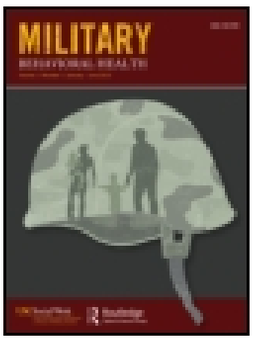

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Military Behavioral Health

ISSN: 2163-5781 (Print) 2163-5803 (Online) Journal homepage: http://www.tandfonline.com/loi/umbh20

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To cite this article: Wayne Chappelle, Emily Skinner, Tanya Goodman, Julie Swearingen & Lillian Prince (2018): Emotional Reactions to Killing in Remotely Piloted Aircraft Crewmembers During and Following Weapon Strikes, Military Behavioral Health, DOI: 10.1080/21635781.2018.1436101

To link to this article: https://doi.org/10.1080/21635781.2018.1436101

Accepted author version posted online: 01 Mar 2018.
Published online: 29 Mar 2018.

MILITARY BEHAVIORAL HEALTH
2018, VOL. 0, NO. 0, 1–11
https://doi.org/10.1080/21635781.2018.1436101

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Emotional Reactions to Killing in Remotely Piloted Aircraft Crewmembers During and Following Weapon Strikes

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As part of United States Air Force remotely piloted aircraft (RPA) weapon-strike operations, Predator/Reaper crewmembers participate in the targeting and destruction of enemy combatants and witness the aftermath via live video feed. Although the demand for weapon-strike operations has increased dramatically, the emotional impact of engaging in remote warfare remains unclear. The purpose of this study is to gather both quantitative and qualitative data on the emotional reactions of remote warriors and examine potential occupational (e.g., number of years as an RPA crewmember, prior military experience, prior combat deployments, and total number of weapon-strike missions), demographic (i.e., age, marital status, gender, and dependents living at home), and mission-specific (i.e., target familiarity, mission outcome, and high-definition vs. standard-definition video feed) correlates of negative reactions. Seventy-four RPA crewmembers participated in semi-structured interviews. Relative risk (RR) analyses indicated only witnessing civilian casualties and witnessing nonhuman collateral damage were associated with elevated risk for negative reactions (RR = 1.91, $p < .05$, 95% confidence interval [CI]: 1.11–3.26, and RR = 1.94, $p < .05$, 95% CI: 1.14–3.29). Limitations of the study, directions for future research, and potential implications of these findings for selection, training, and post-mission support are discussed.

KEYWORDS
Air force; battle/fighting conditions; resilience; remotely piloted aircraft; drone; military stress; killing; warfighting

Over the past decade, United States Air Force (USAF) remotely piloted aircraft (RPA) have engaged in intelligence, surveillance, reconnaissance, close air support, and precision weapon-strike missions worldwide. Although a number of RPA exist in the aeronautical inventory of the U.S. military, only two are capable of delivering weapons on targets—the MQ-1B Predator and MQ-9 Reaper—and these airframes have become tactically indispensable to modern battlefield commanders for targeting and killing enemy combatants.

Occupational stressors endured by RPA crewmembers, and their emotional and behavioral consequences, have been documented in prior research. Comprehensive self-report screenings indicate Predator/Reaper crewmembers experience high levels of emotional exhaustion and clinically significant psychological distress. Issues such as limited manning, the high demand for RPA missions, and role conflicts engendered by simultaneously fighting a war and fulfilling domestic roles and responsibilities are frequently cited by RPA crewmembers as sources of this stress (Chappelle et al., 2014a, 2014b; Chappelle et al., 2014; Chappelle, Salinas, & McDonald, 2011; Ouma, Chappelle, & Salinas, 2011). In addition, survey research suggests approximately 4–5% of Predator/Reaper crewmembers meet the criteria for posttraumatic stress disorder (PTSD; Chappelle et al., 2014b). Although this estimate is low compared to estimates of PTSD in military personnel exposed to traditional combat (7–17%; Richardson, Frueh, & Acierno, 2010), given that younger age and lower levels of education have been documented to increase risk for PTSD (e.g., American Psychiatric Association, 2013; Brewin, Andrews, & Valentine, 2000; Xue et al., 2015) and older age and higher education have been shown to be associated with greater resilience to PTSD (Bonanno, Galea, Bucciarelli, & Vlahov, 2006), one would expect the prevalence of PTSD to be relatively lower in these older and more educated RPA crewmembers. Therefore, a 4–5% estimated prevalence suggests there may be elements of the RPA environment that engender clinically significant emotional reactions.

The missions flown by Predator/Reaper crewmembers expose them to combat stressors that are both universal and unique among warfighters (Chappelle et al., 2011, 2014b;

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The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.

