RISK AND PROTECTIVE FACTORS OF ALCOHOL MISUSE: IN THE NEW ZEALAND DEFENCE FORCE

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Abstract

This study contributes to the scientific literature and is committed to increasing the knowledge of the risk and protective factors for alcohol misuse within a sample group of New Zealand Defence Force (NZDF) personnel. The present study investigated these factors from a New Zealand perspective, as existing literature is predominantly centred around the United States and British Forces. This study utilised data from NZDF military personnel who completed a Health and Wellbeing Survey at two time points: 1) in 2016 and 2) in 2019. Potential risk and protective factors were analysed using t-tests, ANCOVA tests, hierarchical regression, and moderation analyses. Several key findings were obtained. First, demographic variables such as male gender, single relationship status, Navy service, Junior Non-Commissioned Officer (NCO) rank, younger age, and minority ethnic status were associated with greater alcohol use. In addition, psychological distress and trauma exposure at Time 1 were associated with alcohol misuse at Time 1, and PTS and loneliness at Time 1 predicted alcohol misuse at Time 2. The study also revealed direct associations between social support, unit cohesion, and alcohol misuse. Moderation analyses revealed that social support, leadership perception, and unit cohesion exacerbated the association between psychological distress and alcohol misuse. Similarly, moderation analysis revealed that resilience exacerbated the association between trauma exposure and alcohol misuse. The study underscores the importance of targeting alcohol misuse, as participants appear to be using alcohol to cope; therefore, prevention and intervention efforts should prioritise mitigating trauma exposure, PTS, loneliness, and psychological distress alongside initiatives to enhance adaptive coping among NZDF personnel.

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CHAPTER ONE

1. Introduction

"When we are completely exhausted and utterly incapable of further effort, we have, nevertheless, a hidden reserve of energy… the supreme value of alcohol at this desperate moment is that it frees this reserve, places it at the service of the organism for that instant use." Mercier (1915, p. 489)

Research has long discussed the legacy of alcohol in the military and suggested some beneficial outcomes, including its effect on energy. In the current climate however, the harmful effects of alcohol are often acknowledged.

Problematic alcohol use by military personnel has been linked to adverse psychological health outcomes, such as depression and post-traumatic stress disorder (PTSD; Osborne et al., 2022; Schumm & Chard, 2012; Waller et al., 2015). Problematic alcohol use has been found to be associated with physical health problems, such as cardiovascular disease, gastrointestinal and liver disorders, as well as neurological problems (Gossop et al., 2007). Alcohol has also been found to contribute to anti-social behaviours and crime (e.g., drink driving, sexual abuse, domestic violence; Jacobson et al., 2008). In New Zealand, nearly half of the reported military incidents involve alcohol (Teale & McDonald, 2020). Alcohol misuse can also have an adverse impact on work performance (Bray et al., 2003; Fink et al., 2016; Fisher et al., 2000; Jacobson et al., 2008; Marsden et al., 1988). Research on United States (US) active duty military populations have found heavy drinkers are significantly more prone to performance problems compared to light drinkers (Fisher et al., 2000; Mattiko et al., 2011). These adverse outcomes present a significant issue for the military.

Research from the US and United Kingdom (UK) armed forces indicates that binge drinking and heavy drinking are common. Results from the US Health Related Behaviour

Survey (HRBS; 2018) of the US Defence Force found that one-third (34%) of its service members reported binge drinking (defined as consuming five or more drinks on a single occasion for men, or four or more drinks on a single occasion for women at least once) in the last 30 days and close to 10% were categorised as heavy drinkers (defined as binge drinking at least once or twice a week in the past 30 days; Meadows et al., 2021). Similarly, among a representative sample of UK military personnel, Fear et al. (2007) documented that 40% of service members reported binge drinking (≥48g of pure ethanol) on a weekly or daily basis, with 13% classed as heavy drinkers (Fear et al., 2007).

Notably, selected comparisons of alcohol use between military and civilian populations have suggested that military personnel consume alcohol differently from the general population (Bray et al., 1991; Bray et al., 2009; Henderson et al., 2008; Poehlman et al., 2011; Teachman et al., 2015). Ames and Cunradi (2004) compared the drinking culture in the US military with the civilian population. They found that US military respondents aged 18-25 were twice as likely to engage in heavy alcohol use compared to their civilian counterparts. In another study, Fear et al. (2007) reported that excessive alcohol use was more common in UK military personnel than in the general population. Together, these patterns of results suggest that Military personnel may consume more alcohol than their civilian counterparts. This heightened risk, in addition to the harm posed by alcohol misuse, has led scholars to investigate the risk and protective factors associated with alcohol misuse, especially in military populations (Ames & Cunradi, 2004; Bray & Hourani, 2007; Fear et al., 2007; Goodell et al., 2020; Hoopsick et al., 2021; Iversen et al., 2007; Na et al., 2021; Thandi et al., 2015; Woodruff et al., 2018). Today, published literature in this field primarily comes from the United States and the United Kingdom. The situation in New Zealand has been rarely investigated. Accordingly, generalising findings from other Armed Forces may not be directly transferable to the New Zealand Defence Force (NZDF) alcohol misuse detection

and prevention efforts. This absence reflects a need to investigate alcohol use within the context of the NZDF.

1.1 New Zealand Defence Background

The NZDF currently employs 15,600 highly trained professionals who fill various roles in the Navy, Army, and Air Force services. Each of the services has regular, reserve, and civilian components. Collectively, this Force operates jointly to ensure that New Zealand is secure, that threats are deterred and that the country is well (NZDF, 2021). NZDF regular and reserve force personnel may be deployed at any given time to support global headquarters, primary peace operations, and training missions spanning six continents (Ministry of Defence, 2021). Accordingly, personnel must satisfy set standards concerning health and wellbeing to be considered medically and physically fit for duty. The misuse of alcohol can directly impact these standards. For example, alcohol misuse can render individuals unfit for military service. This position is guided by three principles: (1) the safety of personnel is critical, (2) the wellbeing of personnel is a priority, and (3) substance misuse has consequences (DHD & NZDF, 2018). This is also reinforced in the Armed Forces Discipline Act (AFDA, 1971). The AFDA states, “If he or she is unfit to perform his or her duty or any duty that he or she may be required to perform” (section 51, 1971, p. 57) due to intoxication from alcohol, an offence has been committed. Consequently, misuse of alcohol may call for court-martial, dismissals, and detention. Despite these policies, alcohol misuse is rampant in the NZDF.

The harm posed by alcohol misuse, in addition to the importance of force readiness, led NZDF leadership to develop the STAND - A Safer Stand on Substances framework (2018). This framework recognised an urgent need to reposition NZDF substance abuse policies from a punishment focused to a more harm-minimising model of care to provide

support for those in need. If the objectives of STAND are met, it is anticipated that the NZDF will be a healthier, more vital, more efficient, combat-ready force. If NZDF alcohol misuse strategies and policies are to be effective, a better understanding of the factors that influence alcohol use among NZDF personnel is required. This study sought to fill a gap in existing scientific evidence by examining the alcohol use in a sample of NZDF personnel. This study aimed to 1) identify which NZ military personnel were most vulnerable to the development of alcohol misuse and 2) identify the risk and protective factors of alcohol misuse for NZ military personnel.

CHAPTER TWO

2.0 Relevant Literature

This chapter reviews the literature relevant to the primary elements of Alcohol Misuse: demographic characteristics of people who use alcohol, risk factors for alcohol use, and protective factors for alcohol use. First, it clarifies alcohol consumption terminology. Then, it reviews empirical studies focusing on demographic characteristics of drinking. Then, lastly, it includes a review of empirical studies on the key factors that have been found to reduce or increase the risk of alcohol misuse.

2.1 Alcohol Terminology

Standard Drink. A standard drink (or unit of alcohol) is a unit of measurement used to quantify the amount of pure alcohol in a beverage. This measurement provides a consistent way for consumers to track their alcohol intake. A standard drink can vary depending on the country or organisation defining it. New Zealand (NZ) and Australia specify a standard drink as having 10 grams of pure alcohol, the US defines a standard drink as having 14 grams of ethanol, and Canada has 13.6 grams of ethanol (Babor et al., 2001). The World Health Organisation defines a standard drink as having 10 grams of ethanol (Babor et al., 2001).

These discrepancies result from differences in typical serving sizes in countries. Such variation poses several challenges for researchers in this field, especially when comparing findings across multiple international studies. Accordingly, grams of ethanol has often been utilised by researchers in this field when comparing alcohol use across populations. In this research a standard drink is defined as 10 grams of ethanol.

Low risk drinking. Low risk drinking is defined as consuming alcohol in a way that does not result in harm. Based on the NZ standard drink measure of 10 grams of pure ethanol, to minimise long-term health risks, the Ministry of Health (2021) recommended that women

should consume no more than two (≥ 20g ethanol) standard drinks per day and 10 standard drinks per week (≥ 100g ethanol) while ensuring two alcohol-free days per week. For men, the recommendation is to limit consumption to no more than three standard drinks per day (≥ 30g ethanol) and 15 standard drinks per week (≥ 150g ethanol), with two alcohol-free days every week. To reduce the risk of injury, the Ministry of Health (MOH; 2021) suggested that women consume no more than four standard drinks (≥ 40g ethanol) on any single occasion and men consume no more than five standard drinks (≥ 50g ethanol) on any single occasion. The Alcohol Use Disorders Identification Test (AUDIT) is often used to measure alcohol consumption, with a score of 7 or less indicating low risk drinking. In this study low risk drinking is defined as an AUDIT ≤ 7.

Alcohol Use Disorder. Alcohol Use Disorder (AUD) is a condition defined in the Diagnostic Statistical Manual of Mental Disorders 5 (DSM-5; APA, 2017) as a "problematic pattern of alcohol consumption leading to clinically significant impairment or distress" (APA, 2017, *p*. 490). AUD is diagnosed as mild, moderate, or severe based on the number of symptoms present (APA, 2017). Symptoms of AUD include loss of control, craving or strong desire to use alcohol, drinking that interferes with responsibilities, continued use despite negative consequences, developing tolerance – needing more alcohol to get the same effect, and experiencing withdrawal symptoms such as restlessness and shakiness (APA, 2017). For the complete list of symptoms, refer to the American Psychiatric Association (APA, 2017).

Hazardous and Harmful drinking. In general, hazardous drinking refers to a pattern of alcohol use that carries a risk of either short or long-term harm (Anderson et al., 2005). This can relate to both the frequency of alcohol use and the quantities of alcohol one consumes. By contrast, harmful drinking refers to a pattern of alcohol use that results in harm (i.e., psychological or physiological harm; Anderson et al., 2005). One of the most common measures of hazardous and harmful drinking is the AUDIT; a score of ≥ 8-15 indicates

hazardous drinking, while a score of ≥16-19 indicates harmful drinking (Babor & Higgins-Biddle, 2001).

Drinking patterns. According to research evidence on alcohol misuse, there is a range of terms used to describe different forms of harmful and hazardous drinking patterns. Despite efforts to define these patterns, there remains inconsistency in the measures used across studies. For example, the terms binge drinking and heavy episodic drinking are often used interchangeably to describe consuming large amounts of alcohol on a single occasion. However, what constitutes "large quantities" varies between studies. Some studies (e.g., Bloomfield et al., 2008; Sull et al., 2010) defined binge drinking with set thresholds (i.e., 60 grams of pure ethanol; WHO, 2024), while other studies (e.g., Craig & Shelton, 2008; Li et al., 2011; Wechsler & Nelson, 2001) have used gender specific cut offs (i.e., 56 grams for Women and 70 grams of pure alcohol for Men; Wechsler & Nelson, 2001). In this study, binge drinking is defined as six or more drinks on one occasion.

There is also disagreement over the term heavy drinking, which is used to refer to frequently drinking large quantities of alcohol. While some studies have used an AUDIT score of ≥ 16 to depict heavy drinking (e.g., Waller et al., 2015), others studies (e.g., Bray et al., 2003; Brown et al., 2010; Mattiko et al., 2011) have used set thresholds (i.e., 70 grams or more per typical drinking occasion at least once a week; Matiko et al., 2011), while others (e.g., Jacobson et al., 2008; Stahre et al., 2009) have used gender specific cut offs (i.e., 196 grams per week for men and 98 grams per week for women; Jacobson et al., 2008). This lack of consistency in definitions and measurement complicates efforts to assess and compare drinking behaviours across populations accurately. In this study, heavy drinking refers to a score ≥ 16 on the AUDIT.

Alcohol Misuse. Alcohol misuse is a general term that is used to describe a spectrum of drinking behaviours that can result in harm to oneself or others. This harm may negatively

affect physical health, mental wellbeing, and social relationships. Alcohol misuse includes drinking patterns that exceed drinking guidelines, such as hazardous drinking, harmful drinking, binge drinking, and heavy drinking. Thus, it refers to problematic patterns of drinking that continue despite adverse health and social outcomes. In this research, alcohol misuse is defined as an AUDIT score of ≥ 8.

2.2 Alcohol and Demographic Characteristics

Certain demographic variables are associated with an increased risk of alcohol use, among these, the most documented associations in military personnel are gender, age, marital status, ethnicity, service, and rank. Each of these factors will be examined further.

Alcohol and Gender.

Alcohol and how it is consumed varies by gender. Globally, compared to women, men tend to drink alcohol more frequently and in larger quantities (Wilsnack et al., 2000). Research has suggested several possible reasons why universal gender differences in drinking behaviour might arise. One perspective emphasises biological differences in how women and men react to the intake of alcohol. For example, women generally metabolise alcohol slower than men and often have smaller volumes of body water in which alcohol is distributed, thus requiring less alcohol for similar effects (Baraona et al., 2001; Cole-Harding & Wilson, 1987; Goist & Sutker, 1985). Cultural influences also play a significant role, with societies using alcohol to define gender roles (Sudhinaraset et al., 2016; Wilsnack et al., 2000). For example, drinking patterns often reflect societal norms, with drinking alcohol in most cultures usually tied to masculinity (Berke et al., 2020; Campbell, 2000; Macdonald, 2020; Wilsnack et al., 2000). Thus, when drinking heavily, men can display their stamina, self-control, and wellness by taking risks. Conversely, cultural norms typically restrict women's drinking, with

female drinking discouraged as the effects of intoxication were considered incompatible with women's traditional domestic roles (Martin, 2001; Wilsnack et al., 2000).

The New Zealand Ministry of Health (2022/23) survey shows that men were more likely to misuse alcohol than women. Men were approximately twice as likely as women to report heavy episodic drinking at least once a month and approximately three times more likely than women to engage in heavy episodic drinking every week. These patterns of alcohol use are also consistent with gender differences found in Military populations.

Brown et al. (2010) investigated alcohol use and related problems among a sample of US military personnel. Their study found that women were significantly more likely to be abstainers, light drinkers, or moderate drinkers, while men were more likely to be heavy and binge drinkers. Accordingly, men showed a higher incidence of alcohol-related problems, which correlated with their tendency for heavier alcohol use. Brown et al. (2010), suggested that these findings may be attributable to biological differences in how women and men metabolise alcohol. Among a sample of Australian military personnel Waller et al. (2015) found that men were twice as likely to binge drink on a weekly or daily basis (defined as 48 grams of pure ethanol on one occasion) and three times more likely to drink hazardously (defined as AUDIT $\geq$ 16) compared to women. Together, these patterns of results suggested that gender is an essential factor to consider when assessing alcohol consumption among military personnel, with men potentially facing higher risks of alcohol misuse.

Alcohol and Age.

Alcohol consumption is associated with age. Research evidence has consistently shown that younger individuals are more likely to drink than older individuals. In particular, studies have documented that alcohol consumption and harmful drinking often peaks in early adulthood (18-25 years of age) and decreases with advancing age (Ahacic et al., 2014; Grant

et al., 2004; Greenfield & Rogers, 1999; Li et al., 2004; McEvoy et al., 2013; Moos et al., 2009; Towers et al., 2018; Welty et al., 2019).

The New Zealand Health Survey (2020/21) found that the highest prevalence of harmful drinking (AUDIT of ≥ 8**)** was among 18 to 24yearolds (40.5%), with this group of individuals most likely to binge drink (defined as 60 ≥ gram of pure ethanol or more) at least weekly (22.9%). These results suggest that age is an essential factor to consider when assessing alcohol consumption, with younger personnel potentially facing higher risks of problem drinking behaviours.

Similar drinking patterns are also found among Military populations. A longitudinal study investigating the drinking patterns of the UK Armed Forces found that 16 to 25-year-olds had greater odds of heavy drinking and binge drinking compared with all other age groups (Fear et al., 2007). Fear et al. (2007) proposed that these differences are likely due to alcohol availability, the nature of social and recreational activities undertaken in young age groups, and the fact that young age groups are less likely to have children and hold other domestic responsibilities, making hazardous drinking more frequent or feasible. In a cohort of Australian military personnel, Waller et al. (2015) found that 20 to 29 year olds had greater odds of hazardous drinking compared to individuals over 30 years of age. In a study investigating health-related behaviours among US military personnel, Bray et al. (2003) documented that personnel aged 18 to 25 had a higher likelihood of binge drinking occasions (53.8%) than personnel who were between 26 and 55 (31.4%). Using data from the 2011 National Survey on Drug Use and Health, Liew (2016) found that frequent heavy drinking was most common among military personnel between the ages of 18 and 25. Liew (2016) argued that part of this association hinges on the possibility that ageing is associated with an intrinsic decline in vulnerability to anxiety and depression. Overall, these patterns of results suggested that age is an essential factor to consider when assessing alcohol consumption

among military personnel, with younger personnel potentially facing higher risks of problematic drinking behaviours.

Alcohol and Ethnicity.

Alcohol consumption and drinking patterns vary among ethnic groups globally, with research suggesting that minority ethnic groups face a heightened risk of hazardous drinking (Caetano et al., 1998; Chartier & Caetano, 2010; Mulia et al., 2017). In the US, for instance, alcohol use is most common among white Americans, while it is lowest among Asian Americans. However, heavy drinking (defined as ≥ 60 grams of pure ethanol on the same occasion for 5 or more of the past 30 days) appears to be most frequent among Native Americans, followed by White Americans and Hispanics (Chartier & Caetano, 2010). In Australia, ethnic minorities, such as Pasifika people, have been found to demonstrate lower levels of alcohol consumption compared to the broader population. However, despite this lower consumption, Pasifika minority groups as a whole exhibit the highest likelihood of harmful and hazardous drinking (Donato-Hunt et al., 2012). Similarly, in New Zealand, the trend mirrors international patterns, with ethnic minorities demonstrating a tendency to engage in more hazardous alcohol consumption than non-ethnic minorities (MOH, 2023). Specifically, reports show that Māori and Pacific minority groups are significantly more likely to engage in heavy episodic drinking compared to Europeans/Others (MOH, 2023). Together, these findings indicate lower alcohol consumption rates among ethnic minority groups but with a greater propensity for misuse.

Scholars have proposed several theories to explain alcohol use differences among ethnic groups. Most can be linked to factors ranging from the individual-level (i.e., genetics) to population-level (i.e., cultural and societal factors; Berkman et al., 2014; Link & Phelan, 1995). On a population level, research has documented that acculturation stressors (Lee et al.,

2013; Torres et al., 2022) and socio-economic disadvantages (Collins, 2016; Cook & Caetano, 2014) experienced by minority ethnic groups are associated with drinking as a coping mechanism. On an individual level, ethnic differences in alcohol consumption may also be influenced by genetic factors. For example, due to a gene mutation affecting the enzyme aldehyde dehydrogenase, people of Asian ethnicity experience unpleasant reactions to alcohol consumption (Wall & Ehlers, 1995). Thus, they tend to experience lower rates of AUD and higher rates of abstinence (Klatsky et al., 1983; Zhang et al., 2024). Overall, these results suggested that ethnicity is an essential factor to consider when assessing alcohol consumption among military personnel, as ethnic minority individuals may be at a higher risks of problematic alcohol consumption.

Alcohol and Relationship Status.

Research has demonstrated that marriage is strongly associated with positive health behaviours. Studies have consistently found that married adults drink less than their single or divorced counterparts (Kendler et al., 2016; Layne & Whitehead, 1985; Liang & Chikritzhs, 2011; Power et al., 1999; Temple et al., 1991). It has been hypothesised that marriage is associated with low risk drinking due to two significant effects: marriage selection and marriage protection. The marriage selection effect refers to the greater propensity of low risk drinkers to marry and stay married (Goldman, 1993). Alternatively, the marriage protection effect suggests that marriage enhances resources (i.e., social support, emotional support & income; Booth & Amato, 1991; Waldron et al., 1996) and ushers a change in social and recreational activities, decreasing alcohol use (Leonard & Rothbard, 1999).

Among Military samples, studies have shown that married personnel have lower problematic use of alcohol than those who are single. Bray et al. (2003) examined alcohol use among US military personnel. They found that unmarried personnel were more likely to drink

heavily (defined as having 70 grams or more drinks per typical occasion at least once a week) than personnel who were married. Similarly, Waller et al. (2015) investigated alcohol use among Australian military personnel, finding that married personnel were less likely than single persons to report binge drinking (defined as having 60 grams of pure alcohol on one occasion) and harmful drinking (defined as ≥ 16 AUDIT score). Waller et al. (2015) reasoned that these findings may result from different social and recreational activities married people take (i.e., marriage protective effect). Similarly, Iversen et al. (2007) investigated alcohol use in a large cohort of UK military personnel. They found that heavy drinkers (defined as ≥ 16 AUDIT score) were more likely to be single, with a change in marital status (to divorce, separation, or widowhood) resulting in the commencement of heavy drinking. Likewise, Thandi et al. (2015) investigated alcohol use among a sample of UK military personnel. They found that personnel who entered a new relationship between Time 1 and Time 2 reported a decrease in AUDIT scores, with the breakdown of a relationship associated with an increase in AUDIT scores. Thandi et al. (2015) proposed that these findings may be the result of low-risk drinkers entering intimate relationships and risky drinkers exiting relationships (i.e., marriage selection effect). Collectively these studies suggested that having a partner is a protective factor against alcohol misuse, contrasting with the heightened risk associated with being single.

Alcohol and Military Rank.

The hierarchal rank system is one of the defining characteristics of the military culture. An extensive body of literature has consistently shown that alcohol use differs depending on the rank they hold. For example, the enlisted ranks (i.e., lower ranking) consume alcohol less healthily than the highest-ranking officers (Ames & Cunradi, 2004; Brown et al., 2010; Waller et al., 2015). A study by Bray et al. (2003) conducted with US

military personnel revealed that enlisted service members were six times more likely than their highest-ranking commissioned officers to engage in heavy alcohol use, even after adjusting for age and marital status. Similarly, a cross-section survey of Australian military personnel found that enlisted personnel were more likely to report risky alcohol use than the highest ranked commissioned officers (Waller et al., 2015). These findings are also supported by Brown et al. (2010) and Stahre et al. (2009), who documented heavy alcohol use (defined as consuming ≥ 60 grams of pure alcohol per typical drinking occasion at least once a week) occurred more among enlisted personnel in comparison to commissioned officers. These results may be due to differences in occupation duties, marital status, self-efficacy, coping capacity and resources. Collectively, these findings suggested that lower-ranking military personnel may be at greater risk of alcohol misuse.

Alcohol and Military Service.

Scientific literature has documented a distinct pattern in alcohol consumption among military services (Fear et al., 2007; Schuler et al., 2022; Waller et al., 2015). Schuler et al. (2022) discovered notable disparities in alcohol use across different branches. The research revealed that rates of alcohol consumption were notably higher among individuals in the Army and Navy compared to those in the Air Force. Specifically, Schuler et al. (2022) observed that heavy episodic drinking was most prominent among Navy personnel at 35%, followed by the Army at 29%, with the Air Force reporting the lowest rate at 21%. Likewise, among a sample of Australian military personnel, Waller et al. (2015) documented that Navy and Army personnel were significantly more likely to report binge drinking at least once per month compared to Air Force personnel. Waller et al. (2015) argued that variations in alcohol consumption among military branches may arise from discrepancies in entry criteria, occupational duties, and, potentially, unique drinking customs within each group. Schuler et

al. (2022) proposed that differences in alcohol consumption across services may indicate self-medication in response to adverse emotions and potential trauma linked to military deployments or efforts to alleviate symptoms of mental or physical health issues. Together these findings suggested that military service is an important factor to consider when examining alcohol consumption among military personnel, as alcohol consumption varied significantly between the difference military services.

Alcohol and Deployment.

Military deployment refers to the armed forces' globally organised movement, position, and logistic support infrastructure. In New Zealand, defence force personnel may be deployed to support global headquarters, peacekeeping operations, and training missions (Ministry of Defence, 2021); these deployments vary in scale, duration, and purpose.

Many studies have documented that deployment and deployment-related experiences impact alcohol use (Besse et al., 2018; Browne et al., 2008; Campbell-Sills et al., 2018; Cerdá et al., 2014; Erbes et al., 2017; Hooper et al., 2008; Skipper et al., 2014). This influence has been observed preceding, during and following deployment (Campbell-Sills et al., 2018; Erbes et al., 2017; Harbertson et al., 2016). Among a sample of US National Guard soldiers, Erbes et al. (2017) documented higher rates of alcohol misuse before and after deployment, with a reduction during the deployment. Erbes et al. (2017) proposed that these findings may suggest a "social facilitation effect" (pp. 305) in which spouses and domestic partners drink more together and less when apart. In a longitudinal study of US Army soldiers, Campbell-Sills et al. (2018) found that personnel who engaged in binge drinking prior to deployment were more likely to develop a new onset of heavy drinking and AUD post-deployment.

Among a cohort of male UK Armed Forces personnel who were deployed to Iraq, Browne et al. (2008) found that personnel who had major problems at home during and following their deployment were more likely to be heavy drinkers post-deployment. This association remained after adjustment for socio-demographic factors, deployment experiences and psychological distress. These findings indicate that alcohol may be being used as a maladaptive coping mechanism for stress.

Studies examining drinking behaviours among military personnel have demonstrated that service members exposed to combat are more likely to misuse alcohol. This is often viewed as a coping strategy, where alcohol is used to manage the heightened stress and trauma that can result from combat exposure. In a longitudinal study by Hooper et al. (2008) exploring alcohol consumption among UK armed forces personnel, it was discovered that individuals who had been deployed showed a notable increase in alcohol use. This increase was especially prominent among individuals concerned about their survival during deployment or those who experienced hostility from civilians in their operational environment. Likewise, Jacobson et al. (2008) revealed that reserve and national guard members who were deployed with exposure to combat had a higher likelihood of alcohol misuse compared to their nondeployed counterparts. These findings are consistent with studies of veterans from previous conflicts, including the Gulf, Iraq and Afghanistan wars, which demonstrated that combat deployed veterans had a higher risk of alcohol misuse compared to those who were not deployed (Iowa, 1997; Kelsall et al., 2015). These findings suggested that the stress and trauma associated with deployment and combat situations may contribute to increased alcohol use as a coping mechanism. Together, these findings suggested that deployment is an essential factor to consider when assessing alcohol consumption among military personnel, as deployed personnel may be at a higher risk of alcohol misuse.

2.3 Risk Factors

Several factors are associated with increased risk of alcohol use. Among the most critical documented associations are psychological distress, trauma exposure, Post Traumatic Stress (PTS) symptoms and loneliness. These risk factors are now discussed.

Alcohol and Psychological Distress.

The term psychological distress is often defined as a state of emotional suffering denoted by symptoms of depression and anxiety (Drapeau et al., 2011). Psychological distress has been widely used as an indication of mental health. It has increasingly been implicated as a risk factor for alcohol misuse in a variety of populations, including the general population (Paljärvi et al., 2009), young adults (Alva, 1995; Lechner et al., 2020; Piumatti et al., 2019; Shin et al., 2015), adults (Park et al., 2020) and military populations (Calhoun et al., 2018; Fink et al., 2016; Marshall et al., 2012; Moody et al., 2020; Smith et al., 2014).

Several theories have been proposed to explain the pathway between distress and alcohol use. Researchers have primarily cited stress-dampening and tension-reduction theories, which posit that individuals experiencing high levels of distress may drink alcohol for its tension-reduction effects (Backer-Fulghum et al., 2012; Cappell & Herman, 1972; Dvorak et al., 2018). Military personnel exposed to events or conditions that produce distress may use alcohol to seek relief from distress symptoms.

In the military, there is considerable evidence for an association between psychological distress and alcohol use. Lee et al. (2020) investigated alcohol misuse within a cohort of US Veterans. They revealed a significant positive correlation between psychological distress and AUDIT scores, which suggests that higher levels of distress are associated with increased hazardous drinking behaviours. Richer et al. (2016) uncovered

distinct variations in drinking patterns and psychological distress among members of the Canadian Regular Force. Their findings revealed that individuals categorised as problem drinkers were significantly more likely to score high on psychological distress compared to individuals classified as infrequent drinkers. Similarly, in a cohort of regular UK armed forces personnel, Rona et al. (2010) found that personnel with alcohol dependence and greater AUDIT scores were more likely to exhibit psychological distress.

In a longitudinal study involving Australian Defence Force (ADF) personnel deployed in the Middle East Area of Operation, Kaine (2016) demonstrated that pre deployment psychological distress was predictive of post deployment alcohol frequency and severity. Specifically, psychological distress correlated with an increase in alcohol consumption and binge drinking highlighting the significant impact of mental wellbeing on alcohol related tendencies among deployed ADF personnel. Similarly, Thandi et al. (2015) observed in a longitudinal study among regular UK military personnel deployed to Iraq that the remission from psychological distress between Time 1 and Time 2 coincided with a reduction in AUDIT scores. Similarly, in a longitudinal study involving US military personnel, Smith et al. (2014) discovered that individuals experiencing psychological distress were notably more likely to engage in newly reported hazardous drinking. Collectively, these findings suggested that the experience of psychological distress is linked to heightened alcohol use within military populations.

Alcohol and Trauma.

Trauma exposures. A traumatic reaction is a psychological and physical response that arises from experiencing, witnessing, or confronting an event involving actual or threatened serious injury or death or a threat to the physical integrity of the self or others (APA, 2013). An event is deemed traumatic based on the capacity of the event to overwhelm an individual's

ability to cope. Exposures to trauma affect everyone differently. After experiencing trauma, individuals may report a variety of reactions; these can include feelings of “confusion, sadness, anxiety, agitation, numbness, dissociation, confusion, physical arousal, and blunted affect” (Centre for Substance Abuse Treatment, 2014, p 61). While some people will experience temporary reactions to traumatic events, others may experience prolonged and escalating reactions that evolve from acute distress to more severe mental health consequences, such as PTS (Centre for Substance Abuse Treatment, 2014).

Based on theories such as the "life change model" and the "vulnerability perspective," repeated exposure to stressors can disrupt homeostasis, exhaust coping resources and heighten vulnerability to future adverse experiences (Holmes & Masuda, 1973). As such, experiencing trauma often increases the risk of subsequently developing PTS and AUD.

