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# The Longitudinal Australian Defence Force Study Evaluating Resilience (LASER-Resilience)

## Patterns and Predictors of Wellbeing Report

2019

LASER Resilience

THE UNIVERSITY OF MELBOURNE

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Disclaimer:

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## Background

The Longitudinal Australian Defence Force (ADF) Study Evaluating Resilience (LASER-Resilience) is a longitudinal study, designed and implemented collaboratively by the Australian Commonwealth Department of Defence and Phoenix Australia – Centre for Posttraumatic Mental Health. LASER-Resilience aims to better understand the situational factors and individual characteristics that promote and erode resilience over the first three to four years of a military career. The overall goal of this report is to inform future policy, program and strategic development in order to maintain the psychological health and wellbeing of current and future ADF members.

The initial years of a military career require adjustment to new training, work and social environments. While most military members will adjust successfully to these changes, some will experience the initial transition as stressful. Therefore, understanding the experience of this early career period has utility in terms of identifying those who show resilience during periods of stress and those who do not, and seeking to understand how these patterns may contribute to wellbeing over time.

In this report, resilience has been conceptualised as the maintenance of wellbeing or return to levels of wellbeing that were experienced prior to a stressful experience. Wellbeing can be indicated by the absence of psychological disorder or maladaptive behaviours, or the presence of positive emotions and positive coping styles.

Psychological outcomes (used as a proxy for resilience) and predictors were included in this report based on a review of the literature and on those factors included at earlier time points of the LASER-Resilience data collection. These situational and individual factors include exposure to potentially traumatic events (e.g. childhood adversity and transition points during early military career), coping and adjustment style, physical health (e.g. sleep and alcohol consumption) and psychosocial functioning (e.g. social support and support from leadership).

It is important to note that the majority of previous military research has been conducted in the United States (US) and has been cross-sectional in design. Therefore, this LASER-Resilience report fills a gap in the literature by shedding light on the longitudinal patterns of resilience among ADF personnel during the early stages of their military career.

## Approach

The approach to conceptualising resilience in this report centres around ‘the maintenance or quick recovery of mental health during and after exposure to significant stressors’ (Kalisch et al., 2017). Trajectories of mental health symptoms from the end of the initial training period to the final data collection point were modelled to identify the different patterns of wellbeing that exist among military members in the context of adjustment to a military career. In addition, the factors associated with these different trajectories were examined.

## Key findings

1. The majority of military members (over 80%) maintain consistently high levels of wellbeing throughout the early years of their military career. This group were classified as resilient.
2. Another subgroup reported decreasing levels of mental disorder symptomatology from post-training onwards, indicating that elevated distress at the conclusion of training (or at the end of the first year of training for those in longer courses) does not necessarily predict ongoing levels of distress throughout the subsequent stages of their military career.
3. Another subgroup experienced increasing levels of distress over the first three to four years, indicating that sub-syndromal disorder post-recruit or initial officer training may worsen over time to develop into psychological disorder.
4. The proportion of members in each of the subgroups was similar across all Service types.
5. There were a number of modifiable factors associated with maintaining wellbeing through the early years of a military career, including adaptive coping skills (acceptance and reappraisal), adequate sleep, good social support and good morale within the unit/team.
6. Certain coping styles (self-blame, avoidance and risk-taking), lifetime trauma exposure and anger were associated with a greater risk of developing mental health issues over time.

## Conclusions and implications

- Modifiable factors associated with resilience could be targeted in early intervention and training efforts to ensure that there is a focus on adaptive coping, sleep hygiene, managing anger and utilising social supports.
- Factors that promote resilience should be embedded and consolidated throughout the military career, e.g. actively practice skills during exercises.
- There are certain people who should be targeted for early intervention with appropriate supports and strategies, e.g. those using maladaptive coping skills or consuming alcohol at hazardous levels.
- Training programs should be reviewed to ensure that they are optimised to assist individuals in acquiring and maintaining skills and strategies to support resilience, and to check that these skills are being utilised.
- Screening individuals in the early stages of their career could allow for the early identification of sub-syndromal disorder and poor coping styles and facilitate intervention to prevent further deterioration.
- Leaders and instructional staff who have regular contact with individuals during the early stage of their military career should be upskilled to identify those at risk, encourage and model adaptive coping skills and foster support networks and morale within their workplace.

# Introduction

## Background

The Longitudinal Australian Defence Force (ADF) Study Evaluating Resilience (LASER-Resilience) is a longitudinal study of General Enlistees (GE) and Officers over the first three to four years of their military career. The study was designed and implemented collaboratively by the ADF and Phoenix Australia. The overarching goal of LASER-Resilience is to identify the main patterns of wellbeing and functioning during the initial stages of a military career and the situational factors and individual characteristics that may enhance resilience (Crane & Kehoe, 2012).

The early years of a military career require adjustment to a rigorous new training, work and, in many cases, living environment (Crane, Lewis, Forbes & Elliott, 2013). While the majority adjust successfully to this new environment, there are significant cultural, physical, psychological and occupational changes associated with joining the military. These can include moving away from established support networks, working and living in a team environment, handling weapons, complying with military protocols, and changes to sleeping patterns. There is also an expectation that individuals will integrate into the military culture, which can involve shifts in personal identity, values and norms (Crane, Lewis, Kehoe, Reid & Casetta, 2012). Understandably, many will experience the initial transition into the military as stressful and, during their first few years, the majority will also transition from a training establishment to their first ship, unit or base. However, most individuals will successfully adapt to each new setting and maintain their wellbeing as they pursue their chosen career (Crane et al., 2013).

There are broader stressors that can affect wellbeing beyond the period of transition to the military. Military members are not exempt from the range of stressors and traumas that people can experience in their personal lives. Additionally, the military workplace potentially contains a range of everyday stressors that are present in all workplaces including conflict with co-workers, a demanding workload, lack of autonomy and issues with work–life balance (Britt, Crane, Hodson & Adler, 2016; Brooks & Greenberg, 2018). Furthermore, a career in the military has the potential to expose individuals to stressors and potentially traumatic events through training exercises and military operations including combat, peace-keeping, border protection, humanitarian assistance and national security tasks (Department of Defence, 2017). While this range of stressful or potentially adverse events can place an individual at risk for poor mental health (Masten, Best & Garmezy, 1990), findings from a previous LASER-Resilience report, the *Early Career Report* (Crane et al., 2013) indicated that the majority of individuals demonstrate psychological resilience during the early years of their military career as indicated by low levels of self-reported symptoms of psychological distress.

## The definition of resilience

*Resilience* is a broad term that has been conceptualised in several ways across different studies (Cosco et al., 2017). For this program of research, resilience was considered to be ‘the sum total

of psychological processes that permit individuals to maintain or return to previous levels of wellbeing and functioning in response to adversity' (The Technical Cooperation Program, 2008). This definition highlights the link between the concept of resilience and the processes of wellbeing and functioning. Resilience has, therefore, been identified in this report as an overarching construct characterised by wellbeing and functioning in response to a life transition (e.g. commencement of military service, movement from a training group to a work group). *Wellbeing* can be indicated by the absence of psychological disorder, such as posttraumatic stress disorder (PTSD) or depression, or the absence of certain maladaptive behaviours, such as self-harm or suicidal behaviour. It can also be indicated by the presence of positive emotion and positive coping styles. *Functioning* can be indicated by objective measures, such as the ability to carry out work or normal activities.

An individual's level of resilience can affect their ability to successfully embark on a military career. Lower levels of resilience, as measured by the Connor-Davidson Resilience Scale (CD-RISC), have been linked to attrition from the military and being diagnosed with a mental health condition in the early years of military service (Bezdjian, Schneider, Burchett, Baker & Garb, 2017). In contrast, higher levels of resilience have been shown to reduce the risk of alcohol related consequences during periods of high stress (Morgan, Brown & Bray, 2018). Thus, it is important to understand the factors that may promote or erode psychological resilience in the early years of a military career.

Given that the definition of resilience adopted in this report has a focus on both wellbeing and functioning, it is important to note a limitation of the LASER-Resilience dataset. After significant review of the data collected for the current report, it was determined that there were no measures that assessed functioning in a sufficiently methodologically rigorous way to be utilised as a robust outcome measure in the analyses. Initial plans to link ADF data about participants' performance in training and their early career were not able to be implemented at the time of writing this report. Therefore, resilience in this report is conceptualised as the maintenance of wellbeing or return to levels of wellbeing that were experienced prior to exposure to a stressor. This definition is consistent with current conceptualisations of resilience that highlight its status as an emergent wellbeing outcome post-risk (Kalisch et al., 2017) and current research. While some individuals may experience positive changes following adversity, such as improved relationships, changed priorities and an increased sense of personal strength, known as posttraumatic growth (Tedeschi & Calhoun, 2004) – this level of analysis is beyond the scope of the LASER-Resilience dataset and as such will not be the focus of this report. Deeper explorations of constructs such as posttraumatic growth and improvements in measurement of functioning will, however, be highlighted as core areas for future research and investigation.

# Objectives of this LASER-Resilience report

This report uses survey data collected over the entire duration of the LASER-Resilience project to examine the factors that are most important in promoting or eroding psychological resilience in ADF members in the early phase of their career. The aim of this report is to inform future policy,

program and strategic development, with a view to maintaining the psychological health and wellbeing of current and future ADF members.

The selection of factors to be included in this LASER-Resilience Report was guided by a review of the literature (with a particular focus on research relating to military populations) and the factors that were analysed in earlier time points[1] of LASER-Resilience data collection. Since the commencement of the project in 2009, four initial reports and three detailed reports – exploring specific factors demonstrated to influence psychological resilience and mental health outcomes – have been delivered to Defence. Selected findings from these reports are outlined below; a full overview of the key findings from these reports is presented in Appendix A.

# Previous LASER-Resilience reports

*Initial Report 1*, the *Pre-enlistment Report* (Crane, Kehoe, Reid & Casetta, 2012), provided a preliminary analysis of the LASER-Resilience sample at the first data collection time point, which occurred post-selection but pre-training for GEs and in the first two weeks of training for Officers. Preliminary analysis found that:

- most Officers and GEs reported good mental health, adaptive coping skills and high levels of self-confidence, with respondents also reporting high levels of social support from their family and friends; and
- resilience, as measured by the CDRISC-2, was correlated with coping skills and self-efficacy.

*Initial Report 2*, the *Initial Training Report* (Crane & Kehoe, 2012), examined how key indicators of mental health and wellbeing changed for ADF members from pre- to post-initial training (or after one year of service for those undertaking longer periods of initial training) and found that:

- in general, both Officers and GEs had very good mental health and wellbeing at baseline and this was maintained post-initial training; and
- a small number (< 10%) experienced psychological distress or PTSD symptoms at the end of initial training, which was attributed to the physical/mental demands of initial training.

*Initial Report 3*, the *Contributors to Change Report* (Crane et al., 2013), built upon the *Initial Training Report* and examined the factors that influenced mental health and wellbeing of ADF members during their initial training (or during their first year of training for those undertaking longer periods of initial training). The report indicated that:

- avoidant and self-blaming coping styles prior to entering military training predicted psychological distress after training, and coping styles such as acceptance used after training were associated with fewer symptoms of distress;
- poor sleep pre-training predicted more posttraumatic stress symptoms and greater expressed anger post-training; and

[1] LASER data collection time points included: Time 1 (T1): at enlistment/beginning of training; Time 2 (T2): post-training/end of training; Time 3 (T3) 1 year post-T2; Time 4 (T4): 1 year post-T3; and Time 5 (T5): 1 year post-T4. For more detail, see Table 0-A in the approach.

- coping styles could be used flexibly to maximise adaptation to changing environmental demands.

*Initial report 4*, The *Early Career Report* (Crane et al., 2013), explored the health and wellbeing status of ADF members from enlistment to the completion of their first year of service and found that:

- respondents reported more positive social interactions than negative ones and strongly identified with their immediate group of colleagues at initial training; and
- there was a high degree of coping flexibility across all three time points.

*Detailed Report 1, Prior Trauma Exposure and Mental Health* (O'Donnell et al., 2015) explored the relationship between pre-military trauma exposure, coping style and mental health outcomes in the first one to two years of service and indicated that:

- prior trauma exposure was fairly common in individuals joining the ADF but there were high rates of good mental health overall;
- prior trauma exposure made only a small contribution to symptoms of mental health disorder; and
- there was a notable subgroup with ≥4 prior traumatic events, which, while not evidently impacted at this time point, was worthy of closer scrutiny over time.

*Detailed Report 2, Alcohol and Tobacco Use, Coping and Mental Health* (Lewis et al., 2015) examined alcohol and tobacco use in the first one to two years of service and found that:

- despite a significant increase in alcohol consumption in the first two years of their military career, the majority of enlistees were not drinking at harmful levels;
- there was a significant increase in the use of tobacco, particularly for GEs, but this was not associated with changes to mental health or coping styles; and
- there was no clear relationship between psychological distress and alcohol use.

*Detailed Report 3, Exploring Social Support in the Initial Years of Military Service* (Crane et al., 2016) explored the role of social support over the first two years of military service and found that:

- the majority of individuals reported having a network of supportive relationships throughout their initial two years of service, and the presence of these networks was associated with better mental health outcomes; and
- a subgroup was identified at T3 who initially reported strong supports across the first two time points but were starting to report poorer mental health, and this was reflected in deteriorating relationships with leadership and peer supports.

In consultation with Defence, it was agreed that the *Patterns and Predictors of Wellbeing* report would address the following research questions.

Q1. What are the main patterns of wellbeing within and across time for GEs and Officers over the first three to four years of a military career?

(a) Which of these patterns corresponds best with conceptual notions of resilience; that is maintaining or returning to previous levels of wellbeing?

Q2. What are the key situational and individual variables that influence these patterns of wellbeing, within and across time?

Q3. Are there any major subgroups that show distinctive patterns of wellbeing, or associations with situational or individual variables, that may predict resilience?

# Resilience in the military: a brief review of the literature

As outlined above, resilience can be conceptualised in terms of both wellbeing and functioning, and a range of measures are often used as a proxy for resilience. In this review of the literature, resilience has been described in terms of the specific outcome measure/s used to operationalise it in each study. In the majority of studies found during the literature search, resilience was operationalised as the absence of PTSD symptoms or psychological distress.

Resilience in the military has been observed in the aftermath of potentially traumatic events, such as combat exposure, and over a period of increased stress or adjustment, such as the transition to a military career. Although studies that measure resilience over a longer period of time are more relevant to the analysis in this report, important findings can still be drawn from the literature that focuses on a single time point. The lack of consistency in the way that resilience has been measured can make it difficult to draw conclusions about the collective body of research. Therefore, the literature reviewed here is specifically related to the variables under investigation in the LASER-Resilience project in order to provide a useful context for the analysis presented in the next section of this report. The review focuses on the factors that influence wellbeing and functioning during an individual's military career, particularly during periods of high stress or potential high stress. It is worth noting that the majority of research on the military has been conducted using United States (US) samples and, as such, there may be differences from Australian samples in terms of both the number and type of stressors to which the subjects are exposed and the socioeconomic differences that influence resilience.

## Main patterns of wellbeing and functioning within and across time for military members

Individual responses to adversity are varied, and several studies have found that these responses can be characterised by patterns of mental health symptoms over time. A number of studies have examined longitudinal mental health patterns – also called trajectories – over the course of a military career. Predominantly, these studies have used the absence of PTSD symptoms as a proxy for resilience. Trajectories are an informative statistical method for examining resilience, as they demonstrate how mental health outcomes change in response to challenges and adversity over time.

Common posttraumatic stress symptom trajectories are described in the literature. This is typified by a study of US military members following deployment (Bonanno et al., 2012) that identified a

series of trajectories of posttraumatic stress symptoms, as shown in **Figure 1**. The majority of individuals had a trajectory of low–stable posttraumatic stress, which the authors defined as a 'resilience trajectory'. Other trajectories identified were 'moderate–improving', characterised by steadily decreasing posttraumatic stress; 'worsening–chronic', characterised by low pre-deployment symptoms and worsening posttraumatic stress post-deployment; and 'high–stable', characterised by consistently elevated posttraumatic stress. Trajectories were similar whether individuals had deployed once or multiple times.

Other studies of mental health trajectories following adversity have also demonstrated that trajectories characterised by consistently low levels of posttraumatic stress are the most common (Fink et al., 2017; Hart & Lancaster, 2016). This has even been found to be the case post-deployment (Andersen, Karstoft, Bertelsen & Madsen, 2014; Bonanno et al., 2012; Eekhout, Reijnen, Vermetten & Geuze, 2016; Polusny et al., 2017). This indicates that although there is a subgroup of individuals who experience poor mental health during stressful periods, most military personnel demonstrate resilience throughout their military career, including those who deploy on operations. It is, therefore, advantageous to understand the factors that may predict whether or not an individual will demonstrate resilience during periods of stress and adjustment, as well as adversity. Examining patterns of mental health longitudinally has the potential to highlight the factors that impact on resilience at different stages of an individual's life.

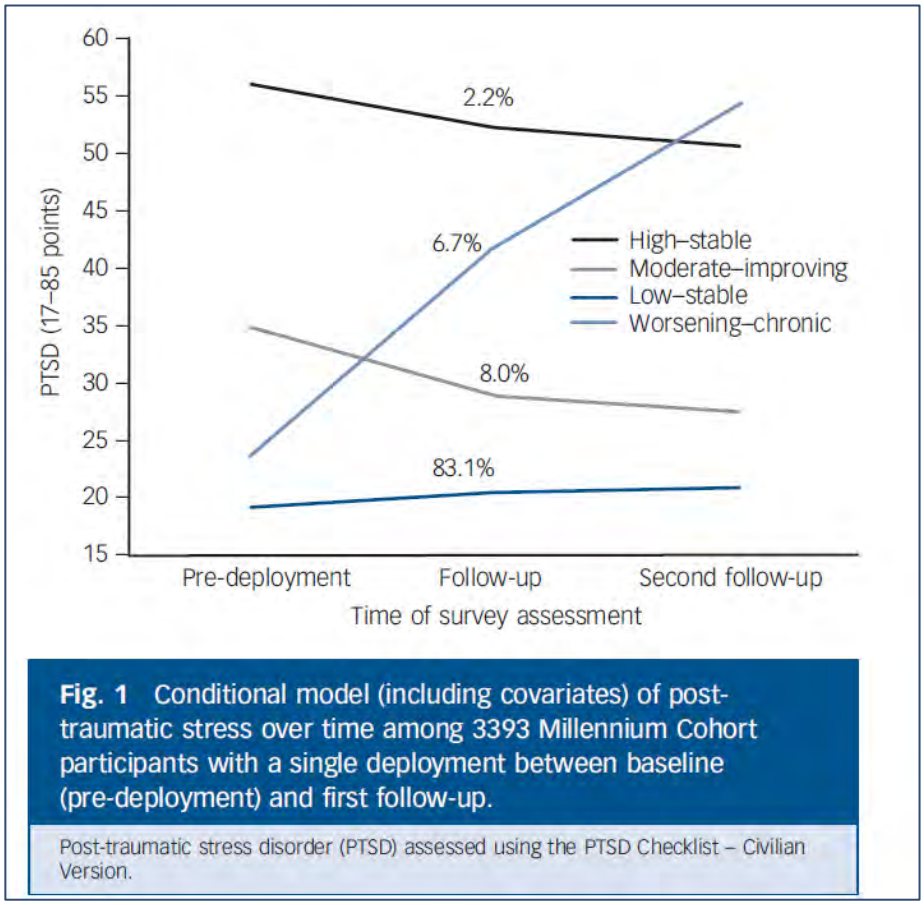


**Fig. 1** Conditional model (including covariates) of post-traumatic stress over time among 3393 Millennium Cohort participants with a single deployment between baseline (pre-deployment) and first follow-up.

Post-traumatic stress disorder (PTSD) assessed using the PTSD Checklist – Civilian Version.

*Figure 1. Trajectories of posttraumatic stress symptoms (Source: Bonanno et al., 2012). Note that the interval between observations was three years.*

# The key situational and individual factors that influence patterns of wellbeing and functioning

Studies in military populations have identified a number of factors associated with poor mental health and functional outcomes during a military career. Risk factors and protective factors that predict adjustment to military life have been grouped into four categories for the purposes of this report: exposure to potentially traumatic life events; coping style; physical health; and psychosocial functioning.

## Exposure to potentially traumatic life events

Exposure to potentially traumatic life events increases the risk of individuals developing mental health symptoms (Lee, Phinney, Watkins & Zamorski, 2016) and decreases the ability to bounce back from adversity (Campbell-Sills et al., 2017). Traumatic events experienced during childhood and/or adulthood, as well as current stressful life events, may impact a member early in their military career.

### *Childhood adversity*

Childhood adversity and exposure to potentially traumatic events is a demonstrated risk factor for the development of mental health problems (particularly PTSD) in adulthood (Brewin, Andrews & Valentine, 2000). Moreover, risk increases as the number of childhood traumas increase (McFarlane, Hodson, Van Hooff, Verhagen & Davies, 2011). Among US Army members, childhood maltreatment is negatively associated with self-reported resilience (Campbell-Sills et al., 2017). Conversely, it is strongly associated with suicidal behaviour (Stein et al., 2017), increased risk of developing depression or anxiety following a stressful event (Bandoli et al., 2017) and post-deployment PTSD (LeardMann, Smith & Ryan, 2010). Of note, experiencing both physical and sexual childhood abuse has been associated with more severe PTSD symptoms among active duty soldiers compared to those who experienced no abuse or physical abuse only (Seifert, Polusny & Murdoch, 2011).