Chappelle, McDonald, Thompson, & Swearengen, 2012; Ouma et al., 2011). Combat-related stressors include identifying, tracking, targeting, and killing enemy combatants and destroying enemy assets, witnessing real time (via video) torture and death of civilian bystanders and U.S. military forces by enemy combatants, directing and protecting ground forces, safeguarding convoys, and surveying post-trike battle damage. Poststrike battle damage assessments often involve the witnessing of grief reactions in friends and family of those killed, the observation of first responders recovering bodies and body parts, as well as the witnessing of mortuary and burial services. Although many of these stressors are characteristic of traditional military combat missions, it is rare for combat personnel to have such vivid and prolonged surveillance, visual detail, and personal knowledge of their targets prior to and after the deployment of weapons.

Analyses of traditional warfare have postulated that as the distance between the target and the warrior increases, emotional reactivity decreases, ultimately concluding that "dropping bombs from 20,000 feet or firing artillery from two miles away is, psychologically speaking, not at all difficult" (Grossman & Christensen, 2008). This theory suggests RPA crewmembers should be as emotionally insulated as a warfighter can be, given they are often half a world away from their targets. The presumption that killing from a distance is easy and/or impersonal has led some in the popular media to depict RPA crewmembers as either reluctant, morally conflicted warfighters fighting a "coward's war" or socially detached video gamers who kill without emotion (e.g., Amin & Niccol, 2014; Monbiot, 2012). However, to date, there are no empirical data supporting the assertion that remote warfare is accomplished in a perfunctory manner and without emotional consequences.

In military personnel who physically deploy to combat zones, exposure to combat increases risk for emotional and/or behavioral problems (e.g., depression, anxiety, PTSD, increased alcohol and substance use; Smith et al., 2008; Thomas et al., 2010; Vasterling et al., 2010; Wells et al., 2011). However, recent research suggests that being responsible for the death of another human has emotional repercussions independent of the physical dangers of combat. Maguen et al. (2010) found in their study of over 2,700 U.S. Army service members that, after controlling for combat exposure, the acts of "killing" and "being responsible for killing" were associated with higher levels of post-traumatic stress symptoms and other emotional and behavioral problems.

Although Maguen et al. (2010) statistically controlled for the threats to personal safety in combat, until 2015 no research had been conducted on those who kill in combat without such threats to personal safety (Campo, 2015). In an effort to elucidate the emotional experiences of remote warriors, 111 RPA aircrew were interviewed about their reactions to engaging in weapon-strike missions with presumed and/or verified killing of enemy combatants (Campo, 2015). These interviews suggested that remote warfare elicits emotionally complex responses that include a sense of responsibility and connectedness to the battlefield that is reminiscent of what Maguen and colleagues described in traditional warfighters (Campo, 2015; Maguen et al., 2010). Taken together, these studies suggest that the level of detail with which RPA crewmembers observe their missions may create a psychological proximity that diminishes the emotional insulation afforded by their geographic distance.

A focused inquiry into the phenomenology of remote weapon strikes that target enemy combatants is lacking in the literature. The purposes of this study are to document and describe prominent emotional responses (and underlying cognitive attributions) of Predator/Reaper crewmembers to killing via remote combat operations and to examine potential associations between these responses and demographic, occupational, and mission-specific variables. It is hypothesized that despite the geographic distance and physical safety from which RPA crewmembers operate, they are emotionally responsive throughout their weapon-strike missions.

Methods

Participants

A total of 74 RPA Predator/Reaper crewmembers from 13 squadrons across the continental U.S. participated in semistructured interviews. Each interview participant was currently medically cleared to fly operational missions (i.e., no disqualifying physical or psychological issues) and had used a laser-guided munition (e.g., Hellfire missile) that was launched from an RPA toward an enemy combatant with one or more confirmed or assumed kills (i.e., no disqualifying physical or psychological issues).

It is important to note that all RPA crewmembers must meet rigorous aeromedical psychological standards as part of their selection into the career field (i.e., no prior history of cognitive, emotional, social, or behavioral problems). The psychological standards for these operators are the same as the requirements for crewmembers in traditional airframes (i.e., fighter/bombers, tanker/transporter, and special operations), and once operators are medically cleared for admission into the career filed each must pass an annual physical and psychological evaluation. All crewmembers who volunteered to participate in this study met the inclusion criteria and were interviewed. All collected interview data were included in the analyses.

Measures

Demographic and operational data

The data collected included age, marital status, and number of years of experience as an RPA crewmember (Table 1). Interview participants were asked about prior aircraft or military experience, including details of prior combat deployments.

Semistructured interview

Interviews were conducted by one of a team of five behavioral science researchers (three licensed doctoral-level clinical psychologists and two trained mental health technicians with clinical interviewing experience). The primary questions posed included but were not limited to: (a) Describe your emotions upon notification and preparation for an impending weapon strike; (b) Describe your emotions during and after weapon-strike engagements; (c) When you recall previous weapon strike engagements, what sort of emotions do you currently experience? (d) Are there any particular missions that you recall that continue to stir or bring up strong negative emotional reactions? (e) Have you ever spoken with a specialty trained operational psychologist with adequate security clearances to facilitate coping with a negative weapon strike experience?