Irrespective of PTS diagnosis and symptoms, studies have shown a strong connection between exposure to traumatic events and increased risk of alcohol misuse (Fillo et al., 2018; Maguen et al., 2019; Suris & Lind, 2008). This correlation arises from the tendency for individuals to turn to alcohol as a means of self-medication to alleviate or cope with mood disturbances linked with a stress response. In a cross-section study, Maguen et al. (2010) investigated mental health and experiences with killing among combat veterans. Findings indicated that engaging in killing during combat was linked to PTS symptoms but also independently linked to alcohol misuse on its own. Fillo et al. (2018) investigated deployment-related military sexual trauma (MST) and alcohol use among US male reserve and National Guard soldiers. They concluded that higher levels of MST (i.e., uninvited or unwanted or physical contact of a sexual nature) was associated with an increased likelihood of engaging in frequent heavy drinking and experiencing alcohol problems. Similarly, Suris and Lind (2008) investigated the association between MST experiences and mental and physical health outcomes. Suris and Lind (2008) found that MST was linked to a variety of

adverse psychological and physical health outcomes, including higher rates of alcohol misuse among personnel with MST compared with nontraumatised individuals.

In a longitudinal study, Kline et al. (2014) found a significant association between baseline trauma exposure and new onset alcohol dependence among US National Guard soldiers deployed to Iraq. Specifically, soldiers who reported higher levels of trauma exposure at baseline were more likely to develop alcohol dependence following deployment compared to those with lower levels of trauma exposure. Similarly, in a retrospective longitudinal study on UK military personnel, Hooper et al. (2008) found that alcohol consumption significantly increased following traumatic experiences on deployment. Notably, even when those with PTS were removed from the analysis, the findings remained unchanged, suggesting that this association was not PTS mediated. In a longitudinal study, Straus et al. (2020) found that new-onset AUD among US military veterans was linked to baseline trauma exposures. Together, these patterns suggested that trauma exposure is an important factor to consider when assessing alcohol consumption among military personnel, as individuals with higher levels of trauma exposures may be at an increased risk for alcohol misuse.

Post Traumatic Stress. PTS is an anxiety disorder that can arise from experiencing, witnessing, or confronting a traumatic event (APA, 2013). PTS is diagnosed based on the presence of symptoms found across four categories; these include re-experiencing the traumatic event, avoidance of reminders of the trauma, alterations in memories or mood associated with the trauma, and alterations in physiological arousal and reactivity (APA, 2013). Research has demonstrated that exposure to a traumatic event increases the likelihood of alcohol misuse. However, PTS symptoms and diagnosis have been more strongly linked to

alcohol misuse than trauma exposure alone (Carter et al., 2011; Head et al., 2016; Katherine Mills et al., 2006; McFarlane, 1998; Sullivan et al., 2016)

The co-occurrence of PTS and problematic alcohol use is common (Jacobson et al., 2008; Morice et al., 2022; Thomas et al., 2010). PTS can contribute to the development of AUD, as individuals may use alcohol to numb traumatic memories or cope with PTS symptoms. Conversely, AUD can also increase the risk of developing PTS.

To date, research broadly suggested that PTS plays a causal role in the development of AUD, with the self-mediation hypothesis commonly cited to support this relationship (Hawn et al., 2020; Khantzian, 1997). According to this hypothesis, alcohol is used as a coping mechanism, where individuals use the substance to treat the underlying distress symptoms. There is considerable support for the self-medication hypothesis among military populations (Besse et al., 2018; Kehle et al., 2012; London et al., 2020; Seager et al., 2024). In a longitudinal study, Thandi et al. (2015) investigated alcohol misuse among a sample of UK military personnel, they found that experiencing symptoms of probable PTS was associated with an increase in AUDIT scores. Brown et al. (2012) conducted a study involving post-deployment US active duty and reserve military personnel, discovering a correlation between PTS scores and alcohol consumption. The study revealed that individuals with lower PTS scores were less inclined to misuse alcohol, contrasting with those with higher PTS scores. This indicated that individuals with more pronounced PTS symptoms are at a heightened risk of alcohol misuse (Brown et al., 2012). These studies provide support for the relevance of self-medication by demonstrating how experiencing PTS symptoms leads to increased alcohol use.

In another study, Jacobson et al. (2008) investigated alcohol use and alcohol-related problems before and after military combat deployment. Findings indicated that baseline symptoms of PTS predicted new-onset alcohol-related problems in active duty and

reserve/guard personnel at follow-up. Likewise, Kline et al. (2014) observed among a cohort of US Reserve/National Guard soldiers deployed to Iraq that baseline PTS symptoms were significantly associated with an increased risk of screening positive for new-onset AUD. Norman et al. (2018) examined changes in alcohol use within a cohort of US veterans from their last year of military service to their first year post-separation. Findings indicated that PTS symptoms were significantly associated with alcohol misuse at follow-up. These findings collectively suggested that the experience of PTS symptoms or diagnosis increased the risk of alcohol misuse among military personnel.

Alcohol and Loneliness.

Loneliness is an adverse feeling that occurs when an individual's desired level of social interaction does not meet their desired standards (Perlman & Peplau, 1984). Subsequently, feeling lonely can have a significant impact on cognitive, emotional, behavioural, and physical health (Cacioppo et al., 2006; Hawkley & Cacioppo, 2010). Although loneliness is a recognised problem for the general population, the military lifestyle presents unique challenges that may heighten vulnerability to loneliness (Stapleton, 2018). Despite this heightened vulnerability, the relationship between loneliness and alcohol use within this population has been largely overlooked, with emerging research predominantly concentrated on veteran samples and cross-sectional.

Conflicting evidence regarding the relationship between loneliness and alcohol consumption has been documented across various populations. Some studies have involved college students (Chen & Feeley, 2015; McBroom et al., 2008), and adolescents (Beutel et al., 2017), and have found a negative relationship between loneliness and alcohol use. However, other studies among college students (Berberian et al., 2022; Knox et al., 2007; Sæther et al., 2019), adults (Arpin et al., 2015; Gutkind et al., 2022; Wakabayashi et al.,

2022) and veteran populations (Fitzke et al., 2021; Kelly et al., 2022; Williamson et al., 2023) have documented a positive relationship between loneliness and alcohol consumption.

McBroom et al. (2008) investigated the relationship between college transition, loneliness, and alcohol consumption among a cohort of US College students. Their McBroom et al. (2008) finding revealed that as feelings of loneliness decreased, alcohol consumption tended to increase. Relatedly, Chen and Feeley (2015) found a negative correlation between loneliness and binge drinking among College students. McBroom et al. (2008) and Chen and Feeley (2015) proposed that these patterns may stem from the social dynamics of alcohol consumption in college settings. Specifically, lonely students may be less inclined to attend social gatherings or events where alcohol serves as a social facilitator, resulting in lower alcohol consumption among those experiencing loneliness.

Research has shown that loneliness is a risk factor for health compromising behaviour, including a greater propensity to misuse alcohol (Hawkley & Cacioppo, 2010). Experiencing loneliness can disrupt a person's ability to self-regulate (Hawkley & Cacioppo, 2010). As a result, individuals who feel lonely might use alcohol as a coping mechanism (Hawkley & Cacioppo, 2010). The Motivational Model of Alcohol Use proposes that people often consume alcohol to alleviate negative emotions (i.e., loneliness) and to enhance positive emotional experiences (Cooper, 1994). Consequently, alcohol can result in further withdrawal and increased feelings of loneliness (Arpin et al., 2015).

In a nationally presentative sample of adults from Japan notable variations in mean loneliness scores were observed across various drinking categories. Specifically, individuals classified as high-risk drinkers or those with probable alcohol dependence exhibited higher average loneliness scores compared to those in lower-risk categories (Wakabayashi et al., 2022). Similarly, a study examining the links between loneliness and daily alcohol consumption during COVID-19 discovered that individuals who show daily increases in

loneliness, who were not classed with severe loneliness at intake, were at heightened risk of alcohol use (Bragard et al., 2022).

In veteran populations, research suggests that alcohol misuse is positively associated with loneliness. Williamson et al. (2023) explored loneliness and alcohol misuse among UK veterans, finding that lonely veterans had a higher incidence of alcohol misuse compared to their non-lonely counterparts. In a further study, Fitzke et al. (2021) found among US Veterans that greater loneliness correlated with heavier drinking, particularly among those with pre-existing depression. These findings suggested that loneliness is positively associated with alcohol misuse, with lonely veterans showing higher rates of problem drinking behaviours. Additional research into how loneliness affects alcohol use among active duty personnel is essential to guide the development of effective interventions and prevention measures.

2.4 Protective Factors

Several factors are associated with reduced risk of alcohol misuse in the military. The most documented associations are resilience, social support, leadership, and unit cohesion. These are now discussed.

Resilience.

Resilience is a quality that allows some people to suffer adversities and bounce back. Resilience is characterised by the ability to maintain a relatively stable and healthy level of psychological functioning in the face of adverse events (Bonanno, 2004). Early research conceptualised resilience as a characteristic (Anthony, 1987) or behaviour trait (Wagnild & Young, 1993). However, contemporary perspectives view resilience as a dynamic, multidimensional construct in which individuals utilise both personal characteristics and

resources in their environment to navigate challenges successfully (Gartland et al., 2011). Accordingly, individuals with higher levels of resilience are better equipped to confront stressors that exceed their immediate coping capabilities (Green et al., 2014; Morgan et al., 2018; Tugade & Fredrickson, 2004). Notably, this capacity can evolve across an individual's lifespan and can be strengthened by protective factors inherent to both the individual and their surrounding environment (Haase, 2004).

Resilience is essential in protecting against alcohol misuse (Eisen et al., 2014; Green et al., 2014; Green et al., 2010; Ward et al., 2023). Critical components of resilience, such as problem-solving, stress tolerance, the ability to focus under pressure, persistence, self-efficacy, and emotional regulation, provide significant protective benefits (Green et al., 2014). As such, resilient individuals tend to employ adaptive coping mechanisms to effectively navigate challenges, whereas individuals with low resilience may turn to alcohol as a means of coping with stress. For example, in a study involving US veterans, Green et al. (2010) found that greater resilience was associated with reduced alcohol misuse even when controlling for combat-related PTS. Similarly, in a longitudinal study involving US combat-exposed veterans, Green et al. (2014) found that personnel with low baseline resilience were more prone to alcohol misuse at follow-up compared to those with high resilience. In this study, the researchers controlled for trauma-related variables (e.g., combat exposure, probable PTS) and history of alcohol misuse (Green et al., 2014). Furthermore, Ward et al. (2023) examined the impact of perceived resilience on SUD (Substance Use Disorder) in a sample of US Army active duty and reserve soldiers and found that perceived resilience reduced soldiers' risk of SUD (Ward et al., 2023). Together, these studies suggested that greater resilience is associated with a reduced risk of alcohol misuse.

Resilience has also been found to have an essential moderating role in the relationship between stress and alcohol misuse (Cusack et al., 2023; Morgan et al., 2018; Tudehope et al.,

2022; van Gils et al., 2022; Wingo et al., 2014). For example, Morgan et al. (2018) examined resilience and alcohol misuse among US Army Soldiers. They found that low resilience was associated with increased vulnerability to alcohol misuse as stress levels increased. On the other hand, individuals with greater resilience did not follow the same trajectory; their resilience appeared to buffer the adverse effects of stress on alcohol-related outcomes. Morgan et al. (2018) conceptualised resilience as an individual's ability to bounce back from stress, measured using the Connor-Davidson Resilience Scale (CD-RISC). Likewise, Tudehope et al. (2022) examined the effects of resilience using the CD-RISC scale on the association between stress and changes in alcohol consumption among Australian adults. Tudehope et al. (2022) found that greater resilience buffered against increases in alcohol consumption associated with stress. Moreover, a recent scoping review, which analysed 14 studies, found that individuals with low psychological resilience had a heightened risk of alcohol misuse as their stress levels increased (Cusack et al., 2023). Collectively, these findings suggested that individuals with high resilient are less likely to misuse alcohol, compared to individuals with lower levels of resilience.

Social Support.

Social support is generally defined as a network of individuals, including family, friends, neighbours, co-workers, and community members, who can be relied upon in times of need (Ozbay et al., 2007). A wealth of research underscores the beneficial impact of social support on physical and psychological well-being (Bailey et al., 1994; Cohen & Syme, 1985; Eisen et al., 2014; Skomorovsky, 2014). This impact is observed both directly and indirectly through stress-buffering effects. The buffering theory posits that social support protects against adverse psychological outcomes during stress (Cohen & Wills, 1985). In contrast, the direct effect model suggests that social support impacts health by reducing negative

indicators of wellbeing and promoting positive ones, irrespective of adversity (Cohen & Wills, 1985). While initially framed as contrasting theoretical perspectives, subsequent research has demonstrated that social support benefits health and wellbeing through both mechanisms (Bavik et al., 2020).

A substantial body of research suggests that social support is protective against alcohol misuse (Dawson et al., 2008; Dixit et al., 2015; Fuehrlein et al., 2018; Harvey et al., 2011; Kirchner et al., 2007; Lechner et al., 2020; McDaniel et al., 2022; McDonald, 2018; Rapier et al., 2019; Trautmann et al., 2015; Waller et al., 2015). For example, Fuehrlein et al. (2018) found that greater social support was associated with a reduction in excessive drinking among US veterans, reinforcing the idea that social support is negatively associated with alcohol use. In addition, Trautmann et al. (2015), examined post-deployment drinking habits of UK soldiers, revealing that greater levels of social support were associated with reduced alcohol consumption. Dixit et al. (2015) also found that Indian military personnel with AUD who maintained abstinence had a greater perception of social support compared to individuals who experienced a relapse. Together, these studies emphasise that greater social support is associated with healthier drinking patterns, reduced excessive consumption, and increased likelihood of abstinence. Conversely, contrasting research has indicated that social support is associated with an increased risk of alcohol misuse. Blair et al., (2020) explored factors related to hazardous alcohol consumption among a sample of males currently serving in the US military. The study found that men who perceived more than half of their social network as supportive had nearly two times higher odds of hazardous drinking compared with those with less supportive networks (Blair et al., 2020). Blair et al. (2020) argued that military drinking norms and attitudes shape these findings, for example, the use of alcohol to reduce stress or for social bonding. Together, these findings suggested that, in some contexts, social support can contribute to alcohol misuse.

Social support has also been found to have an essential moderating role in the relationship between stress and alcohol misuse (Cohen, 2004; Griffith & West, 2010; Kelley et al., 2017). Kelley et al. (2017) investigated stress, depressive symptoms, and problematic alcohol use among US Navy personnel anticipating deployment. The findings indicated that social support played a protective role by mitigating the impact of stress and depressive symptoms on problematic alcohol use. Specifically, as levels of social support increased, the connection between stress and alcohol misuse through depressive symptoms diminished. Griffith and West (2010) reinforce this theory with their longitudinal study of the US Army National Guard returning from deployment in Iraq and Afghanistan. They discovered that social support was linked to a reduction in risk behaviours, including daily alcohol and illicit substance use. Together, these findings implied that strong social support serves as a safeguard, mitigating the impacts of mental illnesses or stressors on alcohol misuse.

Unit Cohesion. Unit cohesion is a type of social support characterised by the strength of bonds among individuals within a unit or group (Kanesarajah et al., 2016). Within the military, units often share a deep-rooted culture that binds them together. This shared culture fosters mutual understanding and familiarity with common challenges and experiences, such as separation from loved ones, risk of injury or death, and frequent relocations. These parallels between the support providers and recipients can be pivotal in maximising the effectiveness of social support.

A large body of literature has shown that high levels of unit cohesion can have a positive impact on an individual's ability to cope with military stressors and have a beneficial influence on mental health outcomes (Armistead-Jehle et al., 2011; Breslau et al., 2016; Dickstein et al., 2010; Kanesarajah et al., 2016). To date, limited research has explored the association between unit cohesion and alcohol use in military populations.

Evidence suggests that higher levels of unit cohesion are a protective factor against alcohol misuse (Kanesarajah et al., 2016; Ward et al., 2023), potentially by reducing negative wellbeing indicators and promoting positive ones. A study investigating the relationship between unit cohesion and alcohol use in a sample of Australian military personnel discovered that personnel with low levels of unit cohesion were more likely to experience alcohol misuse on deployment compared to personnel with higher levels of unit cohesion (Kanesarajah et al., 2016). Further, Ward et al. (2023) examined unit cohesion's impact on SUD in a cohort of US Army active duty and reserve soldiers and found that unit cohesion reduced soldiers' risk of SUD (Ward et al., 2023). These findings indicated that unit cohesion served as a protective factor against alcohol misuse.

Conversely, research has also shown that unit cohesion is a risk factor for alcohol misuse. For instance, Browne et al. (2008) investigated heavy drinking among male UK Armed Forces personnel deployed to Iraq and found that heavy drinking was associated with experiencing strong in-theatre unit cohesion. Similarly, Breslau (2016) investigated unit cohesion and alcohol misuse among US Marines before and after deployment to Iraq or Afghanistan. The findings revealed that higher levels of unit cohesion were linked to an increased likelihood of alcohol misuse. Browne et al. (2008) and Breslau (2016) suggested that this finding may stem from drinking being perceived as an integral aspect of bonding in the military. Additionally, Breslau (2016) argued that drinking patterns established on deployment likely persist after returning home (Breslau, 2016). Overall, these findings suggested that greater unit cohesion may contribute to alcohol misuse.

Leadership perception. Leadership is a process by which individuals influence people to accomplish a common goal (Yukl, 2006). Leadership plays a crucial role in day-to-day work dynamics and has been associated with employees' mental health, both positively and negatively. Favourable mental health outcomes among employees are correlated with

supportive leadership styles (Finne et al., 2014), while detrimental effects are often associated with more destructive forms of leadership (Montano et al., 2023; Schmidt et al., 2018). Supportive leaders have been found to enhance employee well-being (Robertson et al., 2015; Rooney et al., 2009) and alleviate psychological distress (Khalid et al., 2012).

There is a growing body of research that has suggested that leadership is negatively associated with alcohol consumption (Browne et al., 2008; Woodruff et al., 2018). Browne et al. (2008) explored how experiences in Iraq affected alcohol use among UK military personnel and found that inadequate leadership was significantly associated with heavy drinking. Moreover, Woodruff et al. (2018) investigated factors associated with binge drinking among a sample of the US Marine Corps. They found that personnel who felt their leader discouraged alcohol use were less likely to binge drink. These findings collectively suggested that leadership plays a significant role in shaping alcohol-related behaviours among personnel. Together, these findings underscored the significance of social support sources, including unit cohesion and leadership, as factors in mitigating alcohol misuse.

2.5 Rationale

Alcohol misuse in the NZDF population is an area of research that needs to receive more attention. Information on the risk and protective factors of alcohol misuse is essential to help detection and prevention efforts. This information could guide policy and practice in the NZDF and help create environments that support reductions in detrimental drinking behaviours. Thus, the current study sought to determine the risk and protective factors of alcohol misuse in a sample of New Zealand military personnel.

This goal was achieved by utilising data collected from Health and Wellbeing surveys undertaken by the NZDF. Data from these surveys were used in the current study to explore alcohol misuse among the following variables: distress, loneliness, trauma, deployment,

resilience, social support, leadership, unit cohesion, and demographic characteristics. The hypotheses and aims posed for this study are discussed below.

Research Questions and Hypothesis

This longitudinal study aimed to 1) identify which NZ military personnel were most vulnerable to the development of alcohol misuse and 2) identify the risk and protective factors of Alcohol Misuse for NZ military personnel.

Who is most vulnerable to alcohol misuse?

Certain socio-demographic variables are associated with an increased risk of alcohol misuse. Among the most documented associations in military personnel are gender, age, ethnicity, marital status, service, rank, and deployment. Despite the absence of uniformity in the literature, several factors for the development of alcohol misuse were considered, and hypotheses were formed. These risk factors have been classified into demographic factors (Hypotheses 1, parts a-d) or military factors (Hypotheses 1, parts e-g).

- Hypothesis 1a: Male personnel will be significantly more likely to misuse alcohol than Female personnel.
- Hypothesis 1b: Younger personnel, particularly those aged 17-24 and 25-29, will be significantly more likely to misuse alcohol compared to older personnel.
- Hypothesis 1c: Single personnel will be significantly more likely to misuse alcohol misuse than individuals in a relationship (married/partnered).
- Hypothesis 1d: Māori and Pacific Islanders will be significantly more likely to misuse alcohol than NZ European, Asian, Other European and Other ethnic groups. While Asians will be significantly less likely to misuse alcohol compared to NZ Māori and Pacific Islanders, Europeans, Asians, Other Europeans, and Other ethnic groups.

- Hypothesis 1e: Junior NCOs will be significantly more likely to misuse alcohol than highest-ranked personnel.
- Hypothesis 1g: Deployed personnel will be significantly more likely to misuse alcohol than personnel who do not deploy.

Hypothesis 2: Trauma, PTS, psychological distress, and loneliness are positively associated with alcohol misuse.

Research indicates that an individual's resources and coping ability become strained after a stressful or traumatic event. Studies have demonstrated that military personnel often misuse alcohol as a coping mechanism or for self-medication. According to the self-medication hypothesis and tension reduction hypothesis, individuals resort to alcohol as a means of alleviating stressors or coping with stressors. Therefore, hypothesis 2a-2d and 3a-3d were:

- Hypothesis 2a: Individuals with alcohol misuse will report significantly higher loneliness scores in comparison to low-risk drinkers.
- Hypothesis 2b: Individuals with alcohol misuse will have experienced significantly more trauma in comparison to low-risk drinkers.
- Hypothesis 2c: Individuals who misuse alcohol will score significantly higher on the PTS scale in comparison to low-risk drinkers.
- Hypothesis 2d: Individuals who misuse alcohol will score significantly higher on the psychological distress scale in comparison to low-risk drinkers.
- Hypothesis 3a: Theorised that loneliness reported at time 1 would predict alcohol misuse longitudinally at time 2.

- Hypothesis 3b: Theorised that Trauma exposures at time 1 would predict alcohol misuse at time 2.
- Hypothesis 3c: Theorised that PTS symptoms at time 1 would predict alcohol misuse longitudinally at time 2.
- Hypothesis 3d: theorised that psychological distress symptoms at time 1 would predict alcohol misuse longitudinally at time 2.

Hypothesis 4: Social support, resilience, leadership perception and unit cohesion are negatively correlated with alcohol misuse.

After experiencing stressful or traumatic events, one's ability to manage stress is challenged. Some people may turn to alcohol consumption as a means of alleviating their distress. How an event affects an individual's behaviours can depend on various factors, including their available support networks. According to the stress-buffering effect, social support protects against harmful drinking behaviour by promoting positive coping responses to stress (Cohen, 2004). Moreover, individuals with higher levels of psychological resilience are better equipped to confront stressors that exceed their immediate coping capabilities (Green et al., 2014; Morgan et al., 2018; Tugade & Fredrickson, 2004). Individuals with greater resilience and social support may be more adept at handling stressors, reducing their likelihood of alcohol misuse through the use of more adaptive coping strategies. Therefore, hypothesis 4a-4d and 5a-5d posit the following:

- Hypothesis 4a: Personnel with low risk drinking habits will score significantly higher on the resilience scale compared to personnel with alcohol misuse.
- Hypothesis 4b: Personnel with low-risk drinking habits will score significantly higher on the leadership perception scale than personnel with alcohol misuse.

- Hypothesis 4c: Personnel with low-risk drinking habits will score significantly higher on the unit cohesion scale than personnel with alcohol misuse.
- Hypothesis 4d: Personnel with low-risk drinking habits will score significantly higher on the social support scale than personnel with alcohol misuse.
- Hypothesis 5a: Social support will moderate hypotheses 2 and 3.
- Hypothesis 5b: Leadership perception will moderate hypotheses 2 and 3.
- Hypothesis 5c: Unit cohesion will moderate hypotheses 2 and 3.
- Hypothesis 5d: Resilience will moderate hypotheses 2 and 3.

What is the trend in alcohol use over time?

- Hypothesis 6: Alcohol consumption will significantly decrease from Time 1 to Time 2.

CHAPTER THREE

3. Methods

Chapter Three presents the method used to investigate alcohol misuse within the NZDF population. This chapter outlines the research design, details the sample collection process, outlines the measures employed, and explains the procedure framework utilised in this project.

3.1 Research Design

This study employed a quantitative, longitudinal design to investigate both protective and risk factors associated with alcohol misuse among a sample of NZDF personnel over time. Participants were surveyed at two separate intervals, spaced three years apart. The NZDF collected the data in 2016 (Time 1) and 2019 (Time 2).

3.2 Participants

This study represents a subset of a broader investigation into health and well-being conducted by the NZDF. All NZDF employees were invited to participate in the online survey, with data collected at two distinct time points, three years apart. The initial survey occurred in 2016 (Time 1), and the second time point (Time 2) was in 2019. New participants joining the study after 2016 were excluded from the analysis. Demographic characteristics are presented in Table 1. As expected, attrition occurred, with many participants completing the first questionnaire but not the second (N=3402). At Time 1, there was a final sample of 3769. At Time 2, 3 years later, there was a final sample of 374 participants. Note that this reduction at Time 2 was partly due to this study's anonymous nature, which required

participants to use their anonymous research code to utilise their responses longitudinally, but many did not.

3.4 Demographic Characteristics

Descriptive statistics for the final sample of 374 participants are summarised in Table 1. Most participants were male, constituting 75% of the sample (N = 280). Age distribution ranged from 17 to 60 years, with the most significant proportions falling within the 30-39 age group (26%) and the 40-49 age group (20%). Participants represented diverse ethnic backgrounds, with the majority identifying as New Zealand European (75%, N = 279). Most of the sample, comprising 72% of respondents (N = 268), were married or in a partnership. Regarding military rank, the sample consisted of 22% junior non-commissioned officers (Junior NCO), 53% senior non-commissioned officers (Senior NCO), 11% junior officers (Junior OF), 8% mid officers (Mid OF), 5% senior officers (Senior OF), and 1%executive officers (EX OF). Participants were more likely to be serving in the Army (66%, N = 383) than serving in the Navy (16%, N = 94) or Air Force (18%, N = 104). Most participants, 54% (N = 313), had deployment history.

Table 1.
Demographic Data of Participants in the Study

		Time 1		Time 2	
		N	%	*N*	%
Gender					
	Female	1020	27	280	75
	Male	2749	73	94	25
Age					
	<24 years	615	16	45	12
	25-29 years	535	14	51	13
	30-39 years	823	22	96	26
	40-49 years	903	24	75	20
	50-59 years	700	19	74	20
	60+	200	5	33	9
Ethnicity					
	New Zealand European/Pakeha	2769	73	279	75
	Māori	452	12	41	11
	Pacific Island	74	2	4	1
	Asian	41	1	7	2
	Other European	197	5	17	4
	Other	243	7	26	7
Relationship status					
	Coupled	2652	70	268	72
	Single	996	27	106	28
Rank					
	Junior NCO	985	26	82	22
	Senior NCO	1993	53	196	53
	Junior Officers	383	10	41	11
	Mid ranked Officers	268	7	31	8
	Senior Officers	108	3	20	5
	Executive Officers	39	1	4	1
Service					
	Navy	619	16	71	19
	Army	2278	77	232	62
	Airforce	879	7	71	19
Deployment status					
	Deployed	1689	45	196	52
	Non-deployed	2087	55	179	48
Total Sample		3776		374	

3.5 Measures

Demographics.

Several demographic questions were asked, including gender, age, service, ethnicity, marital status, rank, and service questions. Gender was determined by asking "What is your gender?" with response options being "Male", "Female", or "Other". Age was measured with the question, "What is your age?" with seven selection options: (1) "Less than 20 years", (2) "20-24 years", (3) "25-29 years", (4) "30-39 years", (5) 40-49 years", (6) "50-59 years", and (7) "60 years and over". Option 1 and 2 were collapsed into one age group (under 20-24).

Ethnicity was measured with the options "NZ European", "Māori", "Asian", "Other European", "Pacific Islander", and "Other". This variable was collapsed to ethnic minority (i.e., Māori, Asian, other European, Pacific Islander, and other) and ethnic majority (i.e., NZ European)

Marital status was measured with the options "Married or de-facto", "Married or de-facto with dependents", "Single, never married, "Single (divorced, widowed, separated), "Single (including divorced, widowed, separated) with dependents", and Other (please specify). This variable was collapsed to coupled (i.e., married/partnered) or single (i.e., unmarried/unpartnered) Those who respond "Not applicable" will be excluded.

Rank was measured using the question "What is your current rank?" with seven response options: (1) "Pte-Cpl/Ord–LH/LAC-Cpl" (Junior NCO), (2) "Sgt-WO/PO–WO/Sgt-WO" (Senior NCO), (3) "Ocdt-Capt/Mid–LT/PO-FLTLT" (Junior Officer), (4) "Maj/LTCDR/Sqnldr" (Mid ranked Officer), (5) "LtCol/CDR/WG CDR" (Senior and Officers), (6) "Col & above" (Executive Officers) and (7) Not applicable. These groups were formed based on leadership level equivalence across the three services, with group (1) Junior NCO being the lowest rank and group (6) Col and above being the most superior ranks within the NZDF. Those who respond "not applicable" will be excluded from rank data analysis.

Service was answered by asking the question, “If you are military, what service do you belong to?” with the response options being “Navy”, “Army”, or “Airforce”. Measures for deployment history were collected using the question, “Have you ever been deployed on either an operational mission that would be qualifying service for the Operational Service Medal or other overseas activities (excluding courses or permanent established postings)?” with “yes” or “no” response options.

Brief-Resilience Scale (BRS; Smith et al., 2008).

The BRS is a 6-item scale that measures one’s level of resilience (Smith et al., 2008). Individuals rate the degree to which they agree with a series of statements (e.g., “I tend to bounce back quickly after hard times” or “It does not take me long to recover from a stressful event”) and responses on a 5-point scale (i.e., 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 – agree; 5 = strongly agree). Items are reverse coded as appropriate, summed to give a total score (range 6 to 30), then divided by the total number of questions answered (8). A score of 1.0 – 2.9 represents low resilience, 3.0 – 4.3 normal and 4.31 – 5.0 high resilience. For the complete list of items in the BRS, see Smith et al., 2008. Cronbach’s alpha reliability coefficient for this study was .84 at both time points, indicating good internal consistency.

Social Support

In the 2016 survey, social support was assessed using the 4-item Social Support Scale (SSS): “There is a special person who is around when I am in need”, “I can count on my friends when things go wrong”, “I can talk about my problems with my family”, “I can talk about my problems with my friends”. Participants responded on a five-point Likert scale: (1) “Strongly disagree”, (2) “Somewhat disagree”, (3) “Neither agree nor disagree”, (4) “Somewhat agree” and (5) “Strongly agree”. Items were summed to give a total score (range

4-20), then divided by the total number of questions. Cronbach's alpha reliability coefficient at Time 1 for this study was .82, indicating good internal consistency.

In the 2019 survey, a single item was used to measure social support: "If I have a problem, there is someone I trust that I can talk to about it". Participants responded on a five-point Likert scale: (1) "Strongly disagree", (2) "Somewhat disagree", (3) "Neither agree nor disagree", (4) "Somewhat agree" and (5) "Strongly agree". Cronbach's alpha reliability coefficient was not applicable due to the single-item nature of the measure (Gliem & Gliem, 2003). Note that this measure of Social Support was developed for internal use within the NZDF.

Perceptions of Leadership.

Four items were used to form a measure of perception of leadership. Participants were asked to rate the items "My direct manager/leader treats everyone fairly", "My direct manager/leader is approachable", "My direct manager/leader treats me with dignity and respect", "My direct manager/leader refrains from improper remarks or comments", using a five-point Likert-type scale of (1) "Strongly disagree", (2) "Somewhat disagree", (3) "Neither agree nor disagree", (4) "Somewhat agree", and (5) "Strongly agree". Cronbach's alpha reliability coefficients from this study were .92 at Time 1 and .90 at Time 2, indicating good internal consistency. This measure of Unit Cohesion was developed for internal utilisation within the NZDF.

