

Deployment Stressors: A Review of the Literature and Implications for Members of the Canadian Armed Forces

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Most Canadian Armed Forces (CAF) personnel are deployed at some point in their careers. In a 2008-2009 survey of the CAF Regular Force, 65% had already deployed and 15% had deployed within the preceding year (Born *et al.*, 2010). From 2001 to 2012, more than 40,000 members of the CAF were involved in Task Force Afghanistan (TFA ; Boulos & Zamorski, 2013). The proportion of personnel deploying in support of this mission increased steadily after 2005, with 15% of CAF officers and 18% of non-commissioned members (NCMs) participating in TFA in 2009. Furthermore, in 2006, the CAF moved from Kabul to the more dangerous, Taliban-populated theatre of Kandahar, which increased the combat exposure involved in the mission (Fang, 2010).

In many cases, deployment does not adversely affect the psychological health of military members. In fact, deployment has been associated with benefits, such as greater self-discipline and self-esteem (Aldwin *et al.*, 1994), self-confidence and pride (Joint Mental Health Advisory Team VII [J-MHAT 7], 2011), self-improvement (Fontana & Rosenheck, 1998), patriotism (Maguen *et al.*, 2004), increased camaraderie (Hosek *et al.*, 2006), time for reflection (Newby *et al.*, 2005), greater tolerance of others and appreciation for one's own life (Thomas *et al.*, 2006), and lower short-term attrition rates (Fang *et al.*, 2010). However, rates of psychological disorders have been shown to increase from pre- to post-deployment (e.g., Larson *et al.*, 2009). In addition, deployed military members have shown substantially elevated rates of stress and psychological illness and more mental health treatment-seeking when compared with their non-deployed peers; and rates are even higher in members deployed to an area of combat (e.g., Bartone, 1999 ; Born *et al.*, 2010). In two US studies of members who had deployed, only those who had been exposed to combat were at increased risk of developing PTSD (Smith *et al.*, 2008) and depression (Wells *et al.*, 2010).

Among CAF personnel who deployed in support of TFA between 2001 and 2008, 14% had a deployment-related mental health condition, most commonly post-traumatic stress disorder (PTSD), with a prevalence of eight percent overall. Members who had deployed to Kandahar province, the most combat-heavy location of the mission, were most likely to

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develop a psychological disorder as a result of their deployment (Boulos & Zamorski, 2013). In addition, in a recent analysis, nearly half of the cases of PTSD among male CAF members were attributable to exposure to combat or peacekeeping situations (Sareen *et al.*, 2008).

The economic costs of combat-related mental disorders such as PTSD and depression are enormous. Research on US military members has shown that PTSD is associated with organizational factors such as increased burnout, job strain, and work-family conflict, as well as reduced deployment readiness (Vinokur *et al.*, 2011), which can lead to substantial losses in productivity. One US study used microsimulation modelling techniques to calculate the average costs of combat-related psychological problems among veterans of the missions in Afghanistan and Iraq. For PTSD, the estimated cost per member over the two years immediately following deployment was up to \$10,000, and as high as \$25,000 for depression. For the 1.6 million members who deployed in support of these missions from 2001 to 2007, the total costs were estimated at as much as six billion dollars, which includes the costs of mental health treatment and lost productivity (Eibner *et al.*, 2008). Psychological treatment costs are an issue in the CAF as well, with nearly a third of TFA veterans having used mental health services since returning home (Boulos & Zamorski, 2013).

The effects of deployment-related mental health conditions can extend far beyond economic costs to the military. In a review of the long-term consequences of combat-related mental health difficulties, Karney and colleagues (2008) identified numerous adverse outcomes, including physical health problems via compromised immune functioning or engagement in risky health behaviours; substance abuse or dependence; marital problems and poor family functioning; and increased risk of suicide or mortality from cardiovascular disease.

Because of these serious potential negative consequences for their members, the CAF are highly concerned with the contributors to deployment-related mental health problems in order to mitigate or, ideally, prevent the effects of these experiences on well-being. Investigation of these factors is especially important at this current phase of transition of the participation of the CAF in TFA: from a combat to a training and security mission in 2011, and the ultimate conclusion of CAF involvement in TFA in 2014 (Government of Canada, 2013). This paper explores the literature on deployment stressors encountered by a variety of militaries in a number of different operations and their contribution to the development of post-deployment mental health problems. Potential mediating or moderating factors, as well as general themes and limitations in the literature, are identified, with recommendations on the utility of these findings for a variety of audiences.

Dimensions of Deployment Stressors

With all of the potential stressors military members encounter on deployment, it would be beneficial to explore possible dimensions of these stressors to summarize them concisely, to investigate the relationships between them, and to examine the types of stressors that are most likely to be associated with adverse outcomes. Past research with other militaries has

attempted to identify categories of deployment experiences. Some analyses yielded a more parsimonious description of the data. For instance, US and Australian studies of peacekeeping stressors found three to five main categories of deployment (Adler *et al.*, 1996 ; Litz *et al.*, 1997a ; Waller *et al.*, 2012). Three other studies of deployment to a war zone (i.e., 1973 Yom Kippur War ; Vietnam War ; Operation Iraqi Freedom) also summarized deployment stressors concisely, identifying four or five general stressor dimensions (Dekel *et al.*, 2003 ; King *et al.*, 1995 ; Wilk *et al.*, 2010). Another study of US military personnel, with no specific type of deployment specified also identified five categories of deployment stressors (Stein *et al.*, 2012), as did a literature review of potentially distressing experiences in peacekeeping operations (Sareen *et al.*, 2010). Other studies of US Vietnam, Iraq, and Gulf War veterans, as well as Dutch veterans of the mission in Afghanistan, have described deployment stressors more extensively, resulting in six to ten final components (Boermans *et al.*, 2013 ; Green *et al.*, 1990a ; Killgore *et al.*, 2008 ; King *et al.*, 2006 ; Wolfe *et al.*, 1993). Three known studies, one based on CAF peacekeepers in the former Yugoslavia (Farley, 1995) and the others investigating members returning from deployment in support of the mission in Afghanistan (Sudom *et al.*, unpublished data ; Watkins, 2012) have classified deployment stressors among CAF personnel. All three analyses suggested four dimensions of stressors on these missions. Note that research on categories of deployment stressors has focused on a wide variety of types of operations (e.g., peacekeeping *vs.* combat), which would likely result in a range of dimensions from one sample to the next. Additionally, some studies determined their categories based on only specific aspects of the deployment, such as combat (e.g., Wilk *et al.*, 2010) or non-traumatic stressors (e.g., Waller *et al.*, 2012).