During the interview, participants who described having negative emotions to one or more weapon-strike missions were asked to describe the intensity and duration of their emotional reaction, the underlying thoughts and beliefs that accompanied the reaction, and if/how their reaction affected their functioning. Participants who indicated effects on functioning (i.e., led to changes in their general well-being and/or social or occupational functioning) were asked to describe how they were negatively impacted, how long the disruption in their functioning persisted, whether or not they had emotional reactions that continued to lead to distress, and if the experience affected their desire to participate in future weapon strikes.

Furthermore, participants were asked to describe details of the identified mission(s) associated with negative emotional response(s), including whether they developed personal connections with their targets, especially combatants who were tracked for an extended period of time, and whether the mission involved any unintended or unexpected outcomes such as collateral damage to civilian assets, or civilian or friendly force casualties. Finally, participants were queried on whether their mission utilized HD or standard video feed.

Table 1. Demographic data.

Demographic	*n*	%
Rank		
Airmen (E1–E4)	9	12.2
Non-Commissioned Officer (E5–E6)	12	16.2
Senior Non-Commissioned Officer (E7–E9)	12	16.2
Company Grade Officer (O1–O3)	17	23.0
Field Grade Officer (O4–O6)	23	31.1
Missing data	1	1.3
Gender		
Male	65	87.8
Female	9	12.2
Age		
18–25	7	9.5
26–30	17	23.0
31–34	12	16.2
35–39	16	21.6
40+	19	25.6
Missing data	3	4.1
Marital status		
Single	18	24.3
Married	55	74.3
Missing data	1	1.3
Years of RPA experience		
1–3	30	41.0
4–5	17	23.0
6+	22	30.0
Missing data	5	6.0
Prior military experience		
Yes	52	70.2
Prior military deployment		
Yes	36	48.6
# of weapon strikes		
1–3	13	17.5
4–6	15	20.2
7+	45	61.0
Missing data	1	1.3
HD video feed		
Yes	46	62.2
No	27	36.5
Missing data	1	1.3
Collateral damage		
Yes	12	16.2
No	61	82.4
Missing data	1	1.4

Note: To protect the anonymity of participants, variables were not recorded if participants chose not to report them. These responses are captured under the "Missing Data" response categories.

Procedure

Participation was solicited by requesting military leadership support for the study. Once leadership at each squadron granted access to interview their crewmembers, the interviewer(s) coordinated details for number of participants (usually 10–15) and visit length (usually 2–3 days).

Interviews were conducted one-on-one in meeting rooms or offices within the RPA unit. The interviewer took written notes using a semistructured interview form. Electronic recording devices were not used due to the restriction of such devices within operational squadrons. The interviewer provided a copy of the research protocol for review, answered any questions, and solicited verbal consent to participate. The interviewer instructed the participants that they could discontinue their participation in the interview at any time. No

records were kept of participant names or personally identifiable information, and all participants completed the interview in full. The typical interview took approximately 90 min to complete, and the lengths of the interviews ranged from approximately 1 hour to over 2 hours.

Data analysis

Participants' responses were coded and entered into a database. Responses were not limited to a single emotional category as it was possible for a subject to report both positive and negative responses for the same event. Participants who reported having a negative emotional reaction were further categorized according to the severity of their reaction (nondisruptive vs. disruptive), the duration of their emotional reaction, and whether or not their negative emotional reactions remained problematic (resolved vs. unresolved) for them at the time of the interview. The following categories were used to categorize negative emotional reactions:

- *Disruption*: A response was categorized as disruptive if participants reported negative changes in their social or occupational functioning caused by their emotional response. For example, participants who reported becoming socially isolated and withdrawn around co-workers and/or family that led to relational distress were categorized as having a disruptive experience, whereas subjects who had a negative emotional reaction but continued to function without difficulties were categorized as having a nondisruptive response.
- *Duration*: Psychological responses persisting 48 hours or longer were categorized as long duration and responses lasting less than 48 hours were categorized as short duration due to the distribution of responses within the sample. The 48-hour cutoff was based upon a clear dichotomy in the responses of the crewmembers; the emotional reactions either resolved within 48 hours or persisted. This approach is common when categorizing responses in qualitative phenomenological research (Smith, 2015).
- *Resolution*: Negative psychological responses were categorized as resolved or unresolved based upon whether the participants reported they had emotionally and functionally recovered from their event.

