military, the results of the current research imply that greater attention should be paid to the way that reductions in mastery may act as a mechanism for these effects.

It is also important to emphasize that this research depicts a nonlinear relationship between mastery and both forms of distress, in which the relationship between mastery and distress weakens as mastery increases. This nonlinear relationship is likely because high levels of mastery can lead to maladaptive attempts to over-control unyielding situational characteristics, leading to greater frustration and distress that counter the beneficial effects of mastery for mental health. Such over-controlling efforts may especially be frustrating in the "total institution" of the rigid and isolated military combat environment. Since the relationship between mastery and distress is stronger at lower levels of mastery, and threat is inversely related to mastery, the indirect relationship between threat and distress grows stronger at higher levels of threat.

Findings on the nonlinear indirect relationship between threat and distress have relevance for broader sociological understandings of the stress process. Although structural amplification typically involves the depletion of a moderating resource by a stressor, the results of the current research show that when a resource is nonlinearly related to an outcome, the stressor may strengthen its effects simply by depleting the resource, regardless of whether stress-buffering occurs. These results therefore suggest that future research into the stress process should consider nonlinear forms of structural amplification. These nonlinear forms are irrespective of stress moderation and occur when a stressor amplifies its own effects simply by depleting

a resource that is more strongly related to distress at lower levels of the resource. Perceptions of control are likely to be a prime candidate for mechanisms of nonlinear structural amplification. Perceived control is especially likely to influence distress nonlinearly under conditions of high constraint, as these conditions provide considerable opportunities to frustrate individuals who attempt to act on beliefs of a high degree of personal control. In this context then, nonlinear structural amplification is not simply an individual stress process, but is instead the result of structural conditions that weaken the mental health benefits of high levels of mastery. Additional research should therefore examine whether nonlinear structural amplification may be more likely to occur under contextual conditions of high structural constraint, and in particular how variations in conditions of structural constraint lead to variations in nonlinear relationships between mastery and psychological distress.

An intriguing additional result of this research suggests that depletions in mastery may be beneficial for mental health when high levels of mastery detract from the resource's buffering effects. This is intimated by results showing that mastery buffered the relationship between threat and distress nonlinearly, with mastery's buffering effects substantially weaker at high levels of mastery than moderate levels of mastery. This nonlinear form of stress buffering is likely because particularly high levels of mastery lead to maladaptive behavior and cognitions in response to threat. Individuals who have a strong sense of personal control are likely to blame themselves even when a stressor contains a substantial degree of uncontrollability and unpredictability, as is the case with threats caused by the "asymmetrical warfare" waged by opposition in Iraq and Afghanistan. However, the benefits of reductions

in mastery are fairly specific, as they apply only when very high levels of mastery are reduced to moderate levels. This suggests that more conventional forms of structural amplification—in which threat amplified its effects by reducing a buffering resource—also occurred, but were specific to when moderate or high levels of mastery were reduced to low levels. Hence, future research on structural amplification should also take nonlinear stress buffering into account because nonlinearities in stress buffering are likely to create segmentation in the extent to which reductions in resources amplify the effects of the stressor. Nonlinear stress buffering is especially important to consider because the results of this research suggest that mastery's moderating effects may not be observed if nonlinearities are not taken into account. Little research has examined the presence of nonlinear stress buffering though, and additional research should consider whether mastery is more likely to nonlinearly buffer stressors when the stressors contain a substantial degree of randomness or are beyond individual ameliorative efforts.

It should also be noted that direct relationships between threat and both measures of distress remained significant even after indirect relationships through mastery were taken into account. This suggests that additional mechanisms may play a further role in structural amplification. One of the most likely of these is unit cohesion, as unit cohesion has historically been emphasized as vital for maintaining functioning within the military (Stouffer et al. 1949; Wessely 2006). Unit cohesion encompasses social support, but is more clearly seen as functioning in respect to the group because cohesion facilitates both productivity and successful social interactions (Griffith and Vaitkus 1999), illustrating how cohesion comprises both social and task-oriented concerns (Carron and Brawley

2000). Both dimensions are likely important moderators of threat because ambient stressors may be more potent in the face of not only a less actively supportive social system, but also one that is less capable of mitigating potential threats (e.g., Kim and Ross 2009; Schieman and Meersman 2004). Moreover, because immersion within threatening circumstances is likely to lead individuals to be more suspicious and less trustful (Ross 2011), a greater sense of threat may harm both task and social cohesion. Although little research has examined the importance of unit cohesion for civilians who work in the military, the emphasis on unit cohesion within the military tradition highlights its potential as both a mediator and moderator in the relationship between threat and mental health, and therefore as possibly an additional important mechanism for the process of structural amplification.

