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Rodger K. Bufford[1], Anna Frise[2], Raymond F. Paloutzian[3], Tyler J. Mulhearn[2], Neal Scheuneman[2], Wayne Chappelle[4], Kristin Galloway[4], and Lillian Prince[4]

[1] Graduate School of Clinical Psychology, George Fox University

[2] NeuroStat Analytical Solutions, LLC, Vienna, Virginia, United States

[3] Department of Psychology, Westmont College

[4] Aerospace Medicine Department, U.S. Air Force School of Aerospace Medicine, Wright-Patterson Air Force Base

Introduction: Remotely piloted aircraft (RPA) require multiple crewmembers to successfully operate the aircraft. RPAs shape modern warfare and pose challenges for the spiritual–emotional health of RPA personnel. This study explored whether (a) RPA crewmembers could be separated into groups based on their experiences, (b) the groups differed in psychological health outcomes, and (c) they differed in aspects of spiritual well-being. ***Method:*** Participants included 354 United States Air Force personnel involved in RPA duty. Participants provided demographic information and completed the Work Role Strain Scale as a predictor. Outcome measures included job satisfaction, the Maslach Burnout Inventory, Outcome Questionnaire-45.2, Posttraumatic Stress Disorder Checklist for *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (*DSM–5*), and medical complaints and psychosocial services indices. The Spiritual Well-Being Scale and Unit Cohesion Scale were assessed as moderating factors. ***Results:*** Cluster analysis identified two groups of crewmembers. Psychologically healthy participants included 73.4% of crewmembers (n = 260); the remaining 26.6% (n = 94) were distressed. The distressed group included more imagery analysts, weapon-strike pilots, and females, and fewer sensor operators and males compared with the healthy group. Symptoms among the distressed group included more psychological difficulties and PTSD symptoms, more medical complaints, and greater use of psychosocial services. The distressed group reported greater work-role conflict, role ambiguity, work overload, relationship stress, emotional exhaustion, and cynicism as well as lower job satisfaction, unit cohesion, professional efficacy, and existential well-being. ***Discussion:*** The strongest predictors of distress were lack of meaning and feeling overextended at work. Emotional exhaustion and low existential well-being identified distressed crewmembers.

Clinical Impact Statement

About one quarter of remotely piloted aircraft (RPA) crewmembers reported high distress. They could be identified by their emotional exhaustion and low existential well-being. Primary stressors were work-role conflict, ambiguity, overload, and relationship stress. Greater attention to psychological wellness among RPA personnel seems essential given these findings. Successful intervention may require attention to religious/spiritual struggles, loss of meaning and purpose, guilt and shame, interpersonal alienation, anxiety, and depression. Trauma-informed treatment should incorporate aspects of spirituality and personal/cultural values. Similar approaches are suggested for others, including first responders, who experience similar events that challenge psychological and spiritual wellness.

Keywords: burnout, emotional exhaustion, existential well-being, mental health, remotely piloted aircraft

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Rodger K. Bufford https://orcid.org/0000-0001-7494-2234

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Correspondence concerning this article should be addressed to Rodger K. Bufford, Graduate School of Clinical Psychology, George Fox University, 414 North Meridian – V6104, Newberg, OR 97132, United States. Email: rbufford@georgefox.edu

Exposure to natural disasters, war, death, or other significantly stressful events may contribute to intense feelings such as fear, confusion, or helplessness. Trauma may lead to fear, confusion, helplessness, and posttraumatic stress disorder (PTSD; American Psychiatric Association, 2013). Trauma can impair functioning, change beliefs, and alter worldviews, including our sense of self and others, our views of good and evil, and our ability to find meaning and purpose in life (van der Kolk, 2014).

In this study, we examined aspects of psychological and spiritual health for those exposed to potentially traumatic events resulting from their involvement in armed combat by means of remotely piloted aircraft (RPA). In contemporary combat, the Department of Defense relies heavily on RPAs as a significant component of national defense. Sometimes referred to as "drones," these aircraft are highly specialized weapon systems that depart significantly in their purposes, capabilities, and sophistication from the drones commonly seen in civilian and business settings. The United States Air Force (USAF) has supported combat operations around the globe with both the MQ-1B Predator and MQ-9 Reaper aircraft. The use of weaponized RPAs by the Department of Defense has increased in recent decades owing to cheaper costs compared with manned aircraft (Gertler, 2012) and because they are designed for long endurance missions and are equipped with enhanced capabilities for surveillance, reconnaissance, and precision strikes (Armour & Ross, 2017). The use of weaponized RPAs is expected to further increase in coming years. Importantly, however, although RPAs are unmanned, they are operated from a remote location by highly trained crews that may include nearly 100 geographically dispersed Airmen.

An RPA crew includes a pilot, who flies the aircraft and triggers the laser-guided bombs; sensor operators, who control the high-definition cameras and targeting systems; and imagery analysts, who provide essential information about enemy combatants and their materials, supplies, and support systems ("assets") to the pilot and sensor operator (Bryant-Lees et al., 2021). RPA missions often span weeks or months of mostly tedious surveillance that involves hundreds of hours observing, monitoring, and tracking the daily routines of identified targets and their support and supply systems.

At times, RPA crewmembers may suddenly shift from these monotonous surveillance tasks to intensive activities that often involve real-time weapon strikes (Bryant-Lees et al., 2021; Chappelle, Goodman, et al., 2019). These sudden shifts in mission operations entail heightened levels of adrenaline and alertness in preparation for potential action (Chappelle et al., 2018). Outcomes may include killing or injuring enemy combatants or destruction of various combatant assets such as buildings, vehicles, and material. Unintended outcomes may result as well, such as killing or harming friendly personnel or uninvolved civilians who happen to be present, destruction of U.S. or allied assets, or damaging civilian property. Decisions and actions are carried out in milliseconds, but their consequences endure well beyond the mission and can take a significant toll on the individuals involved in the mission (Chapelle, Goodman, et al., 2019). The intensity and stressors of such missions often result in high levels of physical and psychological (i.e., emotional, social, behavioral) distress and doubts about potential causes and outcomes (Chappelle et al., 2018, 2020, Chappelle, Prince, et al., 2019). Although the physical space of the battlefield may be 7,000 miles (approximately 11,000 km) away, RPA crewmembers observe the daily patterns of potential targets along with their families and associates for weeks or months. This engagement results in a sense of intimacy, although the aircrew is fully aware of the impending decision to target and kill the enemy combatant (Chappelle, Prince, et al., 2019; Chappelle et al., 2020).