Interviewer notes were reviewed by a clinical psychologist using the methodology described in Smith (2015); specifically the method of analyzing data using "grounded theory" described by K. Charmaz (2015). This qualitative methodology approaches interview data without a preconceived hypothesis or theory, but instead allows the data to drive the identification and construction of meaning, themes, and reactions to the unique experience of killing remotely. Using this method as a guide, universal positive and negative emotional themes were identified.

A dataset was created consisting of the described emotional response categorizations as well as demographic variables (gender, marital status, and dependent children living at home); occupational variables (enlisted or officer, prior deployments to a combat zone); and mission-specific variables (number of weapon-strike missions, HD video exposure, unintended military or civilian casualties, and nonhuman collateral damage), and whether or not the crewmember engaged with a mental health-care professional in response to a weapon strike. A team of three doctoral-level clinical psychologists analyzed all interview notes for positive and negative emotional themes. Once identified, the presence/absence of each theme was coded for each participant.

Contingency tables were used to obtain the frequency and proportion of participants within each demographic, occupational, and exposure-specific variable for the following two outcome variables: (a) negative, disruptive emotions of long duration and (b) unresolved negative, disruptive emotions of long duration. Chi-square tests and risk analyses were run to obtain the relative risk (RR) for the contingency tables. The RR value indicates how much more likely that level of the predictor variable is to endorse the outcome variable than the predictor variable's comparison level. For an example, using gender as the predictor, a RR would provide a comparison quantifying how much more likely females are to report negative, disruptive emotions of long duration as compared to males.

Results

Table 1 shows the collected demographic, occupational, and mission-specific data. The participants were largely married, male enlisted members, 31 years old or older who had 5 years or less of RPA experience. Most of the participants had prior military experience before cross-training into the RPA career field and had participated in 7 or more RPA (MQ-1 Predator/MQ-9 Reaper) weapon strike events.

Forty-six participants (62%) used HD video feeds during their identified weapon strike(s). A total of 71 participants (96%) self-reported a state of autonomic arousal in the minutes preceding and during their identified weapon-strike engagement(s). Self-reported symptoms of autonomic arousal included elevated heart rate, sweating, and increased respiration that were sometimes accompanied by subjective feelings of anxiety. Crewmembers typically described this as being a state of

elevated alertness with increased focus that enhanced performance. Heightened autonomic arousal and state anxiety were self-reported to last for several minutes to several hours following completion of the weapon-strike mission.

Sixty-nine (93%) participants reported at least one positive emotion, and 62 (84%) endorsed at least one negative emotion surrounding their weapon-strike event (s). Fifty-six participants (76%) reported experiencing both positive and negative emotions, 13 (18%) indicated only positive emotions, four crewmembers (5%) endorsed only negative emotions, and one crewmember (1%) didn't recall having any emotional responses to his weapon strike missions.

Twenty-nine participants (39%) reported a negative emotional response to at least one weapon strike event that resulted in a change in their personal and/or work-related functioning (i.e., "disruptive"). Twenty-two of these (30% of total sample) reported their reactions persisted 48 hours or longer. Of these 22 crewmembers, 6 (8% of total sample) reported their response continued to evoke unsettling thoughts, emotions, and behaviors at the time of the interview. Negative emotional responses were categorized according to the tree diagram presented in Figure 1.

Thematic analyses of emotional responses

Analysis of interview responses and interviewer notes yielded three recurring themes for both the positive and negative emotions reported by RPA crewmembers. Tables 2 and 3 represent the identified themes, their commonly reported emotions, and examples of crewmember attributions for each.

Although several subjects stated they had tracked targets for an extended period of time, none of them endorsed developing personal connections with targeted individuals, and no interview subject recalled having significant negative emotional reactions to striking targets that were tracked for extended periods of time. None of the 46 interview respondents who reported observing their missions using HD video feed reported experiencing any increased emotional impacts due to the enhanced visual clarity of the feed.