Interpersonal Stressors

Some stressful aspects of deployment, while typically not characterized as traumatic, have shown associations with mental well-being, particularly while deployed. In their categorization of deployment stressors, several studies have included a dimension on difficulties in relationships with others, such as “Isolation” (Bartone & Adler, 1996), “Home Front Separation” (Boermans *et al.*, 2013), “Separation”, “Other People” (Waller *et al.*, 2012), and “Sexual Harassment during Deployment” (Sareen *et al.*, 2010). One study even contained four separate categories of interpersonal stressors : “Concerns about Life and Family Disruptions”, “Deployment Social Support”, “General Harassment”, and “Sexual Harassment” (King *et al.*, 2006). Among CAF personnel on a peacekeeping mission, two components in this domain were identified : “Leadership/Management,” and “Family Concerns” (Farley, 1995), while some CAF members deployed in combat in Afghanistan experienced “Personal Suffering”, which included experiences such as sexual and physical assault (Watkins, 2012). Based on the present study’s review of the literature, four deployment experiences emerged that were considered interpersonal stressors: disruption to relationships and separation from family, lack of unit cohesion, harassment, and difficulties with leadership.

Disruption to Relationships and Separation from Family

With the length of deployments (typically six months) and the additional time in pre-deployment training, the duration and distance away from loved ones are sometimes associated with significant stress. The vast majority (82%) of CAF members are in a romantic relationship (Born *et al.*, 2010), with 63% currently married or in a common-law relationship (DHRIM, 2014). Accordingly, the separation from partners or spouses may cause considerable distress. Among US peacekeepers deployed to Kosovo, for example, many believed that deployment was detrimental to their marital quality (Castro *et al.*, 2000). US Army personnel have also frequently attributed the end of a romantic relationship to their tour of duty, and those who are married tend to view their deployment experience more negatively (Newby *et al.*, 2005). Relationship problems while deployed are associated with later mental health problems. For example, male Australian veterans of the Vietnam War who had received less support from their wives and whose relationships had ended while in theatre were more likely to develop PTSD (O'Toole *et al.*, 1998).

The relationship between deployment and marital and relationship quality has also been demonstrated within the CAF. Among CAF personnel serving in Canada, for example, less than half believed that their spouses would support a deployment within the next six months (Sudom & Dursun, 2007). CAF members have also cited deployment as a frequent cause of relationship breakdown (Dunn *et al.*, 2005). Indeed, the time spent apart while deployed takes its toll on relationship stability, as shown among CAF personnel surveyed seven months after their return from Bosnia. In the short time span since homecoming, 20% of the romantic relationships had ended and nearly half of the sample reported relationship problems since returning (Murphy & Farley, 1998).

CAF members on deployment must also cope with the distress of separation from their children. In one large sample of CAF families, more than two-thirds had children in their home full-time (Dursun & Sudom, 2009), so this concern is relevant to many of these families. Additionally, a substantial proportion of CAF members have reported the occurrence of a major problem at home (e.g., death or severe illness of a family member, separation from romantic partner, financial difficulties) while deployed to Afghanistan (Garber *et al.*, 2012). Among personnel of other militaries, including the American¹ and the Dutch,² missing family is consistently cited as one of the most difficult aspects of deployment.

The impacts of this separation from family can have important implications for attrition, as illustrated in one study of US soldiers, in which time spent away from family was the most common reason for officers contemplating leaving the service (Alderks, 1998).

¹ See, for instance : Bartone, 1996 ; Castro *et al.*, 2000 ; Chappelle & Lumley, 2006 ; Halverson *et al.*, 1995 ; Hosek *et al.*, 2006 ; Litz *et al.*, 1997b ; Maguen *et al.*, 2004 ; MHAT-V, 2008 ; Newby *et al.*, 2005 ; Orsillo *et al.*, 1998 ; Ritzer *et al.*, 1999 ; Thomas *et al.*, 2006.

² Dirkzwager *et al.*, 2005.

Moreover, female US Air Force members who deployed to the Gulf War often cited separation from family as a strong factor in decisions to leave the military, particularly if their deployment caused significant disruption to their children's lives (Pierce, 1998). Similarly, in the CAF, adverse feelings about returning for a subsequent deployment are frequently attributed to time spent away from family (Garabedian, 2006) and many CAF members reconsider their career in the military when faced with familial demands (Dunn *et al.*, 2006).

Separation from family while deployed can also have negative consequences for military members' mental well-being. In a sample of US peacekeepers deployed to the former Yugoslavia, the participants who were most worried about their families also had the highest rates of anger and depression (Bartone, 1996). Furthermore, among US military members deployed to Iraq or Afghanistan, concerns about the state of home affairs and family functioning are strongly related to PTSD, even when taking combat exposure into account (Booth-Kewley *et al.*, 2010; Vasterling *et al.*, 2010; Vogt *et al.*, 2008a). Problems at home during deployment have also been associated with increased rates of PTSD and general psychological distress (Rona *et al.*, 2007), as well as heavy drinking among UK military personnel (Browne *et al.*, 2008). In the CAF, family concerns on deployment have been shown to be associated with mental health problems such as depression, anxiety and PTSD (Fikretoglu *et al.*, 2006; Garber *et al.*, 2012), emphasizing the important relationship between this deployment stressor and mental health.

Lack of Unit Cohesion

Although military members must deal with separation from partners and family on deployment, camaraderie within their units can help in coping with this situation. Social support from colleagues and high cohesion and morale within a unit are associated with lower rates of psychological disorders, such as PTSD.³ Among deployed US and UK military personnel, for example, difficulties with colleagues have been shown to be negatively associated with well-being on their own (Larson *et al.*, 2009; Pierce, 1998), as well as through their adverse impact on perceived cohesion, which lowers both unit and individual morale (Bartone & Adler, 2000), and also affects psychological health.⁴ In fact, among Israeli veterans of the 1973 Yom Kippur War, lack of trust and confidence in the unit's support was more predictive of PTSD than were engaging in active combat or witnessing the death of others (Dekel *et al.*, 2003). Among CAF members, a lack of social support and cohesion during deployment has been shown to be related to an increased risk of depression (Fikretoglu *et al.*, 2006) and lower intentions to deploy again (Garabedian, 2006), while more positive perceptions of interpersonal relationships and unit functioning are associated with a decreased likelihood of distress (Blanc, 2012).

³ See, for instance : Bliese & Britt, 2001 ; Hosek *et al.*, 2006 ; Rona *et al.*, 2009).

⁴ Armistead-Jehle *et al.*, 2011 ; Green *et al.*, 1990a ; Iversen *et al.*, 2008 ; MHAT, 2003 ; Mitchell *et al.*, 2011 ; Mulligan *et al.*, 2010)

Harassment

Some military personnel must also cope with harassment from colleagues during deployment. In both the CAF and the US military, general harassment (e.g., constant criticism, gossip, or indirect threats) has been significantly associated with psychological problems, such as depression, anxiety, and PTSD (Fikretoglu *et al.*, 2006 ; King *et al.*, 2006). Racial harassment has also been associated with psychiatric difficulties, as illustrated in research with American veterans of the Vietnam War. Compared with their White counterparts, Black veterans reported more racial tension within their units, rating racial harassment as the most difficult experience of their tour in Vietnam, and also exhibited higher rates of psychopathology, including PTSD (Green *et al.*, 1990b). Asian-American Vietnam veterans also suffered mental health impacts as a consequence of racism in deployment; in one study, being subjected to racism independently predicted PTSD and, collectively, explained a full 20% of the variance in PTSD symptomatology (Loo *et al.*, 2001).