While evidence suggests that childhood adversity has a strong effect on later mental health symptomatology, certain co-occurring factors can serve to mediate or even protect against this effect. A study of Canadian military service members found that social support and number of combat stressors mediated the relationship between adverse childhood experiences and poor mental health (Lee et al., 2016). Furthermore, as outlined in the LASER-Resilience report *Prior Trauma Exposure and Mental Health*, low rates of mental health symptoms were found in new members of the ADF, despite a relatively high frequency of prior trauma exposure (O'Donnell et al., 2015). This suggests that ADF members may have had other characteristics that ameliorated the effect of traumas experienced earlier in life. It is worth noting that the *Prior Trauma Exposure and Mental Health* report was based on the first three time points of data (T1, T2 and T3); therefore, the current report proposes to expand on these findings.

### *Vulnerability points in the early stages of a military career*

There are many points of change and potentially increased stress in the early years of a military career. The US-based Army Study to Assess Risk and Resilience in Service members (Army STARRS) highlighted several transition points in a military career where military personnel are vulnerable to particular psychological stressors and are at risk of developing mental health issues; these were pre-enlistment, post-enlistment, deployment and post-deployment (Ursano et al., 2014). In terms of the Australian military, key points of adjustment and potential vulnerability include the transition from civilian to military life, moving from initial training into job-specific training, and posting to the member's first (and potentially subsequent) ship, unit or base. In addition, some military members will have transitioned into and out of deployments in the first few years of their military career. Potential stressors at each of these points include adjustments to new geographical locations, shifts in role and responsibilities, and changes to support networks and leadership structures. Thus, individuals are likely to experience a diverse range of potential stressors through their early career. These transition points will be experienced differently by different people. The ease of adjustment is likely to be a continuum from those who find the adjustment highly stressful to those who find adjustment easy.

It is worth noting that stress can play a multidirectional role in the development of resilience, and some level of exposure to stress may help individuals build the capacity to cope with stress in the future (Seery, 2011; Seery, Holman & Silver, 2010; Seery, Leo, Lupien, Kondrak & Almonte, 2013). The relationship between exposure to stressful life events and resilience is nuanced and is influenced by the type of event as well as the frequency of exposure to trauma or stress. The remainder of this section will focus on potentially traumatic events that occur within a military career as these are the events that are most commonly examined in the literature on resilience in military members. Arguably operational deployment is the point in a military career where individuals are most likely to be exposed to potentially traumatic events. Military members are more likely to report elevated levels of posttraumatic stress symptoms following a deployment (Bonanno et al., 2012). Deployment increases the risk of posttraumatic stress symptoms, both in the short term (less than six months post-deployment) and the long-term (five years post-deployment) (Eekhout et al., 2016).

Individuals who do not experience posttraumatic symptoms following deployment are often labelled as 'resilient'. However, Boasso et al. (2015) highlighted that a lack of posttraumatic symptoms post-deployment may simply be a measure of lower levels of exposure to combat rather than resilience. They examined the longitudinal course of posttraumatic symptoms by grouping previously deployed marines by the level of combat exposure they had experienced, and found a difference between 'true resilience', where a clinically significant symptom increase was followed by a return to baseline, and 'artifactual resilience', which involved consistently low levels of symptoms (Boasso, Steenkamp, Nash, Larson & Litz, 2015). Examination of resilience trajectories post-deployment indicated that individuals who experienced the most combat during deployment also reported the most elevated and chronic levels of posttraumatic stress symptoms (Bonanno et al., 2012).

There are a number of studies supporting the notion that exposure to potentially traumatic events, rather than deployment in and of itself, predicts poor mental health outcomes following a deployment. A study of Australian military personnel indicated that greater exposure to traumatic events on deployment was associated with a higher risk of PTSD symptoms, higher levels of psychological distress, and alcohol misuse (Kanesarajah, Waller, Zheng & Dobson, 2016). This is consistent with the findings of McFarlane et al. (2011), who identified that while deployment per se did not predict PTSD in a population study of ADF members, the number of potentially traumatic event exposures experienced by members did.

While there is a range of potentially traumatic events that may occur on deployment – such as witnessing human suffering or being unable to help because of the rules of engagement – the research tends to focus on combat exposure as the main source of exposure to trauma. A study of active serving members of the US National Guard found that soldiers without PTSD at baseline were more likely to develop PTSD post-deployment if they were exposed to combat during deployment (Polusny et al., 2011). Notably, exposure to combat has been shown to increase vulnerability to poor mental health outcomes, particularly among early career soldiers compared to more experienced soldiers (Ursano et al., 2017). This supports the hypothesis that it is exposure to potentially traumatic events, rather than the act of deployment, that influences the development of mental health symptomatology. It is, therefore, important to consider potentially traumatic life events when examining patterns of wellbeing and functioning during a military career.

## Coping style

An individual's ability to adjust to the demands of a military career is influenced by their coping style. In a study of Chinese soldiers, positive-focused cognitive emotion regulation – characterised by thoughts that focus on acceptance, positive reappraisal and putting things into perspective – was significantly associated with resilience as measured by the CD-RISC (Cai et al., 2017). A study of US service members identified a number of coping strategies that were related to increased resilience (as measured by the 14-item Resilience Scale, RS-14), including positive reframing and refraining from self-blame (Rice & Liu, 2016). Positive coping styles have also been associated with other measures of wellbeing and functioning. In a study of US and Australian soldiers in basic training, the ability and willingness to accept the demands of training were associated with the development of fewer mental health symptoms (Britt, Crane, et al., 2016). Further, a study of New Zealand Defence Force members in initial training indicated that coping adaptability was associated with being able to manage the demands of basic military training, and higher self-rated performance (Overdale & Gardner, 2012). It is worth mentioning that the ability of an individual to cope with the stressors of a job is also related to other factors, such as personality characteristics, motivation (Proudfit, Inzlicht & Mennin, 2013) and organisational fit (Dunkley, Zuroff & Blankstein, 2003; Newton & Jimmieson, 2008). Nonetheless, studies indicate that certain adaptive coping strategies might buffer the impact of early military career stressors and might even enable individuals to thrive during those stressful years. A study of new recruits to the Swiss military found that those who reported prosocial coping styles and lower levels of psychological distress at the beginning of basic training were more likely to be recommended for further promotion at the end of basic training (Nakkas, Annen & Brand, 2016).

Correspondingly, studies have found an association between certain maladaptive coping styles and poorer mental health outcomes. In particular, the use of avoidant coping styles – characterised by orienting attention away from unpleasant experiences or choosing not to engage with problems – is associated with poorer mental health and functioning (Boden et al., 2014; Nash et al., 2015). Similarly, maladaptive cognitive strategies such as self-blame, rumination and catastrophising are associated with greater physiological and psychological stress (Cai et al., 2017; Kearney, Creamer, Marshall & Goyne, 2001). As noted above, the initial LASER-Resilience *Report 2* demonstrated that certain coping styles were more likely to be associated with reported psychological distress during military training (Crane et al., 2013). This suggests that there is a relationship between particular coping styles and psychological health during the early years of a military career, which warrants further investigation in this LASER-Resilience report.

## Physical health

Physical health has also been linked with psychological wellbeing and functioning during stressful periods. Physical health may buffer some of the effects of high-stress environments and allow individuals to recover more effectively from stressful experiences. In addition, there is evidence to suggest that poor physical health can contribute to diminished psychological wellbeing. A study of US military members following deployment indicated that individuals reporting consistently low levels of posttraumatic stress symptoms tended to be in better physical health compared to those who reported higher levels of posttraumatic stress symptoms (Bonanno et al., 2012).

### *Sleep*

Good-quality sleep plays a crucial role in maintaining overall health and wellbeing. During the early years of a military career, sleep can be disrupted by the need to adopt new sleeping patterns due to enforced times for sleeping (Crane et al., 2013), shift work, a high workload and deployment across time zones (Seelig et al., 2016). Compromises to the quality and quantity of sleep have been shown to have a marked impact on mental health and functioning (Jenkins, 2015). In a very large sample of US military personnel (n = 55,021), sleep impairment was associated with poor functioning in terms of lost work days, lower likelihood of being deployed, lower self-rated health, early discharge from the military and greater healthcare utilisation (Seelig et al., 2016). Chronic sleep deprivation may also impact on an individual's ability to cope with stress. In a study of US Army personnel prior to deployment, individuals with insomnia scored lower on a measure of traits that promote resilience in times of high stress (Taylor et al., 2016). The direction of the relationship between sleep and poor functioning and mental health is difficult to determine, as sleep is a feature of many mental disorders and sleep disruption often occurs during periods of high stress. Nevertheless, these studies indicate that sleep is a potentially modifiable factor that contributes to wellbeing and functioning among military members and warrants investigation in this report.

### *Alcohol consumption*

Excessive alcohol consumption also contributes to lower levels of wellbeing and functioning. This may be a particular concern for members in the early years of their military careers, as international studies have found alcohol consumption to be higher in military populations than in non-military

populations, with the highest alcohol consumption occurring during the early stages of military careers (Bray et al., 2010; Stahre, Brewer, Fonseca & Naimi, 2009). That being said, McFarlane et al. (2011) investigated alcohol consumption in the ADF and found the prevalence of alcohol use disorders (defined as either 'harmful alcohol consumption' or 'alcohol dependence') to be lower in the ADF than in the general Australian community. While the proportion of ADF members reporting harmful alcohol consumption may be below that of the general population, ADF members are likely to be at higher risk of poor mental health than their civilian counterparts (McFarlane et al., 2011). In a study of US service members, heavy drinking was associated with experiencing posttraumatic stress symptoms after deployment followed by slow improvement overtime, suggesting that alcohol was being used as a maladaptive coping mechanism during a period of increased stress (Bonanno et al., 2012). Other studies in military populations have also linked heavy alcohol consumption with poorer mental health, particularly for new enlistees (Stein et al., 2017). Alcohol use disorders have also been found to contribute to increases in symptoms of psychopathology in National Guard members (Sampson et al., 2015).

In a study of US National Guard members, Morgan et al. (2018) demonstrated that resilience (as measured by the CD-RISC) significantly moderated the relationship between stress and alcohol-related consequences, showing that as stress increased, resilience tended to act as a protective factor against alcohol-related consequences. This study emphasised that during periods of stress, resilience was associated with fewer negative alcohol-related consequences rather than reduced consumption of alcohol itself.

As mentioned previously, the *Alcohol and Tobacco Use, Coping and, Mental Health* LASER-Resilience report found no clear association between alcohol use, mental health outcomes and coping styles (Lewis et al., 2015). However, the proportion of respondents using alcohol at harmful levels (above a cut-off criterion) shortly into their military career ranged from 14% (female ADFA Cadets and other Officers) to 37–38% (male GEs and ADFA Cadets). In line with McFarlane et al.'s (2011) findings, the report also found that most personnel were not consuming alcohol at problematic levels, indicating that negative consequences arising from heavy alcohol use may not be as prevalent in the early time points of the LASER-Resilience sample. By further examining the relationship between alcohol use and measures of wellbeing and functioning over subsequent years, the current study has the potential to provide more information on the link between alcohol consumption and resilience.

## Psychosocial functioning

### *Social support*

When individuals undergo major life transitions, such as starting a military career, they are often separated from their existing social support networks (Haslam et al., 2008). This can reduce the availability of social support and has implications for the ability to cope with the transition to military life. Social support has been found to buffer the effects of exposure to stress during highly stressful periods such as initial training (Smith et al., 2013). On the other hand, lower levels of perceived social support from family, friends or a significant other have been found to increase the risk of severe deterioration in mental health post-deployment (Cigrang et al., 2014).

The evidence for the link between social support and mental health also varies depending on how social support is measured. 'Perceived social support' tends to reflect whether people feel cared for and supported, and high levels of perceived social support are usually associated with positive mental health outcomes (Frappell-Cooke, Gulina, Green, Hacker Hughes & Greenberg, 2010; Pietrzak et al., 2010). 'Received social support' reflects the frequency of discrete supportive behaviours, such as listening or comforting (Wethington & Kessler, 1986), and has mixed associations with mental health outcomes (Bolger, Zuckerman & Kessler, 2000; Liang, Krause & Bennett, 2001; Shrout, Herman & Bolger, 2006). The LASER-Resilience study has focused on *received* social support. As previously mentioned, the *Exploring Social Support in the Initial Years of Military Service* report (Crane et al., 2016) found that most ADF members maintained positive social interactions with multiple sources (friends, family and colleagues) during the early years of their military career. The report also found that it was important to have good quality social support, particularly among colleagues, for positive mental health outcomes (Crane et al., 2016). Personnel who had a high frequency of positive colleague and family interactions tended to have better mental health than all other groups. The findings from the *Exploring Social Support in the Initial Years of Military Service* report underscore the need for individuals to maintain relationships with pre-existing support networks, but to also build new support networks amongst military colleagues.

The broader literature on military personnel also indicates that having positive experiences with colleagues is important for wellbeing and functioning. A study of US military medical personnel indicated that having positive military experiences (e.g. good relationships with colleagues) was associated with positive affect prior to deployment and fewer post-deployment PTSD symptoms. The authors speculated that having a sense of trust and belonging to their unit buffered the effects of deployment stressors and allowed people to function effectively in a stressful environment (Maguen et al., 2008). Having a sense of belonging has also been found to protect against the development of depression and posttraumatic stress symptoms post-deployment (Bryan & Heron, 2015). Another consideration is that individuals with PTSD or other disorders may weaken their social support networks as their ability to manage interpersonal relationships deteriorates (Kaniasty & Norris, 2008; Shallcross, Arbisi, Polusny, Kramer & Erbes, 2016).

A number of studies have found that unit cohesion is also important in maintaining wellbeing during the early years of a military career. Personal resources such as social support, unit cohesion and trait resilience have been negatively associated with PTSD severity (Zang et al., 2017). A study of the mental health of soldiers in basic combat training indicated that an increase in unit cohesion over time was associated with less psychological distress, fewer sleep problems and greater confidence in subjects' ability to manage stress reactions. Unit cohesion was also indirectly related to functional measures, including successful graduation from training and passing the Army fitness test. This suggests that unit cohesion is an important factor in maintaining wellbeing and functioning during basic training (Williams et al., 2016).

The way that support is *perceived* also appears to be important when it comes to unit cohesion. A study of US marines found that unit-level cohesion was not associated with probable PTSD or depression. However, when analysed at the individual level, *perception* of a lower level of cohesion relative to peers from the same unit was associated with probable PTSD and depression (Breslau,

Setodji & Vaughan, 2016). This suggests that unit cohesion and support from colleagues are modifiable factors that may increase an individual's ability to maintain wellbeing during periods of change or stress.

### *Support from leadership*

Support from leadership is particularly important to the psychosocial functioning of military personnel. The provision of positive leadership behaviours (e.g. being fair and consistent, and fostering trust) has been shown to promote morale in soldiers (Britt, Dickinson, Moore, Castro & Adler, 2007). Furthermore, perceived supportive leadership is consistently associated with good mental health in military personnel (Jones et al., 2012; McKibben, Britt, Hoge & Castro, 2009; Whybrow et al., 2015). This may be, in part, related to encouragement of treatment seeking; qualitative research suggests that support from leadership promotes the de-stigmatisation of mental illness and helps military personnel feel more comfortable engaging in mental health treatment (Pfeiffer et al., 2012; Zinzow et al., 2013).

Group cohesion is also facilitated by a military leader's support style. Military personnel working for avoidant leaders feel alienated and have difficulty identifying with their unit (Davidovitz, Mikulincer, Shaver, Izsak & Popper, 2007), whereas personnel working for supportive leaders who provide structure report less within-group conflict and role ambiguity (Britt, Davison, Bliese & Castro, 2004). A cohesive working environment acts as a direct buffer against job strain and having a defined set of responsibilities gives an individual a sense of purpose; these aspects are predictive of both psychosocial functioning and resilience.

The LASER-Resilience *Exploring Social Support in the Initial Years of Military Service* report (Crane et al., 2016) investigated the specific link between leadership and the quality of social support networks. A key finding was that interactions with leadership played a role in determining how personnel interacted with colleagues. The findings suggested that military leaders perpetuate either a positive or negative team culture, which in turn influences how colleagues interact. The report also investigated the relationship between leadership and mental health and found that a subgroup of military personnel experienced more frequent negative leadership interactions and a greater deterioration in mental health from T2 to T3. This suggests that personnel experiencing a high degree of psychological distress are sensitive to the adequate provision of social support from leaders. Alternatively, it is possible that symptoms of mental health problems cause individuals to interpret leader interactions as unfavourable (Crane et al., 2016; Shallcross et al., 2016).

## This LASER-Resilience report

As noted earlier, resilience in this report is conceptualised as the maintenance of wellbeing or return to levels of wellbeing that were experienced prior to a stressful experience. In accordance with the data available, and in keeping with previous studies of resilience in military members, an absence of mental health symptoms will be used as the primary indicator of resilience.

For the purposes of this report, the first three to four years of a military career are conceptualised as a transition period that requires significant psychosocial adjustment. While some individuals will

thrive on these new experiences and adapt readily to their military career, others will experience increased stress during the early phases of their career. Therefore, this period has utility in terms of identifying those who demonstrate resilience during these potentially stressful life transitions and those who do not. The longitudinal patterns of wellbeing that exist across time were examined in order to assess which patterns best represent military members who adjust well to these new demands and which represent military members who are reactive (not adjusting well) to life transitions or periods of increased stress. Although a number of previous studies have utilised longitudinal patterns of mental health to successfully highlight factors that impact on resilience at different stages of a military career, most of these studies focused on the later stages of a military career. The LASER-Resilience study can provide new information about patterns of wellbeing during the first three to four years of military service.

The key situational and individual factors outlined in the literature review, including exposure to potentially traumatic events, coping strategies, sleep and alcohol problems, and social support, were investigated to determine their impact on indicators of wellbeing during the early years of a military career. Analyses were also conducted to determine whether any distinctive patterns of resilience exist within or between the different subgroups (e.g. Officers vs GEs, males vs females, Navy vs Army vs Air Force) within the overall sample. This may inform programs and interventions that can be tailored and targeted to help support specific groups of ADF members.

# Approach

The LASER-Resilience study protocol is described in detail in Crane, Lewis, Cohn et al. (2012). Relevant aspects of the design and procedures are summarised below.

## LASER-Resilience study design and procedure

The LASER-Resilience study employed a longitudinal panel design, which commenced at enlistment/appointment and followed participants through the early years of their military career and up to four years post-enlistment/appointment. GEs and Officer appointees in multiple cohorts were surveyed over five time points, labelled Time 1 (T1), Time 2 (T2), Time 3 (T3), Time 4 (T4) and Time 5 (T5). Cohorts were defined by the month and year of enlistment.

Data collection was timed to capture critical transition points that signify important periods of adjustment to military life. For GEs, T1 data collection was scheduled at the point of enlistment in order to measure the pre-enlistment factors that may impact on resilience. The LASER-Resilience questionnaires were mailed in paper form to incoming GEs and collected by administrative staff at the Defence Force Recruiting Centre during the monthly enlistment cycle. In contrast, T1 questionnaires were administered by staff to Officers and Australian Defence Force Academy (ADFA) cadets within the first few weeks of commencing their training.

The scheduling of data collection at T2 differed according to Service and rank. These surveys were intended to address experiences of early training and initial adjustment to military life, and thus

were not scheduled solely on the basis of when training was completed. Rather, different personnel completed T2 questionnaires at slightly different time points:

- GEs at the end of recruitment training (approximately three months post-recruitment);
- Navy and Air Force Officers at the end of their Officer training period (four to six months after joining);
- Royal Military College (RMC) and ADFA Officer cadets at 12 months after joining (while they were still in training).

Specialist Service Officers (SSOs, directly appointed as Officers due to their civilian professional qualifications) also completed an online version of the T2 questionnaire at 12 months. All other participants completed hard-copy questionnaires in a classroom setting, administered by trained civilian test administrators.

Subsequent time points of data collection occurred annually after the completion of T2 to measure ongoing adaptation to a military career and exposure to potentially traumatic events, as well as responses to stressful life situations. From T3 onwards, the LASER-Resilience questionnaire was administered online using the surveying tool Opinio (Version 6.3.3). Participants were sent an email containing a web link to the Opinio survey. Paper surveys were sent to participants at T3 and T4 who requested these or did not have a listed email account. See Table 0-A for a summary of the length of time between each data collection time point.

***Table 0-A.*** *Summary of length of time between each data collection time point*

| Time point | Participants | Timing |
|---|---|---|
| **T1** | GEs | At enlistment |
| | Officers | In first weeks of commencing training |
| **T2** | GEs | Post-initial training (approximately 3 months post-recruitment) |
| | Navy and Air Force Officers | Post-officer training (4 to 6 months after joining) |
| | RMC & ADFA Officer cadets | 12 months into initial training (12 months after joining) |
| **T3** | All | One year post-T2 |
| **T4** | All | One year post-T3 |
| **T5** | All | One year post-T4 |

The study was approved by the Australian Defence Human Research Ethics Committee. This study was conducted in accordance with the Australian Code for the Responsible Conduct of Research.

# LASER-Resilience participants

Participants were ADF personnel who entered the Australian Navy, Army and Air Force between November 2009 and December 2012. GEs, ADFA Cadets and other Officer trainees from the three Services were recruited via a phased enrolment strategy. All newly enlisted GEs with surnames

beginning with the letters L–Z were eligible for inclusion. To avoid over-surveying participants, those with surnames commencing A–K were instead recruited into a separate study that was being conducted concurrently – the Longitudinal ADF Study of Retention. Previous analyses (Crane, Lewis, Cohn, et al., 2012) have confirmed that there were no systematic differences in common baseline measures between the two groups of GEs (i.e. A–K and L–Z). Given that Officer appointees comprised a much smaller population than GEs, there were concerns about dividing this sample and reducing the capacity to examine Officers as a unique sub-population. As such, all Officer appointees were eligible to participate in the LASER-Resilience study. As this study examines the early years of military service, it is also worth noting that not all officer appointees are new to ADF; some may have transitioned from being in-service soldiers and vice versa.