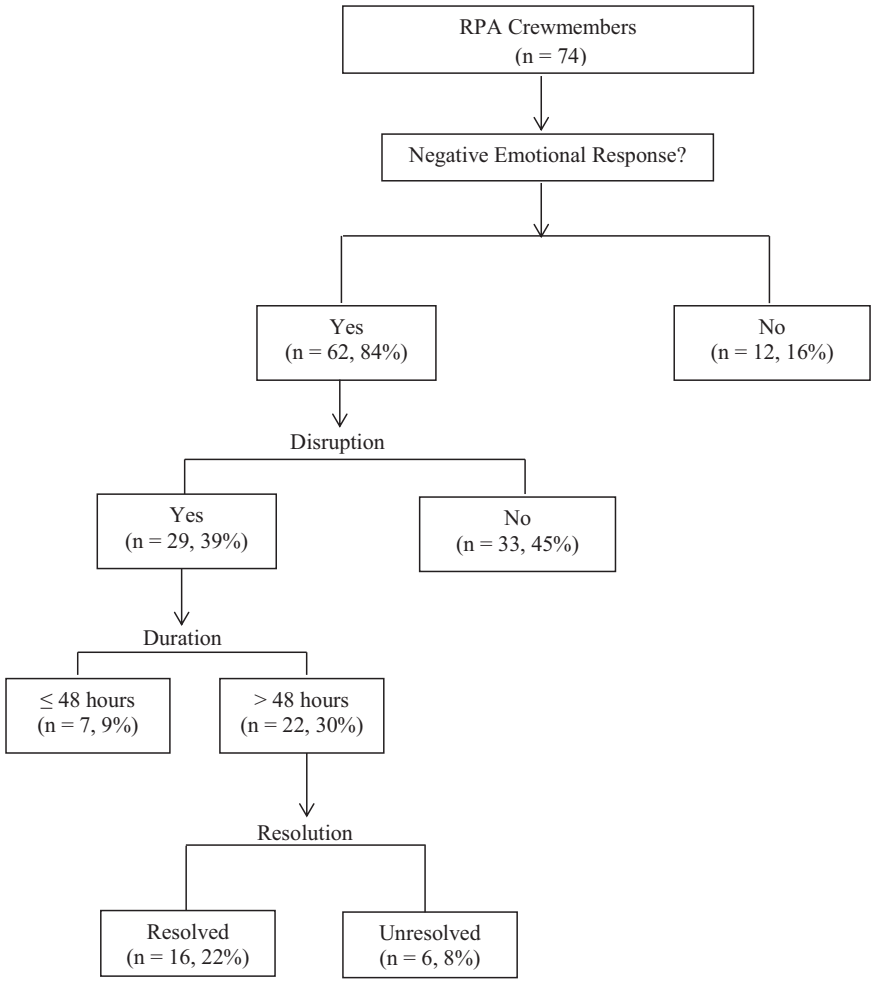

Figure 1. Tree diagram depicting emotional response categorizations. Percentages reflect total sample percentages.

Table 2. Collective attributional themes: positive emotions.

Theme	Frequently endorsed emotions	Examples of attributions	*n* (% of total sample)	*n* (% of those with positive emotions)
Emotions related to believing mission is important and/or justified	Justified, satisfied, gratified, fulfilled, impactful, sense of accomplishment, pride	Doing important work; keeping people safe/ saving lives, "mission is important," thoughts of 9/11, "I know I'm doing good"	53 (71.6)	52 (75.4)
Emotions related to technical proficiency/skills	Confident, competent, focused, prepared, successful, pride	Pride in doing job well, drive to excel in duties, getting mission done; satisfaction in perfect execution of mission	43 (58.1)	44 (63.8)
Emotions related to a devotion/connection to someone or something outside of him/herself (patriotism, fellow warfighters, honor, etc.)	Dedicated, patriotic, passionate, pride, devotion, valued	Sense of camaraderie, a sense of being a defender/protector of coalition forces on ground, "taking out bad guys before they can harm 'Blue' forces," being part of a team	26 (35.1)	25 (36.2)

Occupational, demographic, and mission-specific factors

No differences in proportions of demographic (e.g., age, gender, marital status) or occupational (e.g., rank, prior military experience, # of years as an RPA operator) variables were identified for crewmembers endorsing negative, disruptive emotions. Of the three mission-specific variables that were analyzed (witnessing nonhuman collateral damage, witnessing civilian torture and casualties by enemy combatants, and exposure to HD video feeds), witnessing civilian torture and casualties by enemy combatants and nonhuman collateral damage were associated with higher risk for endorsing negative disruptive emotions. Results revealed crewmembers witnessing civilian torture and casualties by enemy combatants were 1.91 times more likely (61% vs. 32%, $p < .05$; 95% confidence interval [CI]: 1.11–3.26) to endorse negative disruptive emotions than crewmembers who had not. Similarly, crewmembers who had witnessed non-human collateral damage were 1.94 times as likely to endorse negative disruptive emotions as those crewmembers who had not (67% vs. 34%, Fisher's exact test = 0.04; 95% CI: 1.14–3.29).

Table 3. Collective attributional themes: Negative emotions.