In addition to racial harassment, military personnel, particularly women, are also at risk for sexual harassment while deployed. In one US study, more than half of female participants reported military sexual trauma, with half of these stating that it had occurred on a daily or weekly basis while deployed to Iraq or Afghanistan. Although injury and witnessing the death of others were also assessed in this study, deployment sexual harassment was the only deployment stressor significantly associated with psychological health problems, with these women experiencing marked problems in readjustment (Katz *et al.*, 2007). In US samples, sexual trauma has also been shown to be significantly related to PTSD (Fontana *et al.*, 1997, 2000), with an even greater negative effect than that of combat exposure (Wolfe *et al.*, 1998).

Difficulties with Leadership

While conflicts with unit peers can be distressing, poor perceptions of or relationships with unit leaders on deployment can also be negatively related to psychological health. In research with US military personnel, lack of recognition from and confidence in leadership have been rated as major stressors at various stages of the deployment cycle.⁵ They are also associated with lower morale⁶ and mental health problems, such as depression and PTSD,⁷ as well as with attrition (Pierce, 1998). In the Persian Gulf War, the constant presence of unit leaders due to confined living space has been associated with poorer mental well-being (Marlowe, 2001). Difficulties with supervisors or the chain of command have also been strongly associated with heavy drinking (Browne *et al.*, 2008) and PTSD (Mulligan *et al.*, 2010) among UK military members. In the CAF, ineffective leadership has been commonly

⁵ Bartone, 1996 ; Castro *et al.*, 2000 ; Marlowe, 2001 ; Newby *et al.*, 2005.

⁶ (Bartone & Adler, 2000 ; Bliese & Britt, 2000 ; MHAT-IV, 2006).

⁷ Bartone & Adler, 1994 ; Booth-Kewley *et al.*, 2010 ; Britt *et al.*, 2007 ; Halverson *et al.*, 1995.

cited as a reason for not wanting to deploy again (Garabedian, 2006), while positive experiences with leadership are associated with better mental health (Blanc, 2012).

Operational and Environmental Stressors

Like interpersonal difficulties, logistical or physical elements of deployment are generally not considered “traumatic” in the traditional combat sense, but have been shown to cause significant distress among deployed military members and, as such, have been incorporated into multiple classification systems of deployment stressors. Dimensions such as “Ambiguity”, “Boredom” (Bartone & Adler, 1996), “Duration and Number of Deployments” (Sareen *et al.*, 2010), “General Milieu of a Harsh or Malevolent Environment” (King *et al.*, 1995), and “Difficult Living and Working Environment” (King *et al.*, 2006) have been suggested as fundamental and often stressful experiences of deployment. Boermans and colleagues (2013) included three categories of this theme as significant categories of deployment stressors among Dutch military personnel in Afghanistan: “Physical Workload”, “Boredom and Isolation”, and “Physical Environment”. Among CAF peacekeepers, “Privacy and Adjustment” was incorporated into a model of distressing experiences on the mission (Farley, 1995). The present study’s review of the literature found four operational or environmental factors associated with deployment-related distress : mission uncertainty, demanding workload, boredom, and difficult living environment.

Mission Uncertainty

Military personnel on deployment have been shown to experience stress due to uncertainty about mission-related issues, such as insufficient or inaccurate information about their return date. Among US Army members, lack of awareness of the location of their next destination, whether home or to another theatre, is associated with stress at multiple phases of deployment.⁸ Uncertainty about the date of their return is another frequently reported concern (Chappelle & Lumley, 2006), sometimes rated as more distressing than other deployment experiences, such as difficult living conditions and separation from family (Halverson *et al.*, 1995). In one US sample, uncertainty about return date caused moderate to extreme levels of worry and anxiety in 73% of deployed peacekeepers (Ritzer *et al.*, 1999). It has also been shown to influence decisions to leave service (Hosek *et al.*, 2006).

Demanding Workload

In theatre, psychological health problems are also related to long, difficult workdays, with little time for rest and relaxation. Among deployed US peacekeepers, for example, many report working nearly twice the number of weekly hours as they did in garrison (Castro *et al.*, 2000), often seven days per week (Bartone, 1996). These demanding workweeks take their toll on members’ mental functioning and are associated with increased rates of burnout (Castro *et al.*, 2000), depression (Britt *et al.*, 2007) and intentions to leave military service (Hosek *et al.*,

⁸ Bartone, 1996 ; Bartone & Adler, 1994 ; MHAT-IV, 2006.

2006). Moreover, inadequate time off for rest and relaxation has been associated with both lower morale (Bliese & Britt, 2001 ; MHAT-IV, 2006) and poorer self-rated general health (Mulligan *et al.*, 2010) ; and, in various studies, it has been rated as a highly distressing deployment factor in as many as one-third (Halverson *et al.*, 1995) to one-half (Ritzer *et al.*, 1999) of participants. Downtime in deployment is also important for CAF personnel, as greater workload has been associated with work problems such as role conflict and role ambiguity (Sudom & Dursun, 2007), and insufficient time allocation for rest has been cited as a primary contributor to mental health difficulties (Dunn *et al.*, 2005).

Boredom

Although time off for relaxation is essential to military members' well-being, a lack of engaging tasks can also be detrimentally related to psychological health. In one US study, for instance, both an intense workload and the boredom resulting from a shortage of meaningful work were related to increased depression (Britt *et al.*, 2007). UK (Thomas *et al.*, 2006) and US military members commonly report high stress levels due to dull, repetitive situations on deployment,⁹ which are associated with lower cohesion and morale (Bartone & Adler, 2000). According to CAF health service providers, boredom on deployment leads to frustration, while alleviating boredom may reduce other deployment stress (Dunn *et al.*, 2006).

Difficult Living Environment

Military members must also face the challenge of the living conditions in operational theatres. Overall discomfort with the physical environment has been cited as a significant stressor among the majority of members on a given deployment (e.g., Halverson *et al.*, 1995 ; Hosek *et al.*, 2006). It has been associated with poor mental health outcomes, such as PTSD among US military personnel (Litz *et al.*, 1997a ; Schnurr *et al.*, 2004), even more strongly than other potentially distressing deployment experiences, such as combat exposure (King *et al.*, 1995) and family separation (Vogt *et al.*, 2005). When perceived as an undesirable consequence of deployment, difficult living conditions have been shown to be related to psychological functioning for many years after leaving service (Aldwin *et al.*, 1994). Among CAF veterans deployed at least once during their military careers, challenging physical environments are associated with greater depression, anxiety and PTSD symptomatology (Fikretoglu *et al.*, 2006).