Participants were followed over five time points of data collection that ceased in November 2016.

# Description of the sample

This section summarises results from preliminary analyses of the extent and distribution of data for the LASER-Resilience analytic sample (n = 5329). These preliminary analyses included:

- descriptive analyses of the extent of available data at each time point, as well as the data that was lost to follow-up or unavailable to analyses for any reason;
- logistic regression analyses of whether participants who did not provide survey data from T3–T5 (for any reason) were systematically different from those who were retained on T2 measures; and
- descriptive analyses of the sociodemographic and clinical characteristics of the analytic sample (n = 5329).

## Missing data and analyses of survey non-completion

In addition to data that was lost to follow-up due to survey non-response and early termination of service, additional data were lost to analyses due to survey administration problems between T1 and T2. These have been largely attributed to different strategies for data collection at T2 (e.g. by mail or in person) and T2–T5 (when data was collected by trained civilian administrators in most cases), which produced surveys that could not be matched within persons across time points because of inconsistent usage of codes to identify respondents. There was also a number of surveys lost at T2 as a result of a pause in the study while the LASER Retention and the LASER-Resilience project teams consulted on implementation issues. This pause in data collection contributed to the loss to follow-up from T1 to T2.

In order to recover the maximum number of surveys that could support analyses of change over time, the Mental Health Strategy and Research team at Defence undertook a manual process of matching thousands of surveys with respondents based on sociodemographic information collected through surveys. This manual process of matching was not possible in all cases, and unfortunately resulted in significant levels of missing (or unusable) data matched with T1.

**Table 0-B** shows the total numbers of surveys returned at each time point (which includes duplicates from participants who completed multiple surveys at a single time point at different

locations or training establishments, as well as cases where individuals may have completed a survey twice; for instance if they were backclassed, i.e. had to repeat training or transferred services/from Officers to GE and vice versa) as well as the numbers that could be matched with a unique person ID at T2 in order to form the analytic sample. The analytic sample refers to how many surveys at the later time points could be matched (by SURVEYID) to the available T2 data, in order to ensure that longitudinal data was available for individual cases. It also shows the response rate at each time point post-training (T3–T5) relative to both T2 and T-1 (where T-1 refers to the immediately preceding time point at any given time point).

As can be seen from **Table 0-B**, there were 3476 surveys at T1 that could be matched with a unique identifying code at T2. This comprised 61.0% of all surveys returned at T1 and 65.2% of surveys returned at T2. From T2 onwards, the number of matched surveys declined across time with particularly high levels of loss to follow-up observed between the second and third time point (with 33.0% of T2 patients providing matched surveys at T3). Although numbers continued to decrease from T3 to T5, the rate of decline was much attenuated with return rates exceeding 70% (relative to T1). The comparably high response rates from T3–T5 suggest a stable sub-group of respondents across the latter time points of assessment. The response rates for GEs and Officers across time points can be seen in Appendix B: Response rates and drop-out across time. Box 1 provides a summary of issues relating to loss to follow-up in prospective studies, including the implications for substantive analyses.

***Table 0-B.*** *Survey response numbers and response rates for each time point relative to T2 and the immediately preceding time point ($T_{-1}$)*[2]

| | T1 | T2 | T3 | T4 | T5 |
|---|---|---|---|---|---|
| **Total numbers of returned surveys** | 5696 | 5329 | 2311 | 1768 | 1650 |
| **Surveys matched within analytic sample** | 3476 | 5329 | 1759 | 1271 | 1194 |
| **Response rate (%) relative to T2 for analytic sample** | | | 33.0 | 23.9 | 22.4 |
| **Response rate (%) relative to $T_{-1}$ for analytic sample** | | | 33.0 | 72.3 | 93.9 |

In order to examine the nature and implications of loss to follow-up in LASER-Resilience, a series of logistic regression models were estimated which specified binary indicators of 'missingness' (referring to survey data that was unavailable to analyses for any reason) at T3–T5, respectively, and were regressed on explanatory variables at T2. T2 was selected as the most informative 'baseline' for these analyses given that (a) T1 was also characterised by high levels of missing or unusable data (see above), and (b) the main prospective models of change over time also used T2 as the baseline for analyses (see the Data Analysis Approach section for more details). The explanatory variables included sociodemographic characteristics and T2 levels of outcome variables that were considered in subsequent analyses, which were all considered in separate

[2] This table has been replicated in Appendix B to examine survey response rates at each time point by respondent rank.

'bivariate' models. These indicated whether participants lost to follow-up for any reason were substantively different from those who were retained on these T2 measures.

**Table 0-C** presents results of logistic regression analyses that considered the binary indicator of missingness at T3. These results included Odds Ratio measures of effect size to quantify the magnitude of difference between participants who were retained versus lost to the study according to T2 explanatory variables. The 95% confidence intervals (CIs) for Odds Ratios are provided to support inferences that are consistent with conventional null-hypothesis significance testing (95% CIs that exclude one suggest associations that are statistically significant at $p < 0.05$). Comparable results for logistic regression analyses of missingness indicators at T4 and T5 are provided as appendices.

**Box 1: Loss to follow-up in prospective studies and implications for analyses.**

Prospective studies are uniquely equipped to address questions about change and processes that unfold over time, but are also vulnerable to biases that may result from loss to follow-up. By way of illustration, prospective studies of military samples suggest rates of loss to follow-up (also described in terms of 'attrition' or study 'drop-out') ranging from around 35% for UK military personnel over four years (Fear et al., 2010) to 80% for U.S. soldiers transitioning out of the military after nine months (Hourani et al., 2012). Such wide variations in loss to follow-up are also common for prospective studies of civilian samples and may be attributable to factors including characteristics of target populations (e.g. age, gender, geographical mobility), the duration of intervals separating assessments (with greater difficulties obtaining follow-up generally expected across longer periods), and the nature and intensity of strategies intended to maximise response rates. Loss to follow-up can also be random or related to participant characteristics that may or may not be linked with outcomes of interest. Losses that are entirely random will reduce the precision and statistical power of analyses but will not generally produce substantial biases in results. In contrast, loss to follow-up that is related systematically to participant characteristics can produce some degree of bias, although the extent of this can also vary. For example, systematic losses have been shown to have particular influences on findings from descriptive analyses, with cross-sectional studies providing preferred approaches to addressing questions about the prevalence and incidence of disorders (Wolke et al., 2009). In contrast, evidence suggests comparably modest impacts on measures of association (e.g. regression coefficients), which have been shown to be robust to effects of systematic loss to follow-up (Wolke et al., 2009) and minimally affected even when levels are high (Gustavson et al., 2012)

Thus, while high levels of both random and systematic loss to follow-up comprise limitations of longitudinal studies, and should be considered when interpreting findings, these are generally not fatal flaws. Rather, they represent the unique, and to some extent unavoidable, challenges associated with conducting studies that are capable of addressing questions about change and processes that unfold over time. Despite these limitations, longitudinal studies remain a very important study design for understanding how individuals change over time and the factors that impact on that change.

As can be seen from **Table 0-C**, there were several significant associations with sociodemographic characteristics, with participants lost to follow-up at T3 more likely to be male and younger, and less likely to be married/cohabitating (relative to single), have greater numbers of dependent children, and served with the Air Force (relative to the Army). However, the magnitude of Odds Ratios approximated 'small' effects, defined using conventional guidelines (i.e. 1.31 < Odds Ratio < 2.26; Olivier, May & Bell, 2017); the largest Odds Ratios were for gender (Odds Ratio = 1.94), married/cohabitating status (inverse Odds Ratio [1/0.74] = 1.35) and Air Force service (inverse Odds Ratio [1/0.43] = 2.33). In relation to the T2 values of outcome variables, only Dimensions of Anger Reactions (DAR) scores were significantly associated with increased likelihood of T3 loss to follow-up and this effect was also small in magnitude.

Comparable analyses of missingness indicators at T4 and T5 (see Appendix B) yielded similar patterns of results, with small associations (Odds Ratios < 2.00) observed for most variables, exceptions being (a) Divorced/Separated/Widowed status, which was associated with reduced likelihood of drop-out at T4 (inverse Odds Ratio [1/0.43] = 2.33), relative to the single category; and (b) Air Force service, which was associated with reduced likelihood of loss to follow-up at T5 (inverse Odds Ratio [1/0.47] = 2.13).

***Table 0-C.*** *Logistic regression models specifying T3 dropout as the dependent variable, with explanatory variables including sociodemographics and T2 levels of outcome variables.*

| Variable | Odds Ratio | 95% CI | |
|---|---|---|---|
| | | Lower CI | Upper CI |
| **Gender (male)** | 1.94*** | 1.66 | 2.27 |
| **Age** | 0.96*** | 0.95 | 0.97 |
| **Relationship status** | | | |
| Single | | | |
| Married/Cohabiting | 0.74*** | 0.65 | 0.84 |
| Divorced/Separated/Widowed | 0.92 | 0.54 | 1.66 |
| **Number of dependent children** | 0.86** | 0.79 | 0.94 |
| **ADF Service** | | | |
| Army | | | |
| Navy | 1.04 | 0.90 | 1.20 |
| Air Force | 0.43*** | 0.37 | 0.51 |
| **K10** | 1.01 | 0.99 | 1.02 |
| **PHQ-S** | 1.00 | 0.97 | 1.02 |
| **PCL-4** | 1.00 | 0.96 | 1.02 |
| **DAR** | 1.02*** | 1.01 | 1.04 |
| **CDRISC-2** | 1.04 | 0.99 | 1.10 |
| **SII** | 0.99 | 0.97 | 1.01 |

*Note*. **p < 0.01, ***p < 0.001; CI = confidence interval; K10 = Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = PTSD Checklist (Civilian Version) 4-item; DAR = Dimensions of Anger; CDRISC-2 = Connor Davidson Resilience Scale 2-item; SII = Sleep Impairment Index.

These findings suggest that, despite high levels of attrition from the study overall, there were few indications of major differences across participants who were retained versus excluded from the sample, and thus limited evidence of systematic bias from study attrition. In other words, the analysis presented in this report is unlikely to have been impacted by the attrition from the study.

## Sociodemographic analysis of the sample

Refer to Appendix C for the detailed table of sociodemographic information (n and %) at T1 and T2, when the greatest number of sociodemographic measures were administered. Appendix C also includes tables illustrating traumatic exposure in the past 12 months at T3, T4 and T5.

Available data from the analytic sample at pre-training (n = 3476) and post-training (n = 5329) were comparable in terms of age and gender, with the sample being predominantly young (mean age at T1 was 20.00 years) and male (2942 at T1 [84.74%]; 4527 [85.58%] at T2). Two-thirds of the sample (65.65% at T1, 63.11% at T2) were in the Army, followed by the Navy and the Air Force. At T1, almost a quarter (23.63%) reported prior military experience and two-thirds of the sample had completed Year 12 or higher education (59.88% and 13.60% respectively). At T1, two-thirds of the sample were single/never married (76.83%); this reduced slightly at T2 (70.39%), while the proportion of those married increased slightly from T1 (22.13%) to T2 (28.57%).

Descriptive analyses of additional LASER-Resilience measures (see below) are presented in Appendix D. Any demographic items that were endorsed by fewer than five people were removed to protect the privacy of participants.

# LASER-Resilience measures

Measures were included in the LASER-Resilience study based on the five main criteria:

1. quality of measures (empirical research demonstrating scale validity and/or based on expert advice);
2. brevity (entire questionnaire could not exceed 30 minutes in duration);
3. comparability (scales that allow comparison with other military and civilian populations);
4. ease of completion (scales could be self-administered); and
5. acceptability (face validity to the military population).

Scales and questions that allowed direct comparisons with other military and civilian populations were preferred; however, this criteria was not critical and some scales were shortened in the interests of brevity. A measure of self-efficacy was included in the LASER-Resilience study because it was being used in the parallel ADF study of retention but is not analysed in this report.

In addition to measures of demographic information, the scales included in the LASER-Resilience questionnaires assessed six broad domains:

1. resilience (as defined by various measures of mental health and psychological wellbeing);
2. physical health;
3. exposure to potentially traumatic events and stressful life events;
4. coping and adjustment styles;

5. psychosocial functioning (as measured through social support and support from leadership); and
6. access to mental health service providers and barriers to care.

The core measures included in the LASER-Resilience questionnaire were kept consistent across the five time points of data collection; however, not all measures were administered at all time points. This variability was partly due to the fact that certain measures were expected to be of particular relevance at certain time points (e.g. social support from ADF peers and superiors only being relevant post-enlistment) or measured stable constructs that were not expected to change over time (e.g. lifetime exposure to potentially traumatic events). Other variations were due to the method of questionnaire distribution changing from a paper format to online at T3. See Appendix E for a complete profile of measures and the time points at which they were administered.

The measures detailed below comprise the main outcome measures and predictor variables that were used in the analyses for this report. Measures were administered at all time points unless otherwise stated. Information relating to item-level missing data and psychometrics has been highlighted for those measures with less stable psychometrics (e.g. Reappraisal Coping subscale) and/or a higher proportion of missing data at certain time points (e.g. ADF peer and leader social support at T4 and T5). See Appendix F for the full item-level screening and missing data analysis and Appendix G for the full psychometric analysis.

The measures used in this report provide an indication of the ability to maintain wellbeing but not an indication of increased workplace performance; that aspect of resilience is of interest but beyond the scope of this report.

# Psychological distress

Psychological distress was measured via the K10 (Kessler et al., 2002). The K10 is a brief measure of psychological distress consisting of 10 questions about emotional states (namely anxiety and depression). Responses on the K10 are measured on a 5-point Likert scale (1 = none of the time, 5 = all of the time). Total scores range from 10 to 50, with higher scores indicating higher levels of psychological distress.

## Impact on functioning

Impact on functioning was measured via a single item from the K10+ (‘How many days of the past 4 weeks were you totally unable to work or carry out your normal activities because of these feelings?’; Kessler et al., 2002) as this was the approach used in a previous LASER-Resilience report (Crane, Lewis, et al., 2013). This K10+ item is typically measured on a continuous scale. However, it was heavily skewed in this dataset and also evidenced high proportions of missing data (among participants who were expected to provide a response given their K10 scores) and limited variability among non-zero scores.

## Perceived resilience

The Connor-Davidson Resilience Scale 2 (CD-RISC 2; Vaishnavi, Connor & Davidson, 2007) was used to measure perceived resilience. The CD-RISC 2 is an abbreviated version of the original 25-item CD-RISC (Connor & Davidson, 2003) consisting of two items: 'I am able to adapt to change' and 'I tend to bounce back after illness or hardship'. Respondents are asked to rate items based on how they felt 'during the past 30 days'. Responses are measured on a 5-point Likert scale (0 = not true at all, 4 = true nearly all the time). The CD-RISC 2 is strongly correlated with the full CD-RISC ($r = 0.78$, $p < .001$; Vaishnavi et al., 2007). The full CD-RISC was not included because of a need to control the length of the survey and reports from US colleagues who were using the 2-item version and reported good psychometric properties.

## Somatic symptoms

Somatic symptoms were measured via the somatic symptom scale from the Patient Health Questionnaire (PHQ-S; (Spitzer, Kroenke, Williams & Group, 1999). The scale was modified for this study with four items omitted that were related to menstrual pain, pain during sexual intercourse, feeling tired and trouble sleeping. The former two items were omitted because they were not relevant to the study and the latter two because perceived sleep impairment was covered by a separate outcome measure (described below). The PHQ-S asks respondents to rate how much they had been bothered by a somatic symptom (e.g. stomach pain) 'during the past four weeks'. Responses are measured on a 3-point Likert scale (0 = not bothered at all, 3 = bothered a lot). Total scores range from 0 to 22, with higher scores indicating more severe somatic problems.

Preliminary analyses of scale dimensionality, comprising Exploratory Factor Analyses (EFA), indicated that the PHQ-S was sufficiently unidimensional to support the tentative interpretation of a single summed scale score. See Appendix G for a full description of the psychometric analysis.

## Perceived sleep impairment

Perceived sleep impairment was measured via a modified version of the Sleep Impairment Index (SII; Forbes et al., 2014). The SII assesses the subjective symptoms and consequences of poor sleep, as well as the degree of distress caused by those difficulties. The version of the SII included in the LASER-Resilience questionnaire omitted one item from the index: 'How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?' This item was omitted in the interests of brevity, because it was not as relevant in the context of training, i.e. people who know them well (family and friends) would not notice their sleep problems during this time. Responses are measured on a 5-point Likert scale (0 = none, 4 = very severe). Total scores range from 0 to 24, with higher scores indicating more severe perceived sleep impairment.

Analyses of the item-level missing data revealed that from T4 to T5 there were two items from the SII that had high levels of missing data (exceeding 20%), which may have been due to issues with administration of the electronic survey. On the basis of high levels of item missing data, the decision was made to exclude the two SII items from consideration at all time points, and thus

define sleep impairment in terms of the remaining four items, which were unaffected by substantive missing data issues.

## Alcohol consumption (AUDIT-C)

The AUDIT-C (Bush, Kivlahan, McDonell, Fihn & Bradley, 1998) was used to assess alcohol intake. Using questions from the full AUDIT, the AUDIT-C is a 3-item self-report survey that measures the frequency and volume of alcohol consumption over the previous three months. Responses are measured on a 5-point Likert scale. Total scores range from 0 to 12, with higher scores indicating a higher level of alcohol consumption. The AUDIT-C has been shown to perform well relative to the standard 10-item AUDIT, demonstrating sensitivities and specificities greater than 0.80 when used for purposes of identifying past-year hazardous and harmful drinking (Bradley et al., 2003; Bush et al., 1998).

Analyses of item-level missing data revealed that the AUDIT-C had high amounts of non-completion (> 60%) at T2. This was due to the fact that the AUDIT-C was administered to Officers but not GEs at T2, because GEs are not expected to have access to alcohol during their training. Since the AUDIT-C was not administered to a large proportion of the sample at T2, the utility of the data was limited. For this reason, AUDIT-C data at T2 was omitted and only data pertaining to T1 and T3–T5 was included in relevant analyses. See Appendix F for a full description of the item-level screening and missing data analysis.

## Posttraumatic stress symptomology

Posttraumatic stress symptomology was measured via the 4-item PTSD Checklist (Civilian Version), PCL-4, which is a shortened version of the original PCL-C (Weathers, Litz, Herman, Huska & Keane, 1993). The PCL-4 comprises four items that are measured on a 5-point Likert scale. Total scores range from 4 to 20, with higher scores indicating more PTSD symptoms. The PCL-4 is strongly correlated with the original PCL-C ($r = 0.943$, $p < 0.05$; Lang & Stein, 2005).

## Social support

The Family and Friend Social Support, ADF Peer Social Support, and ADF Superior Social Support scales included in the LASER-Resilience questionnaire were modified versions of the ‘supportive and negative social interactions’ scale (Schuster, Kessler & Aseltine, 1990). The Schuster et al. (1990) scale measures the frequency of positive and negative social interactions from different sources. Responses are scored on a 4-point Likert scale (1 = often, 4 = never). The scale is intended to provide two subscale scores, one that indicates the frequency of positive interactions and one that indicates the frequency of negative interactions.

Items regarding ADF peers/colleagues and ADF superiors/leadership were based on questions about positive and negative interactions from family and friends, which were modified to be appropriate for the military context. The manner of administration of these items varied across time points. At T2, there was a single version of each item that referenced support and interest received

from ‘your most immediate training groups (e.g. course/section) or work team (e.g. work group/section)’. From T3–T5, paper-based surveys also included items with an equivalent format. It is important to note that the manner in which the electronic survey was set up resulted in only a portion of participants (those that indicated they were still in training) receiving the relevant social support questions regarding peers and leaders at T3, T4 and T5. As a result, there were significantly greater amounts of missing data at the later time points as only a small proportion of participants reported that they were in training (and subsequently completed the social support questions regarding peers and leaders).

Analyses of item-level missing data revealed that these items from the ADF peer and superior social support scales evidenced high levels of missing data at T4 (around 55%) and T5 (around 86%), which was presumably due to the issues with the electronic survey noted above. As such, only data regarding ADF peers/colleagues and ADF peers/superiors measured at T2 and T3 (where missing data was < 20%) were considered in this study. See Appendix F for a full description of the item-level screening and missing data analysis.

## Morale

Surveys from T2–T5 included a single question asking ‘In the last four weeks, the morale (i.e. sense of enthusiasm and dedication) within my team has been good’. This question was taken from the 2008 Australian Defence Attitudes Survey (Defence, 2009). The item is rated from 1 (strongly disagree) to 5 (strongly agree).

## Potentially traumatic events

Surveys examined exposure to potentially traumatic events from T2 onwards (the ADF requested that these questions not be asked at T1). At T2, respondents were asked to indicate the number of times they had experienced any of the listed potentially traumatic events or any other potentially traumatic event over their lifetime prior to enlistment. Similar items from T3 to T5 asked about events in the past year. A single aggregate score representing the total number of events was used in analyses.