### CONCLUSION

Research on the effects of working within war conditions has largely concentrated on military personnel. The current research shows that, although civilians who work for the military in areas of conflict do not engage in combat, they are often exposed to pernicious conditions that may have substantial consequences for psychological well-being. Additional research on the mental health effects of war should therefore consider DACs and other civilians who work with military personnel, as well as the psychological mechanisms that likely explain these effects. In particular, attention to the process of structural amplification is likely to show how the stresses of working in war are a detriment to mental health. As the U.S. military continues to engage in hostilities around the globe, it is important to consider how the individuals who support these efforts are affected.

### APPENDIX. Relationship Between Controls and Endogenous Variables in Path Model

	Mastery	Internalizing	Anger
More than college degree	0.071	-0.020	-0.074
Associate's degree	0.054	-0.066	-0.014
College degree	0.187**	0.031	0.102
Nonmarried	-0.048	0.092	0.097
Women	0.050	0.004	0.189
Low age	-0.088	0.044	0.290*
High age	0.007	-0.062	-0.045
Stationed in Iraq	0.059	-0.003	-0.001
Intercept	-0.087	1.394**	1.603**
R <sup>2</sup>	0.072	0.223	0.197

\* $p < .05$ . \*\* $p < .01$ . Metric coefficients are presented.

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### REFERENCES

- Adams, Richard E. and Richard T. Serpe. 2000. "Social Integration, Fear of Crime, and Life Satisfaction." *Sociological Perspectives* 43:605-29.
- Aneshensel, Carol S. 2005. "Research in Mental Health: Social Etiology versus Social Consequences." *Journal of Health and Social Behavior* 46:221-28.
- Avant, Deborah D. 2005. *The Market for Force: The Consequences of Privatizing Security*. New York: Cambridge University Press.
- Avison, William R. and John Cairney. 2003. "Social Structure, Stress and Personal Control." Pp 127-64 in *Personal Control in Social and Life Course Contexts*, edited by S.H. Zarit, L. I. Pearlin, and K.W. Schaie. New York: Springer.
- Bartone, Paul T. 2006. "Resilience under Military Operational Stress: Can Leaders Influence Hardiness?" *Military Psychology* 18(Supplement):S131-48.
- Becker, A. B., B. A. Israel, A. J. Schulz, E. A. Parker, and L. Klem. 2005. "Age Differences in Health Effects of Stressors and