Specific aspects of the physical deployment location can also be especially challenging. For instance, living quarters are often cramped. Among US military members, lack of privacy has been cited as a major source of stress,¹⁰ and is strongly related to PTSD development (Booth-Kewley *et al.*, 2010). Poor sanitation of living areas in theatre is also associated with significant stress (Bartone, 1996; Chappelle & Lumley, 2006), particularly in

⁹ Bartone, 1996 ; Bartone & Adler, 1994 ; Bartone *et al.*, 1998 ; Castro *et al.*, 2000 ; Maguen *et al.*, 2004.

¹⁰ Bartone, 1996 ; Chappelle & Lumley, 2006 ; Halverson *et al.*, 1995 ; MHAT-IV, 2006.

one US study, in which nearly half of participants attributed severe distress to the degree of sanitation, which was the second most commonly reported stressor, behind only uncertainty of return date (Halverson *et al.*, 1995). Operational theatres can also present extreme temperatures, and climate has been shown to be negatively related to well-being among deployed US members (Bartone, 1996 ; Chapelle & Lumley, 2006 ; Halverson *et al.*, 1996). These physical stressors are also detrimental to CAF personnel, as shown in one study of recent Afghanistan returnees, in which members deployed to areas with poor sanitation and extreme heat reported worse psychological functioning (Zamorski, 2003).

Traditional Combat Stressors

When considering which deployment stressors might be associated with mental health difficulties, exposure to traumatic combat situations tends to be more predictive of psychological problems than the previously described difficult but less traumatic deployment experiences. Military personnel who deploy to a theatre of war tend to have poorer mental health than those who participate in non-combat operations, such as peacekeeping missions.¹¹ In two US studies, the participants who had experienced combat on deployment were most susceptible to mental health difficulties, while those who had deployed without combat exposure were less likely than those who had not deployed to develop psychological problems (Smith *et al.*, 2008 ; Wells *et al.*, 2010). In other militaries, substantial time spent in battle has been shown to be associated with higher rates of psychiatric symptomatology,¹² as well as greater risk-taking propensity (Killgore *et al.*, 2008), and increased likelihood of alcohol abuse (Gallaway *et al.*, 2013 ; Killgore *et al.*, 2008), suicidal ideation (Mitchell *et al.*, 2012), and PTSD.¹³ In one study of US Iraq and Afghanistan veterans, the PTSD prevalence was 4.5% among participants who had never participated in a firefight, and 19.3% among those who had been in more than five fights (Hoge *et al.*, 2004).

The effects of combat exposure also hold important implications for CAF personnel, with the majority of recently deployed members reporting experiences such as receiving incoming artillery or small arms fire and rating them as extremely stressful (Bouchard *et al.*, 2010). These experiences have been shown to be related to mental health problems, such as increased distress, anxiety, PTSD and the need for psychiatric intervention among CAF members.¹⁴ CAF personnel who participate in traditional combat tasks such as sniping and reconnaissance tend to fare worse on aspects of psychological well-being, such as depression and substance abuse, compared to those without such experiences (Zamorski, 2003).

¹¹ For instance : Bartone, 1999 ; Hoge *et al.*, 2006 ; Jacobson *et al.*, 2008 ; Proctor *et al.*, 1998 ; Rona *et al.*, 2007.

¹² Armistead-Jehle *et al.*, 2011 ; Bartone, 1999 ; Gallaway, *et al.*, 2013 ; Orsillo *et al.*, 1998.

¹³ Armistead-Jehle *et al.*, 2011 ; Dekel *et al.*, 2003 ; Fontana *et al.*, 2000 ; Ford, 1999 ; Green *et al.*, 1990a ; Hoge *et al.*, 2004 ; Kolkow, *et al.*, 2007 ; Litz *et al.*, 1997a ; Loo *et al.*, 2001 ; MacDonald *et al.*, 1997 ; Rona *et al.*, 2007, 2009 ; Vasterling *et al.*, 2010.

¹⁴ Blanc, 2012 ; Fikretoglu *et al.*, 2006 ; Garber *et al.*, 2012 ; Lee *et al.*, 2013 ; Sareen *et al.*, 2007.

Virtually all of the studies categorizing stressful deployment experiences on a combat mission,¹⁵ as well as several assessing stressors on peacekeeping operations (e.g., Litz *et al.*, 1997a; Sareen *et al.*, 2010) have included a traditional combat component. In addition, many studies retained deployment stress factors for specific aspects of traditional combat, such as perceived responsibility for another's death,¹⁶ witnessing or participating in atrocities (e.g., Green *et al.*, 1990a; King *et al.*, 1995; Wilk *et al.*, 2010), and perceptions of threat or dangerous experiences.¹⁷

Killing

Some military members must cope with taking the life of another human being. When deployed to a theatre of war, this experience is not uncommon, as nearly half (40%) of US Iraq veterans have killed an enemy or civilian in battle (Maguen *et al.*, 2010). American Vietnam veterans with PTSD are more likely than those without the disorder to have killed another person during the war (Green *et al.*, 1990a). The perceived personal responsibility for someone's death has also been shown to be significantly related to alcohol abuse, anger and relationship problems (Maguen *et al.*, 2010, 2011). Killing has also been associated with apathy, fear, and alienation from others (Fontana & Rosenheck, 1998), as well as danger seeking and feelings of invincibility (Killgore *et al.*, 2008). In fact, taking a life has been rated as the single most enduring, distressing experience of war (Fontana & Rosenheck, 1994). Responsibility for the death of civilians or allies, or failing to prevent their deaths, may be even more traumatic. Responsibility for the death of others has been shown to be associated with increased aggression (Killgore *et al.*, 2008), guilt and rates of PTSD (Fontana & Rosenheck, 1994, 1999), as well as increased risk of attempting suicide (Fontana *et al.*, 1992). Among CAF personnel, almost half (49%) of those who report this experience exhibit clinical levels of psychological distress (Bouchard *et al.*, 2010).

Atrocities

Exposure to the atrocities of war, such as violence, torture and mutilation, are often related to military members' post-deployment mental well-being. Witnessing such atrocities has been shown to be strongly related to alcohol abuse (Wilk *et al.*, 2010), PTSD, and other psychiatric disorders in US samples.¹⁸ It has also been linked to the development of mental health problems, such as depression and suicidality, among CAF personnel (Bouchard *et al.*, 2010; Sareen *et al.*, 2007).

¹⁵ For instance : Dekel *et al.*, 2003 ; Green *et al.*, 1990a ; Killgore *et al.*, 2008 ; King *et al.*, 1995 ; 2006; Sudom *et al.*, unpublished data ; Watkins, 2012 ; Wolfe *et al.*, 1993.

