

Killing Versus Witnessing Trauma: Implications for the Development of PTSD in Combat Medics

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Killing in combat uniquely predicts elevated PTSD symptomatology among military veterans. This study investigated the effects of combat killing in a sample of 345 U.S. Army combat medics who had recently returned from operational deployments to Iraq or Afghanistan. Combat medics provide frontline medical care before, during, and after battles but also fight alongside other soldiers when under attack. Attempting to kill in combat was a significant predictor of PTSD symptomatology even after accounting for passively witnessing trauma in fellow soldiers. Medics may be well prepared to cope with the passive experiencing and witnessing of war-zone trauma, but may benefit from training to cope with the negative consequences of taking actions to kill.

Keywords: medic, killing, military, PTSD, combat experiences

Taking the life of another may adversely affect one's mental health, even for soldiers trained to do so (Grossman, 1996; Litz et al., 2009; MacNair, 2002). While much research has focused on such outcomes for combat soldiers, no research specifically assessed the mental health consequences of killing among com-

bat support personnel (e.g., quartermasters and health care providers) who may need to kill in self-defense. Military medical personnel, which includes combat medics (referred to as medics from herein), are afforded noncombatant status under the Geneva Conventions (International Committee of the Red Cross, 1949) and are only

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to use their weapons for defensive purposes to protect themselves and their patients. Indeed, they could face a court-martial for actively participating in offensive operations when it is not required (i.e., when they are not defending themselves or their patients). Among the U.S. Army's health care community, medics frequently serve in combat zones where they must not only preserve the lives of others but may also have to take the life of an enemy for such defensive purposes.

Medics are an integral part of the operational Army's mission and provide frontline trauma care, often in the heat of a battle, with limited resources and under enormous stress (Chapman et al., 2012). In modern warfare, medics must be able to transition from being a functional member of the fighting team to being a medical provider quickly and decisively in accordance with the tactical situation. Medics are required to cope not only with the emotional burdens associated with maintaining the health and well-being of their fellow soldiers, but also with their own potentially life-threatening situations resulting from combat operations. This research investigates mental health outcomes associated with both witnessing combat trauma and killing from the unique perspective of medics.

Posttraumatic Stress Disorder (PTSD) is defined as a prescribed pattern of symptoms caused by an individual either having experienced, or being witness to, an event that involved actual or threatened death or serious injury (*DSM-IV-TR*; American Psychiatric Association, 2000). PTSD is characterized by re-experiencing symptoms, avoidance, and arousal symptoms. This conceptualization of PTSD does not directly address the possible effects of active participation in a traumatic event (Maguen & Burkman, 2013). However, Litz et al., (2009) proposed that participating in or failing to prevent acts that transgress deeply held moral beliefs, such as killing, may lead to moral injuries which include PTSD symptoms. These affects may occur even for professionals who are trained and expected to kill as part of their duties (MacNair, 2002).

Killing during combat operations predicts negative mental health outcomes for combat-trained soldiers (Maguen et al., 2009, 2012; Van Winkle & Safer, 2011). For example, a study of Vietnam veterans found that self-reports of killing in combat had a strong direct effect on

PTSD (Fontana & Rosenheck, 1999), and that after statistically controlling for killing, witnessing death and general combat experiences did not significantly predict PTSD. More recent studies with Iraq and Afghanistan veterans have similarly found that the number of enemy engagements (Hoge et al., 2004), as well as being either directly or indirectly responsible for an enemy's death (Maguen et al., 2010), predicted subsequent PTSD symptoms. Furthermore, after distinguishing between four profiles of PTSD symptoms (high symptoms, intermediate symptoms, intermediate symptoms with low emotional numbing, and low symptoms), Iraq and Afghanistan veterans who reported killing were twice as likely to be in the most symptomatic PTSD class (Maguen et al., 2013).

Killing and actions associated with attempting to kill result in higher levels of PTSD compared to passively witnessing trauma to one's fellow soldiers (Van Winkle & Safer, 2011). While such studies have generally examined the impact of killing among frontline soldiers (e.g., infantryman), we suspect that the effects of killing and attempting to kill may be particularly important predictors of PTSD symptoms for medics whose primary duty is to provide medical care and preserve life. Therefore, it was predicted that, even after accounting for witnessing warzone traumas, medics who reported either having attempted to kill or actually killed would report higher levels of PTSD.

Method

Participants

Respondents in this research were part of the Soldier Medic Mettle Study, a 3-year mixed-methods study that assessed the impact of combat operations on the mental health outcomes and resilience of U.S. Army medics. The current study presents survey data from 347 medics who were 3-months postdeployment to Iraq or Afghanistan and were, in 2009, stationed at military installations in Europe or at Fort Hood, Texas. All of the respondents were assigned to Brigade Combat Teams responsible for conducting combat operations. Soldiers were eligible to participate if they were qualified medics (i.e., held the military occupational specialty code of 68W), were stationed in Europe or Fort Hood in 2009, agreed to complete two fol-

low-up surveys online over the following 2 years, and had returned from a combat deployment to Iraq or Afghanistan approximately 3 months prior to the data collection. The final sample size was 345 due to missing data from two respondents.