## Coping styles

The 24-item coping strategies scale included in the LASER-Resilience questionnaire was an adapted version of the 28-item ‘Brief COPE’ inventory (Carver, 1997). Based on previous analysis of the LASER sample (Crane, Kehoe, et al., 2012), 17 items from the full scale were grouped to form six coping style variables: acceptance (2 items), reappraisal (3 items), self-blame (2 items), avoidance (3 items), risk-taking (3 items) and support-seeking (4 items). Responses are measured on a 4-point Likert scale describing frequency of using each style (1 = not at all, 4 = a lot). Where the coping styles are referred to in this report it references the frequency of their use (how often). Preliminary psychometric analyses of the coping scales indicated that measures of reappraisal, avoidance and risk-taking coping were all problematic (as indicated by Cronbach’s alpha coefficients < 0.60). As such, the analyses used reduced versions of these subscales, as follows.

- One item from the reappraisal subscale ('I make jokes about problems I have faced') was only modestly correlated with the remaining two items (inter-item correlations ranged from r = 0.16–0.19 at T2) and was excluded. In contrast, the remaining two items ('I look forward to something good in what is happening' and 'I try to see problems in a different light, to make them seem more positive') were strongly associated (r = 0.69) and were used to form the subscale measure.
- There were low inter-item correlations involving all three items that addressed avoidance coping (ranging from r = 0.24–0.31 at T2) and these were not treated as a subscale. Rather, the single item with the greatest face validity ('I avoid thinking or talking about the situation') was used as the best available measure of avoidance coping.
- There were low inter-item correlations involving all three items that addressed risk-taking coping (ranging from r = 0.16–0.40 at T2) and these were not treated as a subscale. Rather, the single item with the greatest face validity ('I engage in risk-taking behaviour, such as speeding, drinking too much or risky sexual behaviour') was used as the best available measure of risk-taking coping.

### Anger

Anger frequency, intensity, duration and impact on social functioning were measured via the Dimensions of Anger Reactions (DAR). The original 7-item version of the DAR included in the LASER-Resilience questionnaire was a version of the DAR that was in use at the time (Forbes et al., 2004; Hawthorne, Mouthaan, Forbes & Novaco, 2006). It includes two additional items compared with the currently favoured DAR-5 ('My anger interfered with my ability to get my work, study or other productive activity done' and 'I became angry at myself when I did not perform as well or achieve what I wanted'). Responses are measured on 5-point Likert scale (1 = none of the time, 5 = all of the time). For the purposes of this report, the shortened 5-item DAR was utilised by dropping the two additional items in the DAR-7. Total scores range from 5 to 25, with higher scores indicating worse symptomatology.

## Data analysis approach

Analyses of the LASER-Resilience data were guided by the approved Data Analysis Plan (DAP) The DAP was developed in the absence of the dataset itself and, as a result, a number of approaches to the analyses were proposed. It was not intended that all analyses outlined in the DAP would be undertaken in this report. Following review of the data and feedback from stakeholders on preliminary versions of the results, the data analysis approach detailed below was determined to be the most appropriate and informative approach.

The data analysis approach was organised in three broad stages:

1. data file preparation and preliminary analyses;
2. descriptive analyses and unconditional models of change including Latent Trajectory Models (LTMs) and Latent Class Growth Analyses (LCGAs); and

3. predictive and conditional analyses, including within-time regression models and time-lagged regressions, as well as conditional LCGA models.

Data file preparation and management was conducted using IBM SPSS Version 24.0, while substantive analyses were all conducted using Program R version 3.4.4 (2017) and MPlus version 8 (Muthén & Muthén, 2017).

## Stage 1: Data file preparation and preliminary analyses

The initial stage of analyses comprised the basic investigation and scrutiny of variable properties, and the production of preliminary statistics to inform the development and interpretation of substantive models at subsequent stages.

Preliminary analyses involved production of frequency statistics for categorical (nominal or ordinal) variables at the item-level to screen for out-of-range (OOR) values and data-entry errors, as well as item-level missing data. Psychometric analyses were then conducted to examine the measurement properties of scales considered in this report. Given that most have been widely used and are supported by existing evidence, these were not intended to provide an in-depth examination of measurement properties. Rather, a series of cursory analyses were conducted for purposes of verifying the main psychometric features of scales, including:

- unidimensionality, as indicated by the eigenvalues produced from exploratory factor analysis (EFA) models with principal axis factoring (PAF); and
- internal consistency reliability, as indicated by Cronbach's alpha coefficients.

Scale modifications were considered where psychometric properties were below required levels, while measures were excluded from substantive analyses if problems were intractable.

For multi-item scales associated with acceptable psychometric properties, aggregate scores were produced in accordance with standard scoring practices, while visual methods (e.g. histograms) and statistical tests were produced to appraise the distributional properties of scale scores.

A final series of preliminary analyses comprised logistic regression models, which examined the nature and implications of loss to follow-up over time. These specified binary indicators of non-completion (or 'missingness') at T3–T5 as dependent variables (there were also issues with missing data at T1, but these were attributable to survey administration issues and were not expected to relate to participant characteristics), and explanatory variables at T2 that comprised the effective 'baseline' for analyses. This means that for most longitudinal analyses, the T2 time point was considered the 'starting' point from which the subsequent time points would be compared and which served as a reference for comparison. Explanatory variables included sociodemographic characteristics and T2 levels of outcome variables considered in subsequent analyses, which were all considered in separate 'bivariate' models.

As noted previously, there were several potential reasons for survey non-completion which were subsumed by these binary indicators. These reasons included:

- early termination of ADF service, whereby participants were no longer in the ADF and thus eligible for continued participation in the study;
- survey non-response, whereby participants were still members of the ADF but did not complete surveys for any reason (e.g. due to low motivation or refusal); and
- survey administration errors, where follow-up surveys were returned but could not be matched with previous records due to problems with SURVEY ID codes.

The current analyses could only identify any form of non-completion on the basis of patterns of observed versus unobserved responses, and we were unable to distinguish across the different reasons for non-completion. As such, the analyses provide general evidence about whether information from participants with follow-up surveys was systematically different from participants for whom equivalent surveys were unavailable.

Administrative information and workforce records from Defence provided information about individuals who had terminated early from ADF service. Table 0-D presents the overall numbers of ADF members who at transitioned out of ADF service at each time point of the LASER-Resilience study, from T2 to T5.

***Table 0-D.*** *Number of ADF members who had transitioned out of service at each time point, by rank*

| | **T2** | **T2** | **T3** | **T5** |
|---|---|---|---|---|
| **GEs** | 341 | 560 | 726 | 909 |
| **Officers** | 99 | 245 | 335 | 415 |
| **Overall** | 440 | 805 | 1061 | 1324 |

Termination reasons were provided for most individuals. The most common reasons for GEs were retention not in service interest, terminated within 90 days of enlistment, and medically unfit for service. The most common reasons for Officers were retention not in service interest, resignation, and medically unfit for service. It was thought that individuals who had terminated from ADF service may be able to provide additional information in relation to how individuals were functioning. However, identification of those who had terminated revealed there were not sufficient numbers to enable complex statistical analysis of this group. The workforce data requires additional exploration and processing to be fully linked with the LASER-Resilience dataset. These analyses may be conducted in the future to investigate whether administrative records can be used to distinguish between early termination and other forms of survey non-completion in comparable analyses.

## Stage 2: Descriptive analyses and unconditional models

This stage of analysis was intended primarily to (a) summarise and describe the main patterns of wellbeing observed within and across time for GEs and Officers, and (b) identify patterns that best correspond with notions of resilience, thus informing models to provide bases for subsequent analyses of explanatory or predictive variables.

The analyses considered data from five repeated measurements across two discrete periods of service:

1. ADF induction/initial training period (T1–T2), when participants were part of the 'training force'; and
2. post-initial training and early career military service (T2–T5), when they had progressed to being part of the 'trained force'.

A range of analyses were conducted to help characterise the nature of change across these periods, including univariate descriptive statistics and analyses of 'trajectories' (patterns) underlying repeated measures (see below for details). The latter were focused particularly on trajectories unfolding across the second period of early career service (T2–T5), which thus excluded the T1 survey data. This approach was partly informed by the Data Analysis Plan and was also informed by several other considerations, including:

- expectations of distinctive change patterns across the period of ADF induction/initial training, relative to early career service, that suggested highly complex non-linear trajectory models (involving multiple 'turning points') that could not be readily captured by traditional statistical analyses (e.g. polynomial models);
- substantive interest in the unique predictors across the induction/initial training period, which also indicated the need for analyses that would enable consideration of change from T1 to T2; and
- the availability of only two time points across the period of induction/initial training, which precluded alternative (e.g. piecewise) trajectory models that were suitable for analysing non-linear change over discrete periods (and including explanatory variables of change across these different periods).

In this context, it was determined that the period of ADF induction/initial training (T1–T2) would be considered separately from post-training and early career military service (T2–T5) using alternative analyses (e.g. time-lagged regression analyses) more suitable for modelling change across two time points. These are discussed further below.

Univariate descriptive analyses: Initial analyses involved production of univariate descriptive statistics in order to summarise characteristics of key outcome measures over time. For aggregate scale scores that approximated continuous measurement, these included means and standard deviations (SDs) for variables at each time point (T1–T5). Frequency analyses were also reported where informative cut-off criteria were available to categorise aggregate scores (thus indicating clinically significant 'cases'). Pearson correlations were produced to examine the bivariate associations among variables within and across time points.

Latent trajectory model (LTM) analyses

A series of analyses were conducted to describe patterns of within-person change (that is, change in an individual over time) in variables across the period of early career service (T2–T5), using the following outcomes: K10, PHQ, PCL-4, AUDIT-C, DAR and SII. These models of within-person change were specified in accordance with an LTM analytic framework.

From a heuristic perspective, the LTM is based on the premise that repeated measurements from individuals over time can be described by underlying individual trajectories (analogous to

regression lines that yield 'best fit' to observed data). These trajectories can vary across individuals, and people differ in terms of attributes such as starting point and rate of change. A linear model, for example, describes trajectories through two factors: an intercept (initial level) and slope (constant rate of change). In statistical terms, the factor means express characteristics of the average trajectory (i.e. mean rate of change when pooled across respondents). Factor variances indicate between-person differences and how individuals vary in patterns of change. More complex models may include additional (e.g. quadratic) factors that describe curvature in trajectories and can be compared with relatively simple (i.e. linear) models to determine the best descriptive account of change over time.

LTM analyses were estimated through specification of confirmatory factor analysis (CFA) models, with repeated measures of outcome variables specified as observed indicators of latent variables that summarise the underlying parameters of change. Separate models were estimated to describe change in each outcome variable, with robust maximum likelihood (RML) used to estimate models (with this estimation technique being generally robust to skewed data).

A 'model building' approach to analysis was adopted, in which relatively simple models were estimated first and provided comparison with increasingly complex models and accounts of change. These models (described below) were all statistically identified in the context of four repeated measurements.

- The *intercept-only model* describes repeated measurements in terms of an intercept that represents the starting point for trajectories. Scores from repeated measurements are not otherwise related in a systematic fashion, indicating no discernible patterns of change. This model is expected to provide poor fit to the data but is an important point of reference for comparison with alternative models.
- The *linear model* specifies an intercept (representing starting points for trajectories) and additional parameters for the linear slope that describes trajectories in terms of a straight line (constant rate of change). The linear slopes for individual trajectories are permitted to vary around a latent mean in order to capture between-person variation in rates of change.
- The *quadratic model* includes a third 'quadratic' parameter that captures the degree of curvature in trajectories, which is additional to an intercept (starting point) and slope. In the context of a quadratic model (relative to a linear model), the interpretation of the slope changes from a linear (constant) rate of change to an 'instantaneous' rate of change that varies over time. Assuming that models are specified such that the intercept represents the starting point for trajectories, the instantaneous slope represents the rate of change across the earliest time points of the study.

For each outcome, the intercept-only model was estimated first, while relatively complex models (i.e. linear and then quadratic factors that test for constant change and curvature in trajectories) were considered subsequently. Model fit was evaluated using the following approximate fit indices, which are appraised relative to standard criteria (see Hu & Bentler, 1998):

- confirmatory fit index (CFI; Bentler, 1990): values range from 0.00–1.00, with estimates closer to 1.0 indicating better model fit; values > 0.95 for the CFI are generally used to indicate very good fit;
- standardised root mean square residual (SRMR; Hu & Bentler, 1998): values closer to zero suggest improved model fit, while estimates < 0.05 are generally used to indicate very good fit; and
- root mean square error of approximation (RMSEA; Steiger, 1989): values closer to zero suggest improved model fit; estimates < 0.06 are generally used to indicate very good fit.

The Akaike information criteria (Akaike, 1998) and Bayesian information criteria (Schwarz, 1978) were also considered, and facilitate statistical comparisons across models (e.g. quadratic versus linear models of change). For both the AIC and BIC, lower values indicate improved fit relative to comparative models.

Separate LTMs were estimated for the subsample of the LASER-Resilience cohort that reported lifetime trauma exposure, in order to assess the implications of limiting the analyses to a trauma-exposed sample (which has bearing on conceptual definitions of resilience). Additional subgroups (e.g. GEs/Officers, males/females) were considered through inclusion of relevant explanatory variables (e.g. rank, gender) in conditional models (see below). By way of illustration, each conditional model that includes rank (GE/Officer) as an explanatory variable provides a focused comparison between these sub-groups on the outcome of interest. Where this outcome reflects group membership (e.g. low–stable versus low–increasing groups identified in the latent class growth analyses), then these analyses with rank as a predictor directly compare GEs and Officers on the probability of belonging to one group versus another.

Growth mixture modelling (GMM)

An additional series of models were estimated to examine the plausibility of subgroups (or ‘mixtures’) of respondents characterised by homogeneous change patterns. Latent variable mixture modelling (LVMM) describes a relevant ‘person-centred’ analytic framework that informed this exploration of subgroups and inferences about group membership. Such inferences are based on the estimation of latent variables that are both categorical (thus classifying individuals into subpopulations) and unobserved (and must be inferred from similar and dissimilar patterns of observed prospective data).

The LVMM framework incorporates a family of techniques that include both cross-sectional and prospective applications comprising latent profile analysis (LPA) and growth mixture modelling (GMM), respectively. Although the use of cross-sectional LPA models was originally considered, it was determined that this report would focus on using GMMs, which have been used in prior research (see Bryant et al., 2015) to operationalise notions of resilience when observed prospectively over time.

A GMM is formally an extension of the LTM that considers trajectories underlying repeated measurements of constructs when obtained from individuals over time. However, while the LTM assumes that such repeated measures can be adequately characterised by a single set of change

parameters (for example, which indicates the intercept and linear slope), the GMM evaluates whether the observed distribution comprises a 'mixture' of subpopulations that are distinguished by different change parameters. Thus, the single-group LTM provides the starting point and 'base model' for a GMM, which then considers whether successive models specifying additional sub-groups (with unique change parameters) provide improved summaries of the observed data.

GMM also subsumes a number of different models that vary both in complexity (and thus computational burden) and – according to the type of model – in the constraints on variances and covariances. These models include (a) the latent class growth analysis (LCGA), which is the simplest form of GMM that constrains all within-class variations to zero; (b) the class-invariant GMM (GMM-CI), which estimates within-class variations but constrains these to equivalence across classes; and (c) the class-varying GMM (GMM-CV) which allows all variances and covariances to be freely estimated. Although different types of GMMs were considered, it was assumed that the simplest LCGA model would be least susceptible to estimation problems and thus have greatest utility.

An exploratory approach was adopted to model specification and identification of the optimal number of latent classes, and initially involved the estimation and comparison of models which specified one through five profiles. These were estimated using MLR estimation and were initially compared using statistical indices, such as the AIC and BIC (for which lower values indicate better model fit), as well as 'entropy' values (which indicate the accuracy with which models classify individuals into their most likely profile) and the size of additional profiles generated by increasingly complex models. In general, relatively parsimonious models were preferred, while class sizes reflecting < 5% of the sample were used to indicate potentially problematic class solutions (with small classes being less likely to generalise to other samples).

Once models were determined that indicated the optimal number of latent profiles, graphical tools (depicting the observed and estimated means and trajectories for each class) were produced to help interpret classes and inform final decisions about the suitability of the final class models.

## Stage 3: Predictive and conditional models

The final stage of analyses comprised a series of predictive and conditional models examining the individual and situational variables (including subgroups) that influenced patterns of wellbeing in the context of transitional stressors, and therefore resilience, within and across time. In order to reduce the volume of analyses conducted in this stage, it was determined that predictive analyses would be conducted for three main outcome measures considered in this study, including the K10, PCL-4 and PHQ-S. These were scales that arguably provided the best recognised and least ambiguous indicators of general psychological adjustment in military populations. These contrast with other scales, including measures of anger (DAR) and sleep impairment (SII), for example, which could also be conceptualised alternatively as explanatory variables.

The major types of statistical model described in the previous stage suggested different ways of modelling the data, including the cross-sectional measures of variables at key time points, repeated measures of the same variable over time, as well as through 'person-centred' analyses

of subgroups underlying the prospective data. These also provided alternative approaches to conceptualising and operationalising resilience.

Cross-sectional (within-time) analyses

The initial predictive analyses comprised a series a repeated cross-sectional models that identified the time-specific predictors of outcome measures when considered separately at each time point. These models also indicated whether and how explanatory variables observed at one time point functioned at subsequent time points of assessment.

Given expectations that outcome measures would be highly skewed (reflecting large numbers of participants indicating low distress or few mental health problems), it was determined that Poisson regression models would be most appropriate. These belong to a broader family of 'count regression' models suitable when distributions are highly skewed and bounded by zero, and thus provide appropriate standard errors (SEs) and significance tests in these contexts (Atkins, Baldwin, Zheng, Gallop & Neighbors, 2013). In order to facilitate the interpretation of effects, however, linear regression models were also used to generate standardised (β) coefficients that enabled comparison of effect magnitude across predictors with different scales of measurement, and also for the same variable at different time points. Each of these predictors was specified separately in models that thus considered 'bivariate' associations.

In addition to regression models that considered as dependent variables the aggregate scores for outcome measures (e.g. K-10, PCL-4) in their natural 'quasi-continuous' forms, we also estimated a series of models for variables associated with cut-off criteria that distinguished clinically significant 'caseness'. These comprised logistic regression models that specified binary indicators of caseness as the outcome variable. Predictor variables were again entered into separate models estimating bivariate associations, which were quantified using the odds ratio as an effect size index.

Prospective (across-time) analyses

These analyses comprised two different types of prospective model that addressed change across the distinct periods of (1) ADF induction/training (T1–T2) and (2) post-training and early career service (T2–T5) respectively.

The initial prospective analyses comprised a series of 'time-lagged' regression models suitable for modelling change across two time points (T1–T2). These were broadly similar to the cross-sectional (within-time) analyses described earlier, but reflect the form of a path model (**Figure 2**).

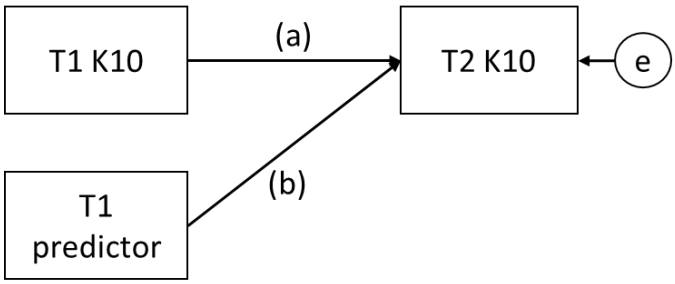


***Figure 2.*** *Path model depicting time-lagged regression model with stability effect (a) and influence of an additional explanatory variable (b) on K10 scores, with residual error.*

As shown, the time-lagged models in Figure 2 are characterised by:

- T2 values of the outcome measure (e.g. K10 scores) that were specified as the dependent variable;
- predictor variables measured at T1, and thus situated before the outcome variable in time; and
- T1 values of the outcome measure (e.g. K10 scores) that were also treated as a predictor of T2 scores.

Through regression of T2 levels of the outcome on T1 values of same measure, the effects of other T1 predictors were additional to these 'stability effects' and, thus, reflected associations with rank-order change in the dependent variable over time. Consistent with the within-time models, Poisson regression was used to generate estimates and SEs, while linear regression models were also used to produce standardised coefficients.

The second series of prospective analyses considered the period of post-training and early career service (T2–T5), and comprised 'conditional' GMMs. These consider as a basis the classes identified in the preceding unconditional (descriptive) mixture models, and are analogous to a multinomial logistic regression in which a latent categorical variable (that identifies the unobserved profiles or classes) is regressed on a time-invariant covariate. Assuming at least one subgroup that suitably corresponds with conceptual notions of resilience, these regression models appraise explanatory variables that can distinguish across resilient and non-resilient subgroups. In the context of three or more subgroups, each trajectory class can be compared with a 'reference category' (or with all other classes in a pairwise fashion), with the magnitude of differences between specific classes quantified using an odds ratio as an effect-size index.

# Results

## Overview

The analyses of the LASER-Resilience data were organised in three broad stages:

1. data file preparation and preliminary analyses;
2. descriptive analyses and unconditional models of change; and
3. predictive and conditional analyses.

This section summarises findings from Stage 2 and Stage 3, which comprised the descriptive and predictive analyses respectively. Findings from preliminary analyses conducted during Stage 1 have been referenced in the previous sections of the report and are also presented as appendices:

- Appendix B: Logistic regression models of survey 'non-completion' over time at T4 and T5
- Appendix F: Item-level screening
- Appendix G: Psychometric analyses.

The main variables considered in the following sections include the K10, PHQ-S, PCL-4, DAR and SII, with additional variables considered for exploratory purposes, including the CDRISC-2 and the AUDIT-C (the latter of which was not administered to GEs – the majority of participants at T2 – and, as a result, was considered from T3–T5 only). In addition, the main predictor variables considered across time points were also examined, including morale, family and friend social support, ADF peer and superior social support, coping styles and traumatic exposure.