Because of the heightened levels of conflict in regions in which RPA crews operate, it is not uncommon for crewmembers to witness graphic displays of wickedness, engage in a shoot-to-kill drama, observe the destruction, injury, and death of those involved, or witness the mourning of bystanders and burial of the deceased. After witnessing or engaging in any of these activities, crewmembers return home to their civilian routines, making a significant shift in context and activities (Chappelle, Goodman, et. al., 2019).

Once home, whether the day was boring or harrowing, RPA crewmembers may have difficulty transitioning into their domestic life roles (Chappelle et al., 2018; Chappelle, Prince, et al., 2019). In interacting with family and friends, they are forbidden from discussing most of the tedious, exhilarating, or traumatic details about the work they performed and its emotional impact due to the sensitivity and classified nature of the operations (Bryant-Lees et al., 2021). Consequently, RPA crewmembers may have difficulties with both compartmentalizing and processing the experiences of their work. The context, duties, and secrecy of their work can take a toll on RPA crewmembers. Attending innocuous civilian events such as soccer games or birthday parties can be challenging because of the isolation and strain experienced as a result of RPA operations and inability to discuss those operations outside of the work context (Chappelle et al., 2018).

Stressors of RPA Crewmembers

Research has identified several common work-related factors that may contribute to distress among RPA crewmembers. These may include excessive workload and inadequate recovery periods (Tvaryanas & MacPherson, 2009), organizational communication difficulties, ergonomic factors, and poor leadership strategies. In addition, stressors more unique to the role itself, such as problems maintaining sustained attention and being deployed in garrison (which involves almost daily shift from combat operations to living in a civilian community) rather than traditional deployment in theater (such as in an isolated military base with limited civilian contact), are reported as top stressors among RPA crews (Armour & Ross, 2017; Chappelle et al., 2014, 2020; Chappelle, Goodman, et al., 2019; Chappelle, Prince, et al., 2019; Prince et al., 2015). This combination of stressors may place significant strain on RPA crewmembers.

Effects of Stress Among RPA Crewmembers

RPA crewmembers may be at risk for various forms of physical, psychological, social, and religious or spiritual distress owing to the nature of the tasks assigned to them (Bryant-Lees et al., 2021). Exposure to the death or serious injury of enemy combatants or others may contribute to psychological difficulties (MacNair, 2015; Maguen et al., 2010). In one study along these lines, Chappelle et al. (2018) found that emotional reactions experienced by RPA personnel varied greatly owing to factors such as whether the harm was done to a legitimate target (the actual enemy), to noncombatant bystanders (innocent civilians) as "collateral damage," or to friendly forces. Awareness of harm to an enemy was often associated with positive emotions such as pride and satisfaction resulting from being able to protect team members, whereas injury of innocent bystanders contributed to negative feelings such as guilt and frustration resulting from perceiving a sense of responsibility for protecting civilians. Approximately 8% of crewmembers experienced long-term existential and moral difficulties as a result of their participation. Despite these findings, there is limited understanding about

how these potentially difficult situations and stressors affect RPA personnel or how common their effects may be.

Campo (2015) found that one-third of the weapon-strike RPA crewmembers reported significant emotional distress such as grief, sadness, remorse, and anxiety after participating in their first weapon-strike operation. Others reported rates of emotional and psychological distress among weapon-strike RPA crewmembers ranging from 5% to 37% depending on the index and military unit; distress was higher than estimated for other military groups (Bryant-Lees et al., 2021; Chappelle, Prince, et al., 2019). Chappelle et al. (2018, 2020) found that imagery analysts experienced both positive and negative emotions following weapon strikes that resulted in loss of life. Notably, 21% of the imagery analysts reported negative emotions that disrupted daily functioning for a month or longer. The most common negative emotions were discomfort with uncertainty, feeling responsible for protecting allied troops and civilians, and spiritual or transcendental implications of warfighting. Negative emotional reactions were more likely after witnessing unforeseen deaths, such as the death of civilians (Chappelle et al., 2020).

Psychological distress among RPA crewmembers may include anxiety, depression, and symptoms of PTSD (Ames et al., 2019; Armour & Ross, 2017; Bryant-Lees et al., 2021; Chappelle et al., 2014, 2018, 2020; Chappelle, Goodman, et al., 2019; Chappelle, Prince, et al., 2019; Prince et al., 2012, 2015). Engagement in RPA weapon strikes may result in religious/spiritual distress including moral/existential difficulties such as feelings of guilt, confusion, or sadness (Koenig, 2018; Koenig et al., 2018).

Despite RPA operators' physical distance from the battlefield, intense and varied emotional experiences may result, leading to several important implications: (a) an RPA crewmember may feel patriotic and confident following a successful mission or feel confused and fearful following a mission where a mishap has occurred (Chappelle et al., 2018); (b) most crewmembers involved in weapon-strike operations are able to resolve negative emotions resulting from missions within a month, suggesting chronic ill effects are rare; and (c) for those experiencing long-term negative emotions, it is unclear what personal or situational factors may exacerbate or ameliorate negative emotional consequences of performing RPA duties. Identifying such factors may help reduce long-term negative effects including physical ailments, psychological disorders (e.g., PTSD, major depression), relationship disruptions, and spiritual effects that could result from RPA operations (Campo, 2015; Chappelle et al., 2018, 2020).