- Perceived Control among Urban African American Women." *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 82:122-41.
- Ben-Zur, Hasida. 2002. "Coping, Affect and Aging: The Roles of Mastery and Self-Esteem." *Personality and Individual Differences* 32:357-72.
- Bierman, Alex. 2009. "Marital Status as Contingency for the Effects of Neighborhood Disorder on Older Adults' Mental Health." *Journals of Gerontology: Social Sciences* 64B:425-34.
- Bierman, Alex. 2012. "Functional Limitations and Psychological Distress: Marital Status as Moderator." *Society and Mental Health* 2:35-52.
- Bliese, Paul D., Kathleen M. Wright, Amy B. Adler, Jeffrey L. Thomas, and Charles W. Hoge. 2007. "Timing of Postcombat Mental Health Assessments." *Psychological Services* 4:141-48.
- Boardman, Jason D., Liam Downey, James S. Jackson, J. Bryce Merrill, Jarron M. Saint Onge, and David R. Williams. 2008. "Proximate Industrial Activity and Psychological Distress." *Population and Environment* 30:3-25.
- Browne, Tess, Lisa Hull, Oded Horn, Margaret Jones, Dominic Murphy, Nicola T. Fear, Neil Greenberg, Claire French, Roberto J. Rona, Simon Wessely, and Matthew Hotopf. 2007. "Explanations for the Increase in Mental Health Problems in UK Reserve Forces Who Have Served in Iraq." *BMJ* 190:484-89.
- Caforio, Giuseppe. 2002. "Some Historical Notes." Pp. 7-26 in *Handbook of the Sociology of the Military*, edited by G. Caforio. New York: Springer.
- Carron, Albert V. and Lawrence R. Brawley. 2000. "Cohesion: Conceptual and Measurement Issues." *Small Group Research* 31:89-106.
- Christie-Mizell, C. Andre, Lala Carr Steelman, and Jennifer Stewart. 2003. "Seeing Their Surroundings: The Effects of Neighborhood Setting and Race on Maternal Distress." *Social Science Research* 32:402-28.
- Department of Defense. 2010. "Operational Contract Support Concept of Operations." Developed by OSD, J-Staff, Service, and DoD Combat Support Agency CONOP writing team (March 31). Retrieved June 25, 2013 ([http://www.acq.osd.mil/log/PS/cio/OCS\\_CONOPS\\_v8Jun2010.pdf](http://www.acq.osd.mil/log/PS/cio/OCS_CONOPS_v8Jun2010.pdf)).
- Downey, Liam and Marieke Van Willigen. 2005. "Environmental Stressors: The Mental Health Impacts of Living Near Industrial Activity." *Journal of Health and Social Behavior* 3:289-305.
- Drapeau, Aline, Dominic Beaulieu-Prévost, Alain Marchand, Richard Boyer, Michel Prévile, and Sylvia Kairouz. 2010. "A Life-Course and Time Perspective on the Construct Validity of Psychological Distress in Women and Men. Measurement Invariance of the K6 across Gender." *BMC Medical Research Methodology* 10:68.
- Enders, Craig K. 2010. *Applied Missing Data Analysis*. New York: Guilford Press.
- Gil, Sharon and Yahil Caspi. 2006. "Personality Traits, Coping Style, and Perceived Threat as Predictors of Posttraumatic Stress Disorder after Exposure to a Terrorist Attack: A Prospective Study." *Psychosomatic Medicine* 68:904-909.
- Griffith, James and Mark Vaitkus. 1999. "Relating Cohesion to Stress, Strain, Disintegration, and Performance: An Organizing Framework." *Military Psychology* 11:27-55.
- Hayes, Andrew F. 2013. *Introduction to Meditation, Moderation, and Conditional Process Analysis. A Regression-Based Approach*. New York: The Guilford Press.
- Hayes, Andrew F. and Kristopher J. Preacher. 2010. "Quantifying and Testing Indirect Effects in Simple Mediation Models When the Constituent Paths Are Nonlinear." *Multivariate Behavioral Research* 45: 627-60.
- Herman, Judith Lewis. 1992. *Trauma and Recovery*. New York: Basic Books.
- Hilton, Michael F., Harvey A. Whiteford, Judith S. Sheridan, Catherine M. Cleary, David C. Chant, Philip S. Wang, Ronald C. Kessler. 2008. "The Prevalence of Psychological Distress in Employees and Associated Occupational Risk Factors." *Journal of Occupational and Environmental Medicine* 50:746-57.
- Hoffmann, John P. and S. Susan Su. 1998. "Stressful Life Events and Adolescent Substance Use and Depression: Conditional and Gender Differentiated Effects." *Substance Use & Misuse* 33:2219-62.
- Holbrook, Troy L., David B. Hoyt, Murray B. Stein, and William J. Sieber. 2001. "Perceived Threat to Life Predicts Posttraumatic Stress Disorder after Major Trauma: Risk Factors and Functional Outcome." *The Journal of Trauma* 51:287-93.
- Iversen, A. C., N. T. Fear, A. Ehlers, J. Hacker Hughes, L. Hull, M. Earnshaw, N. Greenberg, R. Rona, S. Wessely, and M. Hotopf.