¹⁶ For instance : Green *et al.*, 1990a ; Killgore *et al.*, 2008 ; Sudom *et al.*, unpublished data ; Wilk *et al.*, 2010.

¹⁷ For instance : Adler *et al.*, 2000 ; Bartone & Adler, 1996 ; Boermans *et al.*, 2013 ; Dekel *et al.*, 2003 ; King *et al.*, 1995 ; 2006; Stein *et al.*, 2012 ; Sudom *et al.*, unpublished data ; Wilk *et al.*, 2010 ; Watkins, 2012 ; Wolfe *et al.*, 1993.

¹⁸ For instance : Beckham *et al.*, 1998 ; Ford, 1999; Green *et al.*, 1990a ; Schnurr *et al.*, 2004.

Perhaps even more detrimental to members' psychological health than exposure to violent death and disfigurement is their actual participation in these acts. Among US combat veterans seeking treatment for PTSD, the vast majority (82%) reported personal involvement in the perpetration of atrocities and a full third admitted to active contribution (Beckham *et al.*, 1998). Participation in violent or abusive acts in war has been shown to be strongly associated with impaired psychological functioning, including maladaptive thoughts and behaviours, such as isolation from others (Fontana & Rosenheck, 1994, 1998).

Perceived Threat

Military personnel in combat zones experience high levels of stress as a result of life-threatening situations. Receiving incoming fire has been associated with significant distress and mental health problems.¹⁹ Among CAF members, being shot at is particularly related to their psychological well-being in "close call" situations, such as when equipment is hit by incoming fire, or when they are hit and saved by their protective equipment (Bouchard *et al.*, 2010). The presence of mines and improvised explosive devices (IEDs) is also a common concern in theatre, and spending time in these high-risk environments greatly impacts mental health.²⁰ In addition, some past combat missions, such as the Persian Gulf War, involved the threat of nuclear, biological and/ or chemical warfare. Direct exposure to, warnings about, or perceived susceptibility to these agents has been associated with psychiatric difficulties, such as increased distress (Marlowe, 2001), fatigue (Hotopf *et al.*, 2004), poorer self-rated mental health (Unwin *et al.*, 1999), poor concentration, depression, anxiety (Proctor *et al.*, 1998), and PTSD (Vogt *et al.*, 2008a ; Wolfe *et al.*, 1993). Aside from these war zone threats, some military personnel find their lives in danger due to the risk of disease in the deployment location, which can be highly stressful.²¹

The perception that a deployment experience or situation is life-threatening also increases the chances of adverse mental health outcomes. Research with the US, UK, Dutch and Israeli militaries has found that belief that one's life is at risk is significantly related to psychological problems such as PTSD,²² anxiety (Vogt *et al.*, 2005), alcohol abuse (Browne *et al.*, 2008; Hooper *et al.*, 2008b), feelings of fear (Stein *et al.*, 2012), decreased appreciation for life (Fontana & Rosenheck, 1998), and difficulties with concentration (King *et al.*, 2006). In one study of CAF veterans, perceived threat significantly predicted mental health problems, including PTSD, anxiety, and depression (Fikretoglu *et al.*, 2006). In fact, perceived threat is often a stronger predictor than general combat exposure of PTSD development and commonly

¹⁹ For instance : Britt *et al.*, 2007 ; Chappelle & Lumley, 2006 ; Fontana & Rosenheck, 1994 ; Fontana *et al.*, 1992 ; Iversen *et al.*, 2008 ; Rona *et al.*, 2009.

²⁰ Bouchard *et al.*, 2010 ; Castro *et al.*, 2000 ; Chappelle & Lumley, 2006 ; Rona *et al.*, 2009 ; Zamorski, 2003.

²¹ Bolton *et al.*, 2003 ; Britt *et al.*, 2007 ; Halverson *et al.*, 1995.

²² Booth-Kewley *et al.*, 2010 ; Dekel *et al.*, 2003 ; Dirkzwager *et al.*, 2005 ; Kolkow *et al.*, 2007 ; Iversen *et al.*, 2008 ; Mott *et al.*, 2012 ; Mulligan *et al.*, 2010 ; Schnurr *et al.*, 2004 ; Vasterling *et al.*, 2010 ; Vogt *et al.*, 2008a.

mediates the relation between experience with warzone events and PTSD (King *et al.*, 1995 ; Vogt & Tanner, 2007).

Aftermath of Conflict Stressors

Other deployment experiences related to combat, specifically those that involve exposure to the consequences of war to other humans, can affect military members' psychological well-being. Numerous classification systems of distressing deployment experiences have included factors such as "Aftermath of Battle" (King *et al.*, 2006) ; "Body Handling and Physical Devastation" (Adler *et al.*, 2000) ; "Injury and/or Death of Others" ; (Dekel *et al.*, 2003; Wilk *et al.*, 2010) ; "Human Trauma Exposure ; "Buddy Killed or Injured" (Killgore *et al.*, 2008) ; "Aftermath of Violence", "Traumatic Loss" (Stein *et al.*, 2012) ; "Witnessing Enemy or Civilian Death or Dying" ; and "Care of Dead and Dying" (Wolfe *et al.*, 1993). Among CAF members deployed in combat in support of TFA, "Aftermath of Battle" was identified as a significant stressor dimension of this mission (Watkins, 2012). In addition to the casualties and destruction of battle, the inability to retaliate against an attack or to uphold restraint against the enemy has been recognized as a potentially distressing factor on deployment (Litz *et al.*, 1997a; Sareen *et al.*, 2010). The present study's review of the literature identified five experiences related to the aftermath of battle: loss, exposure to widespread suffering, body handling, rules of engagement, and, although it is not typically classified as a dimension of deployment stressors but has been shown to be related to post-deployment mental health difficulties, sustainment of a serious injury.

Loss

The loss of a companion has been rated as an intensely traumatic experience by military personnel and veterans (Hosek *et al.*, 2006), and is strongly associated with the development of PTSD (Green *et al.*, 1990b). The vast majority of recently deployed CAF members have had an acquaintance gravely injured or killed in theatre and, as a result, are more vulnerable to mental health problems, which highlights the importance of this experience in contributing to post-deployment difficulties in recent CAF missions (Bouchard *et al.*, 2010; Murphy & Farley, 1998).