## Descriptive analyses and unconditional models

Univariate descriptive statistics were initially produced for each outcome and predictor variable from T1 to T5 (except for the AUDIT-C, which was only considered at T1 and T3–T5; T2 data on the AUDIT-C is only provided for Officers) and for aggregate scale scores that approximated continuous measurement. The descriptive statistics for the main outcome measures are shown in Appendix D: Descriptive statistics for key outcomes and predictors : Descriptive statistics for key outcomes and predictors, which displays the theoretical range (TR) for summed scale scores, as well as the median (Med), mean (M) and standard deviation (SD). Appendix D: Descriptive statistics for key outcomes and predictors also shows the sample size (n) available for analyses, which varied across measures within time points because of item-level missing data, and across time because of loss to follow-up.

The sample means at each time point (see **Figure 3**) provided no clear evidence for systematic change in scores (when aggregated across participants) for the K10, PHQ-S and DAR, while the SII and PCL-4 were characterised by possible modestly increasing trends. The CDRISC-2 and AUDIT-C also indicated relative stability, although any such findings should be viewed in the

context of the narrow TR – and thus restricted variability – for these scales given the small number of items. Across measures, the Ms were modestly higher than the Meds, except for the PCL-4 which was associated with increasing discrepancies over time (suggesting deviations from normal distributions). There were also trends suggesting gradually increasing SDs across time points for some measures, such as the K10, which may indicate increasing variability in scores over time.

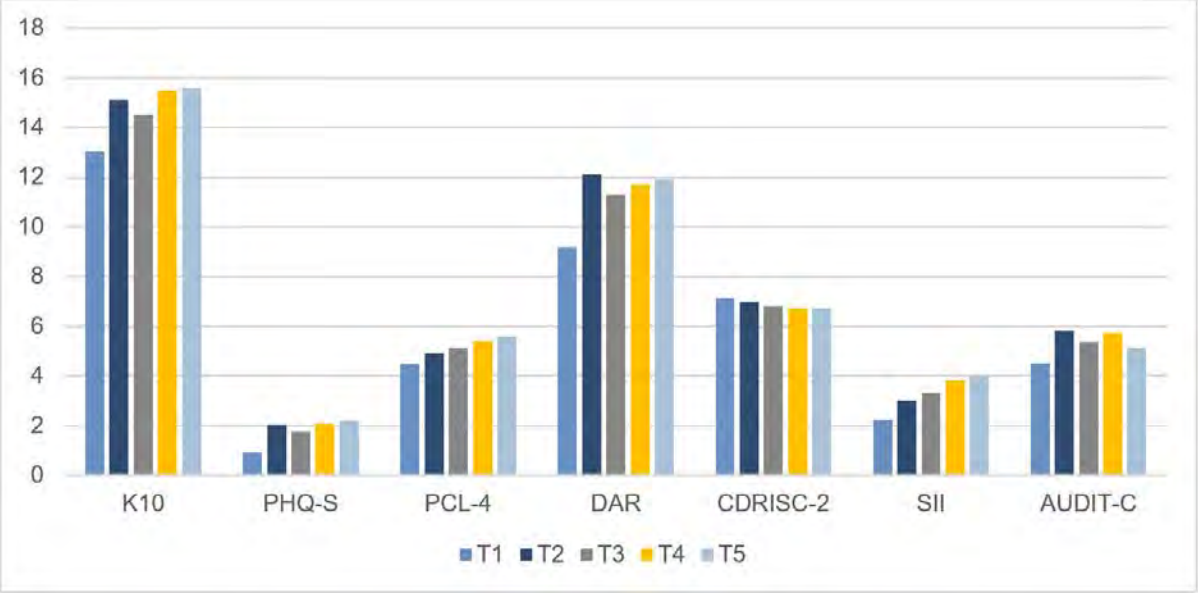


***Figure 3.*** *Mean changes across time by outcome measure*
*Note. AUDIT-C data at T2 is based on n = 1907 Officers who had data available on this measure at this time point*

Analogous descriptive information about the key predictor variables is presented in Appendix D: Descriptive statistics for key outcomes and predictors  Among other things, these tables indicate the selection of variables that were measured consistently across time points – such as family/friend social support and coping styles – and that were also characterised by evidence of general stability in scores at the mean level. As noted previously, questions about social support from ADF peers and superiors were administered from T2 onwards, but were associated with extremely high levels of missing data at T4 and T5. There were several scales administered from T3–T5 only, including measures of self-reported instances of deployment.

In addition to descriptive statistics produced for aggregate scale scores in their natural 'quasi-continuous' form, there were additional frequency analyses conducted for variables that were associated with cut-off criteria for establishing clinically significant 'caseness'. Cut-off criteria information for this sample included those taken from the *ADF Mental Health Prevalence and Wellbeing Study* (McFarlane et al., 2011), which identified two types of K10 cut-offs for the ADF: an optimal screening cut-off that is used to identify individuals who may need care, and an optimal epidemiological cut-off that gives the closest true estimate of the prevalence of disorder in this group. There were three measures considered in this study for which cut-off criteria were used.

1. K10: The ADF-specific optimal screening cut-off score is 17 and the optimal epidemiological cut-off score is 25 (McFarlane et al., 2011). Both these cut-off criteria were recommended in

the *ADF Mental Health Prevalence and Wellbeing Study* report (MHPWS; McFarlane et al., 2011) and are presented here. Respondents who score below both cut-offs are likely to be well, whereas respondents scoring at or above either cut-off are likely to exhibit mild to severe psychological distress.

2. PCL-4: The MHPWS report (McFarlane et al., 2011) did not identify optimal cut-off criteria for the 4-item version of the PCL (as opposed to the full version of the PCL). As such, the cut-off criteria recommended in the general literature were used in this report. Specifically, the general and epidemiological cut-off score for the PCL-4 is 7 (Bliese et al., 2008). Respondents who score below this cut-off are likely to have no posttraumatic stress disorder, whereas respondents who score at or above this cut-off exhibit possible disorder.

3. AUDIT-C: The MHPWS report provides cut-off criteria in the ADF for the full version of the AUDIT measure, not the brief version (AUDIT-C). As such, a general cut-off score of 5 for the AUDIT-C was used (Bradley et al., 2003; Bush et al., 1998). Respondents who score below this cut-off report low-risk drinking habits, whereas respondents who score at or above cut-off may be classified as hazardous or harmful drinkers (Bradley et al., 2007; Rumpf, Hapke, Meyer & John, 2002). In addition, frequency statistics are also provided using an alternative cut-off score of 6 for the AUDIT-C. This cut-off was used previously in the *Alcohol and Tobacco Use: Coping and Mental Health* report (Lewis et al., 2015).

These criteria were used to generate frequency statistics (n and %) which are shown in **Table 1**.

As can be seen, there were notable proportions of participants scoring above cut-off criteria on the K10, with higher rates identified using ADF-specific screening criteria (12–31%) versus epidemiological criteria (1–9%). There was evidence of particularly large increases in caseness as defined by the K10 between T1 and T2. Rates of possible PTSD cases were also notable, with consistent increases observed over time. Around half of participants reported hazardous alcohol use across all time points, with rates increasing between T1 and T4.

Given multiple cut-off criteria for some measures that are applied in different contexts (e.g. research versus clinical practice), the remaining sections of this report involving binary measures of ‘caseness’ (primarily the logistic regression models) will use the screening cut-offs, which (a) maximise variability and (b) are consistent with principles of early identification to prevent worsening of symptoms.

***Table 1.*** *Frequency (n and %) of those above cut-offs associated with K10, PCL-4, and AUDIT-C*

| Variable | | T1 | T1 | T2 | T2 | T3 | T3 | T4 | T4 | T5 | T5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *N* | % | *N* | % | *N* | % | *n* | % | *n* | % |
| **K10** | | | | | | | | | | | |
| | ADF-specific Screening (cut-off: 17+) | 398 | 11.76 | 1477 | 28.11 | 430 | 24.49 | 371 | 29.26 | 367 | 30.84 |
| | ADF-specific Epidemiological (cut-off: 25+) | 29 | 0.86 | 236 | 4.49 | 93 | 5.30 | 111 | 8.75 | 100 | 8.40 |
| **PCL-4** | | | | | | | | | | | |
| | General/ Epidemiological (cut-off: 7+) | 179 | 5.36 | 610 | 11.70 | 260 | 15.15 | 253 | 20.37 | 266 | 22.83 |
| **AUDIT-C** | | | | | | | | | | | |
| | General (cut-off 5+) | 1658 | 50.23 | 1329* | 69.69* | 1106 | 64.26 | 774 | 67.42 | 691 | 59.42 |
| | ADF-specific (Cut-off: 6+) | 1119 | 33.90 | 1062* | 55.69* | 808 | 46.95 | 560 | 48.78 | 509 | 43.77 |

*Note*. K10 = Kessler 10-item Psychological Distress; PCL-4 = 4-item PTSD Checklist; AUDIT-C = AUDIT Consumption Screen.* AUDIT-C scores at T2 are provided only for Officers (n=1907) who had data available on this measures at this time point. There is merit in examining the frequency of ADF members who were above cut-offs by service or rank. However, as prevalence rates were not the focus of the current report this was not included here. To sufficiently investigate differences in prevalence rates within the ADF requires substantial separate analysis.

# Bivariate correlations

**Table 2** presents the Pearson correlation coefficients for within-time associations among the primary outcome measures at T2 (with the exception of the AUDIT-C, which was not administered at this time point), with corresponding information about T3–T5 provided in Appendix H: Outcome measure correlations. For this table, all correlation coefficients are statistically significant at the $p < 0.001$ level.

As can be seen, there were small-to-moderate associations between all measures (i.e. the K10, PHQ-S, PCL-4, DAR, CDRISC-2, SII and AUDIT-C). Coefficients were positive except for associations with the CDRISC-2, which were negative (as expected given that high scores represent positive adjustment on this measure, versus maladjustment on other scales). The K10 scores had the largest associations with other scales (and the largest bivariate association with the PCL-4, which was $r = 0.58$), while the CDRISC-2 was characterised generally by weaker inter-correlations. While the association between K10 and PCL-4 was high, that is was limited to $r = 0.58$ still indicates that these reflect distinction between these constructs. Similar patterns of associations were observed across other time points (see Appendix H), although the specific magnitude of correlations often varied. These subsequent time points also indicated associations with AUDIT-C scores that were generally small and sometimes approaching zero across the other measures (the lowest correlation for the AUDIT-C was with the PHQ-S at $r = 0.03$).

***Table 2.*** *Correlations between key outcome measures at T2*

| | | K10 | PHQ-S | PCL-4 | DAR | CDRISC-2 | AUDIT-C |
|---|---|---|---|---|---|---|---|
| **T2** | K10 | | | | | | |
| | PHQ-S | 0.47 | | | | | |
| | PCL-4 | 0.58 | 0.40 | | | | |
| | DAR | 0.48 | 0.33 | 0.41 | | | |
| | CDRISC-2 | −0.39 | −0.23 | −0.30 | −0.25 | | |
| | SII | 0.50 | 0.42 | 0.42 | 0.36 | −0.27 | |

*Notes*. For these associations, all correlation coefficients are significant at the $p < 0.001$ level; K10 = Kessler Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = 4-item PTSD Checklist; DAR = Dimensions of Anger; CDRISC-2 = Connor-Davidson Resilience Scale 2-item; SII = Sleep Impairment Index; AUDIT-C = AUDIT Consumption Scale.

Overall, the main outcome measures of interest – the K10, PHQ-S and PCL-4 – were all significantly positively intercorrelated at T2, indicating some overlap in underlying constructs but with some distinction between these measures. The CDRISC-2 was negatively associated with all other measures at T2, indicating that higher resilience was correlated with lower symptomatology on the other measures. All measures demonstrated acceptable prospective associations, meaning that a measure performed relatively consistently over time, with associations declining slowly over time.

## Latent trajectory model (LTM) analyses

A series of LTM analyses were conducted to provide a more sophisticated approach to describing patterns of within-person change in outcome measures over time. As noted previously, these models addressed the period of early career military service (T3–T5) and did not consider ADF induction/training (T1–T2). The latter will be considered in separate analyses in subsequent sections (given expectations of distinctive change patterns across these periods and smaller number of time points across the induction/training period, which precluded trajectory analyses). Given interest in the trajectories of those who had experienced trauma, separate LTM analyses for those with lifetime traumatic exposure were also conducted.

Each outcome measure was considered separately in descriptive (unconditional) LTM analyses examining the plausibility of three alternative approaches to modelling change. These models were all 'statistically identified' (and could thus be reliably estimated) in the context of four repeated measurements, and included:

- the *intercept-only model*, wherein scores from repeated measurements suggest no patterns of systematic change over time;
- the *linear model:* trajectories are suitably described by a straight line which indicates constant rate of change (although individual trajectories are permitted to vary around a latent mean which captures between-person variation in rates of change); and
- the *quadratic model*, which captures a degree of curvature in trajectories.

For all outcomes, three LTM analyses were estimated (intercept, linear and quadratic) and evaluated for model fit. See Appendix K for details on fit indices for each model and outcome. Based on statistical fit indices, the best-fitting model was selected for each outcome and parameter estimates were recorded and interpreted (see Appendix L: Latent class growth analysis).

The key findings from the LTM analyses are summarised below.

- A quadratic model of change over time provided best fit to the data from the K10. This suggested trajectories of psychological distress that were decreasing modestly on average across the early time points of assessment, but with attenuation in declines and increasingly positive slopes across later time points. The latter suggest slight escalations in levels of psychological distress over time.
- A quadratic model also provided best fit to the data from the PHQ-S. This suggested trajectories of somatic symptoms decreasing modestly on average across the early time points

of assessment, with attenuation in declines and slightly increasing slopes across the latter time points (T3–T5).

- A linear model of change provided best fit to data for the PCL-4. This suggested trajectories that were increasing gradually across the duration of the study, with significant between-person variation in both starting points and the rates of change.
- A quadratic model provided best fit to the data from the DAR. This indicated trajectories that were decreasing on average across the early time points of assessment but with increasing scores across the latter time points.
- A quadratic model of change provided best fit to data from the SII. However, the mean of the quadratic term was zero, which indicated that there was no curvature in sleep impairment trajectories on average (which were increasing modestly across the duration of the study). However, there was significant variance in the quadratic term, which indicated between-person variability in levels of curvature (whereby there was curvature in some individual trajectories).
- A linear model of change provided best fit to data for the CDRISC-2. This suggested trajectories that were decreasing gradually across the duration of the study, with significant between-person variation in both starting points and the rates of change.
- A linear model of change also provided best fit to data for the AUDIT-C, which was considered over three time points only (owing to survey non-administration at T2). This model indicated generally flat trajectories and stable levels of alcohol consumption.

Figures illustrating the best-fitting latent trajectories for the main outcomes (K10, PHQ-S and PCL-4) can be seen in **Figure 4**, while figures for the remaining outcomes (DAR, CDRIS-2, SII and the AUDIT-C) can be found in Appendix L: Latent class growth analysis and Appendix M: Additional conditional LCGA analysis for K10 and PCL-4 outcomes.

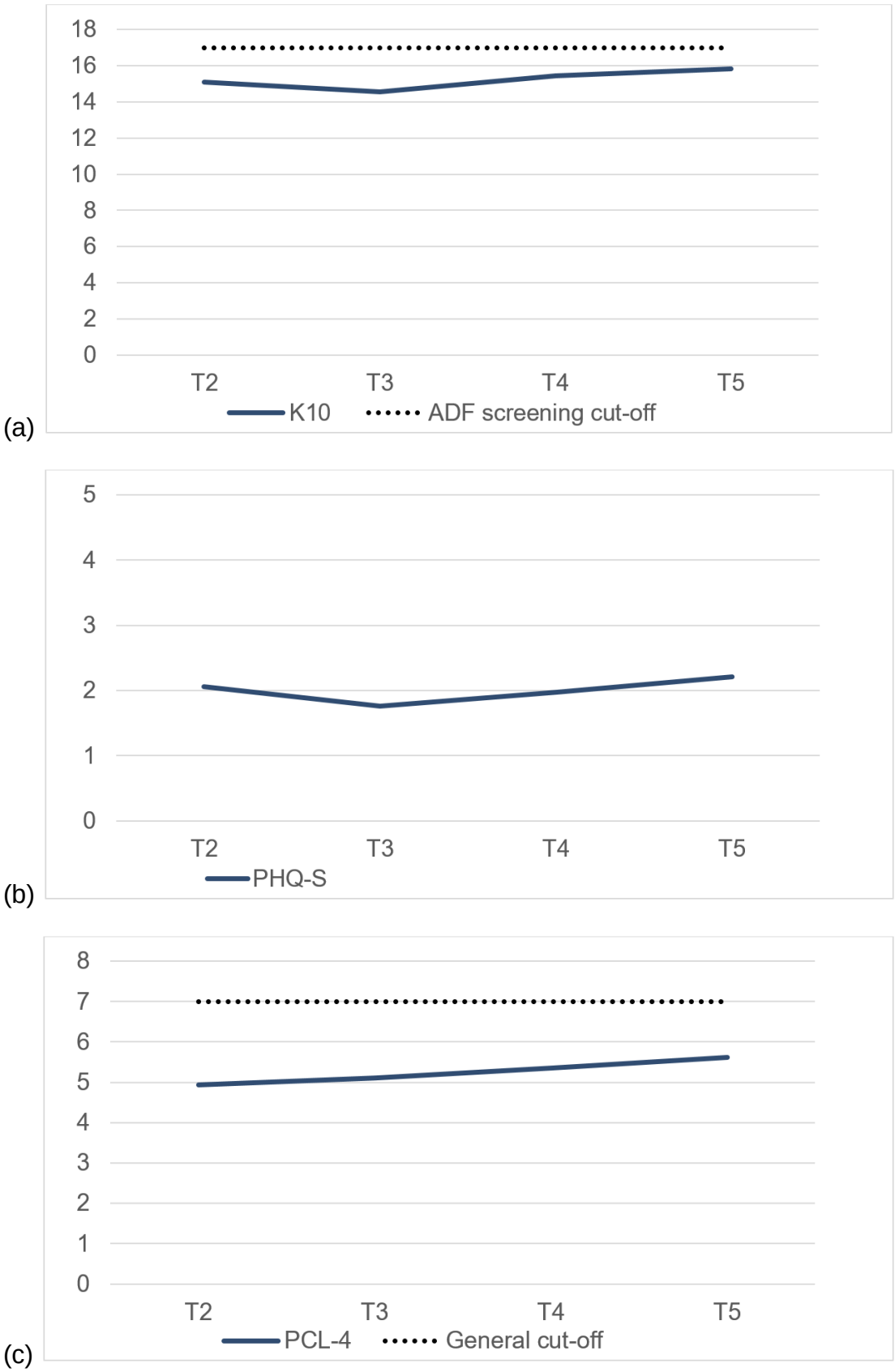


***Figure 4.*** *Mean trajectories underlying repeated measures of (a) K10 scores, (b) PHQ-S scores, and (c) PCL-4 scores.*

# LTM analyses for ADF recruits reporting lifetime trauma exposure

The preceding analyses were conducted using the entire analytic sample (n = 5329), and thus incorporate ADF recruits exposed to a range of challenging and potentially traumatic events (PTEs) across their lifetime. Information about these PTEs were recorded at T2 using a Traumatic Events Checklist that addressed lifetime exposures to 18 different events (shown in **Table 3** below). This table displays frequencies for exposure to each of these events, as well as an aggregate measure of any exposure.

Lifetime PTEs were relatively common occurrences in the LASER-Resilience sample, with 70% of participants at T2 reporting lifetime exposure to at least one such occurrence. The most frequently encountered events were witnessing someone being badly injured or killed, natural disasters and being threatened without a weapon.

***Table 3.*** *Prevalence of lifetime potentially traumatic events*

| **Traumatic event** | ***n*** | **%** |
|---|---|---|
| Direct combat | 458 | 8.8 |
| Life-threatening accident | 1155 | 22.1 |
| Fire, flood or other natural disaster | 1650 | 31.5 |
| Witness someone badly injured or killed | 1767 | 33.8 |
| Sexual molestation | 118 | 2.3 |
| Serious physical attack or assault | 1270 | 24.2 |
| Threatened with a weapon/held captive/kidnapped | 574 | 11.0 |
| Tortured or victim of terrorists | 23 | 0.4 |
| Domestic violence | 436 | 8.3 |
| Witness domestic violence | 931 | 17.8 |
| Finding dead body | 394 | 7.5 |
| Child abuse – physical | 204 | 3.9 |
| Child abuse – emotional | 291 | 5.6 |
| Rape | 79 | 1.5 |
| Threatened/harassed without a weapon | 1671 | 31.9 |
| Witness someone suicide or attempt suicide | 588 | 11.2 |
| Suffer great shock event to someone close | 642 | 12.6 |
| Any other event | 230 | 5.0 |
| Any past event | 3686 | 70.2 |

*Note:* Values for the denominator in calculations of proportions may vary slightly because of item-level missing data.

In order to evaluate whether the preceding models were robust to alternative approaches to defining exposure to stressful events, the LTM analyses for the three main outcomes (K10, PHQ-S and PCL-4) were repeated with a sub-sample of participants who reported exposure to at least one lifetime PTE (n = 3686). Latent trajectory models were run on just this subsample and details of the findings, such as model fit indices and parameter estimates, can be found in Appendix L.