2008. "Risk 2 for Post-Traumatic Stress Disorder among UK Armed Forces Personnel." *Psychological Medicine* 38:511-22.
- Janoff-Bulman, Ronnie. 1992. *Shattered Assumptions: Towards a New Psychology of Trauma*. New York: Free Press.
- Kelly, Megan M. and Dawne S. Vogt. 2009. "Military Stress: Effects of Acute, Chronic, and Traumatic Stress on Mental and Physical Health." Pp. 85-106 in *Living and Surviving in Harm's Way: A Psychological Treatment Handbook for Pre- and Post-Deployment of Military Personnel*, edited by S. M. Freeman, B. A. Moore, and A. Freeman. New York: Routledge/Taylor & Francis Group.
- Kelty, Ryan. 2009. "Citizen Soldiers and Civilian Contractors: Soldiers' Unit Cohesion and Retention Attitudes in the Total Force." *Journal of Political and Military Sociology* 37:1-27.
- Kelty, Ryan and Alex Bierman. 2013. "Ambivalence on the Front Lines: Perceptions of Contractors in Iraq and Afghanistan." *Armed Forces and Society* 39:5-27.
- Kessler, Ronald C., G. Andrews, L. J. Colpe, E. Hiripi, D. K. Mroczek, S. T. Normand, and E. E. Walters. 2002. "Short Screening Scales to Monitor Population Prevalences and Trends in Nonspecific Psychological Distress." *Psychological Medicine* 32: 959-76.
- Kiecolt, K. Jill, Michael Hughes, and Verna M. Keith. 2009. "Can a High Sense of Control and John Henryism Be Bad for Mental Health?" *The Sociological Quarterly* 50:693-714.
- Kim, Joongbaeck and Catherine R. Ross. 2009. "Neighborhood-Specific and General Social Support: Which Buffers the Effect of Neighborhood Disorder on Depression?" *Journal of Community Psychology* 37:725-36.
- Knoops, Geert-Jan Alexander. 2009. "The Duality of the Proportionality Principle within Asymmetric Warfare and Ensuing Superior Criminal Responsibilities." *International Criminal Law Review* 9:501-29.
- Krause, Neal. 1986. "Stress and Coping: Reconceptualizing the Role of Locus of Control Beliefs." *Journal of Gerontology* 41:617-22.
- La Bash, Heidi, A. J. La Bash, Dawne S. Vogt, Lynda A. King, and Daniel W. King. 2009. "Deployment Stressors of the Iraq War Insights from the Mainstream Media." *Journal of Interpersonal Violence* 24:231-58.
- Lachman, Margie E. and Suzanne L. Weaver. 1998. "The Sense of Control as a Moderator of Social Class Differences in Health and Well-Being." *Journal of Personality and Social Psychology* 74:763-73.
- Latkin, Carl A. and Aaron D. Curry. 2003. "Stressful Neighborhoods and Depression: A Prospective Study of the Impact of Neighborhood Disorder." *Journal of Health and Social Behavior* 44:34-44.
- Levy, Barry S. and Victor W. Sidel. 2009. "Health Effects of Combat: A Life-Course Perspective." *Annual Review of Public Health* 30:123-36.
- Lucas, Richard E. and Carol L. Gohm. 2000. "Age and Sex Differences in Subjective Well-Being Across Cultures." Pp. 291-317 in *Culture and Subjective Well-Being*, edited by E. Diener and E. M. Suh. Cambridge: The MIT Press.
- Lundquist, Jennifer Hickey. 2004. "When Race Makes No Difference: Marriage and the Military." *Social Forces* 83:731-57.
- Mabry, J. Beth and K. Jill Kiecolt. 2005. "Anger in Black and White: Race, Alienation, and Anger." *Journal of Health and Social Behavior* 46:85-101.
- Maguen, Shira, Barbara A. Lucenko, Brett T. Litz, Karen H. Seal, Sara J. Knight, and Charles R. Marmar. 2010. "The Impact of Reported Direct and Indirect Killing on Mental Health Symptoms in Iraq War Veterans." *Journal of Traumatic Stress* 23: 86-90.
- Mair, Christina, Ana V. Diez Roux, Mingwu Shen, Steven Shea, Theresa Seeman, Sandra Echeverria, and Ellen S. O'Meara. 2009. "Cross-Sectional and Longitudinal Associations of Neighborhood Cohesion and Stressors with Depressive Symptoms in the Multiethnic Study of Atherosclerosis (MESA)." *Annals of Epidemiology* 19: 49-57.
- Marshall, Stephen W. 2007. "Power for Tests of Interaction: Effect of Raising the Type I Error Rate." *Epidemiologic Perspectives and Innovations* 4:4.
- McClelland, Gary H. and Charles M. Judd. 1993. "Statistical Difficulties of Detecting Interactions and Moderator Effects." *Psychological Bulletin* 114:376-90.
- Milliken, Charles S., Jennifer L. Auchterlonie, and Charles W. Hoge. 2007. "Returning from the Iraq War among Active and Reserve Component Soldiers Longitudinal Assessment of Mental Health Problems." *JAMA* 298:2141-48.
- Mirowsky, John and Catherine E. Ross. 1990. "The Consolation-Prize Theory of