Measures

Trauma exposure and killing. The full survey included two combat experiences scales (Combat Experiences Scale; King, King, & Vogt, 2003; Combat Experiences; Castro & McGurk, 2007) and a scale that assessed exposure to the aftermath of battle (Aftermath of Battle Scale; King et al., 2003). Building on Van Winkle and Safer (2011), 11 questions were identified, which on the basis of face validity alone, were either (1) about passive witnessing of fellow soldiers, men, or women being wounded or killed, (2) about concrete actions related to attempting to kill others, or (3) about killing others. Three variables were created, termed *Witnessing Trauma*, *Attempting to Kill*, and *Killing*. To do this, two of the authors reviewed all of the available questions and agreed on a subset that were most similar to those used by Van Winkle and Safer. Using the questions identi-

fied, a Cronbach's alpha was computed for each of the proposed scales and items were removed until the internal consistency of each scale was acceptable ($\alpha \geq .80$). The six Witnessing Trauma questions were taken from different parts of different scales within the larger survey and addressed potentially traumatic experiences that were not likely caused by the soldier's actions. Responses were dichotomous (0 = no, 1 = yes) and were summed producing a possible range of 0–6. The three Attempting to Kill questions were similarly taken from the larger survey, and were selected because they asked about objective, concrete actions that were likely less emotionally laden than a direct question about killing. Responses to these three dichotomous questions were summed, producing a possible range of 0–3. The two dichotomous Killing questions addressed more directly whether the soldier believes that he or she may have killed someone in combat. A positive response to either of these two questions resulted in a value of 1, while a negative response to both questions resulted in a 0, (see Table 1).

Posttraumatic stress symptoms. Self-reported PTSD symptoms were measured using the PTSD Checklist, Military Version (PCL-M;

Table 1
Frequencies of Positive Responses for Items Comprising Measures of Witnessing, Inferred Killing, and Direct Killing

Measure	Question	Positive responses freq (%)
Witnessing ($\alpha = .81$)	1. I personally witnessed someone from my unit or an ally unit being seriously wounded or killed.	119 (35%)
	2. Seeing dead or seriously injured Americans.	197 (57%)
	3. Had a buddy shot or hit who was near you.	49 (14%)
	4. I was exposed to the sight, smell, or sound of dying men and women.	158 (46%)
	5. I saw Americans or allies after they had been severely wounded or disfigured in combat.	172 (50%)
	6. I saw bodies of dead Americans or allies.	115 (33%)
Attempting to Kill ($\alpha = .89$)	1. I fired my weapon at the enemy.	70 (20%)
	2. Shooting or directing fire at the enemy.	93 (27%)
	3. Successfully engaged the enemy.	86 (25%)
Killing ($\alpha = .82$)	1. I killed or think I killed someone in combat.	28 (8%)
	2. Were you directly responsible for the death of an enemy combatant?	20 (6%)

Note. Witnessing #1, Attempting to kill #1, and Killing #1 Questions came from the Combat Experiences Scale in the DRRRI (King et al., 2003). Witnessing #2 & #3, Attempting to kill #2 & #3 came from the Combat Experiences Scale in the MHAT (Castro & McGurk, 2007). Witness #4, #5, & #6 came from the Exposure to the Aftermath of Battle Scale from the DRRRI (King et al., 2003). The number of participants responding to an item ranged from 343–345.

Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL-M consists of 17 items from the *DSM-IV-TR* (American Psychiatric Association, 2000) to evaluate PTSD's Criteria B (re-experiencing), C (active avoidance and emotional numbing), and D (hyperarousal) symptom clusters. Respondents rated on a 5-point scale (1 = *Not at all* to 5 = *Extremely*) how much "you have been bothered by that problem in the past month." Items were summed for a total score ($\alpha = .95$ in this sample).

Procedures

Data collection. Data were collected between November 2009 and May, 2010. First, Europe and Fort Hood staffs identified units with medics meeting the eligibility criteria and coordinated data collection visits with their commands. All medics in the identified units were required to attend a briefing about participating in a research study. Following the briefing, an ombudsman explained that further attendance was entirely voluntary and a brief break was given so that those who did not want to participate could leave the room. Of the medics who attended the briefing, 96% agreed to participate by signing an informed consent form prior to beginning the survey.