Unit Cohesion.

Four items were used to create a measure of Unit Cohesion. Participants were asked to rate the statements "If I have a problem at work I can talk to my boss about it", "My colleagues treat me with dignity and respect", "Members of my team can bring up problems

and discuss tough issues", and "From a safety perspective, I feel supported/enabled to do my job" using a 5-point Likert-type scale of (1) "Strongly disagree", (2) "Somewhat disagree", (3) "Neither agree nor disagree", (4) "Somewhat agree", and (5) "Strongly agree". Cronbach's alpha reliability coefficients from this study were .80 at Time 1 and .79 at Time 2, indicating good internal consistency. This measure of Unit Cohesion was developed for internal use within the NZDF.

Loneliness.

A single item was used to create a measure of loneliness. Participants were asked to rate the statement "loneliness/isolation had been of concern to them in the past four weeks"? Using a five-point Likert scale of (1) "not at all", (2) "A little", (3) "Somewhat", (4) "Quite a lot", and (5) "A great degree". This measure of loneliness was developed for internal use within the NZDF. Cronbach's alpha reliability coefficient was not applicable due to the single-item nature of the measure (Gliem & Gliem, 2003).

Kessler Psychological Distress Scale (K10; Kessler et al., 2002).

The K10 is a 10-item scale designed to assess psychological distress based on symptoms of anxiety and depression. Participants are asked to indicate how frequently they have had various systems in the past four weeks on a five-point Likert scale (i.e., from 1 "none of the time" to "5 all of the time"). Items measure experiences of anxiety (e.g., "So nervous that nothing could calm you down") and depression (e.g., "So sad that nothing could cheer you up"). Total scores range from 10 to 50; higher scores signify more significant psychological distress (Dadfar et al., 2016). Scores under 20 are indicative of being well. The K10 has previously exhibited excellent psychometric properties. In Canadian military personnel (N=6,700, Cronbach's alpha was 0.89, depicting good internal consistency (Sampasa-Kanyinga et al., 2018). Cronbach's alpha reliability coefficient for this study was

.90 at Time 1 and .85 at Time 2, indicating good internal consistency. For the complete list of items in the K10, see Kessler et., (2002).

Post traumatic Stress symptoms scale (PCL-C, PCL-5; Weathers et al., 1993; Weathers et al., 2013)

The PCL-C is a 17-item self-report measure developed to assess PTS symptomatology. The 17 items correspond to the symptom criteria for PTS. Respondents were instructed to rate each item on a five-point Likert scale ranging from 1 (Not at all) to 5 (Extremely). The responses are summed to give a score from 17 to 85. Great Cronbach's alpha reliability coefficients have been reported within military populations (a = .97; Weathers et al., 1993). Cronbach's alpha reliability coefficient for this study at Time 1 was .94, indicating great internal consistency. For the complete list of items in the PCL-C, see (Weathers et al., 1993).

In 2019, the PCL-5 was replaced by the PCL_C. The PCL-5 is a 20-item self - report measure developed to assess 20 PTS symptoms. Participants were instructed to rate the past month's symptoms in response to stressful life events on a five-point Likert scale ranging from 1 (Not at all) to 5 (Extremely). The responses are summed to give a score from 20 to 100. For the complete list of items in the PCL-5, see Weathers et al. (2013). Great Cronbach's alpha reliability coefficients have been observed in military populations (a = .75 at baseline and .95 at follow up; Wortmann et al., 2016). Cronbach's alpha reliability coefficient for this study at Time 2 was .93, indicating good internal consistency.

Trauma Exposures.

A six item checklist was used to assess exposure to trauma. This checklist was developed for internal utilisation within the NZDF. Participants were asked to respond to each item with a "yes" or "no" response to indicate whether they had experienced the event.

Items covered life threats, extreme stress, unexpected death of close others, physical assault, indecent assault and or sexual violation. The responses are summed to give a score from 0 to 6, with exposure to an event scored as positive if a respondent says 'yes' to an item. Cronbach's alpha reliability coefficient was not applicable as the measure was a checklist that assesses the presence or absence of specific exposure/s rather than a continuous construct. As a result, Cronbach's alpha would not be meaningful in this context.

Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001)

The AUDIT is a 10 item screening tool developed to identify people with hazardous and harmful patterns of alcohol consumption. Items measure the frequency of drinking (e.g., "How often do you have six or more standard drinks on one occasion?"), alcohol-related problems (e.g., "Have you or someone else been injured because of your drinking?"), and alcohol dependence (e.g., "Have you found that you were not able to stop drinking once you started?"). The responses are summed to give a score from 0 to 40; higher scores represent more significant risk. People who score 0 are abstainers, while those who score between 0 and 7 indicate low risk consumption. A score between 8 and 15 presents (medium-risk) people who drink in excess of guidelines for low risk consumption (hazardous drinking; more than 10 grams of alcohol a day). A score of ≥16 on the AUDIT indicates a drinking pattern that is likely damaging to the health and wellbeing of the user (i.e., high risk). Good Cronbach's alpha reliability coefficients have been observed in military populations (a = .80; Watterson et al., 2018). Cronbach's alpha reliability coefficient for this study was .76 at Time 1 and .72 at Time 2, indicating good internal consistency.

Note that this study represented the analysis of an existing dataset. While this research aims to identify and understand potential risk and protective factors of alcohol misuse, it is

essential to acknowledge that not all variables of interest may be included due to limitations inherent to an archival dataset.

3.6 Procedure

The current study uses an existing and current NZDF data process whereby all NZDF personnel were invited to participate in an online Health and Wellbeing Survey. The survey was administered via Qualtrics through an anonymous link to a secure webpage, with printed copies available for those with restricted internet access due to deployment or operational duties.

The survey aimed to gain insight into the current health and well-being status of participants, allowing for the identification of any areas requiring attention. The information sheet clearly outlined this purpose (*see* Appendix A), detailing how their data would be stored, disclosed, and utilised to achieve this objective. Participants were informed that their participation was voluntary, that the survey was anonymous, and that collected data would be stored securely and used for internal and external research projects approved by the NZDF. Before participating in the research, individuals gave their informed consent. Subsequently, enrolled participants completed a self-report questionnaire about their well-being, life experiences, resilience, job, physical health and health behaviours, and attitudes toward help-seeking. The questions and measures utilised in this research (*see* Appendix B) focused on life experiences, resilience, jobs, and health behaviours. Upon completion, participants were presented with information regarding internal and external health resources (*see* Appendix C). No compensation was provided for the participant's involvement in the study. Ethical review processes approved all study procedures.

Low risk ethical approval was granted for this research by Massey University (*see* Appendix D) in August 2021. Notably, to conduct research that involves the use of data from

NZDF personnel, researchers must gain NZDF Organisational Research Approval. Accordingly, NZDF Organisational Research Approval was requested through the internal NZDF ethics review process, and approval was granted in November 2022 (*see* Appendix E). It was agreed with the NZDF that archival data collected by the NZDF Directorate of Psychology from the Health and Wellbeing survey would be provided for this study. Specifically, the data was collected between October to November 2016 and 23rd September to 6th October 2019.

3.7 Statistical Analysis

Analyses were conducted using IDM SPSS Statistics Version 29.0.0.0 (241). Statistical calculations and a Little MCAR test were produced to check for missing data. Descriptive statistics were used to identify outliers and check the normality assumption**.** Reliability tests were performed using Cronbach's alphas to ensure internal reliability. Test retests were performed to assess the stability and precision of constructs across time. T-test, ANCOVA and Regression tests were employed to analyse the 6 hypotheses. The results of these analyses are presented in the following chapter.

CHAPTER FOUR

4. Results

This chapter will discuss the study's results regarding the six hypotheses. First, data screening and reliability are discussed, followed by an overview of descriptive statistics and correlations. Each hypothesis will be analysed, then test procedures and findings will be reported.

4.1 Data Screening

Before analysis, the data set was inspected so that any errors, inconsistencies, or missing information could be identified and resolved. The primary data problems that can emerge are missing data, outliers, and normality (Tabachnick & Fidell, 2018). By screening the data beforehand, confidence in the validity and accuracy of the subsequent multivariate analysis is increased (Hair et al., 2010).

4.2 Missing Data

The first problem to be addressed was missing data. Although relatively common, such as participants omitting a particular item in error or electing not to answer, the quality of statistical inferences is directly impacted by the proportion of missing data. (Dong & Peng, 2013). The greater the missing data, the higher the risk of bias and loss of power in data analysis. However, the pattern in which it is missing has a more significant influence on research results than the proportion missing (Tabachnick & Fidell, 2018). That is, whether data is missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR).

Values in this study were missing because respondents failed to respond by error or opted not to answer. At Time 1, approximately 2.3% of values were missing, with 67% of participants experiencing missing values. The extent of missing values ranged from 0.7% (1

item) to 20.3% (30 items). According to Hair et al. (2010), it is acceptable to delete entire cases if they have a large amount of missing data. Therefore, 312 participants were excluded from the analysis as they failed to respond to over 70% of the AUDIT items. Additionally, 149 participants were omitted from the study because over 5% of the survey was missing. After removing such cases, a missing value analysis showed a reduction in missing values to 1%. Little's MCAR test was carried out and resulted in a significant chi-square test, X^2 (17443, $N = 4051$) = 27385.667, p =<.001; this indicates that data was not MCAR. To investigate further, a missing data indicator method was used by dummy coding participants into two groups: those with missing data and those without. A mean difference test was conducted on demographic variables between these two groups. The significant differences observed suggested that the missing data is not Missing at Random (MAR).

At Time 2, 418 military personnel returned the questionnaire, with 52% of participants experiencing missing values. The extent of this ranged from as little as 0.7% (1 item) to as much as 18.3% (24 items). Participants with substantial data omissions were excluded from the analysis. Specifically, 28 participants were removed for omitting 80% or more items in single measures. Following participant exclusion, only 1% of the remaining data was missing. To determine the pattern of missing data, Little's MCAR test was conducted and resulted in a significant chi-square test, X^2(3348, $N = 390$) = 3816.554, p = <.001, indicating that data was not MCAR. As with Time 1, the missing data indicator method was applied at Time 2 to assess whether the data was MAR. The test results showed significant differences, suggesting that the data at Time 2 is not MAR.

The Expectation Maximisation (EM) method dealt with the missing data. The EM algorithm estimates missing values based on the expected distribution among observed data (Tabachnick & Fidell, 2018). Although the EM algorithm assumes data is MAR, Schafer and Graham (2002) noted that a breach of this assumption should be expected in most cases.

Other research by Collins et al. (2001) has suggested that violations of the MAR assumption in modern missing data procedures do not significantly distort parameter estimates. Accordingly, EM was deemed an appropriate method to deal with the missing data.

4.3 Outliers

Identifying any outliers was the next step in assessing the data. An outlier is a case in which an extreme value that can be found within univariate and multivariate variables (Tabachnick & Fidell, 2018). Visual inspection of scatterplots for the independent and dependent variables revealed the presence of numerous outliers. Standardised z-scores were then used to examine these outliers further. Any cases with standardised scores exceeding ± 3.29 (p<.001, two-tailed test) are deemed potential outliers (Tabachnick & Fidell, 2018). Therefore, cases that deviated ± 3.29 standard deviations from the mean were removed; 275 cases at Time 1 were identified as outliers and removed, resulting in a final sample of 3776 at Time 1. At Time 2, 16 cases were identified as outliers and removed, resulting in a final sample size of 374. The samples at Time 1 and Time 2 were matched, ensuring that the same participants were included in both waves of data collection.

4.4 Normality of Data

The assumption of normality is fundamental in several multivariate procedures and crucial in many statistical tests (Tabachnick & Fidell, 2018). Normal distribution was assessed using skewness and kurtosis statistics (*see* Table 2.) The predicted influence of skewness and Kurtosis statistics was evaluated using a common rule of thumb identified by Hair et al. (2010). This rule states that the normality assumption has not been fulfilled when the skewness statistic is outside the range of ± 2, and the kurtosis statistic is outside the range of ± 7. Following Hair et al. (2010) guidelines, no violations were found for kurtosis and skewness. According to the central limit theorem, in large samples, the sampling distribution

of the mean will approximate a normal distribution, irrespective of the shape of that variable's distribution in the population (Berenson et al., 2012; Lumley et al., 2002; Wilcox, 2010). As such, data is assumed to be normally distributed as the skewness and kurtosis scores are acceptable, and the sample is deemed large.

Table 2

Correlation, Mean, Standard Deviation, Skewness, Kurtosis

		T1	T1	T1	T1	T1	T1	T1	T1	T1	T2	T2	T2	T2	T2	T2	T2	T2	T2
		Lone	K10	Trauma	PTSD	BRS	SS	Unit	Leader	AUDIT	Lone	K10	Trauma	PTSD	BRS	SS	Unit	Lead	AUDIT
T1	Lone	1																	
T1	K10	.52**	1																
T1	Trauma	.10**	.14**	1															
T1	PTSD	.47**	.71**	.29**	1														
T1	BRS	.01	.00	-.02	.00	1													
T1	SS	-.40**	-.34**	-.08**	-.34**	.02	1												
T1	Unit	-.24**	-.37**	-.09**	-.30**	.05**	.33**	1											
T1	Leader	-.13**	-.21**	-.05**	-.20**	.02	.19**	.62**	1										
T1	AUDIT	.10**	.13**	.07**	.13**	-.04*	-.10**	-.10**	-.06**	1									
T2	Lone	.05	.09	.00	.08	.05	-.09	.02	-.04	-.05	1								
T2	K10	.05	.10	.07	.12*	.01	-.07	-.11*	-.03	.04	.51**	1							
T2	Trauma	.06	.02	.06	.05	-.02	.01	-.09	.02	.03	.08	.12*	1						
T2	PTSD	-.06	-.07	.04	-.08	.08	.05	.06	-.05	-.09	-.02	-.03	.09	1					
T2	BRS	.03	-.01	-.03	-.02	.02	-.02	-.03	-.03	.02	-.28**	-.41**	.03	.01	1				
T2	SS	-.02	.02	-.03	-.03	-.06	.09	.03	.07	.04	-.33**	-.27**	.02	-.01	.19**	1			
T2	Unit	-.07	-.05	-.11*	-.07	.02	.10*	.06	.05	-.05	-.25**	-.37**	-.07	.02	.25**	.31**	1		
T2	Leader	-.10*	-.05	-.03	-.08	.01	.10*	.07	.03	-.00	-.19**	-.25**	.00	.11*	.18**	.20**	.63**	1	
T2	AUDIT	-.02	.03	.09	.06	.05	.00	-.01	-.03	-.01	.11*	.18**	.08	-.01	-.07	-.07	-.11*	-.10*	1
	M	1.74	16.72	1.36	24.70	3.70	4.02	4.05	4.22	6.44	1.93	17.29	1.37	30.77	3.67	4.20	4.03	4.25	6.29
	SD	.98	5.56	1.26	8.56	.78	.82	.72	.87	4.35	1.00	5.98	1.26	12.85	.77	.98	.74	.86	4.20
	Skewness	1.24	1.14	.71	1.58	-.09	-.81	-.73	-1.18	1.18	.79	1.18	.69	1.93	-.06	-1.42	-.81	-1.29	1.03
	Kurtosis	.77	.87	-.19	2.14	-.64	.21	.37	.84	1.01	-.42	1.22	-.25	3.97	-.67	1.73	.46	1.11	.62

Note: *M* = mean, *SD* = standard deviation; T1 = Time 1, T2 = Time 2; Lone = Lonely; K10 = Psychological distress; Trauma = Trauma exposures; PTSD = Post Traumatic Stress Disorder Symptoms; BRS = Resilience; UNIT = Unit Cohesion; LEAD = Leadership perception; T2 AUDIT = Time 2 Alcohol Use Identification Test.
Time 1, *n* = 3769 Time 2, *n* = 374.
* *p* <.05, ** *p* <.01.

4.5 Reliability Analyses

A Cronbach's alpha analysis was conducted to assess the internal consistency of the scales in this study (*see* Table 3). Internal consistency refers to the degree of positive correlation among the items in a scale or test (Coolican, 2017). Coolican (2017) suggested that a Cronbach's alpha score of 0.7 to 1 indicates good reliability. Notably, poor reliability (i.e., Cronbach's alpha <.7) can impact the accuracy of the statistics and reduce confidence in the findings. The Cronbach's alpha for most scales were above the threshold of 0.7, indicating acceptable reliability. Descriptive statistics for all variables are presented in Table 3.

A test-retest analysis was conducted to assess the internal consistency of the scales across time (*see* Table 3.). Test-retest reliability is a correlation between scale scores at two different time points. Portney and Watkins (2015) defined values between 0.5 and 0.75 as "poor to moderate", 0.75 to 0.9 as "good", and above 0.9 as acceptable for "clinical measures". The scales in this study were found to have poor test-retest reliability. This was not unexpected given that three years had passed between Time 1 and Time 2, and it was probable that changes could occur during that time that could affect the measured construct.

Table 3.
The Cronbach's Alpha and Test-Re-test for Each Scale Included in this Study

	Cronbach's' Alpha		Test-retest	
	T1	T2	*r*	*p*
Loneliness	[a]	[a]	.06	.10
Psychological Distress	.90	.85	.09	.07
Trauma	[c]	[c]	.05	.36
PTS	.94	.93	.14[b]	.01[b]
Resilience	.84	.84	.01	.86
Social support	.82	[a]	.10[b]	.07[b]
Leadership	.92	.90	.02	.65
Unit Cohesion	.80	.79	.04	.43
AUDIT	.76	.72	.02	.70

Note: T1 = Time 1, *N* = 3776, Time 2, *N* = 374.
[a] single-item measure is used, and Cronbach's Alpha is not considered appropriate.
[b] Difference scales were used for Time 1 and Time 2.
[c] Cronbach Alpha is not considered appropriate for checklist measure.

4.6 Correlation of Measures

Standard deviations and Pearson correlation coefficients were employed to evaluate the independent and dependent variables at both time points. These findings are displayed in Table 2. The findings illustrate a subtle relationship between various psychological factors and AUDIT scores among NZDF service personnel. Loneliness, psychological distress (K10), trauma, and PTS exhibit positive correlations with AUDIT scores, indicating that higher alcohol use is associated with increased levels of these psychological challenges. Conversely, resilience (BRS), social support, unit cohesion, and leadership perception demonstrate negative correlations with AUDIT scores, suggesting that elevated alcohol use is linked to lower levels of these protective factors.

Participants generally reported low levels of loneliness and trauma exposure, coupled with moderate levels of psychological distress (K10) and PTS symptoms. Concurrently, they expressed moderate resilience (BRS) and high levels of social support, unit cohesion, and leadership perception. This overall pattern of results implies predominantly positive outcomes among NZDF service personnel. Each hypothesis will now be discussed.

Hypothesis 1

Alcohol and Gender. An independent sample t-test was conducted to analyse Hypothesis 1a, which posited that male personnel would be more likely to misuse alcohol than Female personnel. The result of the t-test was significant $t(3767) = 8.625$, $p = .001$ (two-tailed). Female personnel ($M = 5.25$, $SD = 3.95$) scored 1.61 points lower on the AUDIT at Time 1 than male personnel ($M = 6.87$, $SD = 4.40$). This finding supports Hypothesis 1a, indicating that males are more likely to misuse alcohol than females in the sample studied (*see* Table 4).

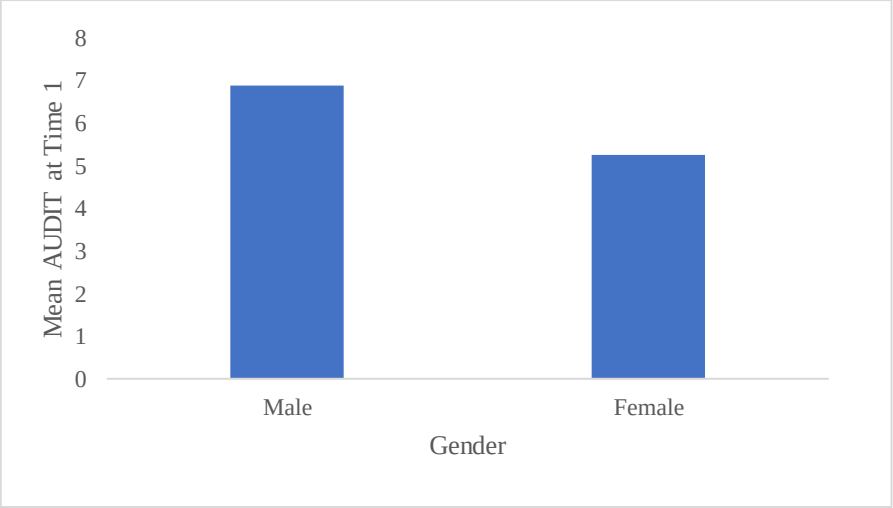
Table 4.

Comparison of AUDIT score by Gender at Time 1

Gender	*N*	*M*	*SD*
Male	2749	6.87	4.40
Female	1020	5.26	3.95

Figure 1.

The Estimated Marginal Means of AUDIT scores on Gender at Time 1



Alcohol and Age. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 1b: younger personnel, mainly those aged 17-24 and 25-29, will be significantly more likely to misuse alcohol compared to older personnel. Rank and gender were included as covariates to control for its potential confounding effect. After controlling for gender and rank, a significant impact of age on Alcohol score at Time 1 was identified, $F(5, 3761) = 65.15$, $p = < .001$, partial $\eta 2 = .08$. Post-hoc tests with Bonferroni confidence interval adjustment ($\alpha = .05$) were conducted to analyse pairwise differences between AUDIT means after these were adjusted for rank effects. The subsequent test result showed that 17–29 year olds scored significantly higher on the AUDIT than all other age groups ($p = < .001$). The adjusted means (*Adj. M*) in Table 6

and Figure 2. illustrate this trend, showing that AUDIT scores decreased as age increased. These findings support the hypothesis 1b (*see* Table 5 and Figure 2).

Figure 2.
The Estimated Marginal Means of AUDIT score for all Age Groups at Time 1

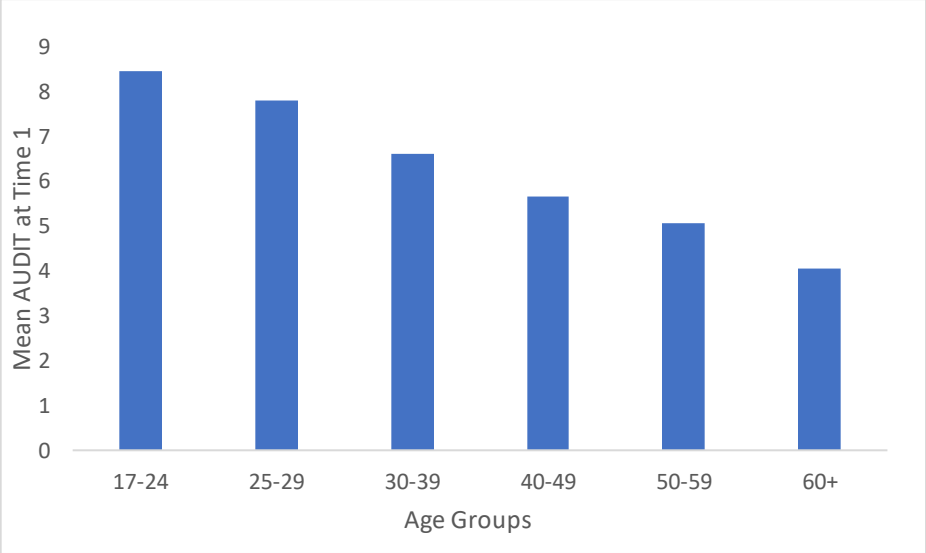


Table 5.
Comparison of AUDIT score by Age at Time 1

Age	N	M	SD	Adj. M	SE	17-24	25-29	30-39	40-49	50-59	60+
17-24	614	8.50	5.04	8.45	0.18	1.0					
25-29	534	7.80	4.78	7.80	0.18	.11	1.0				
30-39	821	6.60	4.25	6.61	0.14	.00***	.00***	1.0			
40-49	901	5.63	3.68	5.67	0.14	.00***	.00***	.00***	1.0		
50-59	700	5.08	3.47	5.08	0.16	.00***	.00***	.00***	.06	1.0	
60+	199	4.14	2.71	4.05	0.29	.00***	.00***	.00***	.00***	.03*	1.0

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Alcohol and Relationship status. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 1c, namely that individuals who were single would score significantly higher on the AUDIT than those in

relationships. Age and Gender was included as a covariate to control for its potential confounding effect. After controlling for these variables, a significant impact of relationship status on alcohol score at Time 1 was identified, $F(1, 3730) = 18.46$, $p = <. 001$, partial η2 =.01. The findings support Hypothesis 1c, indicating that single individuals tend to report significantly higher levels of alcohol misuse, even after accounting for age and gender (*see* Table 6.)

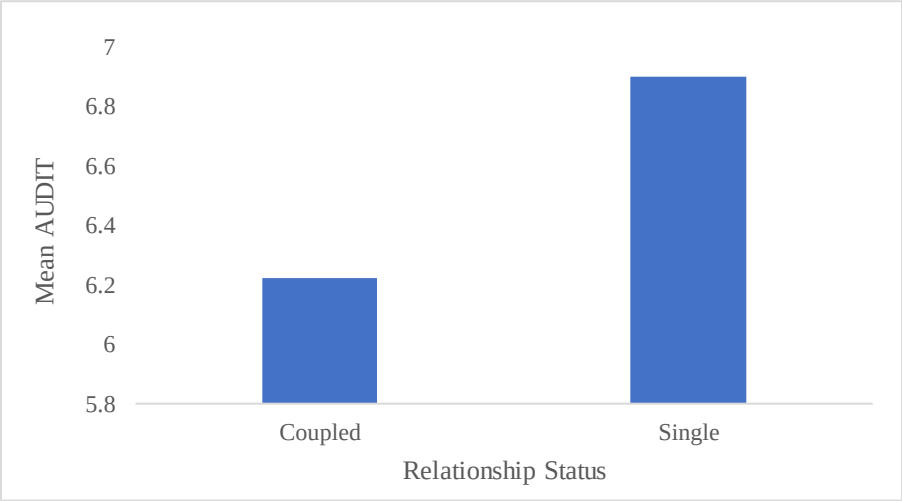
Table 6.

Comparison of AUDIT score by Relationship Status at Time 1

Relationship status	*N*	*M*	*SD*	*Adj. M*	*SE*
Coupled	2682	5.98	4.04	6.22	.08
Single	1087	7.48	4.82	6.90	.13

Figure 3.

The Estimated Marginal Means of AUDIT score for all Relationship Status Groups at Time 1



Alcohol and Ethnicity. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 1d. Hypothesis 1d postulated that Māori and Pacific ethnic groups would score significantly higher on the

AUDIT than New Zealand Europeans, Other Europeans, Asians, and Other ethnic groups. At the same time, Asians will score significantly lower on the AUDIT compared to NZ Europeans, Māori, Pacific Islanders, Other Europeans, and other ethnic groups.

The analysis revealed a significant effect of Ethnicity on AUDIT scores, $F(5, 3763) = 9.55$, $p = <.001$, partial $\eta 2 = .034$. Post-hoc tests with Bonferroni adjustments ($\alpha = .05$) were conducted to explore pairwise differences between AUDIT means. The findings partially support the hypothesis (*see* Table 7).

Consistent with the hypothesis, Māori ($M = 7.35$, $SD = 4.79$) and Pacific Islanders ($M = 8.10$, $SD = 5.35$) scored significantly higher on the AUDIT compared to NZ European personnel ($M = 6.28$, $SD = 4.23$), Other Europeans, and Asians ($M = 4.37$, $SD = 4.10$). However, contrary to the hypothesis, the Other ethnic group (M = 6.75, SD = 4.35) did not differ significantly from Māori or Pacific Islanders ($p > .05$).

As hypothesised, the Asian ethnic group had the lowest AUDIT scores. However, they were only significantly lower than those of Māori, Pacific Islanders, and Other ethnic groups. There was no significant difference between the AUDIT scores of Asians, NZ Europeans, or Other Europeans. The findings partially support hypothesis 1d.

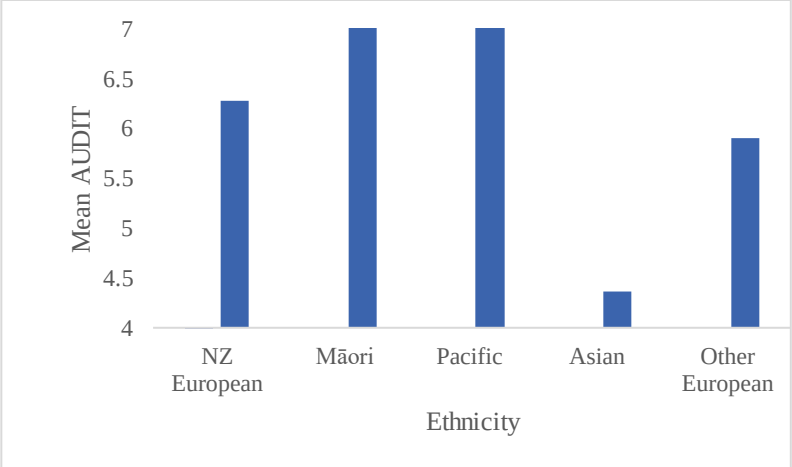
Table 7
Comparison of AUDIT scores by Ethnicity at Time 1

Ethnicity	*N*	*M*	*SD*	NZ Euro	Māori	Pacific	Asian	Other Euro
NZ European	2767	6.28	4.23	1.0				
Māori	451	7.35	4.79	.00***	1.0			
Pacific	73	8.10	5.35	.01*	1.0	1.0		
Asian	41	4.37	4.10	.07	.00***	.00***	1.0	
Other European	196	5.91	4.02	1.0	.00**	.00**	.57	1.0
Other	241	6.75	4.35	1.0	1.0	.29	.02	.66

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 4.

The Estimated Marginal Means of AUDIT score for all Ethnicity Groups at Time 1



Alcohol and Rank. Hypothesis 1e posited that lower-ranked personnel, particularly Junior NCOs, would score significantly higher on the AUDIT than higher-ranked personnel. To test this hypothesis, a one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was conducted to explore the relationships between rank and AUDIT scores. Age was included as a covariate to mitigate the potential confounding effect of the analysis. The analysis revealed a significant impact of rank on AUDIT score at Time 1, even after controlling for age, $F(5, 3758) = 4.06$, $p = .001$ partial η2 =. 005.

Post-hoc tests with Bonferroni confidence interval adjustment ($\alpha = .05$) were conducted to analyse pairwise differences between AUDIT means following age-adjusted effects. These findings provide partial support for Hypothesis 1e (*see* Table 8). Junior NCOs scored significantly higher on the AUDIT than Senior NCOs ($p = .003$). However, contrary to expectation, the difference in AUDIT scores between Junior NCOs and all the other ranks (Junior Office, Mid Officer, Senior Officer, Executive Officers) were not statistically significant.

Table 8.