Exposure to Widespread Suffering

Military members may also have to cope with witnessing the suffering of others. In research with US peacekeepers, more than half of the deployed members surveyed reported that observing physical destruction and civilian distress had a detrimental influence on their psychological well-being (Bolton *et al.*, 2003; Maguen *et al.*, 2004), and many claimed that their inability to prevent this suffering was highly stressful (Halverson *et al.*, 1995). Moreover, the soldiers who had witnessed the consequences of battle, such as dead or injured civilians, were more likely to have difficulties with sleep and depression (Castro *et al.*, 2000) and negative perceptions of the world (Stein *et al.*, 2012), and to develop PTSD (Fontana *et al.*,

2000). Among US and UK Iraq and Afghanistan veterans, exposure to others' suffering has been associated with increased risk of PTSD (Iversen *et al.*, 2008; Vasterling *et al.*, 2010; Vogt *et al.*, 2008a), readjustment problems and worries about deployment (Katz *et al.*, 2010), and greater risk-taking propensity and alcohol use (Killgore *et al.*, 2008). These associations are also a concern for CAF personnel because, among recently deployed members, 81% reported seeing widespread destruction, 64% had witnessed widespread suffering (Murphy & Farley, 1998) and more than half had seen destroyed homes or villages (Bouchard *et al.*, 2010). Exposure to the aftermath of combat has been shown to be associated with anxiety and PTSD in CAF veterans (Fikretoglu *et al.*, 2006), and to affect the psychological well-being of CAF members (Bouchard *et al.*, 2010; Sudom & Dursun, 2007).

Body Handling

Some deployed military personnel may be required to disinter and/or transport human remains. In one UK study, handling bodies was associated with an increased risk of alcohol abuse (Browne *et al.*, 2008). Among US veterans of the Persian Gulf War, recovery of soldiers fallen in battle increased the likelihood of developing PTSD (McCarroll *et al.*, 1995). In the CAF, members who have exhumed human remains tend to fare worse on measures of mental health (Bouchard *et al.*, 2010; Zamorski, 2003). In fact, CAF members have sometimes cited body handling as having the strongest impact on their psychological well-being (Murphy & Farley, 1998; Sudom & Dursun, 2007).

Rules of Engagement

Restraints on military members' ability to act or react may also cause distress. In many operational theatres, the rules of engagement can hinder a member's desires to take action, resulting in frustration. In a study of US Air Force personnel deployed to Iraq, for example, the inability to retaliate against an enemy attack was cited as one of the more difficult aspects of deployment, and a reason for seeking mental health treatment (Chappelle & Lumley, 2006). Further, among US peacekeepers in Somalia, the requirement to exercise restraint was cited more commonly as a source of distress than was exposure to suffering and death (Orsillo *et al.*, 1998). UK military members on peacekeeping operations have also reported frustrations associated with complying with the rules of engagement (Thomas *et al.*, 2006). Among CAF members who have deployed to Afghanistan, being unable to take action in a threatening situation due to the rules of engagement has been shown to be a common and psychologically distressing experience (Bouchard *et al.*, 2010).

Injury

The number of physical injuries sustained by CAF personnel in TFA operations increased dramatically since 2006, the beginning of the engagement of the CAF in the combat mission in Kandahar (DND News Room, 2010). This increase in injury rates is important for mental health as well, as shown by studies of American and Australian veterans of the

Vietnam War, in which those injured in theatre were more likely to have developed PTSD.²³ More recent US and UK research has found significant associations between being wounded in action and readjustment difficulties, particularly via increases in health problems post-deployment (Katz *et al.*, 2010) and PTSD (Hoge *et al.*, 2004). In one study of US military personnel recently returned from Iraq, the PTSD prevalence was 32% among members who had been wounded in theatre, but only 14% among those who had not been injured (Hoge *et al.*, 2007). Similarly, taking sick leave or being hospitalized during deployment has been linked to the development of mental health problems (Hoge *et al.*, 2006), such as PTSD (Mulligan *et al.*, 2010), other anxiety disorders, and depression (Larson *et al.*, 2009). In addition, members injured on deployment experience an increased risk of post-deployment long-term hospitalization (Hooper *et al.*, 2008a). In the CAF, although severe injuries are not common (Watkins, 2012), they have been shown to be related to clinical levels of psychological distress in many of the members they do afflict (Bouchard *et al.*, 2010), and thus should be regarded as potentially traumatic deployment experiences that may be related to mental health difficulties.

Mediators and Moderators of the Stress/Well-Being Relationship

Although many military members encounter the described experiences on deployment, only a small fraction of these members develop psychological difficulties. For instance, in one US study, more than half of the soldiers surveyed had been on patrols or other dangerous duties, and more than a third had had their unit fired upon, but only 9.4% had developed PTSD (Bolton *et al.*, 2003). Also, in one study of Dutch peacekeepers, 73% had witnessed widespread suffering, but only three percent met the full criteria for a diagnosis of PTSD (Bramsen *et al.*, 2000). In other studies of US combat veterans, of those who had participated in many firefights, and of those who had been injured, only 19.3% and 31.8%, respectively, developed PTSD (Hoge *et al.*, 2004, 2007). It appears that, because only certain military members who are exposed to the same stressors experience impairments in psychological well-being, other factors must contribute to these difficulties. Bowman (1999) argues that exposure to a potentially traumatic situation is only one, relatively weak, predictive factor in determining the development of PTSD, as evidenced by the substantially elevated rates of trauma exposure, relative to the prevalence of PTSD. Instead, she posits that individual differences, such as neuroticism and cognitive beliefs, are more predictive of which individuals who have experienced a potentially traumatic event will develop PTSD than the experience of trauma itself.

Cognitive theories of stress have been suggested as integral to the process by which deployment stressors affect military personnel (Adler *et al.*, 2003; Bouchard *et al.*, 2010). For instance, according to the Transactional Theory of Stress, appraisal of a stressor is composed of two processes : primary appraisal, in which one determines the level of threat involved; and

²³ Green *et al.*, 1990a and 1990b ; O'Toole *et al.*, 1998.

secondary appraisal, in which one decides whether he or she has the resources necessary to cope with this stressor (Lazarus & Folkman, 1987). Meanwhile, the diathesis-stress model states that in order for mental illness, such as depression, to occur, both an environmental stimulus and an inherent, predisposing vulnerability to stress must be present (Monroe & Simons, 1991). Hans Selye's theory of the General Adaptation Syndrome, on the other hand, posits that humans go through three stages of stress: alarm, resistance, and exhaustion, and when exposure to a stressor is prolonged, detrimental health effects are more likely to occur (Selye, 1950).

Appraisal and Coping

Research has shown that, consistent with these models, appraisal, coping strategies, and individual differences do, in part, determine whether exposure to deployment stressors will be associated with declines in psychological well-being. For instance, in one US study, the veterans with the highest levels of combat exposure reported not only the most undesirable effects of military service (e.g., loneliness, discomfort), but also the highest number of desirable effects, such as independence and self-discipline. Moreover, desirable appraisals of service decreased, while undesirable appraisals increased the likelihood of these veterans developing PTSD or depression (Aldwin *et al.*, 1994). Another US study found that combat experiences, such as fighting, killing, witnessing the death of others, and perceived threat to life predicted not only poor mental health outcomes, but also positive changes in psychological well-being, such as self-improvement and solidarity (Fontana & Rosenheck, 1998). These psychological gains may be related to identification of a sense of purpose or meaning in traumatic experiences, which protects against combat-related mental health problems (Currier *et al.*, 2011; Gibbons *et al.*, 2012; Schok *et al.*, 2008). In research with CAF members deployed to Afghanistan, appraisal of combat stressors has been shown to fully mediate the positive relationship between exposure to these stressors and mental health difficulties (McCuaig Edge & Ivey, 2012). These findings indicate that, in accordance with the Transactional Theory of Stress, personal perceptions of the impact or value of stressors are important.