Data analysis. For statistical analyses, the positively skewed distribution of PTSD scores were transformed by changing the minimum value from 17 to 1 by subtracting 16 from each score (Osborne, 2002), and then making a base 10 log transformation (Shapinsky, Rapport, Henderson, & Axelrod, 2005), meaning that a value of zero was the minimum score. These transformations improved the skew, kurtosis, and normality of the dependent variable, and in the regression analyses reported below, the errors from the regression line were normally distributed.

The principal data analysis was a sequential regression of PTSD symptoms on demographic variables in step 1, Witnessing in step 2, and Attempting to Kill and Killing in step 3.

Results

Eighty-two percent of the participants were male. The mean age was 27.97 ($SD = 6.12$). Sixty-four percent were junior enlisted (i.e., held the pay grade of E1-E4) and the majority

(70%) had completed at least some college. Sixty-one percent of the participants were returning from their second deployment. Table 1 displays reported frequencies of relevant combat experiences.

Using the standardized cutoff score of 50 on the PCL-M (Terhakopian, Sinaii, Engel, Schnurr, & Hoge, 2008), 9% of the sample can be classified as having probable PTSD. This rate is lower than the 16% reported by Thomas et al. (2010) for 3-month postdeployed combat soldiers, at roughly the same time as the medics in this study.

Table 2 displays correlations, means, and standard deviations for variables of interest. The three-predictor variables were positively correlated with PTSD Symptoms ($ps < .01$). Thus, medics who responded positively to more questions of passive Witnessing, Attempting to Kill, or Killing were more likely to also report symptoms of PTSD. Attempting to Kill was highly correlated with the direct reports of Killing, ($r = .56, p < .001$), as well as with Witnessing Trauma, ($r = .44, p < .001$). Thus medics who reported having attempted to kill in combat were also more likely to have actually killed and to have witnessed warzone trauma. The inter-correlations of these measures in the predicted directions support their convergent validity. Additionally, the high Cronbach's alpha values and therefore internal consistency for each of these measures supports their construct validity.

A sequential multiple regression analysis was conducted to assess the contribution of Killing or Attempting to Kill in combat, over and above passive Witnessing. In the first step of the regression, demographic variables (age, gender,

Table 2
Correlations, Means, and Standard Deviations for Variables

Variable	Attempting to kill	Killing	PTSD	<i>M</i>	<i>SD</i>
Witness	.44***	.36***	.18**	2.31	1.99
Attempting to kill		.56***	.20***	.72	1.16
Killing			.14**	.09	.29
PTSD				.83	.51

Note. $n = 345$ for all variables. Mean and standard deviation of PTSD is for the transformed PTSD variable. The untransformed mean and standard deviation for the PTSD variable was 28.27 and 12.95.

** $p < .01$. *** $p < .001$, 2-tailed.

rank, level of education, and number of deployments) as a whole, did not explain a significant proportion of the variance in PTSD symptoms, ($R^2 = 0.03$, $F(5, 330) = 1.77$, $p = .118$). Only the number of deployments was a significant independent predictor of PTSD symptoms, ($\beta = .13$, $t(330) = 2.09$, $p = .038$). Witnessing was entered in the second step and explained a significant proportion of additional variance, ($\Delta R^2 = .03$, $F(1, 329) = 3.34$, $p = .001$). The two killing variables were entered in the third step, again offering a significant improvement in variance explained, ($\Delta R^2 = .02$, $F(2, 327) = 3.34$, $p = .041$). Of these killing variables, only *Attempting to kill* was a significant independent predictor of PTSD symptoms, ($\beta = .15$, $t(327) = 2.15$, $p = .033$). When the killing variables were entered into the model, *Witnessing* no longer explained a significant proportion of the variance in PTSD (see Table 3).

Discussion

Involvement in actions to kill in combat is an important predictor of PTSD symptoms among medics. This study's findings suggest that conceptualizations and theories of PTSD should account for the contribution of active participation in a traumatic event on subsequent symptoms (Litz et al., 2009; Van Winkle & Safer, 2011). Witnessing trauma no longer predicted PTSD after accounting for the effects of killing. Medics may be well prepared to cope with the

passive experiencing and witnessing of war-zone trauma, however, this study shows that taking actions to kill is uniquely predictive of later reports of PTSD symptoms.

While medical personnel are generally more likely to experience PTSD symptomology following a deployment compared to those in combat specialties (Martin, 2007), the present study found lower PTSD rates among medics compared to combat arms soldiers surveyed during the same time period as part of a separate study (Thomas et al., 2010). The varying PTSD rates between studies might be attributable to differences in measurement instruments used, PCL-M cutoff scores (e.g., 30 vs. 50), anonymity, and active duty versus reserve populations (Sundin, Fear, Iversen, Rona, & Wessely, 2010). It is therefore not certain whether the prevalence rate differences between the medic and combat arms samples are due to methodological differences or an underlying difference between the two populations. Nonetheless, attempting to kill predicted more variance on PTSD symptoms than did witnessing trauma. An immediate implication of this finding is the need for greater training and preparation of medics for these types of combat experiences.