Comparison of AUDIT score by Rank at Time 1

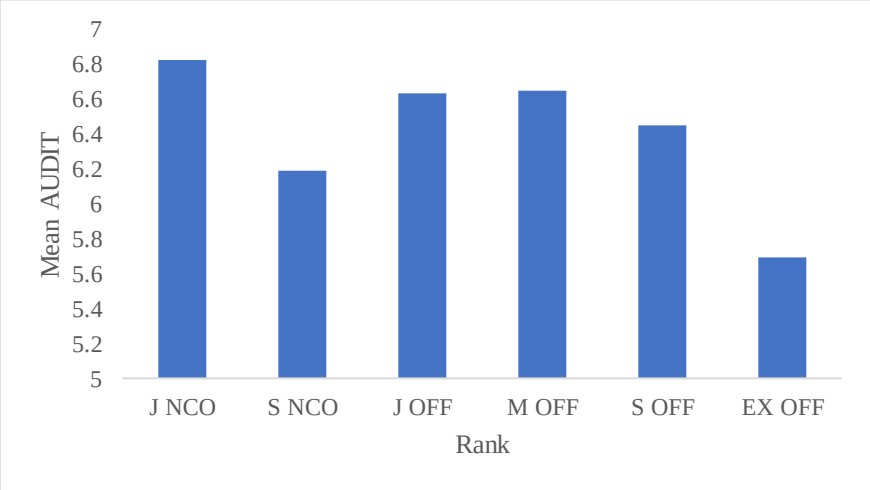
	N	*M*	*SD*	*Adj. M*	*SE*	J.NCO	S.NCO	J.OF	M.OF	S.OF
J.NCO	983	8.12	4.97	12.02	0.20	1.0				
S.NCO	1988	5.54	3.82	11.58	0.19	.00**	1.0			
J.OFF	383	7.23	4.52	11.85	0.29	1.0	.12	1.0		
M.OFF	268	6.24	3.72	11.23	0.40	1.0	.18	1.0	1.0	
S.OFF	108	5.87	3.47	11.13	0.67	1.0	1.0	1.0	1.0	1.0
EX.OFF	39	5.00	3.25	11.42	1.31	1.0	1.0	1.0	1.0	1.0

Note. J.NCO = Junior NCO, S.NCO = Senior NCO, J.OFF = Junior Officer, M.OFF = Mid-ranked Officer, S.OFF = Senior Officer, EX OFF = Executive Officer. Age was incorporated into this model because as individuals grow older, there tends to be a corresponding inclination to progress in rank.

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

Figure 5.

The Estimated Marginal Means of AUDIT score for all Rank Groups at Time 1



Alcohol and Service. A one-way between-groups analysis of variance (ANOVA) was used to analyse Hypothesis 1f, which postulated that Navy personnel would be more likely to misuse alcohol than Air Force and Army personnel. The ANOVA yielded a significant result, indicating that the AUDIT scores of these services differ significantly from one another at Time 1, $F(2,3766) = 34.16$, $p = <.001$, partial $\eta 2 = .018$. Post-hoc pairwise comparisons with

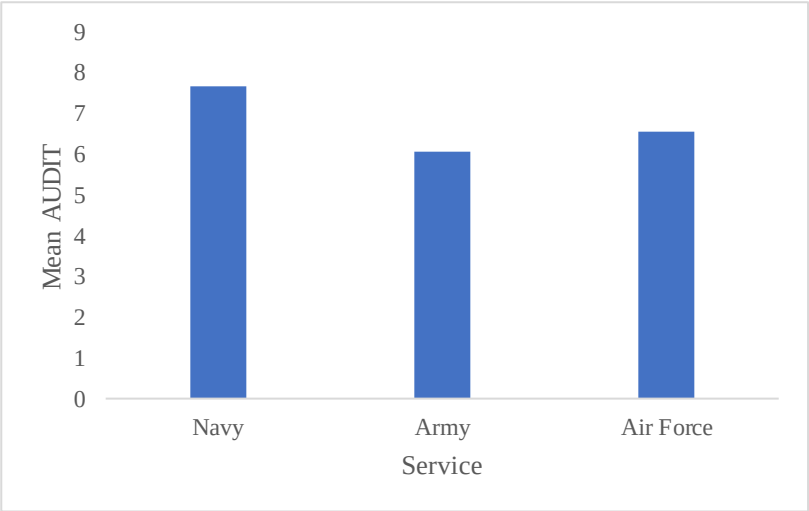
Bonferroni adjustments were conducted to elucidate the differences in alcohol misuse tendencies among the services. Analysis of Pairwise comparison depicts that Navy personnel were most likely to misuse alcohol. These findings support hypothesis 1f (*see* Table 9).

Table 9.
Comparisons of AUDIT score by Service Time 1

Service	*N*	*M*	*SD*	Navy	Army
Navy	618	7.66	4.69	1.0	
Army	2273	6.06	4.23	.00***	1.0
Air Force	878	6.55	4.22	.00***	.01*

Note: * $p < .05$. ** $p < .01$. ***$p < .001$.

Figure 6.
The Estimated Marginal Means of AUDIT scores for each Service Group and at Time 1.



Alcohol and Deployment. A one-way analysis of covariance was used to analyse Hypothesis 1g. Namely, individuals who have deployed will be more likely to misuse alcohol than non-deployed personnel. Psychological distress, trauma, PTS, and loneliness were included as a covariate to control for its potential confounding effect. The result indicates no effect of deployment on AUDIT score at Time 1 after adjusting for covariates, $F(1, 3763) = .280$, $p = .597$, partial $\eta 2 = .000$. This finding does not support hypothesis 1e (*see* Table 10).

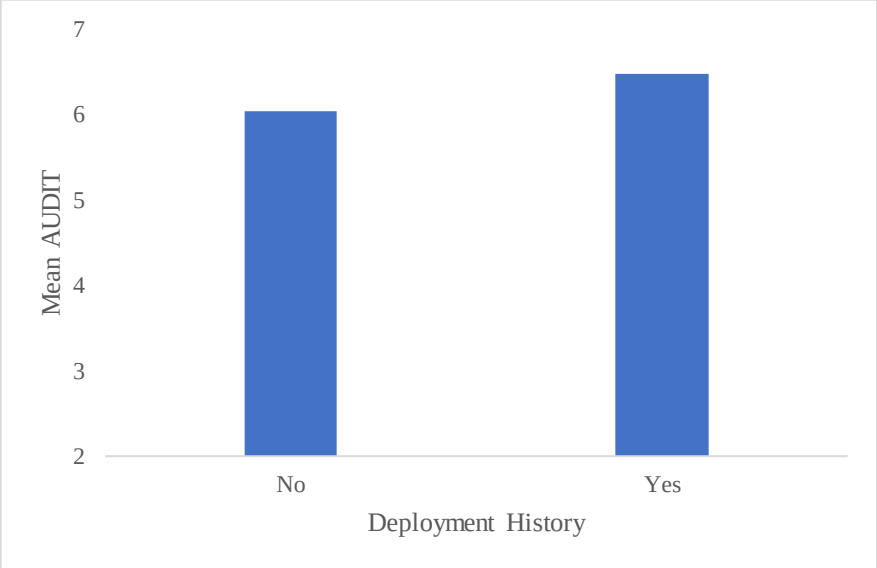
Table 10.

Comparison between Mean AUDIT score by Deployed History Time 1

Deployment	*N*	*M*	*SD*	*Adj. M*	*SE*
No	2081	6.40	4.53	6.40	.10
Yes	1688	6.47	4.10	6.48	.11

Figure 7.

The Estimated Marginal means of AUDIT score for Deployment History at Time 1



Hypothesis 2

Hypothesis 2 stated that Trauma, PTS, psychological distress, and loneliness are positively associated with alcohol use at Time 1 and Time 2. Participants were assessed at two time points, with measures of trauma, PTS, psychological distress, loneliness, and alcohol use collected. Logistic regression analysis examined the predictive relationship between these variables and alcohol use at both time points. Correlation analyses were performed on AUDIT scores, where low-risk drinkers were categorised with AUDIT scores of ≤ 7 and alcohol misuse with scores of ≥ 8. The results indicated positive correlations, although not consistently significant, between the predictive variables and alcohol use (*see* Table 11).

Specifically, PTS symptoms displayed non-significant positive correlations at both time points (Time 1: β = .01, *p* = .22; Time 2: β = .001, *p* = .94). Psychological distress was significantly associated with alcohol use at Time 1 (β = .02, *p* < .001). However, this relationship was non-significant at Time 2 (β = .04, *p* = .06). Similarly, loneliness displayed a significant positive correlation with alcohol use at Time 1 (β = .12, *p* = .01), although this association was non-significant at Time 2 (β = .15, *p* = .25). A positive correlation was observed between alcohol use and trauma at Time 1 (β = .09, *p* = .002). However, at Time 2, this relationship did not reach statistical significance (β = .58, *p* = .52). These findings partially support Hypothesis 2.

Table 11.
Logistic Regression Analysis of Risk Factors for Alcohol Misuse

		β	*SE*	*Wald*	*df*	*p*	Exp(B)
Time 1	Lonely	.12	.04	8.04	1	.01*	1.13
	K10	.03	.01	7.05	1	.01*	1.03
	Trauma	.09	.03	9.45	1	.00**	1.09
	PTS Symptoms	.01	.01	1.53	1	.22	1.01
	Constant	-1.70	.12	205.72	1	.00***	.18
Time 2	Lonely	.147	.13	1.30	1	.25	1.16
	K10	.040	.02	3.58	1	.06	1.04
	Trauma	.058	.09	.41	1	.52	1.06
	PTS Symptoms	.00	.01	.01	1	.94	1.00
	Constant	-1.89	.46	17.07	1	.00***	.15

Note: K10 = Psychological Distress, PTS = Post traumatic stress symptoms, Low risk drinkers = AUDIT ≤ 7, Alcohol misuse = AUDIT ≥ 8, *Wald* = Wald test (Statistical test for parameter significance).
* *p* < .05. ** *p* < .01. *** *p* < .001.

Alcohol and Loneliness. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 2a; that is, individuals with alcohol misuse (AUDIT ≥ 8) will report significantly greater levels of loneliness than personnel without alcohol misuse at both Time 1 and Time 2 (*see* Table 12). Covariates included in the analysis were psychological distress, PTS symptoms, trauma

exposure, social support, unit cohesion, leadership perception and relationship status to mitigate potential confounding effects.

After controlling for covariates, the analysis identified a non-significant effect of loneliness on alcohol use at Time 1, $F(1, 3760) = .30$, $p = .59$, partial $\eta 2 = .00$. Similarly, at Time 2, the analysis showed a non-significant impact of loneliness on alcohol use at Time 2 was identified, $F(1, 364) = 1.38$, $p = .24$, partial $\eta 2 = .00$. Contrary to the hypothesis, there was no significant difference in loneliness scores between individuals with or without alcohol misuse at Time 1 and Time 2.

Table 12.
Comparison of Mean Loneliness Score by Alcohol Misuse Status at Time 1 and Time 2

	Drinking Status	*N*	*M*	*SD*	*Adj. M*	*SE*
Time 1						
	AUDIT ≤ 7	2582	1.67	0.94	1.74	.02
	AUDIT ≥ 8	1187	1.90	1.04	1.75	.02
Time 2						
	AUDIT ≤ 7	257	1.84	.981	1.89	.05
	AUDIT ≥ 8	117	2.93	1.00	2.00	.08

Note: AUDIT ≤ 7 = Low risk drinking status, AUDIT ≥ 8 = Alcohol misuse status.

Alcohol and Trauma. A one-way covariance (ANCOVA) analysis with Bonferroni confidence interval adjustment was used to analyse Hypothesis 2b (*see* Table 13). That is, individuals with alcohol misuse (AUDIT ≥ 8) will report significantly higher levels of trauma exposure than personnel without alcohol misuse, at both Time 1 and Time 2. To control for their potential confounding effect, loneliness, psychological distress, PTS symptoms, social support, leadership perception, unit cohesion, and relationship status were included as covariates.

After controlling for covariates, a significant effect of psychological distress on alcohol misuse at Time 1 was identified, $F(1, 3761) = 9.35$, $p = .00$, partial $\eta 2 = .002$. Post-hoc tests with Bonferroni confidence interval adjustment ($\alpha = .05$) were performed to analyse

pairwise differences between trauma exposure means differences after these were adjusted for the effects of covariates. The subsequent test results show that the personnel with alcohol misuse scored .13 times higher in trauma exposures (M = 1.32) than low risk drinkers (M = 1.45). These findings support the hypothesis. At Time 2, after controlling for covariates, a non-significant impact of trauma exposures on alcohol misuse at Time 2 was identified, $F(1, 364) = .32$, $p = .57$, partial $\eta 2 = .00$. This finding does not support the hypothesis; therefore, hypothesis 4d is only partially supported.

Table 13.
Comparison of Mean Trauma Exposure Score by Alcohol Misuse Status at Time 1 and Time 2

	Drinking Status	*N*	*M*	*SD*	*Adj. M*	*SE*
Time 1						
	AUDIT ≤ 7	2582	1.30	1.25	1.32	.02
	AUDIT ≥ 8	1187	1.50	1.27	1.45	.04
Time 2						
	AUDIT ≤ 7	257	1.33	1.22	1.35	.08
	AUDIT ≥ 8	117	1.47	1.34	1.43	.12

Note: AUDIT ≤ 7 = Low risk drinking status, AUDIT ≥ 8 = Alcohol misuse status.

Alcohol and PTS. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 2c: Personnel with alcohol misuse (AUDIT ≥ 8) will report significantly higher levels of PTS symptoms than those without alcohol misuse at both Time 1 and Time 2 (*see* Table 14). Loneliness, psychological distress, trauma exposures, social support, leadership perception, unit cohesion, and relationship status were included as covariates to control for its potential confounding effect.

After controlling for covariates, a non-significant effect of PTS on alcohol misuse at Time 1 was identified, $F(1, 3761) = .90$, $p = .34$, partial $\eta 2 = .00$. This finding does not support the hypothesis. Similarly, at Time 2, after controlling for covariates, a non-significant impact of PTS on alcohol misuse at Time 2 was identified, $F(1, 374) = .09$, $p = .77$, partial $\eta 2 = .000$. Together, these findings do not support the hypothesis.

Table 14.
Comparison of Mean PTS score by Alcohol Misuse Status at Time 1 and Time 2

Drinking Status		*N*	*M*	*SD*	*Adj. M*	*SE*
Time 1						
	AUDIT ≤ 7	2582	24.03	8.13	24.64	.11
	AUDIT ≥ 8	1187	26.18	9.27	24.83	.17
Time 2						
	AUDIT ≤ 7	257	30.75	12.63	30.63	.81
	AUDIT ≥ 8	117	30.80	13.37	31.07	1.21

Note: AUDIT ≤ 7 = low risk drinking status, AUDIT ≥ 8 = Alcohol misuse status.

Alcohol and Psychological Distress. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 2d (*see* Table 15), namely personnel exhibiting alcohol misuse (AUDIT ≥ 8) will report significantly greater levels of psychological distress than those who do not. Loneliness, PTS symptoms, trauma exposures, psychological distress, social support, leadership perception, unit cohesion and relationship status were included as covariates to control for their potential confounding effect. After controlling for covariates, a significant relationship between psychological distress and alcohol misuse at Time 1 was identified, $F(1, 3761) = 4.88$, $p = .03$, partial $\eta 2 = .001$. Post-hoc tests with Bonferroni confidence interval adjustment ($\alpha = .05$) were conducted to analyse pairwise differences between psychological distress means after these were adjusted for the effects of covariates. The subsequent test results indicated that at Time 1, personnel with alcohol misuse scored .31 points higher on the psychological distress scale ($M = 16.63$) than personnel with a low risk drinking status ($M = 16.92$). This finding supports the hypothesis. However, at Time 2, a non-significant association between psychological distress and alcohol misuse at Time 2 was identified, $F(1, 364) = 2.18$, $p = .14$, partial $\eta 2 = .01$. These results do not support the hypothesis. Therefore, hypothesis 3d is only partially supported.

Table 15.
Comparison of Mean K10 score by Alcohol Misuse Status at Time 1 and Time 2

Drinking Status		*N*	*M*	*SD*	*Adj. M*	*SE*
Time 1						
	AUDIT ≤ 7	2582	16.26	5.40	16.63	.07
	AUDIT ≥ 8	1187	17.72	5.78	16.92	.11
Time 2						
	AUDIT ≤ 7	257	16.66	5.77	17.03	.30
	AUDIT ≥ 8	117	18.66	6.21	16.83	.44

Note: AUDIT ≤ 7 = low risk drinking status, AUDIT ≥ 8 = Alcohol misuse status.

Hypothesis 3

Alcohol across time. The study employed logistic regression to analyse Hypotheses 3a-3d, which explored the longitudinal effects of loneliness, trauma exposures, PTS symptoms, and psychological distress symptoms at Time 1 on alcohol misuse, at Time 2.

Participants were categorised based on their AUDIT scores, with AUDIT ≤ 7 representing low risk drinking and AUDIT ≥ 8 indicating alcohol misuse. This cut-off follows standard guidelines from the World Health Organization (WHO), who class individuals with a score of 8 or greater as at risk for alcohol-related problems (Babor, 2001). Psychological distress was coded as < 20 for no distress and ≥ 20 for distress. This cut-off is based on clinical standards for the Kessler Psychological Distress Scale (K10), where a score of 20 or more indicates a mild to severe level of psychological distress (Kessler et al., 2002). Loneliness was categorised as ≥ 1 for lonely and 0 for not lonely. This dichotomous coding was used to distinguish between individuals who experience any level of loneliness (≥1) and those who report no loneliness (0). Trauma exposure was coded as ≥1 for the presence of trauma exposures and 0 for the absence of trauma exposures. This dichotomous coding was used to distinguish between individuals who experience any level of trauma exposure (≥1) and those who report no trauma exposure (0). Finally, PTS symptoms was analysed as a continuous variable to represent the full spectrum of PTS severity, including all individuals

with any degree of PTS symptoms. Results from the regression analysis are presented in Table 16.

The first step of the regression analysis examined the effects of alcohol misuse at Time 1 on alcohol misuse at Time 2. At step one, alcohol misuse at Time 1 accounted for a non-significant .3% variance in alcohol misuse at Time 2, χ^2 (1) = .97, p = .33, and correctly predicted 68.7% of cases. In step 2, psychological distress, loneliness, PTS symptoms, and trauma exposures at Time 1 were added as predictor variables. This step accounted for an additional non-significant 2.2% of variance in alcohol misuse at Time 2, $\chi^2(4) = 8.50$, p = .08. and correctly predicted 68.4% of cases. Overall, the predictor variables explained 2.5% of the variance in alcohol misuse at Time 2.

Hypothesis 3a, which predicted that loneliness at Time 1 would predict alcohol misuse at Time 2, was supported. Loneliness reported at Time 1 significantly predicted alcohol misuse longitudinally at Time 2 (β = .55, p = .04). Hypothesis 3b, which posited that trauma exposures at Time 1 would predict alcohol misuse at Time 2, was not supported, as trauma exposures were not a significant predictor (β = .06, p = .80). Hypothesis 3c, which predicted that PTS symptoms at Time 1 would predict alcohol misuse at Time 2, was supported (β = .04, p = .02). Hypothesis 3d, which proposed that psychological distress at Time 1 would predict alcohol misuse at Time 2, was not supported (β = .24, p = .35).

These results suggest that loneliness and PTS symptoms at Time 1 are significant predictors of alcohol misuse at Time 2, while trauma exposures and psychological distress are not. Overall, Hypothesis 3 was partially supported.

Table 16.
Hierarchical Logistic Regression Analysis for Predictors of Alcohol Misuse at Time 2

		β	*SE.*	*Wald*	*df*	*p*	Exp(B)	95% C.I. Lower	95% C.I. Upper
Step 1	Alcohol Misuse T1 (1, yes; 0, no)	.24	.25	.96	1	.32	1.28	.78	2.08
	Constant	-.96	.21	20.68	1	.00***	.38		
Step 2	Alcohol Misuse T1 (1, yes; 0, no)	.24	.26	.88	1	.35	1.27	.77	2.10
	Lonely T1 (1, yes; 0, no)	.55	.26	4.36	1	.04*	1.72	1.03	2.88
	K10 T1 (1, yes; 0, no)	.25	.35	.52	1	.47	1.28	.65	2.53
	Trauma T1(1, yes; 0, no)	-.06	.25	.06	1	.80	.94	.57	1.54
	PTS symptoms T1	.04	.02	5.23	1	.02*	1.04	1.01	1.07
	Constant	-2.36	.67	12.46	1	.00***	.09		

Note: K10 = Psychological Distress, Non-case = AUDIT ≤ 7, Case = AUDIT ≥ 8
* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 4

Hypothesis 4 stated that social support, resilience, leadership perception, and unit cohesion at both time points are negatively associated with alcohol misuse. Participants were assessed at two time points, with measures of resilience, social support, leadership perception, unit cohesion, and alcohol use collected. Logistic regression analysis examined the predictive relationship between these variables and alcohol use at both time points. Correlation analyses were performed on AUDIT scores, where low-risk drinkers were categorised with AUDIT scores of ≤ 7 and alcohol misusers with scores of ≥ 8. Results indicated negative correlations (*see* Table 17).

Social support demonstrated a significant negative association with alcohol misuse at Time 1 (β = -.08, $p = < .001$), indicating that higher levels of social support were linked to lower levels of alcohol misuse. At Time 2, there was a non-significant association found between social support and alcohol misuse (β = .011, $p = .68$). Unit cohesion displayed a significant negative association with alcohol misuse at Time 1 (β = -.05, $p = .03$), implying that stronger unit cohesion was associated with lower levels of alcohol misuse. However at

Time 2 this association lacked significance (β = -.051, *p* = .24). The results did not indicate a significant association between leadership perception and alcohol misuse at Time 1 (β = -.006, *p* = .77) and Time 2 (β = -.051, *p* = .16). Likewise, resilience did not exhibit a significant association with alcohol misuse at Time 1 (β = -.024, *p* = .14). Therefore Hypothesis 4 is only partially supported.

Table 17.
Logistic Regression Analysis of Protective Factors for Alcohol Misuse

		β	*SE*	*Wald*	*df*	*p*	Exp(β)
Time 1	Resilience	-.07	.05	2.25	1	.13	.94
	Social Support	-.21	.05	22.14	1	.00***	.81
	Unit Cohesion	-.14	.06	4.72	1	.03*	.87
	Leadership	-.02	.05	.08	1	.77	.99
	Constant	.93	.28	10.84	1	.00***	2.53
Time 2	Resilience	-.07	.15	.22	1	.64	.93
	Social Support	.05	.12	.16	1	.69	1.05
	Unit Cohesion	-.24	.20	1.43	1	.23	.79
	Leadership	-.22	.16	1.87	1	.17	.80
	Constant	1.15	.80	2.07	1	.15	3.15

Note: Low risk drinking = AUDIT ≤ 7, Alcohol misuse = AUDIT ≥ 8.
* *p* < .05. ** *p* < .01. ***p < .001.

Alcohol and Resilience. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 4a (*see* Table 18); that is, personnel with low risk drinking behaviour (AUDIT ≤ 7) will report significantly higher levels of resilience than those with alcohol misuse (AUDIT ≥ 8). Social support, unit cohesion, leadership perception, and relationship status were included as covariates to control for their potential confounding effect. After controlling for covariates, a non-significant impact of resilience on alcohol misuse at Time 1 was identified, $F(1, 3763) = 1.678$, $p = .19$, partial η2 =.000. Similarly, at Time 2, after controlling for covariates, a non-significant impact of resilience on alcohol misuse at Time 2 was identified, $F(1, 368) = .190$, $p = .66$, partial η2 =.001. These findings do not support hypothesis 4a.

Table 18.
Comparison of Mean Resilience score by Alcohol Misuse Status at Time 1 and Time 2

	Drinking Status	*N*	*M*	*SD*	*Adj. M*	*SE*
Time 1						
	AUDIT ≤ 7	2582	3.71	.78	3.71	.02
	AUDIT ≥ 8	1187	3.66	.78	3.67	.02
Time 2						
	AUDIT ≤ 7	257	3.70	.79	3.68	.05
	AUDIT ≥ 8	117	3.60	.69	3.65	.07

Note: AUDIT ≤ 7 = Low risk drinking status, AUDIT ≥ 8 = Alcohol misuse status.

Alcohol and Leadership Perception. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypotheses 4b (*see* Table 19); that is, personnel with low risk drinking behaviour (AUDIT ≤ 7) will report significantly greater levels of leadership perception than those alcohol misuse (AUDIT ≥ 8). Social support, unit cohesion, relationship status, and resilience were included as covariates to control for their potential confounding effect. After controlling for covariates, a non-significant effect of leadership perception on alcohol misuse at Time 1 was identified, $F(1, 3763) = .011$, $p = .92$, partial $\eta 2 = .000$. These findings do not support the hypothesis. At Time 2, after controlling for covariates, a non-significant impact of leadership perception on alcohol misuse at Time 2 was identified, $F(1, 368) = 2.01$, $p = .16$, partial $\eta 2 = .005$. These findings do not support hypothesis 4b.

Table 19.
Comparison of Mean Leadership Perception score by Alcohol Misuse Status at Time 1 and Time 2

	Drinking Status		*M*	*SD*	*Adj. M*	*SE*
Time 1						
	AUDIT ≤ 7	2582	4.25	.87	4.23	.01
	AUDIT ≥ 8	1187	4.16	.87	4.22	.02
Time 2						
	AUDIT ≤ 7	257	4.33	.84	4.28	.04
	AUDIT ≥ 8	117	4.05	.88	4.17	.06

Note: Low risk drinking status = AUDIT ≤ 7, Alcohol misuse status = AUDIT ≥ 8.

Alcohol and Unit cohesion. A one-way covariance (ANCOVA) analysis with Bonferroni confidence interval adjustment was used to analyse Hypothesis 4c (*see* Table 20). That is, personnel with low risk drinking behaviour (AUDIT ≤ 7) will report significantly greater levels of unit cohesion than those with alcohol misuse (AUDIT ≥ 8). Social support, leadership perception, relationship status, and resilience were included as a covariates to control for their potential confounding effect.

After controlling for covariates, a significant effect of unit cohesion on alcohol misuse at Time 1 was identified, $F(1, 3763) = 4.105$, $p = .04$, partial $\eta 2 = .001$. Post-hoc tests with Bonferroni confidence interval adjustment ($\alpha = .05$) were conducted to analyse pairwise differences between Unit cohesion means after adjusting for the effects of covariates. The subsequent test result shows that the personnel with alcohol misuse score .04 points lower in unit cohesion ($M = 4.06$) than personnel without ($M = 4.02$). This finding supports the hypothesis. At Time 2, after controlling for covariates, a non-significant impact of unit cohesion on Alcohol score at Time 2 was identified, $F(1, 368) = 1.41$, $p = .24$, partial $\eta 2 = .004$. This finding does not support the hypothesis; therefore, hypothesis 4c is only partially supported.

Table 20.
Comparison of Mean Unit Cohesion score by Alcohol Misuse Status at Time 1 and Time 2

Drinking Status		*M*	*SD*	*Adj. M*	*SE*
Time 1					
AUDIT ≤ 7	2582	4.09	.72	4.06	.01
AUDIT ≥ 8	1187	2.97	.71	4.02	.01
Time 2					
AUDIT ≤ 7	257	4.09	.72	4.05	.04
AUDIT ≥ 8	117	3.87	.79	3.98	.05

Note: M = Low risk drinking status = AUDIT ≤ 7, Alcohol misuse status = AUDIT ≥ 8.

Alcohol and Social Support. A one-way analysis of covariance (ANCOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 4d (see Table 21), which postulated that personnel with low risk drinking behaviour (AUDIT ≤ 7) will report significantly greater levels of social support than those with Alcohol misuse (AUDIT ≥ 8). Unit cohesion, leadership perception, relationship status, and resilience were included as covariates to control for their potential confounding effect.

After controlling for covariates, a significant effect of social support on alcohol misuse at Time 1 was identified, $F(1, 3763) = 9.32$, $p = .002$, partial $\eta 2 = .002$. Post-hoc tests with Bonferroni confidence interval adjustment ($\alpha = .05$) were conducted to analyse pairwise differences between social support means after these were adjusted for the effects of covariates. The subsequent test result shows that the personnel with alcohol misuse scored .09 points lower on the social support scale ($M = 4.05$) than personnel without ($M = 3.96$). This finding supports the hypothesis.

Contrary to the hypothesis, after controlling for covariates, a non-significant impact of social support on alcohol misuse was identified at Time 2, $F(1, 368) = 1.69$, $p = .68$, partial $\eta 2 = .000$. This finding does not support the hypothesis; therefore, hypothesis 4d is only partially supported.

Table 21
Comparison of Mean Social Support scored by Alcohol Misuse Status at Time 1 and Time 2

	Drinking Status	*N*	*M*	*SD*	*Adj. M*	*SE*
Time 1						
	AUDIT ≤ 7	2582	4.07	.82	4.05	.02
	AUDIT ≥ 8	1187	3.89	.84	3.96	.02
Time 2						
	AUDIT ≤ 7	257	4.22	1.0	4.19	.06
	AUDIT ≥ 8	117	4.16	.92	4.23	.09

Note: Low risk drinking status = AUDIT ≤ 7, Alcohol Misuse Status = AUDIT ≥ 8.

Hypothesis 5.

Hypothesis 5 explored the role of personal resources (i.e., social support, resilience, leadership, and unit cohesion) as moderators of the hypothesis 2 and hypothesis 4 associations. For hypothesis 2, the variables significantly related to alcohol misuse at Time 1 were psychological distress and trauma, while for hypothesis 4, the significant variables were PTS symptoms and loneliness. Consequently, factors not significantly associated with alcohol misuse in each hypothesis were not further analysed with concern to moderation effects.

Social support and Psychological Distress. Moderation analysis was conducted to investigate whether social support would moderate the relationship between psychological distress and alcohol misuse (Hypothesis 4b). The PROCESS SPSS macro was used to analyse the data. Before analysis, both predictors were centred around their means.

Altogether, the model was significant, $\chi^2(3, 3769) = 15.297$, $p = <.001$, Nagelkerke $R^2 = .031$. Table 22 illustrates the unstandardised regression coefficients. The results indicated a significant interaction, $p = <.001$. This moderating effect is shown in Figure 8. The graph demonstrates that the relationship between psychological distress and social support is stronger for individuals who score high on social support and weaker for individuals who scored moderate to low on social support. Table 23 presents the conditional effects for the association between alcohol misuse and psychological distress for the three levels of moderation: low (-1 SD below mean), medium (mean), and high (+1 SD above mean) levels of social support. The analysis revealed a significant positive association between social support and psychological distress when social support was high ($p = .01$), medium ($p = < .001$), and low ($p = <.001$). These results indicate that greater levels of social support amplify the impact of psychological distress on alcohol misuse.