- Alienation." *American Journal of Sociology* 95:1505–35.
- Mirowsky, John and Catherine E. Ross. 2003. *Social Causes of Psychological Distress*. 2nd ed. Hawthorne, NY: Aldine de Gruyter.
- Moskos, Charles C., John Allen Williams, and David R. Segal, eds. 2000. *The Postmodern Military: Armed Forces after the Cold War*. New York, NY: Oxford University Press.
- Mulligan, Kathleen, Norman Jones, Charlotte Woodhead, Mark Davies, Simon Wessely, and Neil Greenberg. 2010. "Mental Health of UK Military Personnel While on Deployment in Iraq." *The British Journal of Psychiatry* 197:405–10.
- Nissen, Lars Ravnborg, Jacob Louis Marott, Finn Gyntelberg, and Bernadette Guldager. 2011. "Danish Soldiers in Iraq: Perceived Exposures, Psychological Distress, and Reporting of Physical Symptoms." *Military Medicine* 176:1138–43.
- Nolen-Hoeksema, Susan and Cheryl L. Rusting. 1999. "Gender Differences in Well-Being." Pp. 330–52 in *Foundations of Hedonic Psychology: Scientific Perspectives on Enjoyment and Suffering*, edited by D. Kahneman, E. Diener, and N. Schwarz. New York: Russell Sage Foundation.
- Norris, Fran H., Tenbroeck Smith, and Krzysztof Kaniasty. 1999. "Revisiting the Experience–Behavior Hypothesis: The Effects of Hurricane Hugo on Hazard Preparedness and Other Self-Protective Acts." *Basic and Applied Social Psychology* 21:37–47.
- Pearlin, Leonard I. 1999. "The Stress Process Revisited: Reflections on Concepts and Their Interrelationships." Pp. 395–415 in *Handbook of the Sociology of Mental Health*, edited by C. S. Aneshensel and J. C. Phelan. New York: Plenum.
- Pearlin, Leonard I. and Alex Bierman. 2013. "Current Issues and Future Directions in Research into the Stress Process." Pp. 325–340 in *Handbook of the Sociology of Mental Health, Second Edition*, edited by C. S. Aneshensel, J. C. Phelan, and A. Bierman. Dordrecht, NL: Springer.
- Pearlin, Leonard I. and Carmi Schooler. 1978. "The Structure of Coping." *Journal of Health and Social Behavior* 19:2–21.
- Peterson, Alan L., Vanessa Wong, Margaret F. Haynes, Anneke C. Bush, and Jason E. Schillerstrom. 2010. "Documented Combat-Related Mental Health Problems in Military Noncombatants." *Journal of Traumatic Stress* 23:674–81.
- Preacher, Kristopher J. and Andrew F. Hayes. 2008. "Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models." *Behavior Research Methods* 40:879–91.
- Pudrovskaya, Tetyana, Scott Schieman, Leonard I. Pearlin, and Kim Nguyen. 2005. "The Sense of Mastery as a Mediator and Moderator in the Association between Economic Hardship and Health in Late Life." *Journal of Aging and Health* 17:634–60.
- Quadrennial Defense Review. 2012. "Quadrennial Defense Review Report." Retrieved June 25, 2013 (<http://www.defense.gov/qdr/qdr%20as%20of%2029jan10%201600.PDF>).
- Renshaw, Keith D. 2011. "An Integrated Model of Risk and Protective Factors for Post-Deployment PTSD Symptoms in OEF/OIF Era Combat Veterans." *Journal of Affective Disorders* 128:321–26.
- Riddle, Mark S., John W. Sanders, James J. Jones, and Schuyler C. Webb. 2008. "Self-Reported Combat Stress Indicators among Troops Deployed to Iraq and Afghanistan: An Epidemiological Study." *Comprehensive Psychiatry* 49:340–45.
- Ross, Catherine E. 2011. "Collective Threat, Trust, and the Sense of Personal Control." *Journal of Health and Social Behavior* 52:287–96.
- Ross, Catherine E. and John Mirowsky. 2006. "Social Structure and Psychological Functioning: The Sense of Personal Control, Distress, and Trust." Pp. 411–47 in *The Handbook of the Social Psychology*, edited by J. DeLamater. New York: Kluwer-Plenum.
- Ross, Catherine E. and John Mirowsky. 2009. "Neighborhood Disorder, Subjective Alienation, and Distress." *Journal of Health and Social Behavior* 50:49–64.
- Ross, Catherine E., John Mirowsky, and Shana Pribesh. 2001. "Powerlessness and the Amplification of Threat: Neighborhood Disadvantage, Disorder, and Mistrust." *American Sociological Review* 66:568–91.
- Schieman, Scott and Stephen C. Meersman. 2004. "Neighborhood Problems and Health among Older Adults: Received and Donated Social Support and the Sense of Mastery as Effect Modifiers." *Journals of Gerontology: Social Sciences* 59B:S89–97.
- Singer, Peter W. 2003. *Corporate Warriors: The Rise of the Privatized Military Industry*. Ithaca, NY: Cornell University Press.
- Stouffer, Samuel A., Edward A. Suchman, Leland C. DeVinney, Shirley A. Star, and