Despite RPA operators' physical distance from the battlefield, intense and varied biopsychosocial and R/S experiences may result. These may include physical ailments (Tvaryanas & MacPherson, 2009), psychological distress such as anxiety, depression, and symptoms of PTSD (Ames et al., 2019; Armour & Ross, 2017; Bryant-Lees et al., 2021; Chappelle et al., 2014, 2018, 2020; Chappelle, Goodman, et al., 2019; Chappelle, Prince, et al., 2019; Prince et al., 2012, 2015), relationship disruptions, and R/S distress including moral/existential difficulties such as feelings of guilt, confusion, or sadness (Koenig, 2018; Koenig et al., 2018). Outcomes vary, with important implications: RPA crewmembers may (a) feel patriotic and confident following a successful mission; (b) feel confused and fearful following a mission where a mishap has occurred, though most crewmembers who experience negative emotions resulting from missions are able to resolve them within a month, suggesting chronic ill effects are rare (Chappelle et al., 2018); and (c) experience long-term negative emotions. It is unclear what personal or situational factors may exacerbate or ameliorate negative emotional consequences of performing RPA duties. Identifying such factors may help reduce long-term negative effects including physical ailments, psychological disorders, relationship disruptions, and R/S effects that sometimes result from RPA operations (Campo, 2015; Chappelle et al., 2018, 2020).

Protective Factors Against Negative Emotional Reactions

Given the emotional intensity of weapon-strike RPA operations, it is worth investigating protective factors against potential negative emotional reactions resulting from these operations. Although little is known about what factors may buffer against the potential negative consequences of performing RPA duties, certain psychological states (i.e., aspects of well-being) appear promising and are worthy of further investigation (Frise et al., 2021).

While operational challenges would remain, certain psychological states may diminish their potential negative impact in at least three ways: (a) enhance the individual's ability to identify and understand the nature of the events and their related reactions, (b) help the individual accept and process his or her feelings more skillfully, and/or (c) prompt the individual to engage in future assignments with greater psychological preparedness, foresight, and competence (Gloster et al., 2020; Hofmann et al., 2012). Such psychological states and protective factors may include spiritual well-being (SWB) and unit social support. An investigation into potential mitigating factors could potentially offer meaningful interventions to help RPA crewmembers cope with unusually difficult and discomforting missions.

Several psychological factors may mitigate the adverse effects of high stress. For example, individuals with a strong sense of purpose in life direction may be more satisfied with life and have more adaptive coping skills (Fischer et al., 2020). SWB may also serve as a buffer against psychological difficulties (Paloutzian et al., 2012, 2021). Bormann et al. (2012) found evidence that SWB mediated PTSD symptoms among veterans. In an extensive body of research, SWB has been shown to predict lower levels of anxiety, depression, alcohol abuse, obesity, general feelings of stress, suicide ideation, and other health-related outcomes (Paloutzian et al., 2012, 2021).

In a preliminary study focused on SWB among RPA crewmembers, Wood et al. (2018) examined the relationship between SWB and PTSD symptoms. They reported that higher levels of spiritual and existential well-being predicted lower risk for PTSD symptoms. However, Wood et al. (2018) only examined one outcome (PTSD) in relation to spiritual and existential well-being. Moreover, PTSD was assessed using the PTSD Checklist-Military Version, which has since been updated to the PTSD Checklist for *DSM–5* (PCL-5) to correspond with the 5th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–5*). Finally, the sample assessed was small, suggesting the need to replicate findings with a larger sample.

Spirituality in the USAF

Historically, the USAF has not formally assessed perceptions of spiritual health or the ability to cope with spiritual or moral difficulties. Yet spirituality is an essential part of wellness and a component of the USAF's vision of holistic health (USAF, 2019). The USAF describes spiritual fitness as "strengthening a set of beliefs, principles or values that sustain an individual's sense of well-being and purpose" and involving one's "worldviews, religious faith, sense of purpose, sense of connectedness, values, ethics, and morals" (Air Combat Command, n.d.). Key to this definition is an inclusion of religious and secular perspectives on spiritual fitness, such that individuals can vary in spiritual fitness independent of their religious affiliation. Since 2018, the Spiritual Well-Being Scale (SWBS), a measure of spiritual health, has been incorporated into comprehensive occupational health assessments of USAF units to assess perceptions of spiritual wellness and how this impacts overall health.

Rationale for the Present Study

The present study was aimed to address limitations in the Wood et al. (2018) study and further investigate potential protective factors in RPA crewmembers engaged in weapon-strike missions. By including several occupational health measures, we aimed to assess the degree to which crewmembers could be categorized into distinct groups based on their scores on the Maslach Burnout Inventory (MBI), Outcome Questionnaire-45.2 (OQ-45.2), PCL-5, and medical complaint and psychosocial service use outcomes. Identifying unique groups could suggest potential interventions for treatment and support of RPA crewmembers prior to or following weapon-strike missions. We also sought to identify aspects of spiritual wellness within the RPA community. Three research questions were explored in the present study.

1. Could RPA crewmembers be categorized into groups (based on cluster analysis) in terms of their biopsychosocial and spiritual outcomes?

2. Might these groups be associated with and predictive of differing health or well-being outcomes?

3. To what extent is SWB related to these groups?

In this study, SWB and unit cohesion are mitigating factors, whereas work-role strain comprises three potentially problematic job demands—role ambiguity, role conflict, and role overload. We also explored predictors of adverse biopsychosocial and spiritual outcomes.

Method

Participants

USAF servicemembers (N = 571) engaged in RPA duties participated in a 2018 comprehensive occupational health assessment. The SWBS was added after data collection had begun; thus only 347 participants completed the existential well-being (EWB) subscale of the SWBS and served as participants for the present study. They included aircrew and support personnel from the Air Combat Command and Air Force Special Operations Command: 198 pilots (57%), 85 sensor operators (25%), and 64 imagery analysts (18%). Among these, 86% were male and 14% female; 64% were married, and 36% had dependents at home. Participant demographics are summarized in Supplemental Table 1 in the online supplemental materials.

Materials

The materials included a questionnaire asking for demographic data such as age, biological sex, relationship status, and dependents; race was not included in this survey. Military data were gathered on the participant's branch, duty category, rank, military history and current mission, work schedule, and weekly hours of work. The instruments included the Work-Role Strain Scale to assess role ambiguity, role conflict, and role overload. SWB and unit cohesion were viewed as protective factors. Dependent measures included the MBI, OQ-45.2, PCL-5, and medical complaints and psychosocial services indices.