Table 22.
Social Support as a Moderator of the Psychological Distress and Alcohol Misuse Association

Predictor	β	*SE*	*t*	*p*	95% CL	
					Low	Upper
Constant	-.75	.04	-20.49	.00***	-.83	-.68
K10 (A)	.04	.01	6.58	.00***	.03	.06
Social support (B)	-.21	.05	-4.49	.00***	-.29	-.12
A x B	.03	.01	3.88	.00***	.01	.04

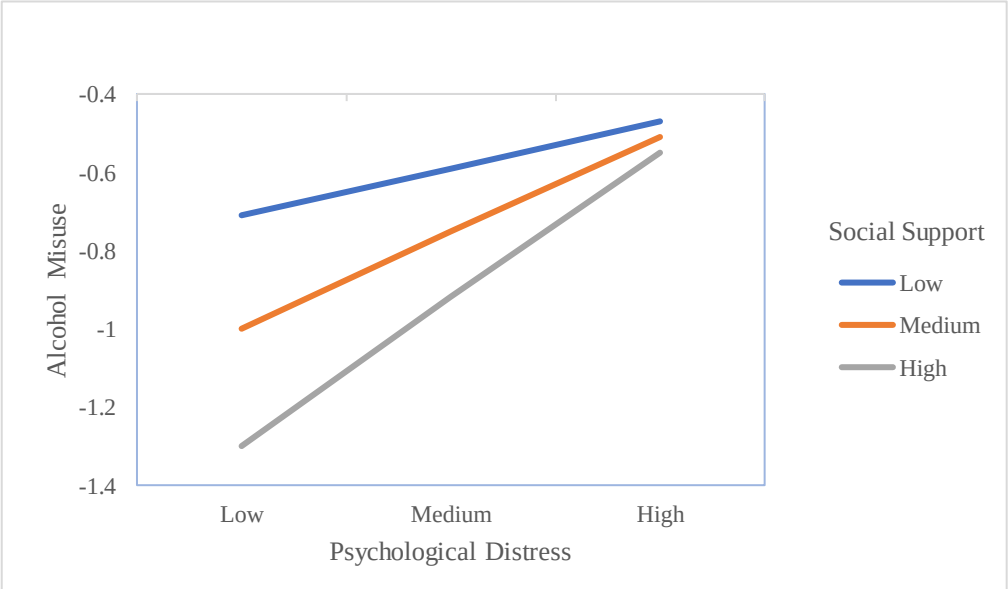
Note: K10 = Psychological Distress * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 23.
Conditional Effects of Psychological Distress on Alcohol Misuse

Social Support	β	*SE*	*t*	*p*	95% CL	
					Low	Upper
-1 SD	.02	.01	2.78	.01*	.01	.04
Medium	.04	.01	6.58	.00***	.03	.06
+1 SD	.07	.01	6.71	.00***	.05	.08

Note: * $p < .05$. ** $p < .01$. ***$p < .001$.

Figure 8.
Social Support Perception as a Moderator of Psychological Distress and Alcohol Misuse Relationship



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Unit Cohesion and Psychological Distress. Moderation analysis was conducted to ascertain whether unit cohesion would moderate the relationship between psychological distress and alcohol misuse (Hypothesis 4b). The PROCESS SPSS macro was used to analyse the data.

Altogether, the model was significant, $\chi^2(3, 3769) = 7.02$, $p = .01$, Nagelkerke $R^2 = .03$. Table 24 illustrates the unstandardised regression coefficients. The results indicated a significant interaction, $p = .01$, indicating that unit cohesion moderated the effect of psychological distress on alcohol misuse. This moderating effect is shown in Figure 9. Figure 9 demonstrates that the relationship between psychological distress and unit cohesion is stronger for individuals with higher unit cohesion and weaker for individuals who scored moderate or low on unit cohesion. Table 25 presents the conditional effects of the association between alcohol misuse and psychological distress for the three levels of the moderation: low (-1 SD below the mean), medium (mean), and high (+1 SD above the mean) levels of unit cohesion. The analysis revealed a significant positive association between alcohol misuse and psychological distress when unit cohesion was high ($p = < .001$), medium ($p = < .001$) and low ($p = < .001$). These results indicate that experiencing higher levels of unit cohesion amplifies the impact of psychological distress on alcohol misuse.

Table 24.
Unit Cohesion as a Moderator of the Psychological Distress and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-.76	.04	-20.60	.00***	-.83	-.69
K10 (A)	.05	.01	6.60	.00***	.03	.06
Unit Cohesion (B)	-.15	.05	-2.74	.01*	-.25	-.04
A x B	.02	.01	2.64	.01*	.01	.04

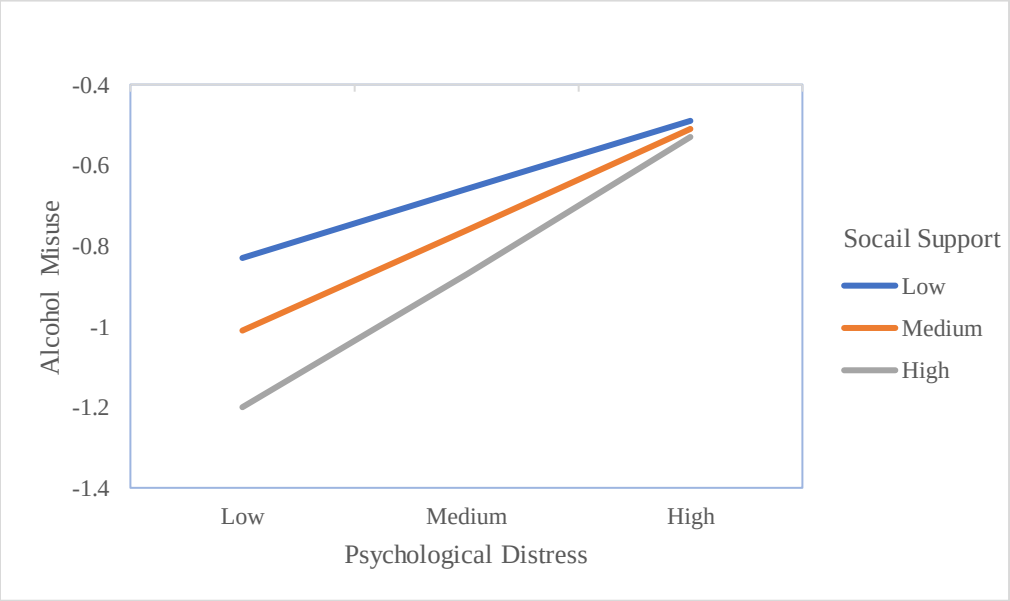
Note: K10 = Psychological Distress
* $p < .05$. ** $p < .01$. ***$p < .001$.

Table 25.
Conditional Effects of Psychological Distress on Alcohol Misuse

Unit Cohesion	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
-1 SD	.03	.01	3.97	.00***	.02	.05
Medium	.05	.01	6.60	.00***	.03	.06
+1 SD	.06	.10	6.01	.00***	.04	.08

Note: * $p < .05$. ** $p < .01$. ***$p < .001$.

Figure 9.
Unit Cohesion as a Moderator of the Psychological Distress and Alcohol Misuse Relationship



Leadership Perception and Psychological Distress. A moderation analysis was conducted to explore whether leadership perception influences the association between psychological distress and alcohol misuse at Time 1 (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro, with predictors centred around their means before analysis.

Overall, the model was significant, $\chi^2(1, 3769) = 4.26$, $p = .04$, Nagelkerke $R^2 = .02$. Table 26 illustrates the unstandardised regression coefficients. The results showed a

significant interaction effect, $p = .04$, indicating that leadership perception moderates the impact of psychological distress on alcohol misuse. Figure 10 shows how leadership perception moderates the relationship between psychological distress and alcohol misuse. Specifically, individuals with high leadership perception exhibit a stronger connection between psychological distress and alcohol misuse, while this link appears weaker among those with moderate or low leadership perception levels.

Table 27 presents the conditional effects for the association between alcohol misuse and psychological distress for the three levels of moderation: low (-1 SD below mean), medium (mean), and high (+1 SD above mean) levels of leadership perception. The analysis revealed a significant positive association between alcohol misuse and psychological distress when unit cohesion was high ($p = < .001$), medium ($p = < .001$) and low ($p = < .001$). This result indicates that experiencing higher levels of leadership perception, in addition to psychological distress, is likely to result in greater levels of alcohol misuse.

Table 26.
Leadership Perception as a Moderator of the Psychological Distress and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-.78	.04	-21.55	.00***	-.85	-.71
(A)	.05	.01	7.18	.00***	.03	.06
(B)	-.08	.04	-1.98	.05	-.16	-.00
A x B	.01	.01	2.06	.04	.00	.03

Note: * $p < .05$. ** $p < .01$. ***$p < .001$.

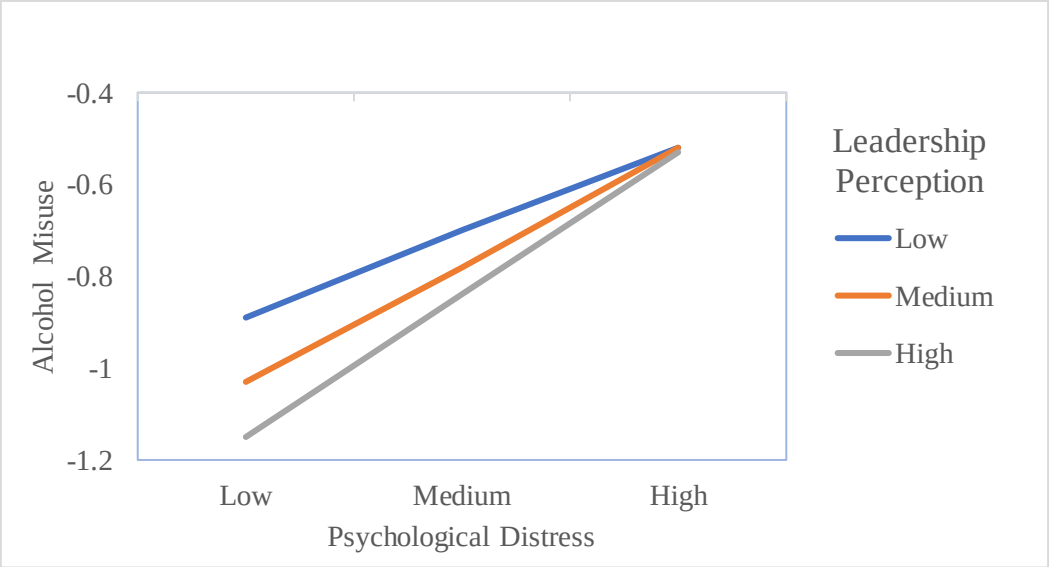
Table 27.
Conditional Effects of Psychological Distress on Alcohol Misuse

Social Support	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
-1 SD	.03	.01	4.25	.00***	.02	.05
Medium	.05	.01	7.18	.00***	.03	.06
+1 SD	.06	.01	6.38	.00***	.04	.07

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 10.

Perceptions of Leadership as a Moderator of Psychological Distress and Alcohol Misuse relationship at Time 1



Resilience and Psychological Distress. A moderation analysis was conducted to explore whether resilience moderates the relationship between psychological distress and alcohol misuse at Time 1. The data was analysed using the PROCESS SPSS macro, with predictors centred around their means before analysis. Overall, the model lacked statistical significance, $\chi^2(1, 3769) = .04$, $p = .84$, Nagelkerke $R^2 = .02$. The unstandardised regression coefficients are presented in Table 28. The analysis revealed a non-significant interaction effect, $p = .04$, suggesting that Resilience did not moderate the impact of psychological distress on alcohol misuse. This does not support the hypothesis.

Table 28.

Resilience as a Moderator of the Psychological Distress and Alcohol Misuse Association

Predictor	β	*SE*	Z	*p*	95% CL	
					Low	Upper
Constant	-.79	.04	-22.24	.00***	-.86	-.72
Psychological distress (A)	05	.01	7.45	.00***	.03	.06
Resilience (B)	-.08	.05	-1.76	.08	-.17	.01
A x B	-.00	.01	-.21	.84	-.02	.01

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Social support and Trauma. Moderation analysis was conducted to ascertain whether social support would moderate the relationship between trauma exposure and alcohol misuse (Hypothesis 4b). The PROCESS SPSS macro was used to analyse the data with predictors centred around their means before analysis.

Overall, the model had no statistical significance, $\chi^2(1, 3769) = 1.09$, $p = .29$, Nagelkerke $R^2 = .02$. The unstandardised regression coefficients are presented in Table 29. The interaction effect was not statistically significant ($p = .29$), indicating that social support did not moderate the effect of trauma exposure on alcohol misuse. This does not support the hypothesis.

Table 29.
Social Support as a Moderator of the Trauma and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-.79	.04	-22.16	.00***	-.86	-.72
Trauma (A)	.12	.03	4.28	.00***	.07	.17
Social support (B)	-.24	.04	-5.76	.00***	-.33	-.16
A x B	.03	.03	1.05	.29	-.03	.10

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Unit Cohesion and Trauma. A moderation analysis was conducted to ascertain whether unit cohesion would moderate the relationship between trauma exposures and alcohol misuse (Hypothesis 4b). The PROCESS SPSS macro was used to analyse the data, with predictors centred around their means before analysis.

The model did not achieve statistical significance, $\chi^2(1, 3769) = 2.68$, $p = .10$, Nagelkerke $R^2 = .02$. Table 30 illustrates the unstandardised regression coefficients. The interaction effect was statistically non-significant ($p = .10$), indicating that unit cohesion did not moderate the effect of trauma exposure on alcohol use.

Table 30.
Unit Cohesion as a Moderator of the Trauma and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-.78	.04	-22.09	.00***	-.85	-.71
Trauma Exposure (A)	.12	.03	4.38	.00***	.07	.18
Unit Cohesion (B)	-.23	.05	-4.60	.00***	-.32	-.13
A x B	.06	.04	1.65	.10	-.01	.13

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Leadership Perception and Trauma Exposures. Moderation analysis was conducted to ascertain whether leadership perception would moderate the relationship between trauma exposures and alcohol misuse (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro, with predictor variables centred around their means before analysis.

Overall, the model did not demonstrate statistical significance, $\chi^2(1) = 1.42$, $p = .23$, Nagelkerke $R^2 = .01$. Table 31 displays the unstandardised regression coefficients. The interaction effect did not reach statistical significance ($p = .23$). This suggests that leadership perception did not moderate the impact of trauma exposure on alcohol use. This finding does not support the hypothesis.

Table 31.
Leadership Perception as a Moderator of the Trauma and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-.782	.035	-22.145	.00***	-.85	-.71
Trauma Exposure (A)	.126	.028	4.532	.00***	.07	.18
Leadership Perception (B)	-.119	.040	-2.995	.00**	-.20	-.04
A x B	.036	.30	1.192	.23	-.02	.10

* $p < .05$. ** $p < .01$. *** $p < .001$.

Resilience and Trauma Exposures. A moderation analysis was conducted to establish whether resilience moderates the relationship between trauma exposures and alcohol misuse at Time 1 (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro, with predictor variables centred around their means before analysis.

Overall, the model was significant, $\chi^2(1, 3769) = 6.25$, $p = .01$, Nagelkerke $R^2 = .01$. Table 32 illustrates the unstandardised regression coefficients. The interaction effect, $p = .01$, indicates that the relationship between trauma exposure and alcohol misuse is moderated by resilience. Specifically, higher levels of resilience appear to buffer the impact of trauma exposure on alcohol misuse, while lower levels of resilience exacerbate this relationship (see Figure 11.).

Table 31 presents the conditional effects of the association between alcohol misuse and trauma exposure for the three levels of moderation: low (-1 SD below the mean), medium (mean), and high (+1 SD above the mean) levels of resilience. The analysis revealed a significant positive association between alcohol misuse and trauma exposure when resilience was high ($p = < .001$) and medium ($p = < .001$), but not when resilience was low ($p = .11$). This result indicates that experiencing higher levels of resilience, in alongside trauma exposures is likely to result in higher levels of alcohol misuse.

Table 32.
Resilience as a Moderator of the Trauma Exposures and Alcohol Misuse Association

Resilience	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-.78	.04	-22.18	.00***	-.85	-.71
Trauma Exposures (A)	.13	.03	4.70	.00***	.08	.18
Resilience (B)	-.08	.05	-1.84	.07	-.17	.01
A x B	.09	.04	2.49	.01*	-.02	.16

* $p < .05$. ** $p < .01$. *** $p < .001$.

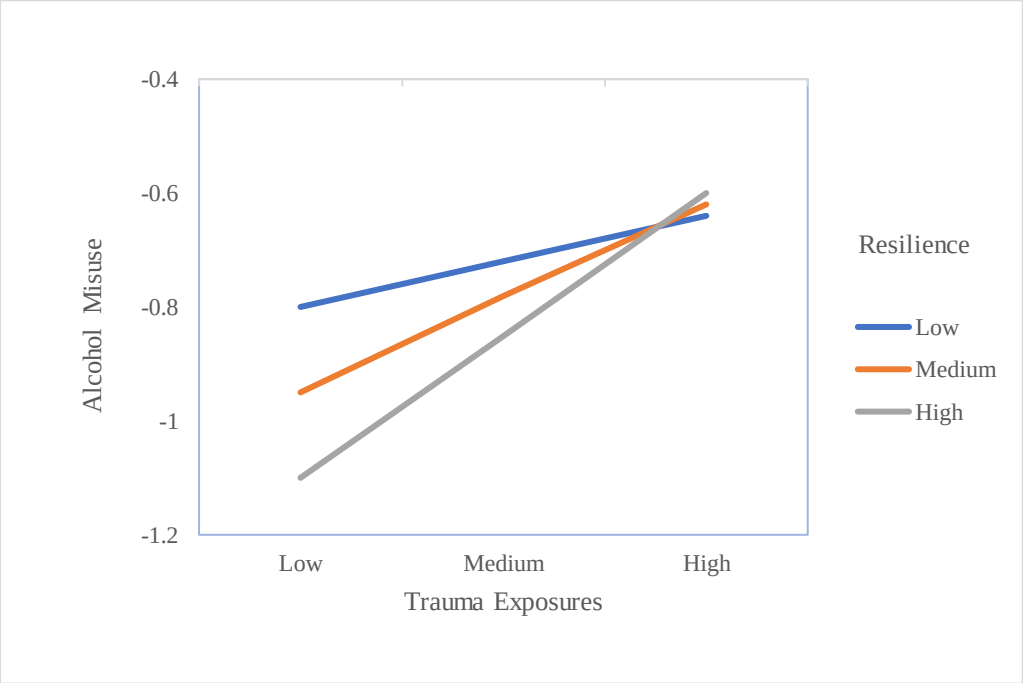
Table 33.
Conditional Effects of Trauma Exposures on Alcohol Misuse

Resilience	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
-1 SD	.06	.04	1.62	.11	-.01	.14
Medium	.13	.03	4.70	.00***	.08	.18
+1 SD	.20	.04	4.943	.00***	.12	.27

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 11.

Resilience as a Moderator of the relationship between Trauma Exposures and Alcohol Misuse Time 1



Social Support and PTS. Moderation analysis was conducted to explore whether baseline social support would moderate the relationship between PTS at Time 1 and alcohol misuse at Time 2 (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro, with predictor variables centred around their means before analysis. Overall, the model lacked statistical significance, $\chi^2(1, 374) = .88$, $p = .35$, Nagelkerke $R^2 = .05$. Table 34 illustrates the unstandardised regression coefficients. The results demonstrated a non-significant interaction effect ($p = .35$), indicating that social support at Time 1 did not moderate the effect of PTS at Time 1 on alcohol use at Time 2. This finding does not support the hypothesis.

Table 34.
Social Support as Moderator of the PTS and Alcohol Use Relationship

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-1.07	.27	-3.94	.00***	-1.60	-.54
PTS (A)	.04	.02	2.17	.03*	.00	.07
Social Support (B)	-.03	.16	-.18	.86	-.34	.29
A x B	-.02	.02	-.93	.35	-.04	.02

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Leadership perception and PTS symptoms. Moderation analysis was conducted to ascertain whether leadership perception would moderate the relationship between psychological distress and alcohol misuse (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro, with predictor variables centred around their means before analysis. Overall, the model lacked statistical significance, $\chi^2(1, 374) = 3.08$, $p = .08$, Nagelkerke $R^2 = .05$. Table 35 illustrates the unstandardised regression coefficients. The results indicated a non-significant interaction effect ($p = .08$), indicating that social support at Time 1 did not moderate the effect of PTS at Time 1 on alcohol use at Time 2. This finding does not support the hypothesis.

Table 35.
Leadership Perception as a Moderator of the PTS symptoms and Alcohol Use relationship

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-1.04	.27	-3.88	.00***	-1.6	-.52
PTS (A)	.04	.02	2.38	.02*	.06	.07
Leadership Perception (B)	-.13	.13	-1.01	.31	-.39	.13
A x B	.03	.01	1.71	.09	-.00	.05

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Unit Cohesion and PTS. Moderation analysis was conducted to ascertain whether unit cohesion would moderate the relationship between PTS and alcohol misuse (Hypothesis 4b). The data were analysed using the PROCESS SPSS macro, with predictor variables centred around their means before analysis. Overall, the model lacked statistical significance, $\chi^2(1,$

374) = .108, p = .74, Nagelkerke R^2 = .04. Table 36 illustrates the unstandardised regression coefficients. The interaction effect was statistically non-significant (p = .91), indicating that unit cohesion at baseline did not moderate the effect of PTS symptoms at baseline on alcohol use at follow-up.

Table 36.
Unit Cohesion as a Moderator of the PTS Symptoms and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-1.03	.27	-3.81	.00***	-1.56	-.50
PTS (A)	.04	.02	2.23	.03*	.01	.07
Social Support (B)	-.04	.17	-.22	.83	-.37	.29
A x B	.01	.02	.33	.74	-.03	.04

Note: * p < .05. ** p < .01. *** p < .001.

Resilience and PTS. Moderation analysis was conducted to ascertain whether unit cohesion would moderate the relationship between PTS and alcohol misuse (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro, with predictor variables centred around their means before analysis. The model lacked statistical significance: $\chi^2(1, 374)$ = .011, p = .92, Nagelkerke R^2 = .035. Table 37 illustrates the unstandardised regression coefficients. The interaction effect lacked statistical significance (p = .92), indicating that Resilience at baseline did not moderate the impact of PTS at baseline on alcohol misuse at follow-up.

Table 37.
Resilience as a Moderator of the PTS Symptoms and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-1.04	.27	-3.88	.00***	-1.57	-.51
PTS (A)	.04	.02	2.34	.02*	.01	.07
Resilience (B)	.13	.14	.89	.37	-.16	.41
A x B	-.00	.02	-.10	.92	-.03	.03

Note: * p < .05. ** p < .01. *** p < .001.

Social Support and Loneliness. Moderation analysis explored whether baseline social support would moderate the relationship between loneliness at Time 1 and alcohol misuse at Time 2 (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro. Overall, the model lacked statistical significance, $\chi^2(1, 374) = .28$, $p = .60$, Nagelkerke $R^2 = .03$. Table 38 illustrates the unstandardised regression coefficients.

The results indicated a non-significant interaction effect ($p = .60$), indicating that social support at Time 1 did not moderate the impact of loneliness at Time 1 on alcohol use at Time 2. This finding does not support the hypothesis.

Table 38.
Social Support as Moderator of the Loneliness and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-2.00	.46	-4.34	.00***	-2.90	-1.10
Loneliness (A)	.58	.27	2.13	.03*	.05	1.11
Social Support (B)	-.14	.21	-.64	.52	-.56	.28
A x B	.16	.31	.52	.60	-.45	.77

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Leadership Perception and Loneliness. Moderation analysis explored whether baseline social support would moderate the relationship between loneliness at Time 1 and alcohol misuse at Time 2 (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro. Overall, the model lacked statistical significance, $\chi^2(1, 374) = .18$, $p = .72$, Nagelkerke $R^2 = .03$. Table 39 illustrates the unstandardised regression coefficients. The results indicated a non-significant interaction effect ($p = .72$), indicating that leadership perception at Time 1 did not moderate the effect of loneliness at Time 1 on alcohol use at Time 2. This finding does not support the hypothesis.

Table 39.
Leadership Perception as a moderator of the Loneliness and Alcohol Misuse Relationship

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-1.96	.46	-4.26	.00***	-2.9	-1.06
Loneliness (A)	.56	.26	2.16	.03*	.05	1.07
Leadership Perception (B)	-.05	.19	-.25	.80	-.41	.32
A x B	-.09	.26	-.35	.72	-.59	.41

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Unit cohesion and Loneliness. Moderation analysis explored whether baseline social support would moderate the relationship between loneliness at Time 1 and alcohol misuse at Time 2 (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro with predictor variables. Overall, the model lacked statistical significance, $\chi^2(1, 374) = .367$, $p = .55$, Nagelkerke $R^2 = .03$. Table 40 illustrates the unstandardised regression coefficients. The results indicated a non-significant interaction effect ($p = .55$), indicating that unit cohesion at Time 1 did not moderate the effect of loneliness at Time 1 on alcohol use at Time 2. This finding does not support the hypothesis.

Table 40.
Unit Cohesion as a Moderator of the Loneliness and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-1.97	.47	-4.22	.00***	-2.89	-1.06
Loneliness (A)	.57	.26	2.18	.03*	.06	1.08
Leadership Perception (B)	.09	.24	.33	.74	-.39	.55
A x B	-.19	.32	-.61	.55	-.82	.43

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Resilience and Loneliness. Moderation analysis explored whether baseline social support would moderate the relationship between loneliness at Time 1 and alcohol misuse at Time 2 (Hypothesis 4b). The data was analysed using the PROCESS SPSS macro. Overall, the model lacked statistical significance, $\chi^2(1, 374) = .21$, $p = .64$, Nagelkerke $R^2 = .04$. Table 37 illustrates the unstandardised regression coefficients. The results indicated a non-

significant interaction effect ($p = .64$), indicating that resilience at Time 1 did not moderate the effect of Loneliness in Time 1 on alcohol misuse at Time 2. This finding does not support the hypothesis.

Table 41.
Resilience as a Moderator on the Loneliness and Alcohol Misuse Association

Predictor	β	*SE*	*Z*	*p*	95% CL	
					Low	Upper
Constant	-2.01	.46	-4.38	.00***	-2.91	-1.11
Loneliness (A)	.56	.26	2.13	.03*	.05	1.07
Resilience (B)	.06	.21	.260	.80	-.36	.47
A X B	.13	.29	.458	.65	-.44	.70

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 6

Alcohol Use Over Time. A repeated measured analysis of variance (ANOVA) with Bonferroni confidence interval adjustment was used to analyse Hypothesis 6, which posited a decrease in alcohol consumption over time. Contrary to the hypothesis, the analysis revealed a non-significant difference in mean alcohol use between the two time points, $F(1, 373) = .01$, $p = .92$. Therefore, Hypothesis 6, which predicted a decrease in alcohol consumption over time, is not supported.

Table 42.
Alcohol Consumption Over Time

AUDIT	*N*	*M*	*SD*
Time 1	3769	6.29	.23
Time 2	375	6.33	.22

CHAPTER FIVE

5. Discussion

5.1 Overview

The current study aimed to 1) identify which NZ military personnel were most vulnerable to the development of alcohol misuse and 2) identify the risk and protective factors of alcohol misuse for NZ military personnel. In doing so, it sought to fill a gap in the scientific literature.

The current study had six key findings. First, a significant correlation was found between psychological distress at Time 1 and subsequent alcohol misuse. Second, trauma exposures at Time 1 appeared to be a significant predictor of alcohol misuse within this same time point. Third, PTS at baseline predicted alcohol misuse at Time 2. Fourth, Loneliness at baseline predicted alcohol misuse at follow-up. Fifth, this study revealed that social support, including unit cohesion and leadership perception, acted as moderators in the association between psychological distress and alcohol misuse. Lastly, this study showed that resilience emerged as a moderator of the association between baseline trauma exposures and subsequent alcohol misuse.

This study expands knowledge and understanding of the risk and protective factors of alcohol misuse among NZDF service personnel and contributes to international literature. Its implications highlight areas where the NZDF could refine its personnel's education, training, support provisions, and policies.

5.2 Primary Findings

Demographics.

Gender. In the current study, there were significant gender differences observed in alcohol use, with Male participants reporting significantly higher AUDIT scores than

females. This gender difference is consistent with the findings of Brown et al. (2010), Fear et al. (2007), and Waller et al. (2015) and aligned with this study's hypothesis.

Age. Based on trends found in both military and general population samples (Ahacic et al., 2014; Grant et al., 2004; Greenfield & Rogers, 1999; Li et al., 2004; McEvoy et al., 2013; Moos et al., 2009; Towers et al., 2018; Welty et al., 2019) this study hypothesised that younger NZDF personnel would be more likely to misuse alcohol than older personnel. Corresponding with existing literature, this study supported this hypothesis. Examining age groups from 17 to 60 years old showed that those aged 17-29 years old were more likely to misuse alcohol compared to other age groups. These findings are consistent with the NZ general population (MOH et al., 2021). These disparities likely stem from the types of social and recreational activities undertaken in younger age groups and even the differences in domestic obligations.

Relationship Status. This study found that participants in a relationship (i.e., married, in a civil union or in a de facto relationship) reported lower AUDIT scores than participants who were not. This finding aligns with existent research by Bray et al. (2003), Iversen et al. (2008) and Waller et al. (2015), which found that being in a relationship was a protective factor for alcohol misuse. Being coupled most likely acts as a protective factor, providing enhanced resources and encouraging changes in social and recreational activities.

Ethnicity. Consistent with the hypothesis, Māori and Pacific Islanders had significantly higher AUDIT scores than New Zealand Europeans, Other Europeans, and Asians. This aligns with existing research indicating higher alcohol consumption rates among Māori and Pacific populations in New Zealand (MOH, 2023). However, contrary to the hypothesis, the Other ethnicity group AUDIT scores did not differ significantly from Māori and Pacific Islanders. This could be due to similar acculturation stressors and socio-economic disadvantages experienced by minority groups, which may contribute to comparable drinking

patterns. Consistent with the hypothesis, the Asian ethnic group scored the lowest on the AUDIT. This difference was significant compared to Māori, Pacific Islanders, and the Other ethnic groups. This outcome may be attributed to genetic factors, such as a common gene mutation of the enzyme aldehyde dehydrogenase in this population. This mutation contributes to unpleasant reactions to alcohol and, subsequently, lower drinking rates (Klatsky et al., 1983; Zhang et al., 2024). Alternatively, cultural factors, such as different social norms, cultural values and attitudes towards alcohol consumption in Asian communities, may also play a role (Iwamoto et al., 2016).

Rank. Consistent with existing research (Ames & Cunradi, 2004; Brown et al., 2010; Waller et al., 2015), the results indicated that alcohol misuse did vary significantly between lower-ranked personnel and higher-ranked personnel. The analysis controlled for age, as it was anticipated that an increase in age would be associated with an increase in rank. After controlling for age, this study found that lower ranks, particularly Junior NCOs, scored significantly higher on the AUDIT than Senior NCOs. However, there were no significant differences between Junior NCOs and the other ranks, including Junior Officers, Mid-ranked Officers, Senior Officers, and Executive Officers.

Service. In general, Navy personnel are more prone to alcohol misuse compared to those in the Army and Air Force, which partially supported the initial hypothesis. Unexpectedly, the Air Force exhibited higher AUDIT scores than the Army, contrary to expectations based on previous research indicating fewer alcohol problems among Air Force personnel (Bray & Hourani, 2007; Fear et al., 2007). Discrepancies in alcohol misuse among the services may be attributed to differences in subcultures and work environments specific to each branch. Additionally, variance in operational deployment across services could impact drinking behaviours (Rona et al., 2007; Thandi et al., 2015).

Deployment. While previous research, such as studies by Campbell-Sills et al. (2018), Erbes et al. (2017), and Harbertson et al. (2016), has indicated a heightened risk of alcohol misuse associated with deployment, our current study did not find a significant difference in alcohol misuse between individuals with deployment experience and those without. The lack of a significant association in our findings could be attributed to the nature of the deployment-related questions utilised in this study. Contrary to other research indicating a connection between deployment and subsequent alcohol misuse (Campbell-Sills et al., 2018; Erbes et al., 2017; Harbertson et al., 2016), this investigation focused on a lifetime assessment of deployment, and as such, it is conceivable that the impact of deployment on alcohol consumption may not be enduring. Some research has suggested that alcohol misuse may occur post-deployment (Jacobson et al., 2008). However, the measure in these studies assessed the relationship of deployment on alcohol use following return from deployment, and therefore capturing short-term rather than long term impacts.