Also consistent with this theory, coping strategies may buffer or exacerbate the relationship between deployment stress exposure and psychological health. For instance, in a study of US soldiers on a peacekeeping mission, Ippolito and colleagues (2005) found that, even at high levels of deployment stressors, when soldiers used active coping strategies, such as seeking social support and viewing the positive aspects of experiences, those with strong feelings of control over their work reported better mental health than those who did not use these active forms of coping. Furthermore, research with US Persian Gulf War veterans with combat exposure has shown that those who develop PTSD are more likely to use avoidant and self-blame coping strategies, and fewer problem-solving coping techniques (Sutker *et al.*, 1995). Suvak and colleagues (2002) found similar results among US Vietnam veterans, with a

positive relationship between problem-focused coping techniques and achievement, and a negative association between emotion-focused coping strategies and achievement, particularly at moderate levels of combat exposure with which most military members could adequately cope. Among CAF members, active coping strategies are related to psychological benefits such as increased self-esteem, while passive coping approaches tend to be associated with lower self-esteem (Sudom & Dursun, 2007). Military members' coping strategies may play a role in determining their psychological functioning in relation to exposure to deployment stressors.

Personality

Personality traits can also affect the way deployment experiences influence mental health. For example, several US studies have shown that hardiness (i.e., a feeling of control over one's life, a perception that change can be beneficial and promote growth, and commitment to tasks; Kobasa, 1979) appears to influence the relation between deployment stressors and mental health outcomes. In other words, military members who score high on the trait of hardiness tend to be less susceptible to the detrimental psychological effects of deployment and combat stress, suggesting that hardy military personnel may find personal meaning and challenge from these experiences, and choose to use them to grow (Bartone, 1999; Britt *et al.*, 2001; Dolan & Adler, 2006). Hardiness, along with similar psychological resilience traits, such as optimism, may contribute to positive appraisals of deployment stressors, viewing them as challenges and opportunities for growth, rather than potential threats to well-being (Schaubroeck *et al.*, 2011).

Meanwhile, the trait of neuroticism, characterized by emotional reactivity and high levels of worry and stress (McCrae & John, 1992), has also been shown to have an effect on the association between minor deployment stressors, such as difficult climate and lack of privacy, and mental health by rendering military members more susceptible to PTSD when encountering these experiences (Englehard & van den Hout, 2007). Conceptually similar factors to neuroticism, such as trait anxiety and negative affect, may also be predisposing factors for deployment-related mental health problems, as peacekeepers scoring high on this trait have shown an increased negative psychological reaction when faced with many deployment stressors (Larsson *et al.*, 2008; Souza *et al.*, 2008). These findings can be interpreted with the diathesis-stress model, in that exposure to a stressor is not sufficient to contribute to a mental health disorder. Rather, innate, predisposing traits such as hardiness or neuroticism also play a role in determining whether psychological problems will develop as a consequence of these experiences.

Social Support

Military personnel may seek out or receive social support from a variety of sources, including informal (e.g., friends and family), and formal (e.g., social workers and chaplains) networks (Sudom, 2009), both in theatre and after homecoming. This support can also affect

the impact of deployment stressors on psychological health. For instance, in US and UK research, social support has been shown to buffer the effects of combat exposure, in that the odds of developing mental health problems, such as PTSD, anxiety, depression, and suicidal ideation are reduced with greater social support, even at high levels of exposure to combat or other distressing events.²⁴ Furthermore, simply discussing one's distressing deployment experiences with others, including family members and romantic partners (Bolton *et al.*, 2003), and mental health service providers (Hosek *et al.*, 2006), has been associated with reductions in the detrimental effects of these stressors. Support and encouragement from unit leaders has also been shown to protect against the mental health impacts of deployment stress, maintaining levels of morale and well-being when encountering potential stressors (Britt *et al.*, 2004). Social support appears to enhance coping resources and, in accordance with the Transactional Theory of Stress, thereby affects the degree to which these stressors experienced on deployment contribute to psychological well-being.

Deployment Experience and Duration

The length of a deployment or previous experience with deployment may also play a role in the effects of stressors on mental health. US and UK research has consistently shown that a longer duration of time spent in theatre is associated with an increased susceptibility to psychological problems²⁵ and difficulties with home life, both during and after deployment (Rona *et al.*, 2007). In fact, one US study found that, at four months into a peacekeeping deployment, only 14.8% of members met the criteria for a diagnosis of depression, but at nine months, 21.6% were considered depressed (Adler *et al.*, 2005). In a study of CAF members deployed internationally, morale was shown to decline in relation to length of deployment (Sudom & Dursun, 2007). As described by Adler and colleagues (2005), these results appear consistent with the General Adaptation Syndrome, in that the longer the exposure to a stressor, the greater the effect it will have on psychological and physiological coping mechanisms, and thus also on well-being.

The findings of research on the impact of previous deployment experience on mental well-being are inconsistent. Some studies have found multiple deployments to be highly stressful, associated with poorer mental health,²⁶ increased odds of developing PTSD (MHAT-IV, 2006), and decisions to leave service (Halverson *et al.*, 1995). Consistent with the relation between deployment duration and psychological functioning, these associations have been suggested to be simply a consequence of cumulative experience with deployment stressors, such as greater time separated from family, frequent periods of long working days, and increased combat exposure (J-MHAT-7, 2010), in accordance with Selye's General Adaptation Syndrome.

²⁴ Armistead-Jehle *et al.*, 2011; Boscarino, 1995; Fontana *et al.*, 1997; Gibbons *et al.*, 2012; Iversen *et al.*, 2008; Mitchell *et al.*, 2012.

²⁵ Alderks, 1998; Iversen *et al.*, 2008; MHAT-IV, 2006; MHAT-V, 2008; J-MHAT-7, 2010.

²⁶ MHAT-III, 2006; MHAT-V, 2008; MHAT-VI, 2009; J-MHAT-7, 2010.