Predictor Variables

Spiritual Well-Being Scale. The SWBS is a 20-item self-report measure with two 10-item subscales (Ellison, 1983). The EWB subscale consists of 10 items that appraise well-being in relation to others and the world. The religious well-being (RWB) subscale consists of 10 items that measure well-being in relationship to God; these items portray a theistic/Christian God but also can be meaningful in other contexts. About half the items are reverse scored. Customarily, RWB and EWB items are alternated during administration. In the present study, items were separated into the two subscales; EWB items were administered to all participants, whereas RWB items were administered only to those participants who indicated a belief in God. Reponses are made on a 6-point continuum from *strongly agree* to *strongly disagree*. Three scores are commonly computed: EWB, RWB, and SWB, which sums the scores from the two subscales (Bufford et al., 1991; Paloutzian et al., 2012). In the present study, internal consistencies were .92, .96, and .95, respectively.

Unit Social Support Scale. Perceptions of team member and leader social support were assessed using the Unit Social Support Scale (Vogt et al., 2012). It is a 12-item subscale of the Deployment Risk and Resilience Inventory. The revised version of the Unit Social Support Scale developed by Vogt et al., has demonstrated strong internal consistency, α = .96. Six items each assess member cohesion/social support from fellow unit members (e.g., "Members of my unit are interested in my well-being"; α = .92) and leader cohesion/social support from unit leaders (6 items, α = .96; e.g., "I can go to unit leaders for help if I have a problem or concern"). Each item was rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate greater perceived social support from fellow unit members and leaders.

Work-Role Strain. Occupational stressors including role ambiguity, role conflict, and role overload were assessed using a 15-item work-role strain scale developed by Glazer and Beehr (2005). Responses are given on a 7-point continuum from 1 = *strongly disagree* to 7 = *strongly agree*. Role ambiguity is defined as a lack of clear and predictable demands (e.g., "I know exactly what is expected of me"—item is reverse scored). Role conflict is defined

as contradictory and irreconcilable demands (e.g., "I have to do things that should be done differently"). Role overload is defined as demands for too much work in too little time (e.g., "It seems like I have too much work for one person to do"). Higher scores on each scale suggest related role strain. Coefficient alpha for these 15 items in the present sample was .89; alphas for role ambiguity, role conflict, and role overload were .82, .84, and .88, respectively.

Dependent Variables

Job Satisfaction. A single item assessed satisfaction with the participant's current job ("Overall, how satisfied are you with your job?"). Responses were made on a 10-point continuum from 1 (*not at all satisfied*) to 10 (*extremely satisfied*). Higher scores indicate greater job satisfaction. Single-item job satisfaction measures have demonstrated a corrected mean correlation of .67 with full job satisfaction scales (Wanous et al., 1997).

MBI-General Survey. The MBI-General Survey is a 16-item self-report measure that appraises occupational burnout in terms of three subscales: emotional exhaustion (e.g., "I feel burned out from my work"), cynicism (e.g., "I have become less enthusiastic about my work"), and professional efficacy (e.g., "I can effectively solve the problems that arise in my work"; Maslach et al., 2018). Items are rated on a 7-point Likert scale ranging from 0 (*never*) to 6 (*daily*). There are currently no recommended cutoff scores for the MBI, although classification profiles have been suggested to inform individual interventions for addressing aspects of burnout (Leiter & Maslach, 2016; Mind Garden, 2018). The MBI has demonstrated good reliability (Wheeler et al., 2011) and validity (Alarcon, 2011). In the present sample, alpha was .57, .93, and .53 for the MBI subscales of cynicism, exhaustion, and professional efficacy, respectively.

Outcome Questionnaire-45.2. The OQ-45 is a 45-item symptom inventory that measures global psychological distress. The OQ-45.2 is derived from the OQ-45 (Lambert & Finch, 1999), which has been used in several outcome management studies (e.g., Lambert et al., 2002). The scale was intended for monitoring ongoing progress during the course of psychological treatment. It includes three subscales: symptom distress, interpersonal relations, and social roles; it also yields a total score. Three items on each subscale are worded in a positive direction. Item responses are on a 5-point continuum from 0 = *never* to 4 = *always*. Total scores can range from 0–180; a total of 64 or more suggests high levels of distress. Three-week test–retest reliability is reported as .84 by Lambert et al. (1996) and internal consistency at $\alpha = .93$. Extensive validation has been carried out (Beckstead et al., 2003). In the present sample, alpha was .95.

PTSD Checklist for *DSM–5*. The PCL-5 is a checklist for PTSD symptoms based on the *DSM–5*. An adaptation of the PCL-IV (Blanchard et al., 1996; Bliese et al., 2008), it consists of 20 items that correspond to the 20 PTSD symptoms of *DSM–5*. Each item is responded to on a 5-point continuum from 0 (*not at all*) to 4 (*extremely*). When summed, scores could range from 0–80. Both total score and symptom patterns fitting the symptom domains for PTSD in the *DSM–5* are often considered, with scores above the suggested cutoff of 31–33 indicating a potential diagnosis of PTSD (Bovin et al., 2016; Weathers et al., 2013). In the present sample, $\alpha = .96$.

Medical Complaints Index. Participants were asked to report, *since beginning your current assignment*, new or worsened medical conditions such as headaches, back pain, and nausea, which may also be a barometer of RPA-related stress. Each was responded to with a simple Yes/No binary response (scored as 0, 1). These were aggregated to provide an index of potentially adverse outcomes ranging from 0–18 that may be sensitive to work-role stresses experienced by RPA crewmembers.

Psychosocial Services Index. For this index, responses to survey questions regarding changes in the use of nine different bio-psychosocial services and health behaviors since beginning the current assignment were recoded and combined. For these nine items, responses were rated from −1 (*decreased*) to +1 (*increased*). Items included relationship, religious/spiritual services, medical services, prescription medication use, over-the-counter medication use, alcohol use, tobacco use, and caffeine/simulant use. To accomplish composition of the psychosocial services index, recoding of the nine pairs of nonbinary survey responses was required. For purposes of this measure, No and Not Applicable were coded as 0 and Yes was coded as 1. Responses to the nine psychosocial service items were summed; the resulting index could range from 0 to 9.