Risk Factors.

Loneliness. The data revealed no significant differences in loneliness between low-risk drinkers and personnel with alcohol misuse at both time points. These results diverge from those of Williamson et al. (2023), who found that lonely veterans had a higher incidence of alcohol misuse. While the initial cross-sectional analyses did not associate alcohol misuse with loneliness, baseline loneliness emerged as a predictor of alcohol misuse three years later. This association between loneliness and alcohol misuse over time may reflect a method for personnel to cope with difficult emotions. For example, a person's resilience may be weakened by cumulative stress and unpleasant experiences connected to loneliness, increasing their vulnerability to alcohol use as a maladaptive stress-reduction strategy.

Indeed, other studies indicate that people may turn to alcohol to cope with loneliness (Ames & Cunradi, 2004; Williamson et al., 2023).

Trauma. The data revealed that trauma exposures were associated with alcohol misuse. Specifically, at baseline, personnel with alcohol misuse scored higher in trauma exposures than those without. The relationship between trauma exposure and alcohol misuse may reflect a method for personnel to regulate difficult emotions. Indeed, prior research has suggested that alcohol use may represent an effort to self-medicate distress (Maguen et al., 2019; Maguen et al., 2010; Suris & Lind, 2008). Contrary to expectation, at Time 2, this study did not find an association between trauma exposure and alcohol misuse. This finding suggests that as the participants aged, their drinking habits and motivations to drink evolved, potential indicating changes in individuals' coping mechanisms or motivations to consume alcohol over time.

Despite previous research indicating a longitudinal link between trauma exposure and the onset of alcohol misuse (Hooper et al., 2008; Kline et al., 2014), this study did not find a significant association. The unexpected finding may suggest that individuals turned to alcohol as a short term coping strategy, or perhaps that the effects of trauma diminished over time leading to a reduced reliance on alcohol to cope. Alternatively, as participants aged, they may have developed new coping mechanisms that mitigated the impact of trauma on their alcohol consumption over time.

PTS and Alcohol Use. While trauma is closely linked with PTS, and PTS symptoms arise following exposure to traumatic events, upon examination, no significant association between PTS and alcohol misuse was found at either time point. However, data from longitudinal regression analysis found that baseline PTS symptoms significantly predicted alcohol misuse at Time 2. This finding is consistent with prior research indicating that

individuals experiencing PTS symptoms may turn to alcohol to self-medicate symptoms (Capone et al., 2013; Marshall et al., 2012; Thandi et al., 2015).

Psychological Distress. In line with previous literature, the data revealed that psychological distress is associated with alcohol misuse. Specifically, at baseline, personnel with alcohol misuse scored higher in distress than those without. This result is consistent with prior research indicating a strong association between alcohol misuse and psychological distress (Lee et al., 2020; Smith et al., 2014; Thandi et al., 2015). However, when examining the Time 2 data, the relationship between alcohol misuse and psychological distress was not significant. Changes in individual circumstances may explain the unexpected null finding at Time 2. For instance, over time, individuals may have developed more adaptive coping strategies, which could reduce the negative impact of psychological distress on alcohol use.

Similarly, prior longitudinal studies have shown that psychological distress precedes the onset of alcohol misuse (Kaine, 2016; Smith et al., 2014; Thandi et al., 2015), but the current study's findings deviated from this expectation. Contrary to the hypothesis, psychological distress symptoms at Time 1 did not predict alcohol misuse longitudinally at Time 2. This deviation may imply that individuals experiencing psychological distress use alcohol as a short-term coping mechanism. However, they may develop alternative coping strategies over the three years. Another explanation is that the initial distress may have been alleviated, resulting in a weakened association between psychological distress at Time 1 and alcohol misuse at Time 2.

Protective Factors.

Resilience. Previous literature has reported significant associations between resilience and alcohol misuse. In this study, no between group differences were found at Time 1 or 2, indicating that resilience was not directly associated with alcohol misuse. Notably, an indirect

association was found where resilience moderated the relationship between trauma exposures and alcohol misuse. Specifically, at Time 1, as trauma exposures increased, personnel with medium levels of resilience experienced an increase in alcohol misuse. This increase was even more severe for those with high levels of resilience. However, for personnel with low resilience, this increase in trauma exposures did not present the same risk; the change in alcohol misuse was not significant. This finding is contrary to the previous research literature (Cusack et al., 2023), suggesting greater resilience plays a role in buffering the impacts of trauma on alcohol misuse. A possible explanation for this finding is that resilient individuals have greater expectations for their coping abilities and when their expectations are unmet, they may turn to alcohol as a coping mechanism. Another possibility is that resilient individuals have greater social support, which could mean higher exposure to environments where alcohol is consumed.

Social Support. Previous literature has reported a significant correlation between social support and alcohol misuse (Bailey et al., 1994; Cohen & Syme, 1985; Eisen et al., 2014; Skomorovsky, 2014). Findings from this study showed a significant correlation between social support and alcohol misuse at baseline. Specifically, personnel with less social support are more likely to misuse alcohol. This finding highlights the potential impact of social connections on drinking behaviours. In such cases, individuals may turn to alcohol as a coping mechanism when they do not have adequate support from their social circles. Similarly, Unit cohesion significantly correlated with alcohol misuse at baseline, where personnel with probable alcohol misuse scored significantly lower in unit cohesion compared to those with low risk drinking habits. This finding supports other studies that have found unit cohesion acts as a protective factor against alcohol misuse (Breslau et al., 2016; Browne et al., 2008). Conversely, leadership perception was not significantly associated with alcohol misuse at either time point.

Additionally, this study found that the association between psychological distress and alcohol misuse was moderated by social support, unit cohesion, and leadership perception. The impact of psychological distress on military alcohol misuse at Time 1 appears to be exacerbated by more substantial support. This study suggests that social support functions as a risk factor under stress. This finding might seem contradictory given that greater levels of support have been linked to reduced alcohol use, particularly among individuals experiencing psychological distress symptoms (e.g., Howard et al., 2022; Kelley et al., 2017; Peirce et al., 1996; Segrin & Cooper, 2021). However, as studies have observed permissive attitudes toward alcohol use as a way to cope with stress within the armed forces (Ames et al., 2004; Bravo et al., 2017), these results may reflect how military culture influences social behaviour. Another explanation is that greater social support provides increased opportunities for social situations involving alcohol.

Alcohol Use over Time

The result showed no significant difference in mean alcohol use between baseline and follow up. This finding suggests that there was no apparent change in alcohol consumption between Time 1 and Time 2. Various factors may influence this unexpected result. For instance, an increase in PTS symptoms or distress levels during this period may have counteracted any anticipated decrease in alcohol use, resulting in the observed lack of significant change.

5.3 Limitations of the Current Study

This investigation provided valuable information regarding the risk and protective factors of alcohol use. However, a few limiting factors worth mentioning include the use of a

non-probability sample, self-report questionnaires, attrition, and the use of an existing dataset. These limitations have been examined.

This study employed a non-probability sampling method, which is susceptible to sampling bias. The questionnaire relied on volunteers, therefore the sample comprised only individuals willing to participate. This self-selection bias undermines the generalisability of the findings as the characteristics of participants may differ from those who chose not to participate. Consequently, segments of the population that are difficult to reach are not represented in this study, thereby limiting the applicability of its findings to those groups.

Moreover, there is an exclusive reliance on self-report questionnaires for data collection. Self-report questionnaires are suspectable to various biases. Significant correlations, or lack thereof, could result from biases and response tendencies among respondents. Due to the sensitive nature of the collected information, responding honestly to items may have appeared threatening to some participants. Consequently, questions perceived as threatening may have been answered in a socially desirable way. While tools like The Balanced Inventory of Desirable Responding (Paulus, 1999) exist to assess such response styles, they were not included in this questionnaire. This decision was made to avoid lengthening the questionnaire and potentially impacting its reliability by increasing invalid responses and reducing completion rates. Anonymity was adopted to encourage honest responses; however, this approach had limitations. The anonymous nature of the survey required participants to provide a personal anonymous research code to facilitate the longitudinal tracking of their data. However, many individuals did not, reducing the final survey participants count at Time 1. The longitudinal design of this study also introduced attrition, with numerous participants completing the first questionnaire but not the subsequent one. Attrition can impact the reliability and validity of research findings. Other possible forms of bias may have included memory biases, such as consistency bias, where participants

may have incorrectly remembered past behaviour as resembling their present behaviour; representativeness heuristic bias, where respondents may have reported behaviours that were more consistent with their self-concept rather than their actual occurrences and availability heuristic, where respondents may have reported infrequent events based on recency and vividness. This investigation may also be susceptible to acquiescence bias as measures in the survey lacked reversed items that force respondents to disagree with an item measuring a related construct. While some measures in this study included reversed items, these items alone are unlikely to have mitigated acquiescence bias completely, as there were very few throughout the questionnaire. This bias would be best addressed by including reverse-scored items.

Finally, this study involved the analysis of an existing dataset, which presented certain limitations. Because of the inherent constraints of archival data, not all factors of interest could be included. Likewise, some measures, such as the PTS and social support variables, changed beyond the researcher's control between Time 1 and 2. Such changes may have impacted the consistency of the results. Furthermore, the measures of loneliness, social support (Time 2), leadership, and unit cohesion were not established assessments. Instead, these measures were developed for internal use within the NZDF. While these measures demonstrated favourable Cronbach’s alpha scores, the absence of prior validation studies limits the confidence that can be placed in the findings. These limitations highlight potential directions for future research.

5.4 Implications and Future Research Directions

The present study emphasised the pivotal role of psychological distress, PTS loneliness, and trauma exposures as risk factors for alcohol misuse, based on a sample of New Zealand Military personnel. Early detection and intervention regarding these factors

may serve as effective strategies to prevent the escalation of alcohol misuse and the development of AUD. Interventions aimed at addressing alcohol misuse should address these underlying factors, focusing on efforts to mitigate loneliness, psychological distress, trauma exposures, and PTS symptoms, as well as enhancing awareness about mental health and alcohol use. Fostering a supportive environment and encouraging open discussions about mental health and alcohol use is essential. This could be achieved through psychoeducation programs.

The findings from this research suggest that NZDF personnel might turn to alcohol as a coping mechanism or for its perceived enhancing effects. Future studies might consider investigating how personal drinking motivations influence alcohol use. Likewise, intervention and treatment programs should address how personal drinking motives influence drinking behaviours. Strategies should be developed to equip personnel with tools to identify situations in which they may be more vulnerable (i.e., motivated) to use alcohol as a form of self-medication or mood enhancement in response to stress. Helping personnel critically assess the legitimacy of these motivations is essential. This could be achieved through psychoeducation programs that help NZDF personnel understand the association between their alcohol use and their motives (such as coping and enhancement).

The results of this research emphasise the potential benefit of improving social support among NZDF personnel. Social support and unit cohesion emerged as primary contributors to variance in alcohol misuse. Personnel with greater levels of social support and unit cohesion were less likely to misuse alcohol. These findings highlight the value of fostering support networks within the NZDF to reduce the incidence of alcohol misuse. Future research could benefit from incorporating validated measures of social support, including unit cohesion and leadership perception, to explore these dynamics further.

This study used an existing data set to investigate the risk and protective factors of alcohol misuse. Variables, such as motives for drinking (e.g., coping, enhancement, social, and conformity motives), types of support (e.g., family, friends, coworkers), education status, socio-economic status, and other stressors experienced by service members (e.g., those related to family, health, and financial concerns) would provide more significant insights to alcohol misuse within the NZDF.

Future research should also use a mixed method design to enhance our understanding of the factors influencing alcohol consumption in the NZDF. A mixed method approach would help build a comprehensive understanding of alcohol consumption among NZDF personnel. This greater understanding could lead to new insights to help improve the mental health and behaviour of defence personnel.

Lastly, the use of non-probability sampling in this study affects the reliability of results as the sample may not accurately represent the population of interest. Probability sampling should be used in future studies to guarantee that samples closely resemble the population, enhancing the validity of research findings.

5.5 Conclusions

This study contributes to a body of literature committed to increasing the understanding of the risk and protective factors for alcohol misuse within a sample of NZDF personnel. The present study sought to offer a New Zealand perspective, as existing literature on alcohol misuse among military personnel is predominantly centred around the American and British Forces. This is important given the distinct culture, experiences, and environment within the NZDF.

This research has drawn attention to the complex matrix of risk and protective factors that contribute to alcohol misuse in NZDF military personnel. Prevention and intervention

efforts should focus on enhancing adaptive coping strategies and educating personnel on the association between their motivations for their alcohol use. These strategies help personnel manage challenges better and reduce the likelihood of turning to alcohol as a coping mechanism. Knowledge gained from this study can inform targeted interventions that aim to mitigate alcohol misuse. This study provided valuable direction for future research and information for more effective alcohol misuse prevention and intervention efforts.

Appendix A
Information Sheet

NZDF Health and Wellbeing Survey

What is this survey about?

The health and wellbeing of NZDF members is an important part of how we perform as a team, and an organisation. The aim of this survey is to get a picture of the current health and wellbeing of our people so that we may better understand and identify any areas of need. This is a key step in helping keep our people safe and well.

What is involved in the survey?

The survey will take most people no more than 20 minutes to complete. There is an additional section on deployments that will require a little extra time if you have been deployed.

The survey is **anonymous** and no attempt will be made to identify you. This is because we ask some sensitive questions and it is important you feel comfortable answering these honestly and without worrying about being identified. However, because the survey is anonymous we do ask that you provide some basic demographic information at the end of the survey to help us understand patterns of health and wellbeing across different groups.

What questions will be asked?

There are six sections in the survey – these ask about your overall wellbeing, life experiences, resilience, your job, physical health and attitudes about help seeking. The job section includes questions about deployments that you can skip if you have never been deployed. You can find feedback about how you are doing in two areas of wellbeing at the end of the survey.

Some questions are of a personal nature and you do not have to answer these if you do not want to. If you find involvement in this survey distressing or if you have concerns about your health and wellbeing or that of someone else, information about a range of support options available is provided at the end of this survey.

What do we do with the information?

The data will be collected, collated and reported at an aggregated level. The information collected in the survey will be used for internal and external research projects approved by the NZDF and may also form the basis of reports and academic publications. A summary of the results of the survey and any key areas for action identified will be communicated by the end of the year, and a summary of findings will be released externally in early 2017. If you would like to be sent a summary of the results, please email healthcheck@nzdf.mil.nz.

How will we maintain your privacy?

This research is being conducted in accordance with the Privacy Act (1993) and DFO 3 14[5] Authority to Conduct Personnel Research and has been approved by CDF. Data from paper copies of the survey will be entered into a database and then the copies will be destroyed. Your personal data will not be identifiable. The full database will be securely, electronically stored and will only be accessible by the research team. The database will be retained as part of a longitudinal research study which you will find more information about at the end of this survey. By completing this survey you are giving your consent for your personal information to be used for the purpose and in the manner described above.

Why should I participate?

Your contribution is important to helping build a current and accurate picture of health and wellbeing across the NZDF and to inform decisions that aim to improve health and wellbeing for all NZDF staff. Nevertheless the survey is voluntary and you may decide not to take part or withdraw from the study without any disadvantage to yourself of any kind.

Please complete all sections by following the instructions at the beginning of each question.

Note:
The information collected in this survey is Unclassified and while the survey is anonymous, you must not disclose sensitive or classified information.
Some questions may seem a little repetitive, but this is necessary due to the questions being grouped into scales.
The term *'organisation'* is used throughout the survey and refers to the unit that you are currently employed with.
If you would like more information about the study, contact:
Lt Col Clare Bennett, Chief Mental Health Officer, Health Directorate, HQ NZDF
clare.bennett@nzdf.mil.nz 04 496 0524 or healthcheck@nzdf.mil.nz

INSTRUCTIONS

- Read the instructions that correspond to each section of this survey
- Use a dark PENCIL ONLY (or pen if you can't find a pencil)
- Fill in the circle completely under the appropriate response

- If you want to change your response, ERASE or CROSS OUT your initial response and fill in the desired circle

Appendix B
Survey

Health & Wellbeing
Survey / 23 Sep – 6 Oct

New Zealand DEFENCE FORCE

What is this survey about?
The health and wellbeing of NZDF members is an important part of how we perform as a team, and an organisation. The aim of this survey is to get a picture of the current health and wellbeing of our people so that we may better understand and identify any areas of need. This is a key step in helping keep our people safe and well. We invite all members of the Regular Force, civilians and contractors to complete the survey.

What is involved in the survey?
The survey will take most people between 15–30 minutes to complete. Your participation is voluntary. There is an additional section on deployments that will require a little extra time if you have been deployed.

The survey is **anonymous** and no attempt will be made to identify you. This is because we ask some sensitive questions and it is important you feel comfortable answering these honestly and without worrying about being identified. However, because the survey is anonymous we do ask that you provide some basic demographic information at the end of the survey to help us understand patterns of health and wellbeing across different groups.

What questions will be asked?
There are six sections in the survey – these ask about your overall wellbeing; life experiences; resilience, spiritual and social health; your job; physical health; and, attitudes about help seeking. The job section includes questions about deployments that you can skip if you have never been deployed. We also invite your feedback about what we can be doing as an organisation to support you. You can find feedback about how you are doing in two areas of wellbeing at the end of the survey.

Some questions are of a personal nature so remember that all questions are voluntary and you do not have to answer any question if you do not want to. If you find involvement in this survey distressing, or if you have concerns about your health and wellbeing or that of someone else, information about a range of support options available is provided at the beginning and end of this survey.

What do we do with the information?
The data will be collected, collated and reported at an aggregated level. No personally identifying data will be reported. The information collected in the survey will be used for internal and external research projects approved by the NZDF and may also form the basis of reports and academic publications. A summary of the results of the survey and any key areas for action identified will be communicated by the end of the year.
A summary of findings will be also be released externally in early 2020. If you would like to be sent a summary of the results, please email healthcheck@nzdf.mil.nz

How will we maintain your privacy?
This research is being conducted in accordance with the Privacy Act (1993) and DFO 3 14[5] Authority to Conduct Personnel Research and has been approved by CDF. Data from paper copies of the survey will be entered into a database and then the copies will be destroyed. Your personal data will not be identifiable. The full database will be securely, electronically stored and will only be accessible by the Defence Health research team. The database will be retained as part of a longitudinal research study. By completing this survey you are giving your consent for your personal information to be used for the purpose and in the manner described above.

Why should I participate?
Your contribution is important to helping build a current and accurate picture of health and wellbeing across the NZDF and to inform decisions that aim to improve health and wellbeing for all NZDF staff. Nevertheless the survey is voluntary and you may decide not to take part or withdraw from the study at any time without any disadvantage to yourself of any kind.

Please complete all sections by following the instructions at the beginning of each question.

Note:
The information collected in this survey is Unclassified and while the survey is anonymous, you must not disclose sensitive or classified information. Some questions may seem a little repetitive, but this is necessary due to the questions being grouped into scales.

The term '***organisation***' is used throughout the survey and refers to the unit that you are currently employed with.

For more information about the study, contact:
Col Clare Bennett, Chief Mental Health Officer,
Health Directorate, HQ NZDF clare.bennett@nzdf.mil.nz
or healthcheck@nzdf.mil.nz

If at any point you are concerned about your wellbeing you can find a list of contacts and resources on the last page or contact 0800 NZDF4U (0800 693348), or a Defence Health Centre.

Deployment

1.	Have you ever been deployed on either an operational mission that would be qualifying service for the Operational Service Medal or other overseas activities (excluding courses or permanent established postings)? **Note: for Navy** this might include non-operational deployments (e.g OP CALYPSO, OP APEC ASSIST, OP KAUWAE etc.), or operational deployments. **Note: For Air Force** this includes any overseas aircraft operations (e.g., NORPATs, TROPIC ASTRA, PITCH BLACK, HADRs, etc).	No	Yes
		○	○

Brief-Resilience Scale (BRS; Smith et al., 2008)

Please indicate how much you agree or disagree with the statements:

		Strongly Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Strongly Agree
1.	I tend to bounce back quickly after hard times	○	○	○	○	○
2.	I have a hard time making it through stressful events	○	○	○	○	○
3.	It does not take me long to recover from a stressful event	○	○	○	○	○
4.	It is hard for me to snap back when something bad happens	○	○	○	○	○
5.	I usually come through difficult times with little trouble	○	○	○	○	○
6.	I tend to take a long time to get over set-backs in my life	○	○	○	○	○

Social Support

8.	My social relationships are supportive and rewarding	○	○	○	○	○

Perceptions of Leadership

The following statements are about your relationships with your direct manager/leader.

		Strongly Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Strongly Agree
1.	My direct manager/leader treats everyone fairly	○	○	○	○	○
2.	My direct manager/leader is approachable	○	○	○	○	○
3.	My direct manager/leader treats me with dignity and respect	○	○	○	○	○
4.	My direct manager/leader refrains from improper remarks or comments	○	○	○	○	○
5.	My direct manager/leader demonstrates command courage if work circumstances require it	○	○	○	○	○

Unit Cohesion

The following statements are about how you feel about your job. Please read each statement carefully and decide how much you agree with each of the following statements.

		Strongly Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Strongly Agree
8.	If I have a problem at work I can talk to my boss about it	○	○	○	○	○
9.	The demands of my work interfere with my home and family life	○	○	○	○	○
10.	The level of work related stress I experience is acceptable	○	○	○	○	○
11.	I can cope with the pressure of my work	○	○	○	○	○
12.	My colleagues treat me with dignity and respect	○	○	○	○	○
13.	Members of my team are able to bring up problems and discuss tough issues	○	○	○	○	○
14.	From a safety perspective, I feel supported / enabled to do my job	○	○	○	○	○
15.	I am; or I feel, excluded by my work colleagues	○	○	○	○	○

Loneliness.

Life events and circumstances can have an impact on our overall wellbeing.
How much have each of the areas below been of a concern for you over the last 4 weeks?

		Not at all	A little	Somewhat	Quite a lot	A great degree
2.	Loneliness / Isolation	○	○	○	○	○

Kessler Psychological Distress Scale (K10; Kessler et al., 2002).

The following questions ask about how you have been feeling during the last month (4 weeks).
Please read each question carefully and then indicate the response that best describes how you have been feeling.

		None of the time 1	A little of the time 2	Some of the time 3	Most of the time 4	All of the time 5
1.	How often did you feel tired for no good reason?	○	○	○	○	○
2.	How often did you feel nervous?	○	○	○	○	○
3.	How often did you feel so nervous that nothing could calm you down?	○	○	○	○	○
4.	How often did you feel hopeless?	○	○	○	○	○
5.	How often did you feel restless or fidgety?	○	○	○	○	○
6.	How often did you feel so restless that you could not sit still?	○	○	○	○	○
7.	How often did you feel depressed?	○	○	○	○	○
8.	How often did you feel that everything was an effort?	○	○	○	○	○
9.	How often did you feel so sad that nothing could cheer you up?	○	○	○	○	○
10.	How often did you feel worthless?	○	○	○	○	○

If you would like an indication about how you are going, add up the scores from items 1 – 10. The scores for each item is equal to the number in the header column you selected. (e.g. none of the time = 1, all of the time = 5) *Check out how you are going at the end of this survey.*	**Score =** _____

Section 7: Demographic Characteristics

The following information will be used to view differences between groups, such as rank groups or units. Feel free to skip questions that you are not comfortable answering or that you believe may compromise your anonymity.

1. What is your gender?

Male	Female	Other
○	○	○

2. What is your age?

Less than 20 years	20- 24 years	25- 29 years	30 – 39 years	40 – 49 years	50 – 59 years	60 years and over
○	○	○	○	○	○	○

3. Which ethnic groups do you identify with? *(Mark all that apply)*

- ○ New Zealand European/Pakeha
- ○ Māori
- ○ Pacific Islander
- ○ Asian
- ○ Other European
- ○ Other (please specify)_____

4. If you selected more than 1 ethnicity, which do you most identify with? (Please select one)

- ○ New Zealand European/Pakeha
- ○ Māori
- ○ Pacific Islander
- ○ Asian
- ○ Other European
- ○ Other (please specify)_____

5. If you are Māori and you know your Iwi affiliation please enter it here_____

6. Which of the following options best describes how you think of yourself?

- ○ Heterosexual or Straight
- ○ Gay or Lesbian
- ○ Bisexual
- ○ Don't Know
- ○ I prefer not to answer
- ○ Other (please state)_____

7. Which of the following best describes your status?

Regular Force	Reserve	Civilian	Civilian ex-mil	Contractor
○	○	○	○	○

8. If you are **military**, what service do you belong to?

Navy	Army	Airforce
○	○	○

11. What is your current rank? *Please mark one:*

- ○ Pte-Cpl / Ord–LH / LAC-Cpl (E)
- ○ Sgt-WO1 / PO–WO / Sgt-WO (E)
- ○ Ocdt-Capt / Mid–LT / PO-FLTLT (E)
- ○ Maj / LTCDR / Sqnldr (E)
- ○ LtCol/CDR/WG CDR (E)
- ○ Col (E) & Above
- ○ Not applicable

12. Select the home situation that best describes you. *Please mark one:*

- ○ Married or de-facto
- ○ Married or de-facto with dependents (children or elderly adults)
- ○ Single (never married)
- ○ Single (divorced, widowed, separated)
- ○ Single (including divorced, widowed, separated) with dependents (children or elderly adults)
- ○ Other

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013)

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, and then rate how much you have been bothered by that problem in the past month (4 weeks). Remember, confidential support is available if you find any of these questions distressing (0800 693348).

		Not at all	A little bit	Moderately	Quite a bit	Extremely
1.	Repeated, disturbing and unwanted memories, of a stressful experience?	○	○	○	○	○
2.	Repeated, disturbing dreams of a stressful experience?	○	○	○	○	○
3.	Suddenly acting or feeling as if the stressful experience were happening again (as if you were reliving it)?	○	○	○	○	○
4.	Feeling very upset when something reminded you of the stressful experience?	○	○	○	○	○
5.	Having a physical reaction (e.g., heart pounding, trouble breathing, sweating) when something reminded you of the stressful experience?	○	○	○	○	○
6.	Avoiding memories, thoughts or feelings related to the stressful experience?	○	○	○	○	○
7.	Avoiding external reminders of the stressful experience (eg. people, places, conversations, activities, objects or situations)?	○	○	○	○	○
8.	Trouble remembering important parts of the stressful experience?	○	○	○	○	○
9.	Having strong negative beliefs about yourself, other people, or the world (e.g., having thoughts such as: I am bad, there is something seriously wrong with me, no one can be completely trusted, the world is completely dangerous)?	○	○	○	○	○
10.	Blaming yourself or someone else for the stressful experience?	○	○	○	○	○
11.	Having strong negative feelings such as fear, horror, anger, guilt, or shame?	○	○	○	○	○
12.	Loss of interest in activities that you used to enjoy?	○	○	○	○	○
13.	Feeling distant or cut off from other people?	○	○	○	○	○
14.	Trouble experiencing positive feelings (e.g., being unable to feel happiness or have loving feelings for those close to you)?	○	○	○	○	○
15.	Irritable behavior, angry outbursts, or acting aggressively?	○	○	○	○	○
16.	Taking too many risks or doing things that could cause you harm?	○	○	○	○	○
17.	Being 'super alert; or watchful or on guard?	○	○	○	○	○
18.	Feeling jumpy or easily startled?	○	○	○	○	○
19.	Having difficulty concentrating?	○	○	○	○	○
20.	Trouble falling or staying asleep?	○	○	○	○	○

Alcohol Use Disorders Identification Test *(AUDIT; World Health Babor et al., 2001)*

Alcohol Use

The questions below ask about your alcohol use. When answering the following questions use the guidelines below regarding the size of a standard drink. A standard drink measures the amount of alcohol, not the amount of liquid you are drinking.

Thinking of your alcohol consumption:

	Scoring	*0*	*1*	*2*	*3*	*4*
		Never	Occasionally	Monthly	Weekly	Twice a week or more
3.	How often do you have six or more standard drinks on one occasion?	○	○	○	○	○
4.	How often during the last year have you found that you were not able to stop drinking once you had started?	○	○	○	○	○
5.	How often during the last year have you failed to do what was normally expected from you because of drinking?	○	○	○	○	○
6.	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	○	○	○	○	○
7.	How often during the last year have you had a feeling of guilt or remorse after drinking?	○	○	○	○	○
8.	How often during the last year have you been unable to remember what happened the night before because you had been drinking?	○	○	○	○	○
9.	Have you or someone else been injured because of your drinking?	No ***Score [0]***		Yes, but not in the last year ***[2]***		Yes, during the last year ***[4]***
		○		○		○
10.	Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?	No ***Score [0]***		Yes, but not in the last year ***[2]***		Yes, during the last year ***[4]***
		○		○		○

If you would like to assess your current levels of alcohol risk add up the scores from items 3-10. The score of each item is equal to the number in the circle that you selected (e.g., for items 3-8, never = 0, twice a week or more = 4). See how your rate on the last page of this survey.

Score=_____

Trauma Exposures

		No	Yes
1.	Have you ever experienced a situation that was extremely stressful and / or where you feared for your life (eg. accident, natural disaster, personal attack, deployment experience, combat)?	○	○
2.	Did someone very close to you die unexpectedly; for example, they were killed in an accident, murdered, committed suicide, or had a fatal heart attack at a young age?	○	○
3.	In the last 12 months **have you been systematically verbally sexually harassed**? *(e.g., consistent sexual jokes made towards you, repeated comments made about your private life, repeated sexually offensive comments)*	○	○
4.	Have you ever been **physically assaulted?** *(e.g., subject to an intentional or a threatened act of either direct or indirect interpersonal violence)*	○	○
5.	Have you ever been **indecently assaulted** *(e.g., subject to unwelcome physical contact such as touching, pinching, and / or massage in circumstances that are indecent)*	○	○
6.	Have you ever been **sexually violated?** *(e.g., rape or unlawful sexual connection)*	○	○

Appendix C
Information Sheet

How Are You Doing? (Please detach and retain this page)

Below you can find information about how you scored on two of the health screens used in this survey. **Please use this information as a guide, no matter what your score, if you have any concerns about how you are going, seek help.**

K10 Psychological Wellbeing (page 4)

Please use this information as a guide, no matter what your score, if you have any concerns about how you are going, seek help. Scores can sometimes be influenced by particular life events, such as a recent change in circumstances (e.g. financial pressures, birth of a child, relationship breakdown), or a busy work period. These feelings may only last a short period of time, however if you are experiencing signs of distress that have endured over the last four weeks you are strongly encouraged to seek help. Seeking help will enable an earlier recovery and reduce the likelihood of longer term issues developing.

10-14 Low

Your score falls into the low range. This means you're doing pretty well! It's important to remember that this result is not a diagnosis. If you feel down, sad, stressed or anxious, you might want to speak to someone (eg. doctor or other health professional).

15-19 Moderate

Your score falls into the moderate range. Some people who score in this range have mild depression and/or anxiety. We encourage you to see your doctor or health professional for a more personalised assessment.

20+ High

Your score falls into the high range. Many people who score in this range are experiencing depression and/or anxiety. We strongly recommend that you see your doctor or health professional for a more personalised assessment.