- Robin M. Williams, Jr. 1949. *Studies in Social Psychology in World War II: The American Soldier. Vol. 1, Adjustment during Army Life*. Princeton: Princeton University Press.
- Thoits, Peggy A. 1995. "Stress, Coping and Social Support Processes: Where Are We? What Next?" *Journal of Health and Social Behavior* Extra Issue:53–79.
- U.S. Department of the Army. 2010. *Civilian Human Resources (CHR) FY09 Annual Evaluation*. Washington, DC: U.S. Department of the Army. Retrieved December 26, 2012 ([cpol.army.mil/library/civplans/chr-eval/09eval/pdfs/FY09-YIR.pdf](http://cpol.army.mil/library/civplans/chr-eval/09eval/pdfs/FY09-YIR.pdf)).
- U.S. Department of the Army. 2011. *Civilian Human Resources (CHR) FY10 Annual Evaluation*. Washington, DC: U.S. Department of the Army. Retrieved October 25, 2013 ([http://cpol.army.mil/library/civplans/chr-eval/10eval/pdfs/2010\\_Annual\\_Evaluation.pdf](http://cpol.army.mil/library/civplans/chr-eval/10eval/pdfs/2010_Annual_Evaluation.pdf)).
- Vasterling, Jennifer J., Susan P. Proctor, Matthew J. Friedman, Charles W. Hoge, Timothy Heeren, Lynda A. King, and Daniel W. King. 2010. "PTSD Symptom Increases in Iraq-Deployed Soldiers: Comparison with Nondeployed Soldiers and Associations with Baseline Symptoms, Deployment Experiences, and Postdeployment Stress." *Journal of Traumatic Stress* 23:41–51.
- Wells, Timothy S., Cynthia A. LeardMann, Sarah O. Fortuna, Besa Smith, Tyler C. Smith, Margaret A. K. Ryan, Edward J. Boyko, and Dan Blazer. 2010. "A Prospective Study of Depression Following Combat Deployment in Support of the Wars in Iraq and Afghanistan." *American Journal of Public Health* 100:90–99.
- Wessely, Simon. 2006. "Twentieth-Century Theories on Combat Motivation and Breakdown." *Journal of Contemporary History* 41:269–86.
- Wheaton, Blair. 1985. "Personal Resources and Mental Health: Can There be Too Much of a Good Thing?" *Research in Community and Mental Health* 5:139–84.
- Whitfield, Keith E., Jason C. Allaire, Rhonda Belue, and Christopher L. Edwards. 2008. "Are Comparisons the Answer to Understanding Behavioral Aspects of Aging in Racial and Ethnic Groups." *Journals of Gerontology: Psychological Sciences* 63B:P301–P308.

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