Procedure

This study was reviewed and granted exemption by the Air Force Research Laboratory Institutional Review Board at Wright-Patterson Air Force Base and assigned protocol number F-WR-2009-0063-E. Air Force Special Operations Command and Air Combat Command leadership sent an e-mail inviting personnel to complete the occupational health assessment. It explained the purpose of the study and participant anonymity. Interested participants were instructed to follow an e-mail link to a secure website to complete the study. They were informed that no identifiable personal information was obtained, and anyone could withdraw from the study at any time. Completing the questionnaire was anonymous, and participants were instructed to not disclose personally identifiable information. Participation was generally completed in 30–60 minutes. Individuals were asked to complete all items except those that were not personally relevant or related to their RPA job assignment. Most respondents completed the survey as requested; a few fields with missing data are reported.

Results

Results were analyzed using the Statistical Package for the Social Sciences 27. Descriptive data for this sample are reported in Table 1. Descriptive data and tests of significance for groups are reported in Table 2. Mean comparisons among RPA groups are provided in Supplemental Table 2, and correlations among measures are provided in Supplemental Table 3.

Cluster Analysis

A K-cluster analysis was used to ascertain whether participants could be grouped into meaningful clusters in terms of their outcomes. After converting each measure to Z-scores, clustering was based on total scores for the study outcome measures: MBI,

Table 1

Descriptive Data for Scores on Predictor and Criterion Variables

Variable	α	*M*	*SD*	Skew	Skew/*SE*-Skew	Kurtosis	Kurtosis/*SE*-Kurtosis
Age[a]	—	4.54	1.31	0.18	1.77	−0.18	−0.88
Relationship stress	—	1.43	0.50	0.31	2.99	−1.91	−0.53
Job satisfaction	—	7.42	2.57	−0.79	−7.57	−0.02	−6.50
Unit cohesion							
Member cohesion	0.92	23.41	5.21	−0.86	−8.16	0.45	2.15
Leader cohesion	0.97	23.31	6.65	−1.02	−9.77	0.30	1.42
Work role strain							
Role ambiguity	0.82	3.23	1.16	0.43	3.95	0.09	0.43
Role conflict	0.84	3.92	1.37	−0.04	−0.38	−0.59	−2.73
Role overload	0.88	3.87	1.41	0.05	0.42	−0.54	−2.57
Spiritual well-being							
EWB	0.92	47.64	9.77	−0.92	−7.04	0.60	2.29
RWB	0.96	47.94	10.52	−0.39	−2.31	−1.04	−0.31
SWB	0.95	96.27	17.40	−0.65	−3.83	−0.03	0.09
MBI scores[b]							
Cynicism	0.57	2.23	1.64	0.66	0.11	−0.57	0.22
Exhaustion	0.93	2.90	1.66	0.20	0.11	−1.00	0.22
Professional efficacy	0.53	4.23	1.11	−0.72	0.11	0.39	0.22
OQ-45.2	0.95	1.71	1.00	1.11	9.74	1.28	5.62
PCL-5	0.96	0.52	1.00	2.67	20.70	7.26	28.75
Medical complaints[c]	—	0.77	1.00	1.31	10.88	1.04	5.09
Psychosocial services[c]	—	0.28	1.00	4.08	39.95	18.67	91.50

Note. $\chi^2 = 6.81$, $p = .033$ ($df = 2$) for remotely piloted aircraft role; $\chi^2 = 5.23$ for gender, $p = .021$ ($df = 1$). EWB = existential well-being; RWB = religious well-being; SWB = spiritual well-being; MBI = Maslach Burnout Inventory; OQ-45.2 = Outcome Questionnaire-45.2; PCL-5 = PTSD Checklist for *DSM–5*.
[a]Age is reported in eight ordered categories; average age is about 30.5 years, with most participants between 20 and 40 years. [b]MBI scales are reported as mean item scores. [c]Reported as *z* scores.

OQ-45.2, PCL-5, and the medical complaint and psychosocial service use indices. A total of 354 participants provided data for all variables. Convergence was achieved for two clusters with 10 iterations. Results indicated a minimum distance between initial centers was 12.03; 260 participants were grouped together in Cluster 1 and 94 in Cluster 2. All other cluster solutions provided less satisfactory distinctions among the participant groups that they identified. Preliminary examination showed the first group was healthy whereas the second was distressed. Owing to missing data for six participants, most subsequent analyses included 255 (73%) healthy and 93 (27%) distressed individuals.

Table 2

Comparison of Healthy and Distressed Group Scores for Predictor Variables, SWB, and Outcome Variables

Variable	*M*/*SD* Healthy	*M*/*SD* Distressed	*df*	*F*	Sig.	*d*
Relationship stress	1.35/0.48	1.67/0.47	1, 340	29.41	<0.001	−0.67
Job satisfaction	8.07/2.15	4.73/2.70	1, 352	148.66	<0.001	1.41
Unit cohesion						
Member cohesion	24.54/4.48	17.80/5.71	1, 347	72.09	<0.001	1.31
Leader cohesion	24.90/5.59	17.80/7.28	1, 351	94.03	<0.001	1.09
Work role strain						
Role ambiguity	3.02/1.03	4.04/1.38	1, 352	71.70	<0.001	−0.84
Role conflict	3.70/1.33	4.94/1.07	1, 352	65.71	<0.001	−1.03
Role overload	3.68/1.26	4.72/1.40	1, 352	43.80	<0.001	−0.78
Spiritual well-being						
EWB	51.14/6.78	36.42/9.57	1, 280	207.98	<0.001	1.77
RWB	48.96/10.12	43.27/11.05	1, 179	10.73	0.001	0.54
SWB	100.84/14.32	80.21/18.10	1, 174	62.42	<0.001	1.26
MBI scores[a]	32.55/11.65	57.14/11.01	1, 352	316.62	<0.001	−2.17
Cynicism	1.74/1.36	4.00/1.40	1, 352	352.44	<0.001	−1.64
Emotional exhaustion	2.37/1.36	4.86/1.03	1, 352	428.90	<0.001	−2.06
Professional efficacy	4.50/0.99	3.52/1.12	1, 352	66.79	<0.001	0.92
OQ-45.2 total	31.45/13.26	74.19/22.09	1, 352	488.32	<0.001	−2.35
PCL-5 total	2.53/5.23	16.20/17.86	1, 352	122.95	<0.001	−1.04
Medical complaints[b]	0.64/0.72	2.23/1.06	1, 352	255.07	<0.001	−1.83
Psychosocial services[b]	0.20/0.76	0.87/1.66	1, 352	27.41	<0.001	−0.67

Note. Means and standard deviations for remotely piloted aircraft groups are presented in Supplemental Table 2. SWB = spiritual well-being; EWB = existential well-being; RWB = religious well-being; MBI = Maslach Burnout Inventory; OQ-45.2 = Outcome Questionnaire-45.2; PCL-5 = PTSD Checklist for *DSM–5*.
[a]MBI scales are reported as mean item scores. [b]Reported as *z* scores.