AUDIT Alcohol Use (Page17)

Score	Risk	Action
0 - 7	Low risk	This is the healthiest level of drinking, but check the additional risks below to make sure you are not at elevated levels of risk taking.
8- 15	Medium	Your drinking has the potential to cause harm, consider low risk drinking, and try the tips below for change.
16 and above	High risk	This level of risk indicates that you are likely damaging your health and wellbeing with your drinking. Seriously consider changing these behaviours. Talk to your doctor or health professional for additional advice.

Low risk guidelines

Low-risk drinking to reduce the lifetime risk of harm from disease or injury for healthy men and women is:

- on any day no more than 2 standard drinks.

Low risk drinking to reduce the harm of injury or death on any one occasion of drinking is:

- no more than 4 standard drinks on any one day (on a special occasion, not regular drinking) – these drinks should be spread out over several hours;
- having regular alcohol-free days.

For women who are planning to become pregnant, or who are pregnant or breastfeeding, no alcohol is the safest option.

Additional risks

Caution:

- Do you have a health condition made worse by alcohol i.e. diabetes, hepatitis, pancreatitis etc.?
- Do you have heart disease, high blood pressure or are gaining weight?
- Are you on medication?
- Do you suffer from depression, anxiety, or PTSD?
- Do you experience mood swings or irritability?
- Do you have trouble sleeping?
- Are you over 65?

Even if you are in the low risk category you may need to drink less if you are in one of the above groups that are more susceptible to the effects of alcohol. Talk to your doctor or other health professional.

SUPPORT (Please detach and retain this page)

If you find involvement in this survey distressing in any way you can talk to someone about it. If you have concerns about your mental health or that of someone else, there are a range of internal support options available including colleagues and leaders. Additionally, you can contact medical staff, chaplains, social workers, SAPRA and psychologists for military personnel, and EAP and external practitioners for civilians.

Alternatively there are a range of telephone helplines available:

+ **All Hours Support Line 0800 NZDF4U** 0800 693 348

A confidential telephone support service for NZDF members and their families

+ **VITAE 0508 664 981**

A confidential telephone support service for civilian members of the NZDF

+ **VANZ 0800 4838372**

A confidential helpline for veterans

+**SAPRA 0800 693 324** – support for sexual assault

Lifeline 0800 543 354

Confidential counseling service for the general population

+ **Depression helpline 0800 111 757**

+ **Women's Refuge 0800 733 843** (24 hour crisis line for women dealing with violence in their life)

+ **Mensline** 0800 636 754 (Confidential helpline for men) formatting line

+ **Alcohol and Drug helpline 0800 787 797**

+ **Youthline 0800376663 (or text 234)**

IN AN EMERGENCY CALL 111

More information about mental health and available support can be found on the following sites:

NZDF

NZDF Force4Families site http://www.nzdf.dixs.mil.nz/families/default.htm or nzdf.mil.nz/families/default.htm
NZDF Mental Health site http://orgs/sites/nzdf-mh/default.aspx (Intranet)
NZDF Sexual Assault Support http://www.nzdf.mil.nz/personnel-records/sart/about/default.htm

General Mental Health information, stories and tools:

www.mentalhealth.org.nz – Mental Health Foundation – information, stories, tools and support

www.Thelowdown.co.nz – information, stories, and interactive site designed for young people

www.moh.govt.nz/moh.nsf/indexmh useful self-help resources for recognising and managing stress (Ministry of Health)

www.hpa.org.nz -Health Promotion Agency – range of health information for NZers

www.livingwell.org.au - practical resources and support for men

www.depression.org.nz – information, resources and support

www.alac.org.nz – information, resources and support (drugs and alcohol)

www.beyondblue.org.au – anxiety and depression (Australian site)

www.skylight.org.nz - offers services to those facing tough times due to change, loss, trauma and grief - whatever the cause, and whatever their age (including for children)

www.likeminds.org.nz - aims to address stigma and discrimination sometimes associated with mental illness, contains resources, help options and stories from people with mental illness

www.livemoreawesome.com – information and support for those dealing with depression

www.veteransaffairs.mil.nz – site for veterans (NZ)

http://at-ease.dva.gov.au – site for veterans (Aus)

www.force4families.co.nz - information and resource site for family members (NZDF)

www.supportingfamilies.org.nz – support, info and resources for those supporting family members with mental illness

www.militaryonesource.mil – support for the military community (US)

www.sesamestreet.org/parents/topicsandactivities/toolkits/tlc# - resources to support military families including deployments, homecomings, grief, injuries, and self-expression (US)

www.sparx.org.nz – online tool for young people sponsored by MoH

http://www.leva.co.nz/- resources, tools, information and support for Pacifika people

http://teraumatatini.com/m%C4%81oriora - information about Māori workforce training, education and capability-building solutions

General Health information, stories and tools:

http://authoritynutrition.com/about - evidence based healthy eating advice

https://www.heartfoundation.org.nz/healthy-living

Appendix D
Low-Risk Ethics approval

Date: 17 August 2021

Dear Julia Harris

Re: Ethics Notification - **4000024910** - **Risk and Protective Factors of Alcohol Misuse in the New Zealand Defence Force**

Thank you for your notification which you have assessed as Low Risk.

Your project has been recorded in our system which is reported in the Annual Report of the Massey University Human Ethics Committee.

The low risk notification for this project is valid for a maximum of three years.

If situations subsequently occur which cause you to reconsider your ethical analysis, please contact a Research Ethics Administrator.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:
"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director - Ethics, telephone 06 3569099 ext 85271, email humanethics@massey.ac.nz."

Please note, if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to complete the application form again, answering "yes" to the publication question to provide more information for one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand **T** 06 350 5573; 06 350 5575 **F** 06 355 7973
E humanethics@massey.ac.nz **W** http://humanethics.massey.ac.nz

Appendix E
New Zealand Defence Force research approval

UNCLASSIFIED

HEADQUARTERS NEW ZEALAND DEFENCE FORCE
Organisational Research
MINUTE

5000/PB/5/3

November 2022

COS PCP

APPROVAL TO CONDUCT RESEARCH: ALCOHOL MISUSE IN THE NZDF (ORG RESEARCH 2022/10)

References:
A. DFO 3, Chap 5, Part 14: Authority to Conduct Human-related Research

Background

1. In accordance with Ref A, Julia Harris, a Masters student from Massey University, has requested approval to conduct research on alcohol misuse in the NZDF using the 2016 and 2019 Health and Wellbeing Surveys.

2. The aim of the research is to determine what are the protective factors and risk factors for alcohol misuse in a sample of NZDF personnel.

3. The expected benefit from this research is to create a baseline for future research analysis (2023 Health and Wellbeing Survey), and increase knowledge and understanding of the protective factors associated with alcohol use in the NZDF.

4. This project is sponsored by COL Clare Bennett, Director Integrated Wellness.

5. The researcher is undertaking the project as part of a Masters of Science in Psychology with Massey University and the study will be supervised by Dr Ian de Terte, School of Psychology, Massey University.

Methodology

6. The intended approach is to utilise the existing NZDF 2016 and 2019 Health and Wellbeing Survey datasets.

7. A quantitative, longitudinal design will be used to investigate the risk and protective factors of alcohol misuse.

8. The measures from the survey's that will be used include social support, deployment, brief-resilience scale, perceptions of leadership, unit cohesion, loneliness, K-10, trauma exposures, PCL-5 and the alcohol use disorders identification test.

9. The results from this work will form a baseline for future work from the 2023 Health and Wellbeing Survey.

UNCLASSIFIED

10. The data will be analysed using SPSS software to undertake T-test, chi squares and regression analysis.

Confidentiality and Ethics

11. Participation in the survey was voluntary.

12. The Health and Wellbeing survey was anonymous and any identifying variables will be removed before analysis.

Release and Reporting

13. The output will be a thesis that forms the basis of a Masters.

14. The researcher is also to provide a copy of the research report to Organisational Research upon completion for inclusion in the HEARR.

15. Any substantive variations to previously approved research must have the written consent of COS CPO.

Endorsement and Approval

16. The NZDF Research Ethics Committee reviewed this application and originally declined endorsement at their meeting on the 21st September 2022. After reworking of the application, it was approved out of session on the 7th November 2022

17. In my role as Chair, NZDF Research Ethics Committee, I have reviewed this project and am satisfied that all ethical and scientific requirements required by Ref A are adequately met.

18. It is therefore recommended that COS PCP:

    a. **Approve** the proposed research project.

J.K. HUGHES
Principal Advisor Organisational Research

DTeIN Phone: +64 4 496 0141
Email: Joanne.Hughes@nzdf.mil.nz

References

Ahacic, K., Kennison, R. F., & Kåreholt, I. (2014). Alcohol abstinence, non-hazardous use and hazardous use a decade after alcohol-related hospitalization: registry data linked to population-based representative postal surveys. *Biomedical Centre Public Health*, *14*(1), 874-887. https://doi.org/10.1186/1471-2458-14-874

Alva, S. A. (1995). Psychological distress and alcohol use in Hispanic adolescents. *Journal of Youth and Adolescence*, *24*(4), 481-497. https://doi.org/10.1007/BF01537193

Ames, G., & Cunradi, C. (2004). Alcohol use and preventing alcohol-related problems among young adults in the military. *Alcohol Research & Health*, *28*(4), 252-257.

Anderson, P., Gual, A., & Colom, J. (2005). Alcohol and Primary Health Care. Clinical Guidelines on Identification and Brief Interventions. Department of Health of the Government of Catalonia. . *6*, 311. https://doi.org/10.12688/f1000research.11173.3

Anthony, E. (1987). *The invulnerable child*. Guilford Press.

Armistead-Jehle, P., Johnston, S., Wade, N., & Ecklund, C. (2011). Posttraumatic Stress in U.S. Marines: The Role of Unit Cohesion and Combat Exposure. *Journal of counseling and development: JCD*, *89*, 81-88. https://doi.org/10.1002/j.1556-6678.2011.tb00063.x

Arpin, S. N., Mohr, C. D., & Brannan, D. (2015). Having friends and feeling lonely: a daily process examination of transient loneliness, socialization, and drinking behavior. *Pers Soc Psychol Bull*, *41*(5), 615-628. https://doi.org/10.1177/0146167215569722

Association, A. P. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Vol. 5). American psychiatric association Washington, DC.

Association, A. P. (2017). Diagnostic and Statistical Manual of Mental Disorders Fifth Editions (DSM-5). *Arlington: American Psychiat-ric Association*.

Babor, T. F., & Higgins-Biddle, J. C. (2001). In *Brief intervention for hazardous and harmful drinking: a manual for use in primary care*.

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *AUDIT: The alcohol use disorders identification test: Guidelines for use in primary health care*.

Backer-Fulghum, L. M., Patock-Peckham, J. A., King, K. M., Roufa, L., & Hagen, L. (2012). The stress-response dampening hypothesis: How self-esteem and stress act as mechanisms between negative parental bonds and alcohol-related problems in emerging adulthood. *Addictive Behaviors*, *37*(4), 477-484. https://doi.org/10.1016/j.addbeh.2011.12.012

Bailey, D., Wolfe, D. M., & Wolfe, C. R. (1994). With a little help from our friends: Social support as a source of well-being and of copying with stress. *Journal of Sociology and Social Welfare*, *21*, 127-152. https://doi.org/10.15453/0191-5096.2137.

Baraona, E., Abittan, C. S., Dohmen, K., Moretti, M., Pozzato, G., Chayes, Z. W., Schaefer, C., & Lieber, C. S. (2001). Gender differences in pharmacokinetics of alcohol. *Alcohol Clinical Experimental Research*, *25*(4), 502-507. https://doi.org/10.1111/j.1530-0277.2001.tb02242.x.

Berberian, S., Patock-Peckham, J. A., Guarino, K., Gupta, T., Sanabria, F., & Infurna, F. (2022). Does loneliness before the age of twelve indirectly affect impaired control over drinking, alcohol use, and problems through perceived stress? *Addictive Behaviors Reports*, *16*, 100448. https://doi.org/10.1016/j.abrep.2022.100448

Berke, D. S., Leone, R., Parrott, D., & Gallagher, K. E. (2020). Drink, Don't Think: The Role of Masculinity and Thought Suppression in Men's Alcohol-Related Aggression. *Psychol Men Masc*, *21*(1), 36-45. https://doi.org/10.1037/men0000199

Berkman, L. F., Kawachi, I., & Glymour, M. M. (2014). *Social epidemiology*. Oxford University Press.

Besse, K., Toomey, T. L., Hunt, S., Lenk, K. M., Widome, R., & Nelson, T. F. (2018). How soldiers perceive the drinking environment in communities near military installations. *Journal of Alcohol and Drug Education*, *62*(1), 71-90.

Beutel, M. E., Klein, E. M., Brähler, E., Reiner, I., Jünger, C., Michal, M., Wiltink, J., Wild, P. S., Münzel, T., Lackner, K. J., & Tibubos, A. N. (2017). Loneliness in the general population: prevalence, determinants and relations to mental health. *BMC Psychiatry*, *17*(1), 97. https://doi.org/10.1186/s12888-017-1262-x

Bloomfield, K., Grittner, U., Rasmussen, H. B., & Petersen, H. C. (2008). Socio-demographic correlates of alcohol consumption in the Danish general population. *Scandinavian journal of public health*, *36*(6), 580-588.

Bonanno, G. A. (2004). Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? *American Psychology*, *59*(1), 20-28. https://doi.org/10.1037/0003-066x.59.1.20

Booth, A., & Amato, P. (1991). Divorce and psychological stress. *Journal of health and social behavior*, *32*(4), 396-407. https://doi.org/10.2307/2137106

Bragard, E., Giorgi, S., Juneau, P., & Curtis, B. L. (2022). Daily diary study of loneliness, alcohol, and drug use during the COVID-19 Pandemic. *Alcohol Clin Exp Res*, *46*(8), 1539-1551. https://doi.org/10.1111/acer.14889

Bray, R., Hourani, L., Rae, K., Dever, J., Brown, M., Vincus, A., Pemberton, R., Marsden, M., Faulkner, D., & Vandermaas-Peeler, R. (2003). 2002 Department of Defense Survey of Health Related Behaviors Among Military Personnel. 1-349.

Bray, R. M., & Hourani, L. (2007). Substance use trends among active duty military personnel: findings from the United States Department of Defense Health Related Behavior Surveys, 1980-2005. *Addiction*, *102*(7), 1092-1101. https://doi.org/10.1111/j.1360-0443.2007.01841.x

Breslau, J., Setodji, C. M., & Vaughan, C. A. (2016). Is cohesion within military units associated with post-deployment behavioral and mental health outcomes? *Journal of Affective Disorders*, *198*, 102-107. https://doi.org/10.1016/j.jad.2016.03.053

Brown, J. M., Bray, R. M., & Hartzzellt, M. (2010). A Comparison of Alcohol Use and Related Problems Among Women and Men in the Military. *Military Medicine*, *175*(2), 102-107. https://doi.org/10.7205/milmed-d-09-00080

Brown, J. M., Williams, J., Bray, R. M., & Hourani, L. (2012). Postdeployment alcohol use, aggression, and post-traumatic stress disorder. *Military Medicine*, *177*(10), 1184-1190. https://doi.org/10.7205/MILMED-D-11-00119

Browne, T., Iversen, A., Hull, L., Workman, L., Barker, C., Horn, O., Jones, M., Murphy, D., Greenberg, N., Rona, R., Hotopf, M., Wessely, S., & Fear, N. T. (2008). How do experiences in Iraq affect alcohol use among male UK armed forces personnel? *Occupational and Environmental Medicine*, *65*(9), 628-633. https://doi.org/10.1136/oem.2007.036830

Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006). Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses. *Psychology and Aging*, *21*(1), 140-151. https://doi.org/10.1037/0882-7974.21.1.140

Caetano, R., Clark, C. L., & Tam, T. (1998). Alcohol consumption among racial/ethnic minorities: Theory and research. *Alcohol health and research world*, *22*(4), 233-241.

Calhoun, P. S., Wilson, S. M., Dedert, E. A., Cunningham, K. C., Burroughs, T. K., Hicks, T. A., Beckham, J. C., Kudler, H. S., & Straits-Troster, K. (2018). The association of alcohol consumption patterns with self-rated physical health and psychiatric distress

among Afghanistan and Iraq era U.S. veterans [Article]. *Psychiatry Research*, *259*, 142-147. https://doi.org/10.1016/j.psychres.2017.09.067

Campbell-Sills, L., Ursano, R. J., Kessler, R. C., Sun, X., Heeringa, S. G., Nock, M. K., Sampson, N. A., Jain, S., & Stein, M. B. (2018). Prospective risk factors for post-deployment heavy drinking and alcohol or substance use disorder among US Army soldiers. *Psychological MedIcine*, *48*(10), 1624-1633. https://doi.org/10.1017/S0033291717003105

Campbell, H. (2000). The Glass Phallus: Pub(lic) Masculinity and Drinking in Rural New Zealand*. *Rural Sociology*, *65*, 562-581. https://doi.org/10.1111/j.1549-0831.2000.tb00044.x

Capone, C., McGrath, A. C., Reddy, M. K., & Shea, M. T. (2013). Trauma-Related Correlates of Alcohol Use in Recently Deployed OEF/OIF Veterans. *Journal of Traumatic Stress*, *26*(3), 354-360. https://doi.org/10.1002/jts.21817

Cappell, H., & Herman, C. P. (1972). Alcohol and tension reduction; a review. *Quarterly journal of studies on alcohol*, *33*(1), 33-64.

Carter, A. C., Capone, C., & Eaton Short, E. (2011). Co-occurring posttraumatic stress disorder and alcohol use disorders in veteran populations. *Journal of Dual Diagnosis*, *7*(4), 285-299. https://doi.org/10.1080/15504263.2011.620453

Cerdá, M., Richards, C., Cohen, G. H., Calabrese, J. R., Liberzon, I., Tamburrino, M., Galea, S., & Koenen, K. C. (2014). Civilian stressors associated with alcohol use disorders in the National Guard. *Am J Prev Med*, *47*(4), 461-466. https://doi.org/10.1016/j.amepre.2014.06.015

Chartier, K., & Caetano, R. (2010). Ethnicity and health disparities in alcohol research. *Alcohol Research Health*, *33*(1-2), 152-160.

Chen, Y., & Feeley, T. H. (2015). Predicting Binge Drinking in College Students: Rational Beliefs, Stress, or Loneliness? *Journal of Drug Educucation*, *45*(3-4), 133-155. https://doi.org/10.1177/0047237916639812

Cohen, S. (2004). Social relationships and health. *American Psychologlist*, *59*(8), 676-684. https://doi.org/10.1037/0003-066x.59.8.676

Cohen, S., & Syme, S. L. (1985). Issues in the study and application of social support. *Social support and health*, *3*, 3-22.

Cole-Harding, S., & Wilson, J. R. (1987). Ethanol metabolism in men and women. *J Stud Alcohol*, *48*(4), 380-387. https://doi.org/10.15288/jsa.1987.48.380

Collins, S. E. (2016). Associations Between Socioeconomic Factors and Alcohol Outcomes. *Alcohol Research*, *38*(1), 83-94.

Cook, W. K., & Caetano, R. (2014). Ethnic drinking cultures, gender, and socioeconomic status in Asian American and Latino drinking. *Alcohol Clin Exp Res*, *38*(12), 3043-3051. https://doi.org/10.1111/acer.12573

Coolican, H. (2017). *Research methods and statistics in psychology*. Psychology press.

Cooper, M. (1994). Motivations for Alcohol Use Among Adolescents: Development and Validation of a Four-Factor Model. *Psychological Assessment*, *6*, 117-128. https://doi.org/10.1037/1040-3590.6.2.117

Craig, R., & Shelton, N. (2008). *Health Survey for England 2007: Healthy lifestyles: Knowledge, attitudes and behaviour*. National Centre for Social Research with permission of The NHS Information ….

Cusack SE, Bountress, K. E., Sheerin, C. M., Dick, D. M., Amstadter, A. B., & Group, S. f. S. W. (2023). The longitudinal buffering effects of resilience on alcohol use outcomes. *Psychological Trauma: Theory, Research, Practice, and Policy*, *15*(6), 1000-1011. https://doi.org/10.1037/tra0001156

Dadfar, M., Lester, D., Vahid, M. A., & Esfahani, M. N. (2016). The psychometric parameters of the Farsi form of the Kessler Psychological Distress Scale (K10) in psychiatric outpatients. *International Journal of Medical Research and Health Sciences*, *5*(2), 1-7.

Dawson, D. A., Goldstein, R. B., Patricia Chou, S., June Ruan, W., & Grant, B. F. (2008). Age at First Drink and the First Incidence of Adult-Onset DSM-IV Alcohol Use Disorders. *Alcoholism: Clinical and Experimental Research*, *32*(12), 2149-2160. https://doi.org/doi/10.1111/j.1530-0277.2008.00806.x

Dickstein, B. D., McLean, C. P., Mintz, J., Conoscenti, L. M., Steenkamp, M. M., Benson, T. A., Isler, W. C., Peterson, A. L., & Litz, B. T. (2010). Unit Cohesion and PTSD Symptom Severity in Air Force Medical Personnel. *Military Medicine*, *175*(7), 482-486. https://doi.org/10.7205/milmed-d-09-00178

Dixit, S., Chauhan, V. S., & Azad, S. (2015). Social Support and Treatment Outcome in Alcohol Dependence Syndrome in Armed Forces. *Journal of clinical and diagnostic research*, *9*(11), 1-5. https://doi.org/10.7860/JCDR/2015/14142.6739

Donato-Hunt, C., Munot, S., & Copeland, J. (2012). Alcohol, tobacco and illicit drug use among six culturally diverse communities in Sydney. *Drug and alcohol review*, *31*(7), 881-889. https://doi.org/10.1111/j.1465-3362.2012.00417.x

Dong, Y., & Peng, C. Y. (2013). Principled missing data methods for researchers. *Springer plus*, *2*(1), 222. https://doi.org/10.1186/2193-1801-2-222

Dvorak, R. D., Stevenson, B. L., Kilwein, T. M., Sargent, E. M., Dunn, M. E., Leary, A. V., & Kramer, M. P. (2018). Tension reduction and affect regulation: An examination of mood indices on drinking and non-drinking days among university student drinkers. *Experimental and Clinical Psychopharmacology*, *26*(4), 377-390. https://doi.org/10.1037/pha0000210

Eisen, S. V., Schultz, M. R., Glickman, M. E., Vogt, D., Martin, J. A., Osei-Bonsu, P. E., Drainoni, M. L., & Elwy, A. R. (2014). Postdeployment resilience as a predictor of mental health in operation enduring freedom/operation iraqi freedom returnees. *American Journal of Preventative Medicine*, *47*(6), 754-761. https://doi.org/10.1016/j.amepre.2014.07.049

Erbes, C. R., Kramer, M., Arbisi, P. A., DeGarmo, D., & Polusny, M. A. (2017). Characterizing spouse/partner depression and alcohol problems over the course of military deployment. *Journal of Consulting and Clinical Psychology*, *85*(4), 297-308. https://doi.org/10.1037/ccp0000190

Fear, N. T., Iversen, A., Meltzer, H., Workman, L., Hull, L., Greenberg, N., Barker, C., Browne, T., Earnshaw, M., Horn, O., Jones, M., Murphy, D., Rona, R. J., Hotopf, M., & Wessely, S. (2007). Patterns of drinking in the UK Armed Forces. *Addiction*, *102*(11), 1749-1759. https://doi.org/10.1111/j.1360-0443.2007.01978.x

Fillo, J., Heavey, S. C., Homish, D. L., & Homish, G. G. (2018). Deployment-Related Military Sexual Trauma Predicts Heavy Drinking and Alcohol Problems Among Male Reserve and National Guard Soldiers. *Alcoholism: Clinical and Experimental Research*, *42*(1), 111-119. https://doi.org/10.1111/acer.13528

Fink, D. S., Gallaway, M. S., Tamburrino, M. B., Liberzon, I., Chan, P., Cohen, G. H., Sampson, L., Shirley, E., Goto, T., D'Arcangelo, N., Fine, T., Reed, P. L., Calabrese, J. R., & Galea, S. (2016). Onset of Alcohol Use Disorders and Comorbid Psychiatric Disorders in a Military Cohort: Are there Critical Periods for Prevention of Alcohol Use Disorders? *Prevention Science*, *17*(3), 347-356. https://doi.org/10.1007/s11121-015-0624-1

Finne, L. B., Christensen, J. O., & Knardahl, S. (2014). Psychological and social work factors as predictors of mental distress: a prospective study. *PLOS ONE*, *9*(7), e102514. https://doi.org/10.1371/journal.pone.0102514

Fisher, A. M., Hoffman, K. J., Austin-lane, J., & Koa, T. (2000). The Relationship between Heavy Alcohol Use and Work Producvity Loss in Active Duty Military Personnel: A Secondary Analysis of the 1995 Department of Defense Worldwide Survey. *Military Medicine*, *165*(5), 355-361.

Fitzke, R. E., Wang, J., Davis, J. P., & Pedersen, E. R. (2021). Substance use, depression, and loneliness among American veterans during the COVID-19 pandemic. *American Journal of Addiction*, *30*(6), 552-559. https://doi.org/10.1111/ajad.13211

Foundation, D. H. D. a. t. N. D. (2018). *A Safer Stand on Substance Use Framework and Proeject Overview*.

Fuehrlein, S., Kachadourian, L. K., DeVylder, E. K., Trevisan, L. A., Potenza, M. N., Krystal, J. H., Southwick, S. M., & Pietrzak, R. H. (2018). Trajectories of alcohol consumption in U.S. military veterans: Results from the National Health and Resilience in Veterans Study. *American Journal of Addiction*, *27*(5), 383-390. https://doi.org/10.1111/ajad.12731

Gartland, D., Bond, L., Olsson, C. A., Buzwell, S., & Sawyer, S. M. (2011). Development of a multi-dimensional measure of resilience in adolescents: the Adolescent Resilience Questionnaire. *BMC Medical Research Methodology*, *11*(1), 134. https://doi.org/10.1186/1471-2288-11-134

Gliem, J., & Gliem, R. (2003). Calculating, Interpreting, And Reporting Cronbach's Alpha Reliability Coefficient For Likert-Type Scales. *2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education*.

Goist, K. C., Jr., & Sutker, P. B. (1985). Acute alcohol intoxication and body composition in women and men. *Pharmacology Biochemistry and Behavior*, *22*(5), 811-814. https://doi.org/10.1016/0091-3057(85)90532-5

Goldman, N. (1993). Marriage Selection and Mortality Patterns: Inferences and Fallacies. *Demography*, *30*(2), 189-208. https://doi.org/10.2307/2061837

Goodell, E. M. A., Johnson, R. M., Latkin, C. A., Homish, D. L., & Homish, G. G. (2020). Risk and protective effects of social networks on alcohol use problems among Army Reserve and National Guard soldiers. *Addictive Behaviors*, *103*(1), `1-18. https://doi.org/10.1016/j.addbeh.2019.106244

Gossop, M., Neto, D., Radovanovic, M., Batra, A., Toteva, S., Musalek, M., Skutle, A., & Goos, C. (2007). CLINICAL STUDY: Physical health problems among patients seeking treatment for alcohol use disorders: a study in six European cities. *Addiction biology*, *12*(2), 190-196.

Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, S. P., Dufour, M. C., & Pickering, R. P. (2004). The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991–1992 and 2001–2002. *Drug and Alcohol Dependence*, *74*(3), 223-234.

Green, K. T., Beckham, J. C., Youssef, N., & Elbogen, E. B. (2014). Alcohol misuse and psychological resilience among U.S. Iraq and Afghanistan era veterans. *Addictive Behaviors*, *39*(2), 406-413. https://doi.org/10.1016/j.addbeh.2013.08.024

Green, K. T., Calhoun, P. S., Dennis, M. F., & Beckham, J. C. (2010). Exploration of the resilience construct in posttraumatic stress disorder severity and functional correlates in military combat veterans who have served since September 11, 2001. *The Journal of clinical psychiatry*, *71*(7), 823-830. https://doi.org/doi.org/10.4088/JCP.09m05780blu

Greenfield, T. K., & Rogers, J. D. (1999). Who drinks most of the alcohol in the US? The policy implications. *Journal of Studies on Alcohol*, *60*(1), 78-89. https://doi.org/10.15288/jsa.1999.60.78

Griffith, J., & West, C. (2010). The Army National Guard in OIF/OEF: Relationships among combat exposure, postdeployment stressors, social support, and risk behaviors. *Applied and Preventive Psychology*, *14*(1), 86-94. https://doi.org/doi.org/10.1016/j.appsy.2011.11.003

Gutkind, S., Gorfinkel, L. R., & Hasin, D. S. (2022). Prospective effects of loneliness on frequency of alcohol and marijuana use. *Addictive Behaviors*, *124*, 107115. https://doi.org/10.1016/j.addbeh.2021.107115

Haase, J. E. (2004). The adolescent resilience model as a guide to interventions. *Journal of Pediatric Oncology Nursing*, *21*(5), 289-299. https://doi.org/10.1177/1043454204267922

Harbertson, J., Hale, B. R., Watkins, E. Y., Michael, N. L., & Scott, P. T. (2016). Pre-deployment Alcohol Misuse Among Shipboard Active-Duty U.S. Military Personnel. *American Journal of Preventive Medicine*, *51*(2), 185-194. https://doi.org/10.1016/j.amepre.2016.02.029

Harvey, S. B., Hatch, S. L., Jones, M., Hull, L., Jones, N., Greenberg, N., Dandeker, C., Fear, N. T., & Wessely, S. (2011). Coming home: social functioning and the mental health of UK Reservists on return from deployment to Iraq or Afghanistan. *Annals of Epidemiology*, *21*(9), 666-672. https://doi.org/10.1016/j.annepidem.2011.05.004

Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness Matters: A Theoretical and Empirical Review of Consequences and Mechanisms. *Annals of Behavioral Medicine*, *40*(2), 218-227. https://doi.org/10.1007/s12160-010-9210-8

Hawn, S. E., Cusack, S. E., & Amstadter, A. B. (2020). A Systematic Review of the Self-Medication Hypothesis in the Context of Posttraumatic Stress Disorder and Comorbid Problematic Alcohol Use. *J Trauma Stress*, *33*(5), 699-708. https://doi.org/10.1002/jts.22521

Head, M., Goodwin, L., Debell, F., Greenberg, N., Wessely, S., & Fear, N. (2016). Post-traumatic stress disorder and alcohol misuse: comorbidity in UK military personnel. *Social psychiatry and psychiatric epidemiology*, *51*, 1171-1180. https://doi.org/10.1007/s00127-016-1177-8

Health, M. o. (2023). *Alcohol use data and stats*. Retrieved 2024 from https://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/alcohol-use-data-and-stats

Holmes, T. H., & Masuda, M. (1973). *Life change and illness susceptibility*. American Association for the Advancement of Science. (American Association for the Advancement)

Hooper, R., Rona, R. J., Jones, M., Fear, N. T., Hull, L., & Wessely, S. (2008). Cigarette and alcohol use in the UK Armed Forces, and their association with combat exposures: A prospective study. *Addictive Behaviors*, *33*(8), 1067-1071. https://doi.org/10.1016/j.addbeh.2008.03.010

Hoopsick, R. A., Homish, D. L., Vest, B. M., Bartone, P. T., & Homish, G. G. (2021). Resilience to Hazardous Drinking Among Never-Deployed Male United States Army Reserve and National Guard Soldiers. *Alcoholism: Clinical & Experimental Research*, *45*(3), 566-576. https://doi.org/10.1111/acer.14561

Howard, K. J., Leong, C., Chambless, S., Grigsby, T. J., Cordaro, M., Perrotte, J. K., & Howard, J. T. (2022). Major depression in postpartum women during the COVID-19 pandemic: can social support buffer psychosocial risks and substance use?