Conversely, having previously deployed has also been linked to decreased odds of depression and PTSD (Adler *et al.*, 2005), and longer retention in the military (Pierce, 1998). These findings may be due to greater perceptions of preparedness, as a result of prior experience with deployment. Feeling ready for the difficulties of deployment has been shown to be a protective factor for mental health problems, and is typically associated with lower incidence of PTSD (Vogt *et al.*, 2008a ; Wolfe *et al.*, 1993). On the other hand, inconsistencies between deployment expectations and reality (J-MHAT 7, 2010), and inadequate perceived military training (Gibbons *et al.*, 2012), deployment preparation (Mott *et al.*, 2012), and combat experience (Marlowe, 2001) have been associated with mental health problems. These findings are consistent with the Transactional Theory of Stress, such that perceptions of sufficient preparedness might increase members' beliefs in their coping capabilities with deployment stressors, and thereby attenuate the effects of these experiences on their psychological well-being.

Reasons for Variation between Studies

Research clearly suggests that military members encounter many potentially distressing experiences on deployment. However, a great degree of variability was found between the studies reviewed in this report, in terms of both the frequency of exposure to certain deployment stressors, their relative impacts on military members' mental health, and rates of post-deployment mental health problems. There are several explanations for these disparities. First, researchers have assessed deployment stressor experience differently, with some exploring the cumulative exposure to these experiences, and others looking at the degree of impact of these stressors on mental health. Both the frequency of exposure and perceived stressfulness of deployment experiences have been associated with PTSD (Britt *et al.*, 2013). Different measurements of deployment stressor exposure, however, might result in very different depictions of members' potentially traumatic deployment experiences. For instance, in one study of CAF members who had deployed to Afghanistan, the most frequently reported experiences were receiving incoming fire and knowing someone seriously injured or killed. However, only a very small percentage of the members who reported these experiences developed post-deployment psychological difficulties. On the other hand, very few members stated that they had been responsible for the death of a Canadian or allied service member, or had engaged in hand-to-hand combat but, of those who did, nearly half were dealing with mental health problems after returning home (Bouchard *et al.*, 2010). Therefore, military personnel with a higher number of deployment experiences may not be most susceptible to post-deployment mental health difficulties, and stressors less frequently encountered might be equally or more traumatic. As such, both the amount of attributable distress and cumulative experience should be considered when assessing the psychological impact of deployment stressors.

In addition, the timing of the assessments of exposure to deployment experiences ranged over the studies, with some surveying participants mid-deployment, making it impossible to assess later experiences, such as homecoming reception and post-deployment social support. Other research has administered measures of combat exposure after considerable time; in some cases, years had elapsed since the actual experiences, which may have resulted in inaccurate or biased reporting. Reviews of combat-related PTSD have indicated that variation in the time of evaluation can produce substantial heterogeneity in prevalence estimates of PTSD (Richardson *et al.*, 2010; Sundin *et al.*, 2010), with rates generally increasing with time passed since combat (Sundin *et al.*, 2010). Among research with CAF personnel supporting TFA, only nine percent surveyed mid-deployment met the criteria for any mental health diagnosis (Garber *et al.*, 2012), but this proportion increased to 14% among those assessed after returning home (Boulos & Zamorski, 2013). Some research has shown that non-combat experiences, such as problems with leadership and difficult living conditions, may be perceived as very stressful during deployment (e.g., Farley, 1995; Waller *et al.*, 2012). Traumatic experiences, such as witnessing or causing death, on the other hand, may cause more distress after returning home.

In addition to the timing of assessment of combat exposure and/or mental health status, other methodological aspects may account for some of the variability between studies. Sample size, selection or participation bias, sampling method, and survey anonymity have all been noted as contributors to disparities in combat-attributable rates of PTSD across studies (Richardson *et al.*, 2010; Sundin *et al.*, 2010). The type of measurement tool may be especially important in examining PTSD prevalence in military research, with a number of different instruments and cut-off scores for diagnostic criteria used in the literature (Sundin *et al.*, 2010). Combat-related PTSD rates tend to be much higher when using self-reported measures as opposed to structured clinical interviews (Englehard *et al.*, 2007).

Furthermore, the studies cited come from a wide variety of militaries (e.g., Canadian, American, British, Australian, New Zealand, Dutch, Israeli) deployed in support of a number of missions (e.g., Vietnam, Yom Kippur War, Kosovo, Croatia, Former Yugoslavia, Somalia, Haiti, Persian Gulf, Iraq, Afghanistan). Each of these operations and their militaries' roles in them would have been markedly different and, therefore, the experiences of one deployment cannot be generalized to the next. Common experiences in one deployment may have been quite rare in another. For instance, the majority of military members who reported atrocities exposure or participation were veterans of the Vietnam War,²⁷ while those who feared biochemical threats had, for the most part, served in the Persian Gulf War.²⁸ Among CAF personnel deployed to Afghanistan, receiving incoming fire is the most commonly reported

²⁷ See for instance : Beckham *et al.*, 1998 ; Fontana & Rosenheck, 1998 ; Ford, 1999 ; Green *et al.*, 1990a ; Marlowe, 2001 ; Schnurr *et al.*, 2004.

²⁸ See for instance : Hotopf *et al.*, 2004 ; King *et al.*, 2006 ; Marlowe, 2001 ; Proctor *et al.*, 1998 ; Unwin *et al.*, 1999 ; Vogt *et al.*, 2008a ; Wolfe *et al.*, 1993.

deployment stressor (Bouchard *et al.*, 2010; Watkins, 2012). CAF members on peacekeeping operations, however, are most likely to report seeing widespread destruction (Murphy & Farley, 1998). Clearly, with the variety of measurements, timing of assessments, and range of operations and duties, there is very little consistency and consensus in the most difficult deployment experiences and their effects on mental health.

Future Research Directions

The present review explores the potentially distressing experiences military members may encounter on deployment. The CAF's main focus over the past decade has been its involvement in TFA which, from 2006 to 2011, was a combat mission. As such, a great deal of the literature has focused on war-related, traumatic experiences. However, in 2011, this mission was converted to a training operation, with all CAF involvement in TFA ceasing in 2014 (Government of Canada, 2013). Therefore, the operational stressors experienced by CAF members have inevitably shifted from combat-related experiences to those encountered in non-combat deployments and in garrison. Non-combat deployment (e.g., peacekeeping, disaster assistance) stressors include the interpersonal and occupational and environmental experiences of combat deployments. As described in Campbell and Nobel (2009), garrison operational stressors tend to be similar to those experienced in civilian occupational settings (e.g., role ambiguity, role conflict, decision latitude, lack of recognition; Nelson & Simmons, 2003). However, some of the stressors associated with deployment, such as lack of unit cohesion, difficulties with leadership, harassment, and heavy workload can also occur in garrison. Other stressors may be manifested in different ways on deployment and in garrison. For instance, on deployment, separation from family is a salient concern, while in garrison, achieving a harmonious balance between work and family life might be the primary challenge in this domain (Campbell & Nobel, 2009). Therefore, future research should examine non-military occupational stressors and facets of certain deployment stressors in garrison, to determine the operational difficulties CAF members might encounter in their future missions and duties, and the effects of these stressors on members' well-being.

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