Analyses of Group Differences

Analysis of variance was used to assess differences between members of the healthy and distressed groups. Tests on these outcome measures showed that distressed members scored significantly lower on job satisfaction; conversely, they scored significantly higher on the MBI, OQ-45.2, PCL-5, medical complaint index, and psychosocial service use index at the $p < .001$ level. Cohen's d ranged from .54 to 2.35; most values were large or very large (see Table 2). Levene statistics showed significant differences in variance at the $p < .001$ level for job satisfaction, the OQ-45.2, PCL-5, medical complaints index, and psychosocial services use index with greater variance among the distressed group, but variance was homogenous for the MBI.

Examination of the relationship of group membership to predictor variables showed a similar pattern to that for criterion variables. Levene statistics showed significant differences in variance for member cohesion, leader cohesion, degree of satisfaction, and role conflict, but not for age, gender, role overload, or role ambiguity. Levene statistics also showed significant differences in variance for EWB, but not for RWB or SWB. Chi-square tests found significant differences in gender, rank, and RPA role for the two groups; women, those with lower rank, and intelligence analysts tended to report more distress ($\chi_1^2 = 5.32$, $p = .021$ for gender; $\chi_5^2 = 11.49$, $p = .043$ for rank; and $\chi_2^2 = 6.81$, $p = .033$ for RPA duty role), but these differences were relatively small.

Healthy participants reported significantly greater member and leader cohesion in their working groups, lower role ambiguity, role conflict, and role overload, and lower relationship stress; their EWB scores were significantly higher. These factors were generally associated with better outcomes. Conversely, distressed participants reported significantly higher scores on all distress measures, including total scores on the MBI, OQ-45.2, and PCL-5, medical complaints, and use of psychosocial services. Overall, 69.1% of distressed participants also reported increased medical complaints; 11.9% reported increased use of psychosocial services. The distressed group reported higher levels of distress, burnout, medical complaints, and role issues, whereas the healthy group was generally more well-adjusted on these outcomes. The effect size for group differences in relationship stress and RWB was medium. For the other predictor and criterion variables, effect sizes were large to very large; see Table 2.

Regression Analyses

Given the effect size of differences in EWB between the two groups ($d = 1.77$), the current study used hierarchical regression to ascertain the degree to which EWB accounted for differences in the two groups and then explored the extent to which RPA duty experiences added incremental predictive validity through hierarchical and stepwise regression. In this analysis, age and gender were entered in model 1, and EWB was entered in model 2. The predictive measures of RPA duty role, member and leader cohesion, and role ambiguity, role conflict, and role overload were entered stepwise in model 3 to explore whether they would add significant predictive power. Results showed that R^2 for age and gender was .019; ΔR^2 when entering EWB was .430. When the RPA predictor variables were entered next in stepwise fashion, role overload entered with $\Delta R^2 = .040$ and leader cohesion entered with $\Delta R^2 = .017$. Total $R^2 = .497$ for predicting group membership from these EWB and predictor variables, but most of this was attributable to EWB (partial $r = -.656$; see Table 3).

Given the power of EWB to predict group membership, setting a cutoff score for predicting group membership from EWB was explored. The logistic regression suggested a cutting score of about 40 (Tolles & Meurer, 2016). Supplemental Table 4 shows hit, miss, and false positive rates using scores from 38 to 42. These data suggest that a cutoff of 39–41 would work well depending on the concerns for hits, misses, and false positives. For EWB, sensitivity, which is the true positive rate, is 68.8% and specificity, the true negative rate, is 91.8%.

As a final step, the range of scores among members of the two groups was explored to establish proposed MBI cutoff scores. Formerly, cutoff scores on the MBI were based on the range of possible raw scores rather than on empirically established values (e.g., a T score of 65 or greater); however, these are no longer recommended (Mind Garden, 2018). Thus, logistic regression was used to examine the effectiveness of the MBI in distinguishing between the groups and to derive a proposed MBI cutoff for the RPA sample. Each of the subscales of cynicism, exhaustion, and professional efficacy was examined. Results indicated that the MBI could also be used to identify individuals who could be classified as healthy or distressed (Supplemental Table 5). As with the EWB subscale, age and gender were entered in the first step, then MBI, and last RPA experiences. Age, gender, and RPA experiences provided little predictive variance. For cynicism, classification was 81.9% accurate with a 53.8% hit rate and a 7.8% false positive rate; for exhaustion, results were 87.6%, 74.2%, and 7.5%, respectively; for professional efficacy, results were 75.0%, 30.1%, and 8.6%, respectively. As exhaustion was the superior predictor, a cutoff rate for exhaustion was explored. With a cutoff of 23, 70% of distressed members could be accurately identified, while only 7.8% of healthy members exceeded this cutoff and less than 24% of identified cases were false positives. Sensitivity is 70% and specificity is 92.9% for group membership using MBI exhaustion scores.

The mean of 74.19 on the OQ-45.2 for the distressed group exceeds the recently proposed cutoff score of 64 for psychological distress (Alcohol, Drug, and Mental Health Board of Franklin County, 2018), suggesting that general psychological stress is common among distressed participants. Sixty-four members of the distressed group (66%) had scores greater than 64, which corresponds strongly to the outcome of the logistic regression. Further, 13 distressed participants (14%) had scores greater than 100 on the OQ-45.2, suggesting extreme levels of self-reported subjective distress for these participants. In contrast, among the healthy participant group, only two (.8%) exceeded the distress cutoff of 64 on the OQ-45.2.

In the present sample, healthy participants averaged about six standard deviations below the recommended cutoff of 31–33 on the PCL-5 and only three (1.2%) met this criterion (Weathers et al., 2013). Even members of the distressed group averaged well below the PCL-5 cutoff, but the cutoff was only about 1 standard deviation above the mean for this group, and 16 distressed participants (17%) met or exceeded the PCL-5 cutoff score.