Overall, the best-fitting trajectory models for the K10, PHQ-S and PCL-4 replicated those found for the entire sample: quadratic models were the best-fitting for the K10 and PHQ-S, and the linear model was the best-fitting for the PCL-4. In the context of such comparability, all remaining analyses described in this report were conducted using information from the entire analytic sample (n = 5329). This also maximised the information available to subsequent analyses that were computationally intensive (and thus required larger sample sizes).

# Latent class growth analysis (LCGA)

The LTM analyses reported in the previous section assume that trajectories underlying repeated measures can be described by a single set of change parameters that refer to the sample as a whole. This current section reports findings from a subsequent series of growth mixture modelling (GMM) analyses that examined whether trajectories could be described more appropriately through different parameters that correspond to subpopulations within the sample. These subpopulations are 'unobserved', in the sense that they are not directly measured, and are thus inferred from observed patterns of variability in the data.

Specifically, while LTM analyses provide an indication of how the sample is changing over time as a whole and on average, it does not account for potential subgroups of people who may be changing in similar ways. Therefore, a series of latent class growth analyses (LCGAs) were conducted to identify subgroups (or classes; the 'who') within the sample that followed similar trajectories over time. A LCGA was run for each outcome of interest, with fit indices considered primarily to identify the preferred model (which considered 2–5 classes). For more details on the LCGA analyses, consult Appendix L: Latent class growth analysis.

## Psychological distress

LCGAs suggested that a 3-class model provided a suitable description of subpopulations underlying trajectories of K10 scores. These three classes included:

1. a low and stable class (84.0%);
2. a low and increasing class (9.6%); and
3. a high and decreasing class (6.5%).

The K10 classes described above were broken down further to examine the make-up of each class by service type (Navy, Army and Air Force). Within each service type, similar patterns emerged in terms of the proportion of members in each of the classes. Specifically, within the Navy, 86% were in the low–stable class, 6% in the low–increasing class, and 8% in the high–decreasing' class. For

both the Army and Air Force, 89% were in the low–stable class, 5% in the low–increasing class, and 6% in the high–decreasing class.

To facilitate interpretation of the preferred class model, a graphical depiction of the class-specific mean trajectories for the K10 is presented in **Figure 5**.

**Psychological distress:** The largest class accounted for around 84% of the LASER-Resilience sample and was characterised by consistently low levels of self-reported distress across time. In contrast, the two remaining classes were both characterised by < 10% of the sample and included one group defined by increasing distress scores over time, and a final group defined by initially high distress scores that declined across the duration of study.

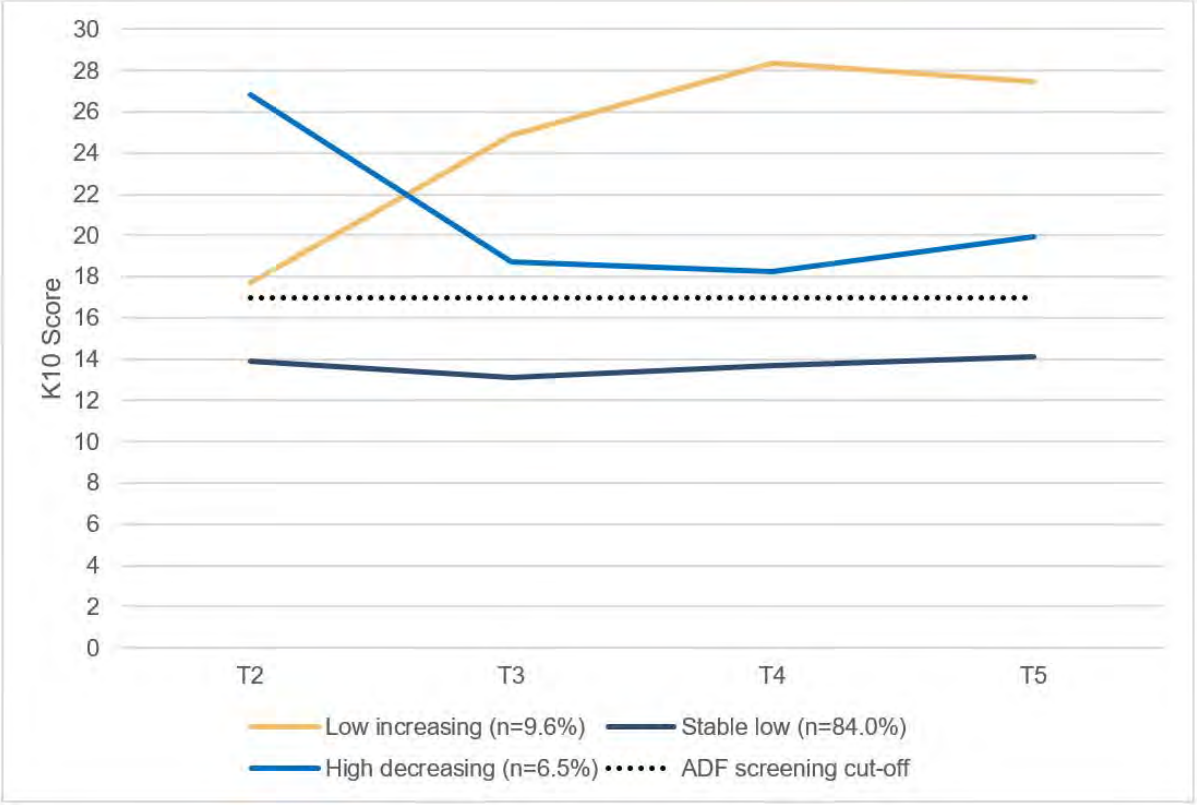


***Figure 5**. 3-class model of K10 score across time*

## Somatic symptoms

LCGAs also suggested that a 3-class model provided a suitable description of subpopulations' underlying trajectories of PHQ-S scores. These three classes included:

1. a low and stable class (82.4%);
2. a low and increasing class (7.4%); and
3. a high and decreasing class (10.1%).

**Figure 6** provides a graphical depiction of the class-specific mean trajectories for the PHQ-S.

**Somatic symptoms:** Consistent with findings for psychological distress (the K10), there was evidence of (a) a single large group comprising around 80% of the sample and defined by consistently low somatic severity; (b) a smaller group comprising around 10% of the sample that was defined by initially high somatic severity scores that exhibited attenuating declines over time; and (c) a final small group (7%) characterised by initially increasing somatic severity that attenuated across the study.

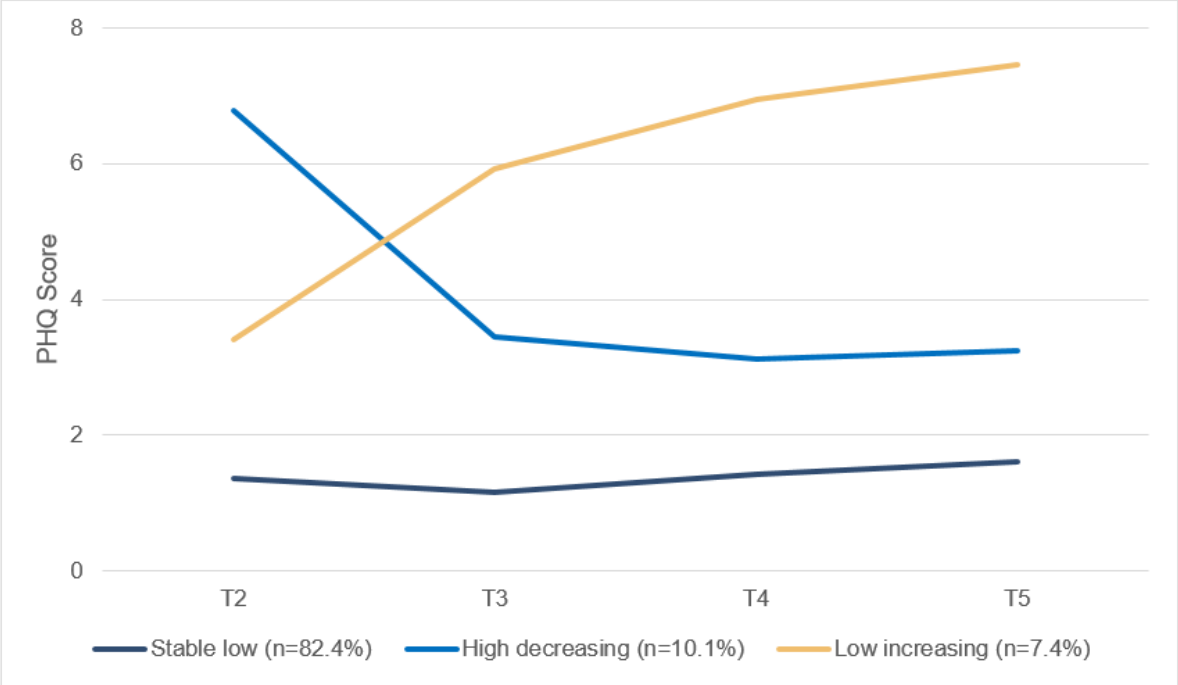


***Figure 6**. 3-class model of PHQ-S score across time*

## Posttraumatic stress symptoms

LCGAs suggested that 2-class, 3-class and 4-class solutions were all plausible descriptions of trajectories underlying scores on the PCL-4. However, the 4-class solution was selected as the preferred model given substantive interest in the specific groups identified by this class model (and despite both 3-class and 4-class solutions identifying one very small class). These four classes included:

1. a low and stable class (82.5%);
2. a low and increasing class (5.8%);
3. a high and decreasing class (2.3%); and
4. a moderate and decreasing class (9.4%).

Looking at the breakdown across the PCL-4 classes by service type revealed that there were slightly varied proportions within each service for the different classes. Specifically, within the Navy the largest proportion (83%) of members were in the low–stable class, followed by 10% in the

moderate–decreasing class, and 3% in both the low–increasing and high–decreasing classes. In the Army, 86% of members were in the low–stable class, followed by 9% in the moderate–decreasing class and 2% in both the low–increasing and high–decreasing classes. For the Air Force, 87% were in the low–stable class, followed by 8% in the moderate–decreasing class, 3% in the low–increasing class, and 2% in the high–decreasing class.

**Figure 7** provides a graphical depiction of the class-specific mean trajectories for the PCL-4.0.

**Posttraumatic stress symptoms:** There was evidence of (a) a single large group comprising around 80% of the sample which reported consistently low traumatic stress symptom severity; (b) a smaller group comprising around 6% of the sample defined by initially low traumatic stress severity and increasing severity; (c) a small class of around 2% characterised by initially high traumatic stress severity scores that declined over time; and (d) another small group of around 10% that was moderate at T2 and characterised by modest declines over time.

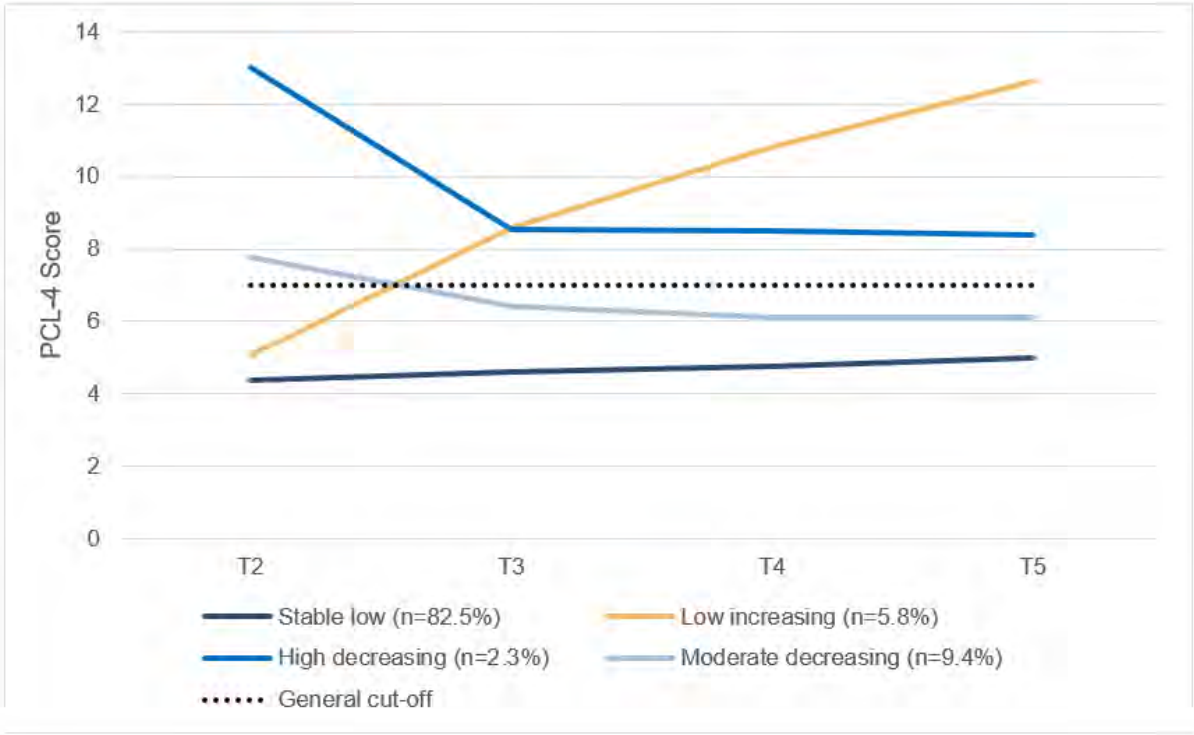


***Figure 7.*** *Class-specific mean trajectories for 4-class model of the PCL-4.*

## Anger

LCGAs suggested that a 3-class model provided a suitable description of subpopulations underlying trajectories of DAR scores. These three classes included:

1. a low and stable class (78.2%);
2. a low and increasing class (11.6%); and

3. a high and decreasing class (10.2%).

***Figure 8*** *provides a graphical depiction of class-specific mean trajectories for the 3-class model.*

**Anger:** The model indicated findings consistent with results for psychological distress (K10) and somatic symptoms (PHQ-S), which comprised groups that were low and stable (78%), increasing anger severity (12%) and high anger but decreasing over time (10%), respectively. This model was compared to a 4-class model, which separated the high and decreasing group (10%) into (a) high and decreasing and (b) moderate and decreasing classes. The latter distinction was not considered to be substantively interesting or of practical importance, and the relatively parsimonious 3-class model was thus preferred.

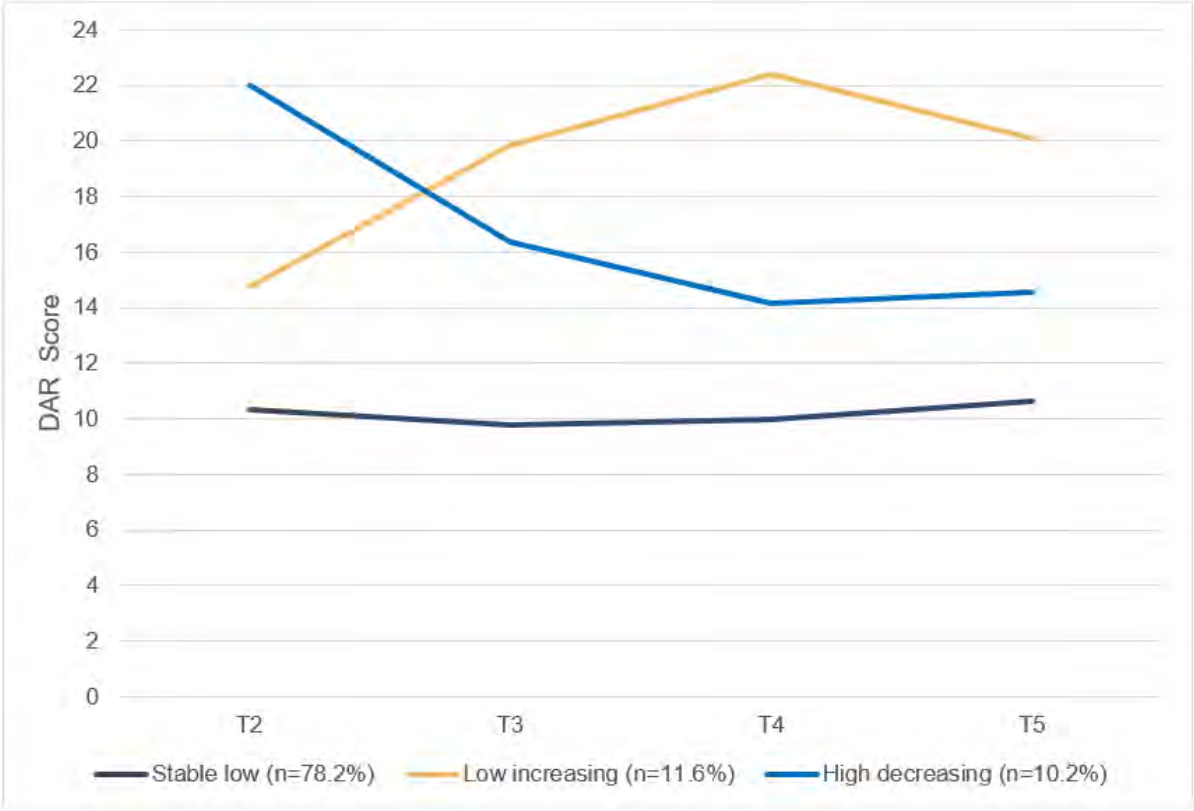


***Figure 8.*** *Class-specific mean trajectories for 3-class model of the DAR.*

## Sleep

LCGAs suggested that a 4-class model provided a suitable description of subpopulations underlying trajectories of the SII. These four classes included:

1. a low and stable class (70.0%);
2. a low and increasing class (5.9%);
3. a high and decreasing class (5.6%); and
4. a moderate class (18.5%).

Class-specific mean trajectories for the 4-class model were produced and are shown in Figure 9.

**Sleep:** The 4-class model is defined by groups reflecting (a) low with minor increases in sleep disturbance; (b) medium levels of sleep disturbance with minor attenuation and then increase; (c) high sleep disturbance with attenuating declines; and (d) low with rapid increase of sleep disturbance with attenuation.

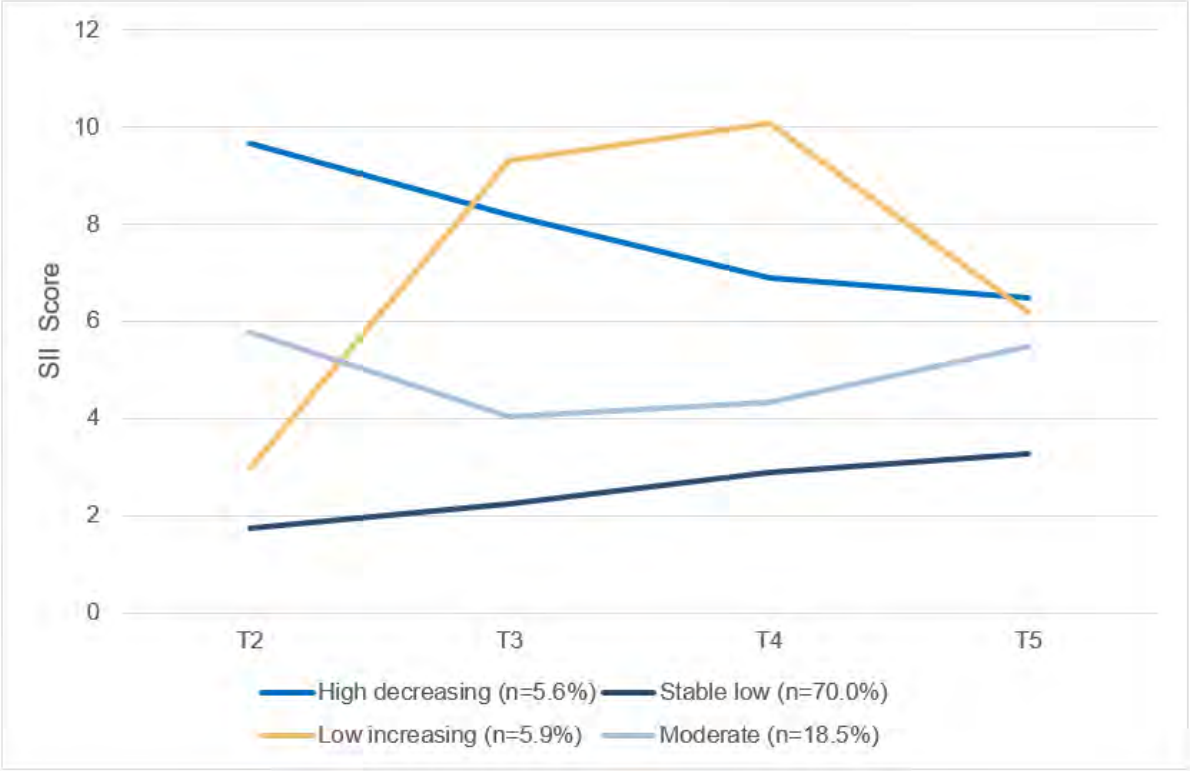


***Figure 9.*** *4-class model for SII scores over time*

## Self-reported resilience

Appendix L shows results from analyses of CDRISC-2 trajectories which considered models specifying between two and five latent classes. There were consistent indications of improved fit across indicators (including the LMR-LRT) for class solutions that specified up to and including four latent classes (after which the LMR-LRT suggested no significant improvements in model fit). Notwithstanding such improvements, both 3-class and 4-class models were characterised by small class sizes which comprised < 2.5% of the sample.

LCGAs suggested that a 2-class model provided a suitable description of subpopulations underlying trajectories of the CDRISC-2. These two classes included:

1. an attenuating increase class (37.2%); and
2. an attenuating decrease class (62.8%)

Class-specific mean trajectories for the 2-class model were produced and are shown in Figure 10.