Theme	Frequently endorsed emotions	Examples of attributions	*n* (% of total sample)	*n* (% of those with negative disruptive emotions ≥48 hr)
Emotions related to crewmember's technical performance/skills/ proficiency	Anger, frustration, fear, anxiety, stress	High level of visibility and scrutiny for each mission; mistakes made or fear of mistakes being made (by self, crew or somewhere in the chain of events from surveillance to strike) that resulted in or almost resulted in an unsuccessful strike (e.g., a target escaping; unintended casualties, ordnance not on target, etc.)	31 (41.9)	10 (47.6)
Emotions related to crewmember's sense of responsibility to others (combatants and noncombatants)	Conflicted, guilt, fearful, anxious, grief/sadness, anger, uncertainty/ doubt, frustration	A) Empathy for targets' families and loved ones (e.g., observation of human remains retrieval, grief reactions, and burial ceremonies)	7 (9.5)	4 (19.0)
		B) "Fog of War" issues that engender doubt and uncertainty (e.g., targets not behaving as predicted, targets keeping their families close by as shields, having to evaluate the legitimacy of secondary targets that arise during a strike, etc.)	15 (20.3)	9 (42.9)
		C) Sense of responsibility to protect troops and noncombatants on the ground (e.g., frustration with approval process to strike to save ground forces, inability to intervene when enemy combatants are performing atrocities on civilians and/or combatants)	24 (32.4)	8 (38.1)
Emotions related to transcendental or abstract concepts (e.g., God, spirituality, karma, etc.)	Fear, doubt, uncertainty, confusion, guilt	Thoughts of karma; uncertainty regarding religious ramifications of killing in warfare; fleeting nature of life and finality of death; the act of killing and what it means about him/her as a person (good vs. evil)	13 (17.6)	4 (19.0)

The same analyses were conducted for crewmembers endorsing disruptive negative emotions persisting 48 hours or longer ($n = 22$). Again, no demographic or occupational risk factors were identified. Witnessing civilian torture and casualties by enemy combatants (56.3% vs. 25.0%, RR = 2.25, $p < .05$; 95% CI: 1.17–4.32) and collateral damage (60.0% vs. 28.6%, RR = 2.10, Fisher's exact test = 0.06, 95% CI: 1.10–4.04) were found to be associated with elevated risk for disruptive negative emotions that lasted for 48 hours or longer.

Participants who endorsed negative disruptive emotions were asked if they had ever talked to an operational psychologist (i.e., a specialty trained licensed, clinical psychologist embedded within the operational unit) or opted out of participating in a weapon-strike mission because of a negative weapon-strike experience. Six crewmembers (8% of the total sample) endorsed talking with an operational psychologist to help them process an emotional reaction following a weapon strike. All six of those crewmembers had disruptive negative emotions that persisted for 48 hours or longer. Of the six crewmembers who had unresolved negative disruptive emotions at the time of the interview, only two (33%) had spoken to an operational psychologist.

Two crewmembers who endorsed negative disruptive emotions (2.7% of the total sample) reported they had purposefully opted out of one or more weapon-strike missions due to feeling uncomfortable with the risk involved and the potential for non-combatant casualties in a particular mission. Both of those crewmembers' negative disruptive emotions persisted 48 hours or longer. One of those crewmembers (1% of total sample) endorsed an unresolved aversion to participation in future weapon-strike operations.

Discussion

Advances in computer, satellite, and aviation-based technology have made it possible for Predator/Reaper RPA crewmembers to engage and eliminate military targets and enemy combatants while geographically positioned hundreds of miles away. By way of real-time video feeds, these warfighters make decisions and take actions that directly translate into the killing of enemy combatants, while witnessing the immediate consequences of their missions via these same, real-time video feeds. Although popular culture and combat theories suggest that killing an enemy from afar engenders either pathologic emotional detachment or debilitating moral conflict in the warfighter, only one empirically based research study exists documenting the psychological consequences of engaging in lethal, remote warfare (Campo, 2015). To increase our knowledge of the consequences of this unique form of warfare, this study describes the self-reported emotional responses of 74 members of the USAF Predator/Reaper community who completed semistructured, anonymous interviews assessing their emotional and cognitive experiences leading up to, during, and after missions involving the deployment of weapons that involved presumed or confirmed killing of enemy combatants.

Evidence of emotional engagement

The results of this study revealed almost all Predator/Reaper crewmembers (96%) endorsed heightened autonomic arousal preceding and during weapon-strike operations. Crewmembers reported heightened autonomic and emotional responsiveness upon notification of a weapon-strike mission and approval to deploy weapons. This arousal reportedly occurred in varying intensities in response to the operational and situation-specific mission demands and to the perceived consequences of the crewmembers' actions. Contrary to theories that suggest physical distance from one's enemy in combat precludes emotional engagement (e.g., Grossman, 1995) and perceptions of RPA warfare being like a video game, this pattern of responsiveness suggests that RPA crewmembers are emotionally engaged from the earliest stages of weapon-strike missions and is similar to the findings of an earlier study of RPA crewmember reactions to weapon strike missions (Campo, 2015).

The majority (76%) of crewmembers reported experiencing both positive and negative emotions in response to weapon-strike missions, suggesting that engagement in remote combat operations is emotionally complex. Positive emotions such as satisfaction, confidence, pride, and dedication were most frequently attributed to crewmembers' beliefs that their missions are important and justified and that they are protecting the lives of civilians and coalition forces on the ground. Crewmembers' attributions for positive emotions spanned a continuum from the very pragmatic (e.g., being proud of his/her technical proficiency and performing the job well) to the abstract (e.g., how the missions impact and are interpreted by others, to include one's "higher power").