Notably, the direct questions about killing, although significantly correlated with the attempting to kill variable and PTSD, did not predict PTSD symptoms. This surprising finding is inconsistent with previous research in general military samples (Maguen et al., 2009, 2013; Van Winkle & Safer, 2011). Of course, caution is warranted in interpreting this lack of statistical significance given that only 9% of the sample reported killing, which is much lower than the 40–50% reported in studies assessing combat soldiers (Maguen et al., 2013).

This study found that attempting to kill, not direct knowledge of successful killing per se, may impact subsequent PTSD. In line with previous research, this study used a series of less emotionally charged questions about observable, intentional actions to infer attempts at killing (Van Winkle & Safer, 2011); for example, the questions asked about firing at the enemy, which could presumably be verified by outside observers, such as fellow soldiers in a medic's unit. In contrast, other members of the unit are not likely to know whether an individual soldier killed someone in combat. The attempting to kill variable explained more of the variance in

Table 3
 β Values for Variables Predicting PTSD Symptoms in the Sequential Multiple Regression Analysis (N = 345)

Predictor	Step 1 (β)	Step 2 (β)	Step 3 (β)	(ΔR^2)
Step 1				.03
Age	-.01	.00	.01	
Gender	-.08	-.05	-.02	
Grade/Rank	-.08	-.10	-.10	
Education	-.02	-.03	-.04	
Number of deployments	.13*	.13*	.13*	
Step 2				.03**
Witnessing		.18**	.11	
Step 3				.02*
Attempting to kill			.15*	
Killing			.01	

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

PTSD symptoms than both the witnessing trauma variable and the direct killing question.

These results have both pre- and postdeployment implications. Prior to a combat deployment, medics might benefit from training on the psychological impact of taking actions to kill in combat, not only as soldiers, but also as health care providers treating others who may be facing these issues. This training may serve to prepare them with realistic expectations of undertaking such actions. Additionally, treatment for postdeployment PTSD may benefit from addressing participation in active combat and current reactions to such experiences. A medic's unique occupational background should be well understood by those providing clinical assessments and treatment to this population. It may be beneficial to ask about and address active participation in combat (attempting to kill) as a potential source of symptoms of PTSD (e.g., see Litz et al., 2009 for further clinical recommendations).

Limitations of this study must be acknowledged. First, participants completed surveys 3 months after returning from a 1-year deployment, and therefore their unverified, self-report answers refer to events that could have occurred up to 15 months earlier. Forgetting and other postevent experiences and biases may alter memories of combat events; however, it may be that memories, not just the actual experiences, are also important in developing PTSD symptoms (Rubin, Berntsen, & Bohni, 2008). Second, there may be more reliable means by which to measure killing or attempting to kill. The goal of this paper was to build on previous findings on this subject using similar methods and survey instruments (Van Winkle & Safer, 2011), not to create an all-purpose measure of combat killing and witnessing. Additionally, medics are trained to identify signs of psychological disturbance in fellow soldiers. This familiarity with screening tools and the stigma associated with negative implications of scoring highly on PTSD symptoms might have affected their answers on this measure.

Given the relatively large sample size and multipost sampling method, these results should generalize to U.S. Army medics deployed to line units during times of war. However, these findings may not necessarily generalize to medics from other branches of service, due to different missions and operational environments

(e.g., being mainly in garrison vs. a forward operating base or continually out on patrol).

The focus of this paper was to extend previous work on the effects of killing and taking actions to kill. Given the many factors that may be relevant in the relationship between combat and PTSD for medics, future research might assess more medic-centric events, such as experiences of secondary trauma from working closely with traumatized survivors (Figley, 1995), having a patient die while under their care, handling dead bodies (McCarroll, Ursano, & Fullerton, 1993), not being able to help a fallen soldier because of ongoing enemy fire, or the influence of their conflicting role as a warrior and a healer. Further research should also explore factors that may protect medics from experiencing PTSD and secondary traumatic stress (Figley, Cabrera, & Chapman, 2010) symptoms. For example, a preliminary analysis from the larger Soldier Medic Mettle Study suggests that lower rates of PTSD were associated with high support from noncommissioned and commissioned officers, high unit morale, and high personal morale (Pitts et al., 2012).

In conclusion, these results highlight the potential psychological impact of combat operations on medics, who are not traditionally expected to engage in combat. Medics and other support personnel should be trained to expect participation in combat and be prepared to deal with the stress of attempting to take a life in battle. It is also proposed that postdeployment and health screenings for medics include questions about both active and passive engagement in combat. Finally, clinical providers should have a strong understanding of the unique challenges that face this population and bear in mind that having participated in active combat may be particularly troublesome for some medics.

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