**Sleep:** The 2-class model is defined by groups reflecting (a) attenuating increases and (b) attenuating decreases, which may be a reflection of regression to the mean. In the absence of clear substantive value in the additional categories identified by the more complex models, as well as small class sizes, the 2-class model was accepted as preferred.

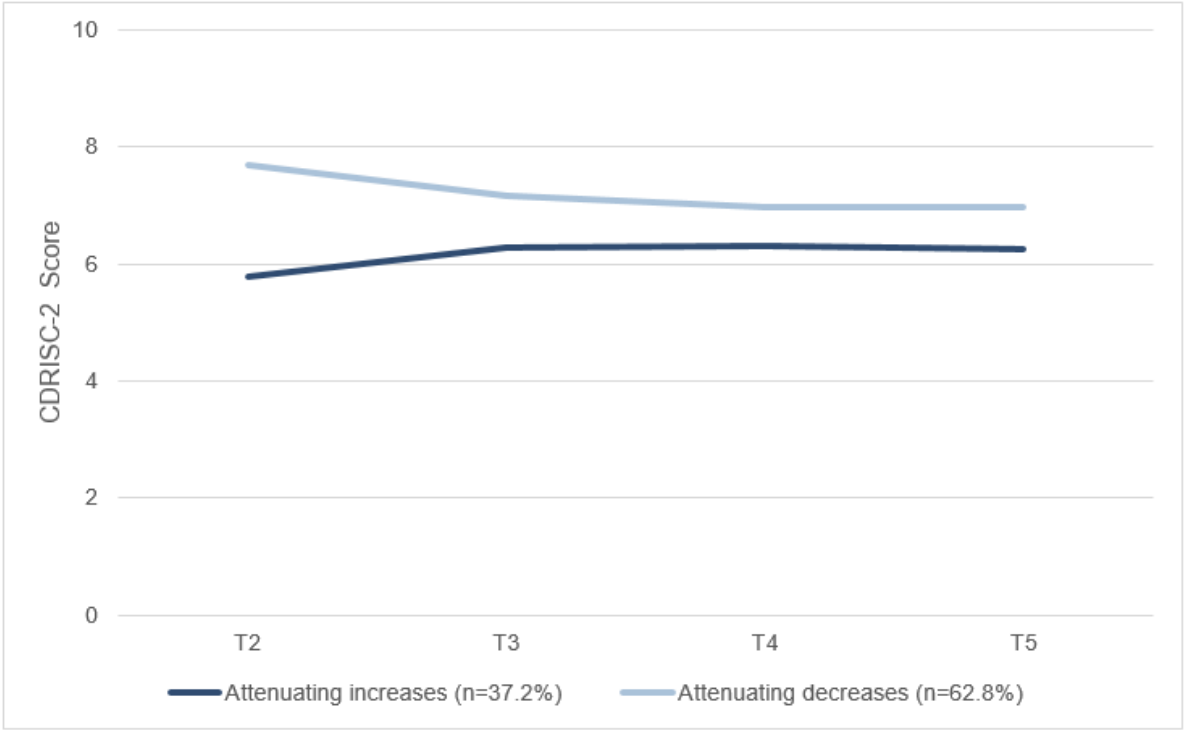


***Figure 10.*** *2-class model for CDRISC-2 scores over time*

## Alcohol consumption

Analyses of AUDIT-C trajectories from T3 to T5 considered models specifying only two and three latent classes. This was because of estimation problems for more complex solutions, and class sizes for these models which corresponded to < 2% of the sample. Given previous analyses that indicated no systematic change in AUDIT-C scores over time, it was determined that LCGA analyses were not viable for this outcome and they were not pursued further.

## LCGA summary

LCGA models were used to identify underlying subgroups (or classes) that changed in generally similar ways over time according to different outcomes of interest. Across the analyses of different outcomes, there were a number of similar subgroups which were identified, including:

1. a low–stable class that represented 70–85% of the sample;
2. a class characterised by scores that were initially low but increased generally over time, suggesting worsening symptoms, which represented 5–10% of the sample; and
3. another class characterised by scores that were initially high but decreased over time, and which represented 2–10% of the sample.

A 3-class model generally consistent with the subgroups listed above was preferred for the measures of psychological distress, somatic symptoms and anger (K10, PHQ-S and DAR respectively). In contrast, a slightly more complex 4-class model was preferred for both the posttraumatic stress symptoms and sleep impairment (PCL-4 and SII). The additional class for posttraumatic stress symptoms was characterised by moderate and decreasing symptoms over time, and the additional class for sleep impairment was characterised by moderate symptoms that decreased from T2–T3 but then increased again from T4–T5.

# Predictive and conditional analyses

This stage of analysis comprised a series of predictive and conditional models that examined the individual and situational variables (including key subgroups) that influenced patterns of adjustment and therefore resilience. To reduce the volume of results, the decision was made to focus these analyses on just two outcomes that were of greatest interest in military settings and were also characterised by recognised cut-off scores that could be used to identify 'caseness'. These were the K10 and PCL-4, which were included in 'within-time' models first, followed by analyses predicting change across two distinct periods: (1) ADF induction/training (T1–T2) and (2) early career military service (T2–T5). As such, the following range of predictive analyses were conducted:

- repeated within-time (cross-sectional) regressions for aggregate scale scores and indicators of 'caseness' from T1–T5;
- time-lagged (prospective) regressions for aggregate scale scores from T1–T2; and
- conditional LCGA models comprising multinomial logistic regressions that distinguish the latent classes identified in the previous unconditional models of change from T2–T5.

## Within-time regressions for aggregate scale scores (T1–T5)

The first series of predictive analyses comprised a series of within-time regressions that considered as outcomes the K10 and PCL-4 aggregate scale scores. These were cross-sectional models (wherein explanatory and outcome variables were all measured at the same time points),

which were repeated from T1–T5 and thus evaluated how predictive associations were maintained or varied across time.

Given that the aggregate scale scores for the K10 and PCL-4 were skewed in all instances, these analyses initially comprised Poisson regression models that were used to derive appropriate parameter estimates and SEs, and thus suitable significance tests. Standardised (β) coefficients were derived from linear regression models in order to provide effect size estimates that were more readily comparable across explanatory variables with different scales of measurement. The results of these analyses for variables situated at T1, T2 and T3 respectively are displayed in **Table 4**, **Table 5** and **Table 6**. To simplify the report, the corresponding tables for T4 and T5 can be found in Appendix I.

***Table 4.*** *Within-time regression models specifying K10 and PCL-4 sores as outcome variables at T1*

| | K10 | | | | | PCL-4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Poisson Regression | | | | β | Poisson Regression | | | | β |
| | Estimate | | SE | p | | Estimate | | SE | p | |
| **Age** | 0.00 | ** | 0.00 | 0.006 | −0.06 | 0.00 | | 0.00 | 0.974 | 0.00 |
| **Gender (Male)** | −0.07 | *** | 0.01 | 0.000 | −0.11 | −0.08 | *** | 0.02 | 0.001 | −0.11 |
| **Relationship status (reference: Single)** | | | | | | | | | | |
| Married/cohabitating | 0.01 | | 0.05 | 0.144 | 0.01 | 0.01 | | 0.02 | 0.797 | 0.01 |
| Divorced/Separated/Widowed | −0.07 | | 0.09 | 0.173 | −0.03 | 0.02 | | 0.08 | 0.790 | 0.01 |
| **Number of children** | 0.00 | | 0.01 | 0.890 | 0.00 | 0.01 | | 0.01 | 0.705 | 0.02 |
| **Education (reference: Completed Year 12)** | | | | | | | | | | |
| Completed Year 10 | −0.12 | *** | 0.02 | 0.000 | −0.16 | −0.09 | *** | 0.03 | 0.000 | −0.12 |
| Post school training | −0.06 | *** | 0.01 | 0.000 | −0.09 | −0.03 | | 0.02 | 0.188 | −0.04 |
| Tertiary | 0.07 | *** | 0.01 | 0.000 | 0.11 | 0.06 | ** | 0.02 | 0.010 | 0.09 |
| **ADF Service (reference: Army)** | | | | | | | | | | |
| Navy | 0.08 | *** | 0.01 | 0.000 | 0.13 | 0.08 | *** | 0.02 | 0.000 | 0.12 |
| Air Force | 0.08 | *** | 0.01 | 0.000 | 0.13 | 0.07 | ** | 0.02 | 0.004 | 0.09 |
| **Military experience (Yes)** | 0.05 | *** | 0.01 | 0.000 | 0.09 | 0.05 | ** | 0.02 | 0.007 | 0.09 |
| **Family/Friend Social Support** | −0.03 | *** | 0.00 | 0.000 | −0.15 | −0.03 | *** | 0.01 | 0.000 | −0.14 |
| **Family/Friend Negative Social Interactions** | 0.03 | *** | <0.01 | 0.000 | 0.25 | 0.02 | *** | <0.01 | 0.000 | 0.16 |
| **Coping styles** | | | | | | | | | | |
| Acceptance | −0.05 | *** | 0.00 | 0.000 | −0.23 | −0.04 | *** | 0.01 | 0.000 | −0.18 |
| Reappraisal | −0.03 | *** | 0.00 | 0.000 | −0.21 | −0.03 | *** | 0.01 | 0.000 | −0.15 |
| Self-blame | 0.07 | *** | 0.00 | 0.000 | 0.44 | 0.06 | *** | 0.01 | 0.000 | 0.35 |
| Avoidance | 0.04 | *** | 0.01 | 0.000 | 0.14 | 0.05 | *** | 0.01 | 0.000 | 0.15 |
| Risk-taking | 0.10 | *** | 0.01 | 0.000 | 0.23 | 0.10 | *** | 0.02 | 0.000 | 0.20 |
| Support-seeking | −0.01 | *** | 0.00 | 0.000 | −0.08 | −0.01 | * | 0.00 | 0.046 | −0.07 |
| **Sleep impairment (SII)** | 0.05 | *** | 0.00 | 0.000 | 0.59 | 0.05 | *** | 0.00 | 0.000 | 0.47 |
| **Anger (DAR)** | 0.04 | *** | 0.00 | 0.000 | 0.53 | 0.04 | *** | 0.00 | 0.000 | 0.48 |
| **Alcohol risk (AUDIT-C)** | 0.01 | *** | 0.00 | 0.000 | 0.13 | 0.01 | ** | 0.00 | 0.004 | 0.09 |

*Note*. K10 = Kessler 10-item Psychological Distress; PCL-4 = 4-item PTSD Checklist. *p < 0.05, **p < 0.01, ***p < 0.001. SE = standard error.

***Table 5.*** *Within-time regression models specifying K10 and PCL-4 sores as outcome variables at T2*

| | K10 | | | | | PCL-4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Poisson Regression | | | | β | Poisson Regression | | | | β |
| | Estimate | | SE | p | | Estimate | | SE | p | |
| **Age** | 0.00 | *** | 0.00 | 0.000 | −0.06 | 0.00 | | 0.00 | 0.105 | −0.03 |
| **Gender (Male)** | −0.91 | *** | 0.18 | 0.000 | −0.07 | −0.06 | *** | 0.02 | 0.000 | −0.06 |
| **Relationship status (reference: Single)** | | | | | | | | | | |
| Married/cohabitating | 0.00 | | 0.01 | 0.585 | −0.01 | −0.01 | | 0.01 | 0.317 | −0.02 |
| Divorced/Separated/Widowed | −0.05 | | 0.04 | 0.151 | −0.02 | 0.10 | | 0.06 | 0.079 | 0.03 |
| **Number of children** | −0.02 | * | 0.01 | 0.012 | −0.03 | −0.01 | | 0.01 | 0.593 | −0.01 |
| **ADF Service (reference: Army)** | | | | | | | | | | |
| Navy | 0.06 | *** | 0.01 | 0.000 | 0.08 | 0.04 | ** | 0.02 | 0.008 | 0.05 |
| Air Force | 0.01 | | 0.01 | 0.498 | 0.01 | 0.00 | | 0.02 | 0.895 | 0.00 |
| **Social Support** | | | | | | | | | | |
| Family/Friend Social Support | −0.04 | *** | 0.00 | 0.000 | −0.24 | −0.04 | *** | 0.00 | 0.000 | −0.20 |
| Family/Friend Negative Social Interactions | 0.02 | *** | <0.01 | 0.000 | 0.17 | 0.02 | *** | <0.01 | 0.000 | 0.14 |
| Peer Social Support | −0.06 | *** | 0.00 | 0.000 | −0.25 | −0.06 | *** | 0.01 | 0.000 | −0.21 |
| ADF Peer Negative Social Interactions | 0.05 | *** | <0.01 | 0.000 | 0.30 | 0.04 | *** | <0.01 | 0.000 | 0.22 |
| Superior Social Support | −0.04 | *** | 0.00 | 0.000 | −0.21 | −0.04 | *** | 0.00 | 0.000 | −0.16 |
| ADF Superior Negative Social Interactions | 0.04 | *** | <0.01 | 0.000 | 0.28 | 0.03 | *** | <0.01 | 0.000 | 0.18 |
| **Coping styles** | | | | | | | | | | |
| Acceptance | −0.07 | *** | 0.00 | 0.000 | −0.27 | −0.06 | *** | 0.01 | 0.000 | −0.20 |
| Reappraisal | −0.05 | *** | 0.00 | 0.000 | −0.25 | −0.04 | *** | 0.00 | 0.000 | −0.18 |
| Self-blame | 0.07 | *** | 0.00 | 0.000 | 0.38 | 0.08 | *** | 0.00 | 0.000 | 0.34 |
| Avoidance | 0.06 | *** | 0.00 | 0.000 | 0.19 | 0.07 | *** | 0.01 | 0.000 | 0.17 |
| Risk-taking | 0.08 | *** | 0.01 | 0.000 | 0.18 | 0.10 | *** | 0.01 | 0.000 | 0.18 |
| Support-seeking | −0.01 | *** | 0.00 | 0.000 | −0.06 | 0.00 | | 0.00 | 0.061 | −0.03 |
| **Morale** | −0.09 | *** | 0.00 | 0.000 | −0.28 | −0.07 | *** | 0.01 | 0.000 | −0.20 |
| **Sleep impairment (SII)** | 0.05 | *** | 0.00 | 0.000 | 0.50 | 0.05 | *** | 0.00 | 0.000 | 0.42 |
| **Anger (DAR)** | 0.03 | *** | 0.00 | 0.000 | 0.48 | 0.03 | *** | 0.00 | 0.000 | 0.41 |
| **Number of Traumatic Events (lifetime)** | 0.02 | *** | 0.00 | 0.000 | 0.12 | 0.02 | *** | 0.00 | 0.000 | 0.16 |

*Note*. K10 = Kessler 10-item Psychological Distress; PCL-4 = 4-item PTSD Checklist. *p < 0.05, **p < 0.01, ***p < 0.001. SE = standard error.

***Table 6.*** *Within-time regression models specifying K10 and PCL-4 sores as outcome variables at T3*

| | K10 | | | | | PCL-4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Poisson Regression | | | | β | Poisson Regression | | | | β |
| | Estimate | | SE | p | | Estimate | | SE | p | |
| **Gender (Male)** | −0.07 | *** | 0.02 | 0.000 | −0.08 | −0.10 | *** | 0.03 | 0.000 | −0.10 |
| **ADF Service (reference: Army)** | | | | | | | | | | |
| Navy | 0.08 | *** | 0.02 | 0.000 | 0.09 | 0.10 | *** | 0.03 | 0.000 | 0.10 |
| Air Force | −0.01 | | 0.02 | 0.480 | −0.01 | −0.01 | | 0.03 | 0.657 | −0.01 |
| **Social Support** | | | | | | | | | | |
| Family/Friend Social Support | −0.04 | *** | 0.00 | 0.000 | −0.24 | −0.04 | *** | 0.01 | 0.000 | −0.20 |
| Family/Friend Negative Social Interactions | 0.02 | *** | <0.01 | 0.000 | 0.12 | 0.01 | *** | <0.01 | 0.023 | 0.06 |
| Peer Social Support | −0.08 | *** | 0.01 | 0.000 | −0.31 | −0.08 | *** | 0.01 | 0.000 | −0.28 |
| ADF Peer Negative Social Interactions | 0.05 | *** | <0.01 | 0.000 | 0.27 | 0.04 | *** | 0.01 | 0.000 | 0.17 |
| Superior Social Support | −0.05 | *** | 0.01 | 0.000 | −0.21 | −0.04 | *** | 0.01 | 0.000 | −0.16 |
| ADF Superior Negative Social Interactions | 0.05 | *** | <0.01 | 0.000 | 0.25 | 0.03 | *** | 0.01 | 0.000 | 0.15 |
| **Coping styles** | | | | | | | | | | |
| Acceptance | −0.07 | *** | 0.01 | 0.000 | −0.22 | −0.06 | *** | 0.01 | 0.000 | −0.17 |
| Reappraisal | −0.04 | *** | 0.00 | 0.000 | −0.19 | −0.03 | *** | 0.01 | 0.000 | −0.11 |
| Self-blame | 0.09 | *** | 0.00 | 0.000 | 0.42 | 0.09 | *** | 0.01 | 0.000 | 0.35 |
| Avoidance | 0.10 | *** | 0.01 | 0.000 | 0.25 | 0.10 | *** | 0.01 | 0.000 | 0.21 |
| Risk-taking | 0.14 | *** | 0.01 | 0.000 | 0.26 | 0.14 | *** | 0.02 | 0.000 | 0.23 |
| Support-seeking | −0.01 | *** | 0.00 | 0.000 | −0.06 | 0.00 | | 0.00 | 0.232 | −0.03 |
| **Sleep impairment (SII)** | 0.06 | *** | 0.00 | 0.000 | 0.50 | 0.06 | *** | 0.00 | 0.000 | 0.45 |
| **Anger (DAR)** | 0.03 | *** | 0.00 | 0.000 | 0.48 | 0.03 | *** | 0.00 | 0.000 | 0.42 |
| **Alcohol risk (AUDIT-C)** | 0.01 | *** | 0.00 | 0.000 | 0.09 | 0.01 | *** | 0.00 | 0.001 | 0.09 |
| **Morale** | −0.10 | *** | 0.01 | 0.000 | −0.26 | −0.08 | *** | 0.01 | 0.000 | −0.18 |
| **Number of Traumatic Events (past year)** | 0.02 | *** | 0.00 | 0.000 | 0.08 | 0.04 | *** | 0.01 | 0.000 | 0.13 |
| **Deployment (past year)** | 0.07 | ** | 0.02 | 0.006 | 0.05 | 0.08 | | 0.04 | 0.051 | 0.05 |

*Note*. K10 = Kessler 10-item Psychological Distress; PCL-4 = 4-item PTSD Checklist. *p < 0.05, **p < 0.01, ***p < 0.001. SE = standard error.

As can be seen from **Table 4**, there were a large number of associations with K10 scores at T1 that were statistically significant. However, the β coefficients indicated that many of these were small in magnitude (< 0.10), and were thus 'significant' mainly due to the large sample size. Relatively, the strongest predictors at T1 of K10 and PCL-4 outcomes were male gender, having completed Year 10 education, risk-taking and self-blame as a coping strategy and negative social support, as well as sleep impairment and anger.

Coping styles, including acceptance, reappraisal and risk-taking, were characterised by comparatively moderate associations, along with family/friend social support and alcohol risk. Specifically, acceptance and reappraisal had small-to-moderate negative associations with K10 scores at T1, whereas risk-taking and self-blame had positive associations with K10. Navy and Air Force service were both associated with higher K10 scores (relative to the Army), while male gender was associated with lower scale scores. However, these associations were generally small in magnitude. There were similar patterns of association observed when treating the PCL-4 as the outcome variable.

**Table 5** shows analogous findings for variables measured at T2, which indicated highly similar patterns of results to those observed at T1.

**Table 6** shows associations with several variables at T3 that were not measured at the previous time point, including social support from ADF peers and superiors (which were both associated with lower scores on the K10 and PCL-4), as well as the number of lifetime PTEs (which was characterised by small positive associations). T3 measures (**Table 6**) also included ADF peer and superior social support and indicated almost identical findings relative to T2. There were negative associations with morale. Past-year reports of deployment were also measured at T3, but this was associated with small effects for both K10 and PCL-4 scores that were approaching zero.

Findings from comparable models situated at T4 and T5 respectively are presented in Appendix I, and these also indicated similar patterns of association observed at the preceding surveys. Across time points, the largest associations were consistently with sleep impairment (which mostly ranged from β = 0.40 to 0.60) and anger (ranging from β = 0.40 to 0.55), as well as self-blame coping (ranging from β = 0.34 to 0.44). Measures of social support and other coping styles were generally characterised by more moderate associations involving both K10 and PCL-4 scores (generally ranging from β = 0.15–0.26), with the exception being for associations with support-seeking, which were smaller and often approached zero. For measures that were only available from T3 onwards, only morale was characterised by consistent associations, which were small-to-moderate in magnitude.

**Predictive analysis:** Sleep impairment, high anger and more frequent use of self-blame coping were important predictors of high psychological distress (K10) across all time points. Social support from family and friends, ADF peers and superiors were associated with lower levels of psychological distress and posttraumatic stress at T2 and T3. Morale was also associated with lower levels of psychological distress and posttraumatic stress at T2 and T3.

A comparable series of repeated within-time logistic regression models were conducted to evaluate the predictors of 'caseness' at each time point (T1–T3), which were indicated by the K10 (using ≥ 17 as a cut-off criterion) and PCL-4 (using ≥ 7 as the cut-off). These analyses also generated findings that were highly consistent with the preceding models using aggregate scale scores; these can be found in Appendix I.