Discussion

When examining aspects of psychological and spiritual health among RPA operators, two distinct groups emerged: approximately

Table 3

Predicting Group Membership Through Hierarchical Logistic Regression of Demographic Variables, EWB, RPA Duty Role, Leader and Member Cohesion, Role Ambiguity, Role Conflict, and Role Overload

Variable	R	R^2	ΔR^2	β	t	Sig.	r^a	Partial r
Model 1								
Age				−0.095	−1.55	0.124	−0.108	−0.094
Gender	0.139	0.019	0.019	0.088	1.45	0.150	0.102	0.088
Model 2								
Age				−0.026	−0.56	0.579		−0.034
Gender				0.096	2.07	0.039		0.126
EWB	0.660	0.436	0.417	−0.649	−14.05	<0.001	−0.652	−0.652
Model 3								
Age				−0.041	−0.91	0.365		−0.056
Gender				0.112	2.48	0.014		0.151
EWB				−0.597	−12.97	<0.001		−0.622
Role overload	0.691	0.478	0.042	0.212	4.62	<0.001	0.345	0.272
Model 4								
Age				−0.011	−0.24	0.811		−0.015
Gender				0.100	2.27	0.024		0.138
EWB				−0.541	−11.14	<0.001		−0.656
Role overload				0.179	3.86	<0.001		0.231
Leader cohesion	0.705	0.497	0.019	−0.159	−3.15	0.002	−0.446	−0.190

Note. EWB = existential well-being; RPA = remotely piloted aircraft.

[a]Zero-order correlations are constant across analyses in which the variable appeared.

three-fourths of the sample could be categorized as healthy (73%), whereas more than one-fourth of the crewmembers were classified as distressed (27%). Female RPA crewmembers were slightly more likely to be included in the distressed group, but the magnitude of gender differences in the sample was trivial. RPA crewmembers identified as healthy reported significantly higher perceptions of social support from their peers and leaders in the unit, lower relationship stress, and much greater job satisfaction. They also reported a stronger sense of purpose in life compared with distressed crewmembers. Healthy personnel were also more likely to agree that the demands placed on them at work were predictable and consistent and included sufficient time to complete assigned tasks. In contrast, distressed crewmembers reported difficulties related to conflict with leaders in their unit, higher relationship distress, and a lower sense of meaning and purpose in their life. They also reported feeling too worn out to make effective work contributions, more psychological distress, a significantly larger number of medical concerns, and greater use of medical and psychosocial services. Distressed personnel were also more likely to see their job demands as unpredictable and inconsistent, with insufficient time to complete work tasks. In sum, large differences were found between healthy and distressed crewmembers related to perceptions of having enough emotional energy to make effective work contributions, as well as levels of psychological distress and PTSD symptoms.

Consistent with previous research on life satisfaction and purpose, having a strong sense of meaning and purpose in life predicted lower levels of psychological and spiritual distress for individuals engaged in RPA combat operations (Paloutzian et al., 2012; Wood et al., 2018). In the current sample of RPA crewmembers, beliefs related to having meaning and purpose in one's life more strongly predicted low levels of distress than perceptions related to one's relationship with God. However, only those who endorsed that a belief in God was an important component of their spiritual life (64%) completed the 10 questions on the SWBS related to one's relationship with God (the RWB subscale).

The level of distress identified among RPA crewmembers in this study is consistent with prior studies (Ames et al., 2019; Chappelle et al., 2020; Chappelle, Goodman, et al., 2019; Chappelle, Prince, et al., 2019; Koenig, 2018; Koenig et al., 2018; Prince et al., 2015; Tvaryanas & MacPherson, 2009; Wood et al., 2018). Two-thirds of distressed RPA crewmembers reported levels of psychological distress above the OQ-45.2 clinical cutoff of 64 (Beckstead et al., 2003), and 14% (one in seven) of this group reported extreme distress, with scores above 100. However, seeking mental health care for psychological distress and trauma was relatively rare among distressed crewmembers and consistent with findings from previous research (Chappelle, Prince, et al., 2019; Otto & Webber, 2013; Wood et al., 2018).

Only 2.8% of the total sample endorsed symptoms that met criteria for PTSD. This finding is consistent with prior studies of RPA crewmembers reporting prevalence rates of PTSD symptomatology between 1.5 and 6% (Chappelle et al., 2014; Chappelle, Prince, et al., 2019; Prince et al., 2012, 2015). The present findings indicate that distressed RPA crewmembers commonly report low meaning and purpose in life, feeling emotionally overtaxed, anxious, and depressed, and having more physical health symptoms. But they seldom report PTSD.

Regression analysis revealed that almost half of the variance distinguishing healthy and distressed crewmembers could be predicted by having a sense of meaning and purpose in life; including other variables added minimal predictive value. Although perceiving unrealistic work demands and poor social support from unit leadership were also both significant predictors of highly distressed crewmembers, together they added only 6.1% of the variance to the prediction. Logistic regression demonstrated that the 10-item EWB subscale of the SWBS identified 68.8% of crewmembers in the distressed group, while limiting false positives.

Identifying whether individuals felt emotionally drained was also an important predictor for identifying healthy or distressed individuals. The emotional exhaustion subscale of the MBI was

more effective for predicting psychological health outcomes than the subscales assessing work attitudes or perceptions of effectiveness at work. This finding is consistent with previous research (Bryant-Lees et al., 2021; Chappelle, Prince, et al., 2019; Maslach et al., 2018). A cutoff score of 23 on the emotional exhaustion subscale could identify 70% of the distressed group while sufficiently limiting false positive rates. These findings provide strong empirical support for use of the 5-item exhaustion subscale as another brief assessment that may identify RPA personnel who are highly distressed.

Clinical Implications for Medical and Mental Health Professionals

This is one of the first studies to examine aspects of the spiritual health of USAF RPA crewmembers, including how spiritual beliefs may interact with exposure to potentially traumatic combat-related events. The results suggest that spiritual wellness is an important part of processing and coping with the stressors and demands on RPA crewmembers, including exposure to injury and death. Those who were healthy tended to report a stronger sense of meaning and purpose in life. Being satisfied with one's life appears to help the individual make sense of difficulties encountered during remote combat, which may prevent chronic negative and disruptive reactions after participating in remote warfare (Frise et al., 2021). Those in the distressed group had more difficulties enjoying life and having a sense of meaning and purpose.