International Journal of Environmental Research and Public Health, *19*(23), 15748. https://doi.org/10.3390/ijerph192315748

Iowa, S. (1997). Self-reported illness and health status among Gulf War veterans. A population-based study. The Iowa Persian Gulf Study Group. *Jama*, *277*(3), 238-245.

Iversen, A., Waterdrinker, A., Fear, N., Greenberg, N., Barker, C., Hotopf, M., Hull, L., & Wessely, S. (2007). Factors Associated with Heavy Alcohol Consumption in the U.K. Armed Forces: Data from a Health Survey of Gulf, Bosnia, and Era Veterans. *Military Medicine*, *172*(9), 956-961. https://doi.org/10.7205/milmed.172.9.956

Iwamoto, D. K., Kaya, A., Grivel, M., & Clinton, L. (2016). Under-Researched Demographics: Heavy Episodic Drinking and Alcohol-Related Problems Among Asian Americans. *Alcohol Research*, *38*(1), 17-25.

Jacobson, I., Ryan, M., Hooper, T., Smith, T., Amoroso, P., Boyko, E., Gackstetter, G., Wells, T., & & Bell, N. (2008). Alcohol Use and Alcohol-Related Problems Before and After Military Combat Deployment. *Journal of the American Medical Association 300*(6), 663-675. https://doi.org/10.1001/jama.300.6.663

Kaine, A. K. (2016). *Drinking to cope with operational service: a longitudinal, prospective investigation into alcohol use and motivations to consume alcohol*

Kanesarajah, J., Waller, M., Zheng, W. Y., & Dobson, A. J. (2016). Unit cohesion, traumatic exposure and mental health of military personnel. *Occupational Medicine*, *66*(4), 308-315. https://doi.org/10.1093/occmed/kqw009

Katherine Mills, B. H. S., Maree Teesson , P. D., Joanne Ross , P. D., & Lorna Peters , P. D. (2006). Trauma, PTSD, and Substance Use Disorders: Findings From the Australian National Survey of Mental Health and Well-Being. *American Journal of Psychiatry*, *163*(4), 652-658. https://doi.org/10.1176/ajp.2006.163.4.652

Kehle, S. M., Ferrier-Auerbach, A. G., Meis, L. A., Arbisi, P. A., Erbes, C. R., & Polusny, M. A. (2012). Predictors of postdeployment alcohol use disorders in National Guard soldiers deployed to Operation Iraqi Freedom. *Psychology of Addictive Behaviors*, *26*(1), 42-50. https://doi.org/10.1037/a0024663

Kelley, M. L., Milletich, R. J., Hollis, B. F., Veprinsky, A., Robbins, A. T., & Snell, A. K. (2017). Social Support and Relationship Satisfaction as Moderators of the Stress-Mood-Alcohol Link Association in US Navy Members. *The Journal of Nervous and Mental Disease*, *205*(2), 99-105. https://doi.org/10.1097/nmd.0000000000000555

Kelly, M. M., DeBeer, B. B., Chamberlin, E., Claudio, T., Duarte, B., Harris, J. I., Kennedy, M. A., Shirk, S., & Reilly, E. D. (2022). The effects of loneliness and psychological flexibility on veterans' substance use and physical and mental health functioning during the COVID-19 pandemic. *Journal of Contextual Behavioral Science*, *26*, 217-226. https://doi.org/10.1016/j.jcbs.2022.10.004

Kelsall, H. L., Wijesinghe, M. S., Creamer, M. C., McKenzie, D. P., Forbes, A. B., Page, M. J., & Sim, M. R. (2015). Alcohol use and substance use disorders in Gulf War, Afghanistan, and Iraq War veterans compared with nondeployed military personnel. *Epidemiol Rev*, *37*, 38-54. https://doi.org/10.1093/epirev/mxu014

Kendler, K. S., Lonn, S. L., Salvatore, J., Sundquist, J., & Sundquist, K. (2016). Effect of Marriage on Risk for Onset of Alcohol Use Disorder: A Longitudinal and Co-Relative Analysis in a Swedish National Sample. *American Journal Psychiatry*, *173*(9), 911-918. https://doi.org/10.1176/appi.ajp.2016.15111373

Khalid, A., Zafar, A., Zafar, M. A., Saqib, L., & Mushtaq, R. (2012). Role of supportive leadership as a moderator between job stress and job performance. *Information Management and Business Review*, *4*(9), 487-495.

Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harvard Review of Psychiatry*, *4*(5), 231-244. https://doi.org/10.3109/10673229709030550

Kirchner, J. E., Zubritsky, C., Cody, M., Coakley, E., Chen, H., Ware, J. H., Oslin, D. W., Sanchez, H. A., Durai, U. N. B., Miles, K. M., Llorente, M. D., Costantino, G., & Levkoff, S. (2007). Alcohol Consumption Among Older Adults in Primary Care. *Journal of general internal medicine*, *22*(1), 92-97. https://doi.org/10.1007/s11606-006-0017-z

Klatsky, A. L., Siegelaub, A. B., Landy, C., & Friedman, G. D. (1983). Racial patterns of alcoholic beverage use. *Alcohol Clin Exp Res*, *7*(4), 372-377. https://doi.org/10.1111/j.1530-0277.1983.tb05486.x

Kline, A., Weiner, M. D., Ciccone, D. S., Interian, A., Hill, L. S., & Losonczy, M. (2014). Increased risk of alcohol dependency in a cohort of National Guard troops with PTSD: a longitudinal study. *Journal of psychiatric research*, *50*, 18-25. https://doi.org/10.1016/j.jpsychires.2013.11.007

Knox, D., Vail-Smith, K., & Zusman, M. (2007). The Lonely College Male. *International Journal of Men's Health*, *6*, 273-279. https://doi.org/10.3149/jmh.0603.273

Layne, N., & Whitehead, P. C. (1985). Employment, marital status and alcohol consumption of young Canadian men. *Journal of Studies of Alcohol*, *46*(6), 538-540. https://doi.org/10.15288/jsa.1985.46.538

Lechner, W. V., Laurene, K. R., Patel, S., Anderson, M., Grega, C., & Kenne, D. R. (2020). Changes in alcohol use as a function of psychological distress and social support following COVID-19 related University closings. *Addictive Behaviors*, *110*, 1-4. https://doi.org/10.1016/j.addbeh.2020.106527

Lee, C. S., Colby, S. M., Rohsenow, D. J., López, S. R., Hernández, L., & Caetano, R. (2013). Acculturation stress and drinking problems among urban heavy drinking Latinos in the Northeast. *Journal of Ethnicity in Substance Abuse*, *12*(4), 308-320. https://doi.org/10.1080/15332640.2013.830942

Lee, J. D., O'Neill, A. S., Denning, E. C., Mohr, C. D., & Hammer, L. B. (2020). A dyadic examination of drinking behaviors within military-connected couples. *Military Behavioral Health*, *8*(4), 396-409.

Leonard, K. E., & Rothbard, J. C. (1999). Alcohol and the marriage effect. *Journal of Studies on Alcohol Supplement*, *13*, 139-146. https://doi.org/10.15288/jsas.1999.s13.139

Li, T.-K., Hewitt, B. G., & Grant, B. F. (2004). Alcohol use disorders and mood disorders: a National Institute on Alcohol Abuse and Alcoholism perspective. *Biological psychiatry*, *56*(10), 718-720. https://doi.org/10.1016/j.biopsych.2004.03.006

Li, Y., Jiang, Y., Zhang, M., Yin, P., Wu, F., & Zhao, W. (2011). Drinking behaviour among men and women in China: the 2007 China Chronic Disease and Risk Factor Surveillance. *Addiction*, *106*(11), 1946-1956. https://doi.org/10.1111/j.1360-0443.2011.03514.x

Liang, W., & Chikritzhs, T. (2011). Brief report: marital status and alcohol consumption behaviours. *Journal of Substance Use*, *17*(1), 84-90. https://doi.org/10.3109/14659891.2010.538463

Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of health and social behavior*, 80-94.

London, A. S., Wilmoth, J. M., Oliver, W. J., & Hausauer, J. A. (2020). The Influence of Military Service Experiences on Current and Daily Drinking. *Substance Use & Misuse*, *55*(8), 1288-1299. https://doi.org/10.1080/10826084.2020.1735438

Macdonald, S. (2020). Whisky, Women and the Scottish Drink Problem. A View from the Highlands1. In (pp. 125-143). https://doi.org/10.4324/9781003135043-6

Maguen, S., Li, Y., Madden, E., Seal, K. H., Neylan, T. C., Patterson, O. V., DuVall, S. L., Lujan, C., & Shiner, B. (2019). Factors associated with completing evidence-based psychotherapy for PTSD among veterans in a national healthcare system. *Psychiatry Research*, *274*, 112-128. https://doi.org/10.1016/j.psychres.2019.02.027

Maguen, S., Lucenko, B. A., Reger, M. A., Gahm, G. A., Litz, B. T., Seal, K. H., Knight, S. J., & Marmar, C. R. (2010). The impact of reported direct and indirect killing on mental health symptoms in Iraq war veterans. *Journal of Traumatic Stress*, *23*(1), 86-90. https://doi.org/10.1002/jts.20434

Marsden, M. E., Bray, R. M., & Herbold, J. R. (1988). Substance use and health among US military personnel: findings from the 1985 Worldwide Survey. *Preventive medicine*, *17*(3), 366-376. https://doi.org/10.1016/0091-7435(88)90011-4

Marshall, B. D. L., Prescott, M. R., Liberzon, I., Tamburrino, M. B., Calabrese, J. R., & Galea, S. (2012). Coincident posttraumatic stress disorder and depression predict alcohol abuse during and after deployment among Army National Guard soldiers. *Drug and Alcohol Dependence*, *124*(3), 193-199. https://doi.org/10.1016/j.drugalcdep.2011.12.027

Martin, A. (2001). *Alcohol, Sex, and Gender in Late Medieval and Early Modern Europe*. Palgrave. https://doi.org/10.1057/9781403913937

Mattiko, M. J., Olmsted, K. L. R., Brown, J. M., & Bray, R. M. (2011). Alcohol use and negative consequences among active duty military personnel. *Addict Behav*, *36*(6), 608-614. https://doi.org/10.1016/j.addbeh.2011.01.023

McBroom, E., Fife, E., & Nelson, C. (2008). " Risky Business": The College Transition, Loneliness, and Alcohol Consumption. *Journal of the First-Year Experience & Students in Transition*, *20*(2), 45-64.

McDaniel, J. T., Hascup, K. N., Hascup, E. R., Albright, D. L., & Wallace, J. P. (2022). Social Support and Decreased Likelihood of Alcohol Misuse among Persons with Dementia. *Health Behavior and Policy Review*, *9*(1), 628-635.

McDonald, K. (2018). Social Support and Mental Health in LGBTQ Adolescents: A review of the literature. *Issues in Mental Health Nursing*, *39*(1), 16-29. https://doi.org/10.1080/01612840.2017.1398283

McEvoy, L. K., Kritz-Silverstein, D., Barrett-Connor, E., Bergstrom, J., & Laughlin, G. A. (2013). Changes in Alcohol Intake and Their Relationship with Health Status over a 24-Year Follow-Up Period in Community-Dwelling Older Adults. *Journal of the American Geriatrics Society*, *61*(8), 1303-1308. https://doi.org/10.1111/jgs.12366

McFarlane, A. C. (1998). Epidemiological evidence about the relationship between PTSD and alcohol abuse: the nature of the association. *Addict Behav*, *23*(6), 813-825. https://doi.org/10.1016/s0306-4603(98)00098-7

Meadows, S. O., Engel, C. C., Collins, R. L., Beckman, R. L., Breslau, J., Bloom, E. L., Dunbar, M. S., Gilbert, M., Grant, D., Hawes-Dawson, J., Holliday, S. B., MacCarthy, S., Pedersen, E. R., Robbins, M. W., Rose, A. J., Ryan, J., Schell, T. L., & Simmons, M. M. (2021). *2018 Department of Defense Health Related Behaviors Survey (HRBS): Results for the Active Component*. RAND Corporation. https://doi.org/10.7249/RR4222

Mercier, C. A. (1915). The rum ration. *British Medical Journal*, *1*(2823), 271.

Montano, D., Schleu, J. E., & Hüffmeier, J. (2023). A meta-analysis of the relative contribution of leadership styles to followers' mental health. *Journal of Leadership & Organizational Studies*, *30*(1), 90-107. https://doi.org/10.1177/154805182211148

Moody, R. L., Savarese, E., Gurung, S., Rendina, H. J., & Parsons, J. T. (2020). The Mediating Role of Psychological Distress in the Association between Harassment and

Alcohol Use among Lesbian, Gay, and Bisexual Military Personnel. *Substance Use and Misuse*, *55*(12), 2055-2063. https://doi.org/10.1080/10826084.2020.1790007

Moos, R. H., Schutte, K. K., Brennan, P. L., & Moos, B. S. (2009). Older adults' alcohol consumption and late-life drinking problems: a 20-year perspective. *Addiction*, *104*(8), 1293-1302. https://doi.org/10.1111/j.1360-0443.2009.02604.x

Morgan, J. K., Brown, J., & Bray, R. M. (2018). Resilience as a moderating factor between stress and alcohol-related consequences in the Army National Guard [Article]. *Addictive Behaviors*, *80*, 22-27. https://doi.org/10.1016/j.addbeh.2018.01.002

Morice, C. K., Yammine, L., Yoon, J., Lane, S. D., Schmitz, J. M., Kosten, T. R., De La Garza II, R., & Verrico, C. D. (2022). Comorbid alcohol use and post-traumatic stress disorders: Pharmacotherapy with aldehyde dehydrogenase 2 inhibitors versus current agents. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *115*, 110506. https://doi.org/10.1016/j.pnpbp.2021.110506

Mulia, N., Karriker-Jaffe, K. J., Witbrodt, J., Bond, J., Williams, E., & Zemore, S. E. (2017). Racial/ethnic differences in 30-year trajectories of heavy drinking in a nationally representative U.S. sample. *Drug Alcohol Depend*, *170*, 133-141. https://doi.org/10.1016/j.drugalcdep.2016.10.031

Na, P. J., Norman, S. B., Nichter, B., Hill, M. L., Rosen, M. I., Petrakis, I. L., & Pietrzak, R. H. (2021). Prevalence, risk and protective factors of alcohol use disorder during the COVID-19 pandemic in U.S. military veterans. *Drug and Alcohol Dependence*, *225*, 1-8. https://doi.org/10.1016/j.drugalcdep.2021.108818

Norman, S. B., Haller, M., Hamblen, J. L., Southwick, S. M., & Pietrzak, R. H. (2018). The burden of co-occurring alcohol use disorder and PTSD in U.S. Military veterans: Comorbidities, functioning, and suicidality. *Psychology of Addictive Behaviors*, *32*(2), 224-229. https://doi.org/10.1037/adb0000348

Osborne, A. K., Wilson-Menzfeld, G., McGill, G., & Kiernan, M. D. (2022). Military service and alcohol use: a systematic narrative review. *Occupational Medicine*, *72*(5), 313-323. https://doi.org/10.1093/occmed/kqac045

Ozbay, F., Johnson, D. C., Dimoulas, E., Morgan, C. A., Charney, D., & Southwick, S. (2007). Social support and resilience to stress: from neurobiology to clinical practice. *Psychiatry (Edgmont)*, *4*(5), 35-40.

Paljärvi, T., Koskenvuo, M., Poikolainen, K., Kauhanen, J., Sillanmäki, L., & Mäkelä, P. (2009). Binge drinking and depressive symptoms: a 5-year population-based cohort study. *Addiction*, *104*(7), 1168-1178. https://doi.org/10.1111/j.1360-0443.2009.02577.x

Park, J. E., Hong, J. P., Jeon, H. J., Seong, S. J., Sohn, J. H., Ha, T. H., Lee, D.-W., Park, J.-I., Cho, S.-J., & Chang, S. M. (2020). Age-related differences in the associations among at-risk drinking, alcohol use disorder, and psychological distress across the adult lifespan: A nationwide representative study in South Korea. *Social psychiatry and psychiatric epidemiology*, *55*(10), 1335-1344. https://doi.org/10.1007/s00127-020-01845-5

Peirce, R. S., Frone, M. R., Russell, M., & Cooper, M. L. (1996). Financial stress, social support, and alcohol involvement: a longitudinal test of the buffering hypothesis in a general population survey. *Health Psychology*, *15*(1), 38-47. https://doi.org/10.1037//0278-6133.15.1.38

Perlman, D., & Peplau, L. A. (1984). *Loneliness research: A survey of empirical findings*. L. A. Peplau & S. E. Goldston (National Institute of Mental Health.)

Piumatti, G., Lietz, F., Aresi, G., & Bjegovic-Mikanovic, V. (2019). Alcohol use, psychological distress, and subjective well-being among young adult university

students: A cross-national study between Serbia and Italy. *Journal of Ethnicity in Substance Abuse*, *18*(4), 511-529. https://doi.org/10.1080/15332640.2017.1417186

Power, C., Rogers, B., & Hope, S. (1999). Heavy alcohol consumption and marital status: disentangling the relationship in a national study of young adults. *Addiction*, *94*(10), 1477-1478. https://doi.org/10.1046/j.1360-0443.1999.941014774.x

Rapier, R., McKernan, S., & Stauffer, C. S. (2019). An inverse relationship between perceived social support and substance use frequency in socially stigmatized populations. *Addictive Behaviors Reports*, *10*, 100188. https://doi.org/10.1016/j.abrep.2019.100188

Richer, I., Lee, J. E., & Born, J. (2016). Patterns of alcohol use among Canadian military personnel and their associations with health and well-being. *Health Psychology*, *35*(7), 685. https://doi.org/10.1037/hea0000328

Robertson, I. T., Cooper, C. L., Sarkar, M., & Curran, T. (2015). Resilience training in the workplace from 2003 to 2014: A systematic review. *Journal of Occupational and Organizational Psychology*, *88*(3), 533-562. https://doi.org/10.1111/joop.12120

Rona, R. J., Jones, M., Fear, N. T., Hull, L., Hotopf, M., & Wessely, S. (2010). Alcohol misuse and functional impairment in the UK Armed Forces: a population-based study. *Drug and Alcohol Dependence*, *108*(1-2), 37-42.

Rooney, J. A., Gottlieb, B. H., & Newby-Clark, I. R. (2009). How support-related managerial behaviors influence employees: An integrated model. *Journal of Managerial Psychology*, *24*(5), 410-427. https://doi.org/10.1108/02683940910959744

Sæther, S. M. M., Knapstad, M., Askeland, K. G., & Skogen, J. C. (2019). Alcohol consumption, life satisfaction and mental health among Norwegian college and university students. *Addictive Behaviors Reports*, *10*, 100216. https://doi.org/10.1016/j.abrep.2019.100216

Sampasa-Kanyinga, H., Zamorski, M. A., & Colman, I. (2018). The psychometric properties of the 10-item Kessler Psychological Distress Scale (K10) in Canadian military personnel. *PLOS ONE*, *13*(4), e0196562. https://doi.org/10.1371/journal.pone.0196562

Schmidt, B., Herr, R. M., Jarczok, M. N., Baumert, J., Lukaschek, K., Emeny, R. T., Ladwig, K.-H., & Investigators, K. (2018). Lack of supportive leadership behavior predicts suboptimal self-rated health independent of job strain after 10 years of follow-up: findings from the population-based MONICA/KORA study. *International archives of occupational and environmental health*, *91*, 623-631. https://doi.org/10.1007/s00420-018-1312-9

Schuler, M. S., Wong, E. C., & Ramchand, R. (2022). Military service branch differences in alcohol use, tobacco use, prescription drug misuse, and mental health conditions. *Drug and Alcohol Dependence*, *235*, 109461. https://doi.org/10.1016/j.drugalcdep.2022.109461

Schumm, J. A., & Chard, K. M. (2012). Alcohol and stress in the military. *Alcohol Research*, *34*(4), 401-407.

Seager, M. J., Bolton, S.-L., Bolton, J. M., Mota, N. P., Afifi, T. O., Sareen, J., & Enns, M. W. (2024). Coping style as a risk factor for future alcohol use disorder: A 16-year longitudinal study in a Canadian military sample. *Drug and Alcohol Dependence*, *262*, 111408. https://doi.org/10.1016/j.drugalcdep.2024.111408

Segrin, C., & Cooper, R. A. (2021). The association between social adversity and alcohol consumption is moderated by social support. *International Journal of Stress Management*, *28*(4), 283-294.

Shin, S. H., Hassamal, S., & Groves, L. P. (2015). Examining the role of psychological distress in linking childhood maltreatment and alcohol use in young adulthood. *The American Journal on Addictions*, *24*(7), 628-636. https://doi.org/10.1111/ajad.12276

Skipper, L. D., Forsten, R. D., Kim, E. H., Wilk, J. D., & Hoge, C. W. (2014). Relationship of combat experiences and alcohol misuse among U.S. Special Operations Soldiers. *Mililtary Medicine 179*(3), 301-308. https://doi.org/10.7205/milmed-d-13-00400

Skomorovsky, A. (2014). Deployment stress and well-being among military spouses: The role of social support. *Military psychology*, *26*(1), 44-54. https://doi.org/10.1037/mil0000029

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *Int J Behav Med*, *15*(3), 194-200. https://doi.org/10.1080/10705500802222972

Smith, T. C., LeardMann, C. A., Smith, B., Jacobson, I. G., Miller, S. C., Wells, T. S., Boyko, E. J., & Ryan, M. A. (2014). Longitudinal assessment of mental disorders, smoking, and hazardous drinking among a population-based cohort of US service members. *Journal of Addiction Medicine 8*(4), 271-281. https://doi.org/10.1097/adm.0000000000000050

Stahre, M. A., Brewer, R. D., Fonseca, V. P., & Naimi, T. S. (2009). Binge drinking among U.S. active-duty military personnel. *Americian Journal of Preventive Medcine 36*(3), 208-217. https://doi.org/10.1016/j.amepre.2008.10.017

Stapleton, M. (2018). Loneliness and social isolation in the armed forces community. *Royal British Legion, London*.

Straus, E., Norman, S. B., & Pietrzak, R. H. (2020). Determinants of new-onset alcohol use disorder in U.S. military veterans: Results from the National Health and Resilience in Veterans Study. *Addictive Behaviors*, *105*, 106313. https://doi.org/10.1016/j.addbeh.2020.106313

Sudhinaraset, M., Wigglesworth, C., & Takeuchi, D. T. (2016). Social and Cultural Contexts of Alcohol Use: Influences in a Social-Ecological Framework. *Alcohol Research 38*(1), 35-45.

Sull, J. W., Yi, S. W., Nam, C. M., Choi, K., & Ohrr, H. (2010). Binge drinking and hypertension on cardiovascular disease mortality in Korean men and women: a Kangwha cohort study. *Stroke*, *41*(10), 2157-2162. https://doi.org/10.1161/STROKEAHA.110.586347

Sullivan, T. P., Weiss, N. H., Flanagan, J. C., Willie, T. C., Armeli, S., & Tennen, H. (2016). PTSD and daily co-occurrence of drug and alcohol use among women experiencing intimate partner violence. *Journal of Dual Diagnosis*, *12*(1), 36-42. https://doi.org/10.1080/15504263.2016.1146516

Suris, A., & Lind, L. (2008). Military sexual trauma: a review of prevalence and associated health consequences in veterans. *Trauma Violence Abuse*, *9*(4), 250-269. https://doi.org/10.1177/1524838008324419

Tabachnick, B., & Fidell, L. (2018). *Using Multivariate Statistics*. Pearson Education. http://ebookcentral.proquest.com/lib/massey/detail.action?docID=5894255

Temple, M. T., Fillmore, K. M., Hartka, E., Johnstone, B. M., Leino, V. E., & Motoyoshi, M. (1991). A meta-analysis of change in maritial and employment status as predictors of alcohol consumption on a typical occasion. *British Journal of Addiction*, *86*, 1269-1281. https://doi.org/10.1111/j.1360-0443.1991.tb01703.x

Thandi, G., Sundin, J., Ng-Knight, T., Jones, M., Hull, L., Jones, N., Greenberg, N., Rona, R. J., Wessely, S., & Fear, N. T. (2015). Alcohol misuse in the United Kingdom Armed Forces: A longitudinal study. *Drug and Alcohol Dependence*, *156*, 78-83. https://doi.org/10.1016/j.drugalcdep.2015.08.033

Thomas, J. L., Wilk, J. E., Riviere, L. A., McGurk, D., Castro, C. A., & Hoge, C. W. (2010). Prevalence of mental health problems and functional impairment among active component and National Guard soldiers 3 and 12 months following combat in Iraq. *Archives of Genernal Psychiatry*, *67*(6), 614-623. https://doi.org/10.1001/archgenpsychiatry.2010.54

Torres, V., Williams, E., Ceballos, R., Donovan, D., & Ornelas, I. (2022). Discrimination, acculturative stress, alcohol use and their associations with alcohol-related consequences among Latino immigrant men. *Journal of Ethnicity in Substance Abuse*, *23*, 1-16. https://doi.org/10.1080/15332640.2022.2077273

Towers, A., Sheridan, J., Newcombe, D., & Szabo, A. (2018). New Zealanders' alcohol consumption patterns across the lifespan.

Trautmann, S., Schönfeld, S., Behrendt, S., Heinrich, A., Höfler, M., Siegel, S., Zimmermann, P., & Wittchen, H. U. (2015). Predictors of changes in daily alcohol consumption in the aftermath of military deployment. *Drug Alcohol Depend*, *147*, 175-182. https://doi.org/10.1016/j.drugalcdep.2014.11.019

Treatment, C. f. S. A. (2014). *Trauma-informed care in behavioral health services*. Substance Abuse and Mental Health Services
Administration.

Tudehope, L., Lee, P., Wiseman, N., Dwirahmadi, F., & Sofija, E. (2022). The effect of resilience on the relationship between perceived stress and change in alcohol consumption during the COVID-19 pandemic in Queensland, Australia. *Journal of Health Psychology*, *27*(12), 2696-2713. https://doi.org/10.1177/13591053211062351

van Gils, Y., Dom, G., Dierckx, E., Van Alphen, S. P. J., & Franck, E. (2022). Resilience, depression and anxiety and hazardous alcohol use behaviour among community dwelling older adults. *Aging & Mental Health*, *26*(1), 56-64. https://doi.org/10.1080/13607863.2020.1870211

Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the Resilience Scale. *Journal of Nursing Measurement*, *1*(2), 165-178.

Wakabayashi, M., Sugiyama, Y., Takada, M., Kinjo, A., Iso, H., & Tabuchi, T. (2022). Loneliness and Increased Hazardous Alcohol Use: Data from a Nationwide Internet Survey with 1-Year Follow-Up. *International Journal of Environmental Research and Public Health*, *19*(19), 12086. https://doi.org/10.3390/ijerph191912086

Waldron, I., Hughes, M. E., & Brooks, T. L. (1996). Marriage protection and marriage selection—Prospective evidence for reciprocal effects of marital status and health. *Social Science & Medicine*, *43*(1), 113-123. https://doi.org/10.1016/0277-9536(95)00347-9

Wall, T. L., & Ehlers, C. L. (1995). Genetic Influences Affecting Alcohol Use Among Asians. *Alcohol Health Res World*, *19*(3), 184-189.

Waller, M., McGuire, A. C., & Dobson, A. J. (2015). Alcohol use in the military: associations with health and wellbeing. *Substance Abuse Treatment, Prevention, Policy*, *10*(1), 1-10. https://doi.org/10.1186/s13011-015-0023-4

Ward, R. N., Erickson, A. J., Carlson, K. J., & Yalch, M. M. (2023). The role of unit cohesion and perceived resilience in substance use disorder. *Military psychology*, 1-7. https://doi.org/10.1080/08995605.2023.2189861

Weathers, F., Litz, B., Herman, D., Huska, J. A., & Keane, T. (1993). The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. *Paper Presented at the Annual Convention of the International Society for Traumatic Stress Studies*.

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). The PTSD Checklist for DSM-5 (PCL-5) - Standard (Measurement instrument) *Available from the National Center for PTSD at www.ptsd.va.gov*.

Wechsler, H., & Nelson, T. F. (2001). Binge drinking and the American college students: What's five drinks? *Psychology of Addictive Behaviors*, *15*(4), 287. https://doi.org/10.1037//0893-164x.15.4.287

Welty, L., Harrison, A., Abram, K., Olson, N., Aaby, D., & McCoy, K. (2019). *Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health* (Vol. 106). Substance Abuse and Mental Health Services Administration. (HHS Publication No. SMA 17-5044, NSDUH Series H-52). Center for Behavioral Health Statistics and Quality)

WHO. (2024). *Alcohol, heavy episodic drinking (population) past 30 days*. https://www.who.int/data/gho/indicator-metadata-registry/imr-details/459

Williamson, C., Wickersham, A., Sharp, M.-L., Dryden, D., Simms, A., Fear, N. T., Murphy, D., Goodwin, L., & Leightley, D. (2023). Loneliness among UK Veterans: Associations with quality of life, alcohol misuse, and perceptions of partner drinking. *Journal of Military, Veteran and Family Health*, *9*(4), 88-99. https://doi.org/10.3138/jmvfh-2023-0009

Wilsnack, R. W., Vogeltanz, N. D., Wilsnack, S. C., Harris, T. R., Ahlström, S., Bondy, S., Csémy, L., Ferrence, R., Ferris, J., Fleming, J., Graham, K., Greenfield, T., Guyon, L., Haavio-Mannila, E., Kellner, F., Knibbe, R., Kubicka, L., Loukomskaia, M., Mustonen, H., . . . Weiss, S. (2000). Gender differences in alcohol consumption and adverse drinking consequences: cross-cultural patterns. *Addiction*, *95*(2), 251-265. https://doi.org/10.1046/j.1360-0443.2000.95225112.x

Wingo, A. P., Ressler, K. J., & Bradley, B. (2014). Resilience characteristics mitigate tendency for harmful alcohol and illicit drug use in adults with a history of childhood abuse: a cross-sectional study of 2024 inner-city men and women. *Journal of Psychiatry Research 51*, 93-99. https://doi.org/10.1016/j.jpsychires.2014.01.007

Woodruff, S. I., Hurtado, S. L., & Simon-Arndt, C. M. (2018). U.S. Marines' Perceptions of Environmental Factors Associated With Alcohol Binge Drinking. *Military Medicine*, *183*(7-8), 240-245. https://doi.org/10.1093/milmed/usx121

Wortmann, J. H., Jordan, A. H., Weathers, F. W., Resick, P. A., Dondanville, K. A., Hall-Clark, B., Foa, E. B., Young-McCaughan, S., Yarvis, J. S., & Hembree, E. A. (2016). Psychometric analysis of the PTSD Checklist-5 (PCL-5) among treatment-seeking military service members. *Psychological Assessment*, *28*(11), 1392-1403. https://doi.org/10.1037/pas0000260

Yukl, G. (2006). *Leadership in Organizations*. Pearson Education India.

Zhang, H., Ruan, W. J., Chou, S. P., Saha, T. D., Fan, A. Z., Huang, B., & White, A. M. (2024). Exploring patterns of alcohol use and alcohol use disorder among Asian Americans with a finer lens. *Drug and Alcohol Dependence*, *257*, 111-120. https://doi.org/10.1016/j.drugalcdep.2024.111120