A similar attributional continuum was observed for crewmembers' negative affect. Anger, frustration, anxiety, sadness, and regret were attributed to factors that ranged from very pragmatic and self-focused (e.g., frustration surrounding technical errors or an imperfect mission) to more abstract and other-focused (e.g., grief and empathy for a target's family; sadness for taking a human life even when confident the target was an enemy combatant; frustration and regret for not being able to save

coalition forces on the ground, frustration and despair over witnessing enemy combatants kill or torture civilians, etc.). The wide range of emotions and recurring attributional themes observed during these interviews suggest RPA crewmembers are cognitively and emotionally engaged throughout their weapon-strike missions. They also speak to the psychologically complex nature of remote warfighting.

Recent discussions about the legality, morality, and psychological consequences of RPA weapon strikes have suggested that RPA crew members are suffering from a psychological strain that is unique to what they deem the inevitable moral conflict engendered by this type of warfare (Hijazi et al., 2017). However, although moral injury was not directly assessed, it is important to note that in the current study, the types of long term existential and moral conflict that would be a presumed consequence of moral injury were seen only rarely in these crewmembers (Table 3), the most liberal estimate being 5% (4 out of the 74 participants).

Disruptive emotional responses

A noteworthy number of the crewmembers interviewed (39%) indicated at least one weapon strike that resulted in negative emotional reactions (e.g., anger, sadness, frustration) that impacted their social and/or occupational functioning. These reactions were typically in response to their perceived failure to safeguard ground troops engaged with enemy combatants, their inability to protect civilian bystanders from being tortured or killed by enemy combatants, or their witnessing of the destruction of buildings and assets within an impoverished area. Almost a quarter of these crewmembers indicated the disruptive effects and negative emotions resolved within 48 hours or less.

Considering the complex emotional and cognitive nature of lethal weapon-strike missions, those who experience disruptive negative emotions but are able to work through them in a couple of days could be presumed to be engaging in appropriate coping strategies in response to an emotionally challenging event. However, the portion of the sample that endorsed disruptive negative emotions of longer duration could be presumed to be at highest risk for adjustment-related problems and other clinically significant emotional, social, and behavioral issues.

Although no definitive statements can be made regarding psychological diagnoses from these data, intense negative emotions causing impairment in functioning are concerning in personnel who potentially engage in warfighting activities and decision-making on a daily basis. According to the data collected in this study, up to 30% of RPA crewmembers have struggled with negative emotions that persisted for 2 days or longer, hindered functioning in some way and were directly related to participation in RPA weapon strike operations.

Proportional analyses indicated that the only demographic, occupational, or mission-related factors measured in this study that were associated with disruptive negative emotions were the witnessing of civilian torture and casualties by enemy combatants and the witnessing of non-human collateral damage, especially in impoverished areas. Although preliminary, these observations suggest that mission-specific variables, more so than demographic or general occupational factors, are associated with disruptive negative emotional reactions in RPA crewmembers. Given that witnessing the death of non-combatants has been associated with higher levels of emotional symptoms in traditional combat (Maguen et al., 2010), these unanticipated, undesirable, and often unavoidable consequences of combat may represent a universal emotional vulnerability for military combatants, no matter the distance from which they engage the enemy.

For some crewmembers, disruptive negative emotions specifically impacted their occupational functioning. Two crewmembers (3% of the total sample) who endorsed experiencing disruptive negative emotions reported they had purposefully opted out of at least one weapon-strike mission due to heightened anxiety associated with the risk and potential consequences of that particular strike. One crewmember (1% of the sample) was not currently participating in weapon-strike operations at all. Both of these crewmembers attributed their aversions to future weapon strikes to a fear of making a mistake leading to unintended casualties and not to internal moral or ethical conflict associated with killing enemy combatants via remote weapon strikes.

The findings from these phenomenological interviews and descriptive analyses are the first strokes in painting a picture of the cognitive and emotional reactions experienced by remote warriors during and following weapon strikes. RPA crewmembers do not report being morally conflicted about being out of harm's way nor emotionally insulated by their great distances from their targets, and they do not report internal moral or ethical conflict associated with killing enemy combatants via remote weapon strikes. However, they do endorse struggling at times, in much the same way other combatants have been shown to struggle, with the unexpected and often unavoidable casualties of war.