While distressed participants reported exhaustion rather than impaired efficacy on the MBI, increased fatigue may result in increased errors and impaired performance (Cropanzano et al., 2003). Thus, their low engagement in seeking mental health services is a concern that will need to be addressed within military settings. Indeed, stigma remains with regard to seeking mental health treatment in the military, and barriers and facilitators to care should continue to be investigated to encourage use of services (Hom et al., 2017).

Moral injury was not directly examined in the present study. Although previous discussions of the psychological impact of RPA weapon strikes suggest the potential role of moral injury (Hijazi et al., 2019), current definitions and appropriate measurement tools are lacking (Griffin et al., 2019). As a result, little empirical evidence currently provides support for the notion that the experience of moral injury is common among RPA crewmembers following weapon strikes. Rather, a complicated cognitive and emotional response involving positive and negative reactions often occurs following a strike (Chappelle et al., 2018).

Spiritual struggles related to faith, meaning, purpose, and life direction cannot be ignored, nor should individuals suspected of experiencing such concerns be simply referred to other providers with the expectation that spiritual difficulties should be handled solely by mental health professionals or chaplains. The assessment of spiritual difficulties must be integrated into all aspects of clinical care. Consistent with the USAF's desire for holistic health, physical, emotional, social, and spiritual health must be assessed and treated simultaneously.

Although almost three fourths of RPA crewmembers who participated in this study seem to be functioning well and not experiencing significant psychological or spiritual distress, more than one-quarter endorsed experiencing significant concerns and levels of distress negatively impacting their social and occupational functioning. Despite such high levels of reported distress, these individuals were not very likely to seek mental health services. However, they were more likely to seek treatment related to experiencing physical health problems, further supporting the notion that all medical providers should be prepared and willing to assess and identify spiritual and moral concerns experienced by RPA crewmembers. Multidisciplinary teams are likely to be most beneficial for identifying spiritual difficulties and reducing stigma related to receiving care.

In some units, embedded mental health care providers and technicians have received the training and security clearances to support specialized military operations. These embedded care personnel are available to consult and support the squadron and commander and provide early assessment and intervention for psychological difficulties to the units they serve. Evidence-based interventions can be introduced by embedded care providers or other individuals involved in the medical care of the individual to address specific concerns to improve performance and overall well-being. For the USAF RPA community, individuals in the distressed group may benefit from interventions such as increasing adaptive coping skills (e.g., cognitive flexibility/restructuring), relaxation skills, mindfulness, or learning skills to more effectively process negative emotions (e.g., distress tolerance skills) to help address distress and increase psychological resilience. Interventions that address meaning and purpose and life satisfaction are essential. Training in psychological flexibility and self-compassion may also be important interventions to address the adverse psychological effects of trauma (Marshall & Brockman, 2016; Nelson et al., 2018). Individualized treatment approaches that are trauma informed and accompanied by sensitivity to spiritual concerns including meaning and purpose, self-identity, and moral concerns may also be important. Acceptance and commitment therapy (Pohar & Argáez, 2017) and other spiritually informed treatment approaches may be especially helpful to address concerns among RPA crewmembers related to witnessing or participating in harmful actions. These interventions may also be useful in other occupations such as first responders and in medical settings where employees encounter similar challenges to personal values and meaning and purpose. Additionally, sufficient rest and time away from work may be important antidotes to psychological and spiritual distress, especially the prevention of emotional fatigue that may be experienced by RPA crewmembers. Reducing the frequency of shift changes and the length of shifts, increasing personnel resources, and encouraging the use of effective support systems may also help prevent burnout, promote resilience, and encourage employees to emotionally recharge (Chappelle, Prince, et al., 2019).

Medical personnel, including embedded mental health care providers who consult with unit leaders, can also provide guidance on addressing the needs of distressed personnel. USAF leaders can be encouraged to reduce potential distress by cultivating purpose and meaning. For example, providing opportunities for meaningful engagement in the mission (e.g., sharing clear objectives and projected advantages of the tasks involved in the mission) may be particularly helpful (Frise et al., 2021). Additionally, unit commanders should encourage subordinates to engage in meaningful and enjoyable activities outside of the workplace that foster engagement in hobbies and acquisition of new skills. Investing in social relationships

in and outside of work should also be promoted to increase overall well-being.

Limitations of the Study

RPA crewmembers face a high level of exposure to human injury and death. Thus, results may generalize best to other military units, civilian first responders, and medical personnel with similar exposures to human trauma. Also, the data on medical concerns may be understated. The direction "Please list any medical conditions you have" was followed by a list of 13 conditions with check boxes and a free response box. Thus, it was not possible to distinguish "No" responses from omitted items in this section, and medical distress may be underestimated. Other factors such as military history, combat readiness training, and number of missions with collateral damage (i.e., killing innocent civilians, friendly forces) may also be important and may be more effective than a sense of meaning and purpose or work-related emotional exhaustion as predictors of healthy or distressed crewmembers. Ethnic identity data were not gathered, so that any interaction between ethnic group and context variables, leadership, role and relationship distress, and work-related stressors could not be examined. Finally, this study, although anonymous, involved self-report data, which could be affected by reporting biases in which underreporting of distress could occur.

Conclusions

RPA crewmembers were identified as experiencing low psychological distress (healthy; 73%) or high psychological distress (distressed; 27%). Those experiencing high psychological distress reported lower satisfaction with life, feeling emotionally overloaded at work, a significant number of physical complaints, greater use of medical services, and relationship distress. Having a lower sense of meaning and purpose in life and lacking the energy to make meaningful contributions at work were among the strongest predictors of high levels of distress in RPA crewmembers. Strategies to help individuals increase meaning and purpose in life and prevent and reduce emotional exhaustion should be a focus for workplace interventions and behavioral health initiatives. Such approaches may lower the risk of negative psychological, spiritual, and health outcomes among RPA crewmembers and others exposed to similar human trauma. Promoting multidisciplinary care and understanding of trauma and moral/spiritual distress are important, as individuals in these groups rarely seek services from mental health providers.

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