Of note are the data regarding the utilization of psychological services that are available to RPA crewmembers. Operational doctoral-level psychologists are assigned to some of these RPA units. These psychologists

have the appropriate security clearances to discuss missions, have specific specialty training regarding the unique operational demands of RPA duties, are intended to be a constant presence in the squadrons, and can be accessed on an as-needed basis. If the current data are representative of all RPA crewmembers involved in weapon strikes, then nearly 40% of these remote warriors have experienced disruptive negative emotions resulting from their RPA duties, and up to 30% have dealt or are dealing with negative disruptive emotions that persisted 48 hours or longer. Of the 29 crewmembers in this sample who endorsed negative, disruptive emotions, only six endorsed speaking with one of these operational psychologists because of a negative weapon-strike experience. Of the six crewmembers endorsing negative, disruptive emotions that were unresolved at the time of the interview, two had spoken to a psychologist. These embedded, specialty trained, and readily available mental health professionals are a potentially valuable resource for RPA crewmembers. They can provide all levels of consultation, training, and debriefing, but they appear to be underused. Gaining a better understanding of the barriers to accessing these services and addressing them might diminish the intensity and duration of negative reactions to weapon strikes and the subsequent functional impairment.

Limitations of the study

This study has some limitations worthy of consideration. Although the interviews were targeted for a representative sampling of crewmembers across the entire USAF RPA community, the sample may not be representative of the entire RPA weapon strike population. For operational security reasons, the Predator/Reaper squadrons cannot release the total number of crewmembers who were assigned to their units at the time of the interviews. However, the demographics of our sample are consistent with available Air Force Personnel Center demographic data for the selected career fields.

Secondly, operational security limitations that prevented both video and audio recording of the interviews not only limited the level of observation that was able to be conducted (e.g., nonverbal communication, interviewer/participant dynamics), but also could have negatively affected rapport-building between the interviewer and the crewmember (due to the interviewer having to write throughout the interview instead of being able to attend solely to the crewmember and the interview process). Having a dedicated transcriptionist present in the interview could address some of these limitations, but it could also be an inhibitor to self-disclosure due to fears of compromised anonymity. In addition, although recording was not an option for our study design, it could be argued that any observational benefits provided by a recording device might have been offset by the potential negative effect on self-disclosure that a recording device could have for a military sample.

Lastly, the voluntary nature of the research and the topic of research could have introduced selection bias into our sample. One source of selection bias could be from crewmembers not wanting to participate out of fear of limited confidentiality and anonymity. We minimized this form of selection bias by emphasizing anonymity in preinterview communications and within the interview itself. A second source of potential selection bias could have resulted from avoidance: crewmembers having significant negative emotions about an event might want to avoid discussions of the event (and therefore not volunteer for the study). However, the presence of this form of selection bias would have resulted in an overrepresentation of positive responses in the interviews. The high frequency of negative emotions and the observed willingness to discuss both positive and negative responses to weapon-strike events suggest that this type of selection bias was not likely a significant influence on our sample.

Finally, selection bias could have resulted from squadron leadership providing their "best" or "worst" interview candidates as volunteers to the study. This potential bias was largely alleviated by how the interviews were conducted. Given the high operations tempo in the RPA community, nearly all interviewees were chosen with minimal notice based upon nothing more than their ability to break away from their job for an hour.

Other potential limitations often cited in quantitative research, most notably a small sample size and recall bias, are not de facto limitations in qualitative research using phenomenological methods (Smith, 2015). Although a larger sample would allow for more robust proportional analyses and more certainty about the identified collective themes, for the primary stated purpose of this particular study, we do not believe these factors limit the accuracy or utility of our observations.

Directions for future research

The psychological impact of killing via remote warfare warrants further attention. Additional observations of the emotional and cognitive responses of RPA crewmembers will be key to refining our understanding of this type of modern warfare, and validation of collective themes and attributions will help shape targeted training and stress inoculation strategies for crewmembers. In addition, a greater understanding of these themes may help medical and mental health providers be more familiar with and responsive to the emotional challenges of

this mission area in order to minimize negative emotions and impaired functioning. Lastly, gathering more data regarding the demographic (e.g., cultural, religious, spiritual and ethnic backgrounds), occupational, and operational factors that are associated with elevated risk for disruptive negative emotional reactions will also help to drive more effective selection, training, and intervention for these indispensable modern warfighters.

Conclusion

The results of this study suggest remote warriors are emotionally engaged in the missions they perform, and they actively process them and their personal, social and, for some, spiritual consequences in many of the same ways reported by military members in traditional combat. The majority of crewmembers interviewed indicated they experienced the emotional complexity of their jobs but were able to process and resolve any cognitive dissonance they faced in a short (less than 48 hours) period of time. The common themes for both positive and negative emotions experienced by crewmembers indicated a dedication to the mission and a connection to the innocent people and coalition forces on the ground in spite of the emotionally burdensome aspects of combat. The depth and breadth of emotional responses articulated by those interviewed indicate that Predator/Reaper crewmembers are not only impacted by their own actions in combat, but they have developed a psychological connection with those they target and support on the ground regardless of the physical distance separating them. Further validation of collective themes for RPA crewmembers will help to guide selection, training, and intervention for these modern warfighters.

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