## Time-lagged regressions from T1–T2

The next series of predictive analyses considered change over time, and specifically across the period of ADF induction/training (T1–T2). These comprised time-lagged regression models which specified:

- T2 scores on the K10 and PCL-4 at T2 as dependent variables (in separate models);
- predictor variables measured at T1, which were thus situated before the outcomes in time; these predictor variables also included T1 scores on the K10 and PCL-4 respectively, which thus controlled for 'stability effects'; and
- further predictor variables specified additional to the stability effects, which modelled influences of these explanatory variables on the change in the K10 and PCL-4 scores over time.

The results of these time-lagged regression models, provided in **Table 7**, indicated significant influences of both K10 and PCL-4 scores at T1 on the same measures at T2, suggesting moderate stability in these variables. After controlling for such stability effects, there were fewer significant associations (relative to the within-time models in the previous section), and these were mostly small in magnitude.

T1 frequency of use of both avoidance and self-blame coping were associated with increased scores in distress and posttraumatic stress severity over time, while frequency of use of acceptance coping was associated with decreases in these outcomes from T1–T2. Sleep impairment and anger were both also associated with small increases in PTSD severity (and to a slightly lesser extent with distress).

There were several other associations (e.g. with gender and social support) that were statistically significant but very small in magnitude ($\beta \leq 0.06$).

***Table 7.*** *Time-lagged regression to predict K10 and PCL-4 outcomes at T2 using T1 predictors*

| | K10 | | | | | PCL-4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Poisson Regression | | | | β | Poisson Regression | | | | β |
| | Estimate | | SE | p | | Estimate | | SE | p | |
| **T1 scores (stability effect)** | 0.03 | *** | 0.00 | 0.000 | 0.31 | 0.07 | *** | 0.01 | 0.000 | 0.28 |
| **Age** | 0.00 | | 0.00 | 0.066 | −0.03 | 0.00 | | 0.00 | 0.000 | −0.02 |
| **Gender (Male)** | −0.03 | ** | 0.01 | 0.008 | −0.04 | −0.05 | * | 0.02 | 0.034 | −0.05 |
| **Relationship status (reference: Single)** | | | | | | | | | | |
| Married/cohabitating | −0.03 | ** | 0.01 | 0.006 | −0.04 | −0.04 | | 0.02 | 0.055 | −0.04 |
| Divorced/Separated/Widowed | −0.03 | | 0.05 | 0.502 | −0.01 | 0.08 | | 0.07 | 0.283 | 0.03 |
| **Number of children** | 0.00 | | 0.01 | 0.806 | −0.01 | 0.02 | | 0.01 | 0.182 | 0.04 |
| **Education (reference: Completed Year 12)** | | | | | | | | | | |
| Completed Year 10 | 0.05 | *** | 0.01 | 0.001 | 0.06 | −0.01 | | 0.03 | 0.821 | 0.00 |
| Post school training | 0.01 | | 0.01 | 0.399 | 0.01 | −0.01 | | 0.02 | 0.811 | 0.00 |
| Tertiary | −0.01 | | 0.01 | 0.377 | −0.02 | 0.02 | | 0.02 | 0.462 | 0.02 |
| **ADF Service (reference: Army)** | | | | | | | | | | |
| Navy | 0.02 | | 0.01 | 0.098 | 0.03 | 0.02 | | 0.02 | 0.288 | 0.02 |
| Air Force | −0.04 | ** | 0.01 | 0.001 | −0.05 | −0.01 | | 0.02 | 0.540 | −0.02 |
| **Military experience (Yes)** | −0.04 | *** | 0.01 | 0.001 | −0.06 | 0.00 | | 0.02 | 0.824 | −0.01 |
| **Family/Friend Social Support** | −0.01 | ** | 0.00 | 0.001 | −0.05 | −0.01 | * | 0.01 | 0.021 | −0.05 |
| **Family/Friend Negative Social Interactions** | 0.16 | *** | 0.03 | 0.000 | 0.08 | 0.05 | *** | 0.01 | 0.000 | 0.07 |
| **Coping styles** | | | | | | | | | | |
| Acceptance | −0.02 | *** | 0.00 | 0.000 | −0.07 | −0.03 | ** | 0.01 | 0.001 | −0.08 |
| Reappraisal | −0.01 | ** | 0.00 | 0.002 | −0.05 | −0.01 | | 0.01 | 0.073 | −0.04 |
| Self-blame | 0.02 | *** | 0.00 | 0.000 | 0.07 | 0.03 | *** | 0.01 | 0.000 | 0.10 |
| Avoidance | 0.03 | *** | 0.01 | 0.000 | 0.10 | 0.04 | *** | 0.01 | 0.000 | 0.08 |
| Risk-taking | 0.02 | * | 0.01 | 0.045 | 0.03 | 0.04 | * | 0.02 | 0.012 | 0.06 |
| Support-seeking | 0.00 | | 0.00 | 0.593 | 0.01 | 0.00 | | 0.00 | 0.973 | 0.00 |
| **Sleep impairment (SII)** | 0.01 | ** | 0.00 | 0.002 | 0.06 | 0.01 | *** | 0.00 | 0.000 | 0.09 |
| **Anger (DAR)** | 0.01 | ** | 0.00 | 0.004 | 0.06 | 0.01 | *** | 0.00 | 0.000 | 0.09 |
| **Alcohol risk (AUDIT-C)** | 0.00 | | 0.00 | 0.162 | −0.02 | 0.00 | | 0.00 | 0.894 | 0.00 |

*Note*. K10 = Kessler 10-item Psychological Distress; PCL-4 = 4-item PTSD Checklist. *p < 0.05, **p < 0.01, ***p < 0.001. SE = standard error.

## Regression analyses summary

A series of cross-sectional (within-time) regressions indicated generally consistent predictors of outcomes across the different time points. Specifically:

- higher scores for psychological distress and posttraumatic stress symptoms (K10 and PCL-4 scores respectively) were predicted by greater levels of sleep impairment, anger and frequency of use of self-blaming coping;
- male gender tended to be associated with lower scores on these two outcomes;
- higher morale was associated with lower scores on these two outcomes; and
- deployment in the past year was associated with lower scores on the K10 and PCL-4.

Logistic cross-sectional regressions identified similar predictors of caseness for psychological distress and posttraumatic stress symptoms.

The time-lagged regressions from T1–T2 provided more rigorous tests of associations with change in psychological distress and posttraumatic stress symptoms scores over time. When controlling for 'stability effects' (e.g. T2 K10 scores predicted by T1 K10 scores), there were associations with predictors including T1 use of avoidance and self-blame coping, as well as sleep impairment and anger.

## Conditional latent class growth analyses (LCGA)

The final series of predictive models were focused on the period of early career military service (T2–T5) and considered factors that could potentially distinguish the subgroups identified in the previous unconditional LCGA models of change over time. These analyses considered predictor variables that were measured at T2, and they provided an appropriate focus for several reasons.

- The LCGA models specify subgroups' underlying trajectories distinguished in terms of both starting points (at T2) and the pattern of change from T2–T5. Thus, predictors also situated at T2 could plausibly account for both elements of trajectories, including where they start and how they unfold. This contrasts with variables measured from T3–T5, which could not directly account for events situated previously in time, and thus the starting points for trajectories.
- There were key measures of ADF social support from peers and superiors that were available at T2 but could not be considered from T4–T5 due to missing data.
- The within-time regressions described previously suggested that explanatory variables measured from T2–T5 had associations with outcomes that were highly similar and thus consistent across time.
- Most explanatory variables measured from T3–T5, but not at T2, including alcohol risk and reports of deployment, were not identified as major predictor variables across the within-time regression models.

The explanatory variables considered in these analyses included sociodemographic characteristics such as age, gender, relationship status and number of dependent children, as well

as service-related variables including rank and ADF service. These explanatory variables also included three dimensions of social support (family/friends, ADF peers and superiors), an index of the total number of lifetime PTEs and measures of six different coping styles (acceptance, reappraisal, self-blame, avoidance, risk-taking, support-seeking). Finally, measures of anger (DAR) and sleep impairment (SII), which had comprised outcome variables in the previous section, were specified as explanatory variables here, also using scale scores at T2.

All analyses reported in this section were conducted in MPlus version 8 (Muthén & Muthén, 2017) using robust maximum likelihood (MLR) estimation and full information maximum likelihood (FIML) to utilise all available data. For each outcome variable, predictors were considered separately in a series of 'bivariate' analyses comprising conditional LCGA models that evaluated predictors of 'class membership' using the 3-step procedure in MPlus. The latter analyses are equivalent to multinomial logistic models in which class membership is regressed on the T2 explanatory variable, producing effects comparing each class with a 'reference category'. Given that the preferred LCGA models for each outcome (K10, PHQ-S and PCL-4) identified a large class defined by consistently low scores over time, this was specified as the reference category of greatest interest for purposes of interpretation. However, comparisons between the other latent classes are also reported for exploratory purposes and are presented in the appendices.

## Psychological distress

**Table 8** shows results from conditional LCGA models that specified predictor variables at T2 in the preferred 3-class model of K10 trajectories. By way of reminder, these classes were (1) a stable–low class; (2) a class characterised by increasing scores over time; and (3) a group defined by initially high scores that exhibited attenuating declines. The stable–low class comprised the reference category of greatest interest for predictive analyses, which thus examined comparisons with the two alternative classes (increasing and decreasing).

As can be seen from **Table 8**, results from multinomial regression analyses comparing increasing and stable–low classes indicated significant effects for gender, social support from family/friends, ADF peers and superiors, and acceptance and reappraisal coping styles. The direction of these effects (all negative) suggested that being male and having high scores on other predictors were associated with a decreased likelihood of belonging to the group demonstrating increasing symptoms over time, and thus an increased likelihood of being resilient.

Results suggest that males, participants reporting high levels of social support, and those more frequently using acceptance and reappraisal coping styles were more likely to be in the stable–low distress group, relative to the group that demonstrated an increase in distress symptoms over time. High trauma exposure, negative social interactions, more frequent use of self-blame, avoidance and risk-taking coping styles, high levels of anger and sleep problems were all associated with a decreased likelihood of being resilient and an increased likelihood of belonging to the group demonstrating increasing symptoms over time.

**Table 8** shows additional comparisons between the high with attenuating declines and stable–low categories.

Participants who were male and reported high social support and acceptance coping were less likely to belong to the high and declining group, relative to the stable–low category.

Participants who reported more traumatic events, negative social interactions, more frequent use of self-blame, avoidance and risk-taking coping styles, as well as anger and sleep problems were more likely to belong to the high with attenuating declines group. In addition there was a significant effect for Navy service (relative to the Army), which was also positive and thus indicated increased likelihood of belonging to high with attenuating declines category, relative to the stable–low group.

***Table 8.*** *Conditional LCGA models with T2 predictors of class membership for the preferred 3-class model of K10 scores*

| | **Stable low vs Increasing** | | | | | | **Stable low vs Increasing** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Estimate | SE | Odds Ratio | Nil | 95% CI LB | 95% CI UB | Estimate | SE | Odds Ratio | | 95% CI LB | 95% CI UB |
| **Age** | −0.02 | 0.02 | 0.98 | | 0.95 | 1.01 | −0.03 | 0.01 | 0.97 | * | 0.95 | 1.00 |
| **Gender (ref: Female)** | | | | | | | | | | | | |
| Male | −0.58 | 0.20 | 0.56 | ** | 0.38 | 0.84 | −0.59 | 0.16 | 0.55 | ** | 0.40 | 0.76 |
| **Relationship status (ref: single)** | | | | | | | | | | | | |
| Partnered/Div/Sep/Wid | −0.22 | 0.19 | 0.81 | | 0.56 | 1.16 | −0.05 | 0.15 | 0.95 | | 0.71 | 1.26 |
| **Number of children** | 0.06 | 0.12 | 1.06 | | 0.84 | 1.34 | 0.03 | 0.12 | 1.03 | | 0.82 | 1.29 |
| **Rank (ref: GE)** | | | | | | | | | | | | |
| Officer | 0.01 | 0.17 | 1.01 | | 0.72 | 1.40 | −0.17 | 0.14 | 0.85 | | 0.65 | 1.10 |
| **ADF Service (ref: Army)** | | | | | | | | | | | | |
| Navy | 0.21 | 0.20 | 1.24 | | 0.84 | 1.82 | 0.34 | 0.15 | 1.41 | * | 1.04 | 1.91 |
| Air Force | −0.09 | 0.24 | 0.92 | | 0.57 | 1.48 | −0.01 | 0.19 | 0.99 | | 0.68 | 1.45 |
| **Social support** | | | | | | | | | | | | |
| Family/Friend social support | −0.30 | 0.05 | 0.74 | *** | 0.67 | 0.81 | −0.38 | 0.03 | 0.68 | *** | 0.64 | 0.73 |
| **ADF social support** | | | | | | | | | | | | |
| Peer Social Support | −0.38 | 0.07 | 0.68 | *** | 0.60 | 0.78 | −0.57 | 0.05 | 0.57 | *** | 0.51 | 0.62 |
| Superior Social Support | −0.18 | 0.06 | 0.83 | ** | 0.75 | 0.93 | −0.42 | 0.04 | 0.66 | *** | 0.60 | 0.71 |
| **Negative Social Interactions** | | | | | | | | | | | | |
| Family/Friend | 0.21 | 0.04 | 1.23 | *** | 1.15 | 1.32 | 0.20 | 0.03 | 1.22 | *** | 1.16 | 1.29 |
| ADF peers | 0.27 | 0.05 | 1.31 | *** | 1.20 | 1.43 | 0.47 | 0.04 | 1.60 | *** | 1.47 | 1.73 |
| ADF superiors | 0.17 | 0.04 | 1.19 | *** | 1.10 | 1.28 | 0.37 | 0.03 | 1.45 | *** | 1.36 | 1.55 |
| **Number of traumatic events** | 0.11 | 0.03 | 1.12 | ** | 1.05 | 1.19 | 0.15 | 0.02 | 1.16 | *** | 1.11 | 1.21 |
| **Coping styles** | | | | | | | | | | | | |
| Acceptance | −0.20 | 0.07 | 0.82 | ** | 0.72 | 0.93 | −0.65 | 0.05 | 0.52 | *** | 0.47 | 0.58 |
| Reappraisal | −0.16 | 0.06 | 0.85 | ** | 0.76 | 0.96 | −0.49 | 0.05 | 0.61 | *** | 0.56 | 0.68 |
| Self-blame | 0.41 | 0.05 | 1.51 | *** | 1.36 | 1.67 | 0.74 | 0.05 | 2.09 | *** | 1.91 | 2.29 |
| Avoidance | 0.21 | 0.09 | 1.24 | * | 1.04 | 1.47 | 0.58 | 0.07 | 1.79 | *** | 1.55 | 2.06 |
| Risk-taking | 0.40 | 0.11 | 1.49 | *** | 1.2 | 1.86 | 0.68 | 0.08 | 1.97 | *** | 1.7 | 2.29 |
| Support-seeking | −0.05 | 0.03 | 0.95 | | 0.9 | 1.01 | −0.06 | 0.03 | 0.94 | * | 0.89 | 0.99 |
| **Anger** | 0.20 | 0.02 | 1.22 | *** | 1.17 | 1.26 | 0.25 | 0.02 | 1.29 | *** | 1.25 | 1.32 |
| **Sleep problems** | 0.29 | 0.03 | 1.34 | *** | 1.26 | 1.42 | 0.35 | 0.02 | 1.59 | *** | 1.52 | 1.67 |

*Note*. CI = confidence interval. The low symptom class served as the referent. *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

## Posttraumatic stress symptoms

**Table 9** shows results from conditional LCGA models that specified predictor variables at T2 in the preferred 4-class model of PCL-4 trajectories. By way of reminder, these classes were (1) a stable–low class; (2) moderate–decreasing; (3) high–decreasing; and (4) low–increasing. The stable–low class comprised the reference category for predictive analyses, which thus examined comparisons with the alternative classes. The additional comparisons are presented as appendices.

Results from multinomial regression analyses comparing the increasing scores and stable–low categories indicated significant effects for gender, rank, social support from family/friends and ADF peers (but not superiors) as well as frequency of using acceptance and reappraisal coping styles. These effects suggest that males, Officers, and participants reporting high social support from family/friends and ADF peers, were more likely to be in the resilient group rather than the group with increasing symptoms. There were also significant additional effects for Navy service (relative to Army), number of traumatic events, use of self-blame coping, and anger and sleep problems. These were all associated with increased likelihood of belonging to the increasing scores class.

Generally similar patterns of association were observed for comparisons with the high–decreasing and stable–low categories, except that social support from ADF superiors and both acceptance and reappraisal coping were associated with reduced likelihood of belonging to the high–decreasing category, while use of avoidance and risk-taking coping styles were also associated with increased likelihood of belonging to this category. Comparable associations were also observed for comparisons with the moderate–decreasing versus stable–low classes, except that support-seeking was weakly associated with reduced likelihood of belonging to the moderate–declining category.

***Table 9.*** *Conditional LCGA models with T2 predictors of class membership for the preferred 4-class model of PCL-4 scores*

| | **Stable low vs High declining** | | | | | | **Stable low vs Moderate declining** | | | | | | **Stable low vs Low increasing** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Estimate | SE | OR | | 95% CI LB | 95% CI UB | Estimate | SE | OR | | 95% CI LB | 95% CI UB | Estimate | SE | OR | | 95% CI LB | 95% CI UB |
| **Age** | −0.01 | 0.02 | 0.99 | | 0.96 | 1.02 | −0.03 | 0.01 | 0.97 | * | 0.95 | 1.00 | 0.03 | 0.02 | 1.03 | * | 1.00 | 1.06 |
| **Gender (ref: Female)** | | | | | | | | | | | | | | | | | | |
| Male | −0.68 | 0.23 | 0.51 | ** | 0.33 | 0.79 | −0.37 | 0.14 | 0.69 | ** | 0.53 | 0.90 | −1.08 | 0.23 | 0.34 | *** | 0.22 | 0.53 |
| **Relationship (ref: single)** | | | | | | | | | | | | | | | | | | |
| Partnered/DSW | −0.13 | 0.21 | 0.88 | | 0.58 | 1.32 | −0.12 | 0.11 | 0.89 | | 0.71 | 1.11 | 0.13 | 0.21 | 1.14 | | 0.75 | 1.73 |
| **Number of children** | 0.01 | 0.15 | 1.01 | | 0.75 | 1.35 | −0.05 | 0.09 | 0.95 | | 0.79 | 1.14 | 0.09 | 0.14 | 1.09 | | 0.82 | 1.45 |
| **Rank (ref: GE)** | | | | | | | | | | | | | | | | | | |
| Officer | −0.66 | 0.19 | 0.52 | *** | 0.36 | 0.74 | −0.35 | 0.10 | 0.71 | ** | 0.58 | 0.87 | −0.48 | 0.20 | 0.62 | | 0.42 | 0.91 |
| **ADF Service (ref: Army)** | | | | | | | | | | | | | | | | | | |
| Navy | 0.42 | 0.21 | 1.52 | * | 1.01 | 2.29 | 0.19 | 0.12 | 1.21 | | 0.95 | 1.53 | 0.53 | 0.23 | 1.69 | | 1.07 | 2.67 |
| Air Force | −0.33 | 0.31 | 0.72 | | 0.39 | 1.32 | −0.14 | 0.15 | 0.87 | | 0.65 | 1.18 | 0.31 | 0.28 | 1.36 | | 0.79 | 2.33 |
| **Social support** | | | | | | | | | | | | | | | | | | |
| Family/Friend social support | −0.46 | 0.05 | 0.63 | *** | 0.58 | 0.69 | −0.27 | 0.03 | 0.76 | *** | 0.72 | 0.81 | −0.19 | 0.06 | 0.83 | ** | 0.73 | 0.94 |
| **ADF social support** | | | | | | | | | | | | | | | | | | |
| Peer Social Support | −0.68 | 0.07 | 0.51 | *** | 0.44 | 0.58 | −0.34 | 0.04 | 0.71 | *** | 0.6 | 0.77 | −0.25 | 0.08 | 0.78 | ** | 0.67 | 0.91 |
| Superior Social Support | −0.43 | 0.06 | 0.65 | *** | 0.58 | 0.74 | −0.23 | 0.03 | 0.80 | *** | 0.75 | 0.85 | −0.02 | 0.07 | 0.99 | | 0.86 | 1.13 |
| **Negative Social Interactions** | | | | | | | | | | | | | | | | | | |
| Family/Friend | 0.24 | 0.04 | 1.28 | *** | 1.19 | 1.37 | 0.16 | 0.02 | 1.18 | *** | 1.13 | 1.23 | 0.01 | 0.04 | 1.01 | | 0.93 | 1.09 |
| ADF peers | 0.41 | 0.05 | 1.51 | *** | 1.37 | 1.66 | 0.26 | 0.03 | 1.30 | *** | 1.23 | 1.37 | 0.10 | 0.06 | 1.11 | | 0.99 | 1.24 |
| ADF superiors | 0.35 | 0.05 | 1.41 | *** | 1.29 | 1.54 | 0.19 | 0.03 | 1.21 | *** | 1.15 | 1.27 | 0.03 | 0.05 | 1.03 | | 0.94 | 1.12 |
| **Number of traumatic events** | 0.24 | 0.03 | 1.27 | *** | 1.2 | 1.34 | 0.11 | 0.02 | 1.12 | *** | 1.07 | 1.16 | 0.12 | 0.04 | 1.13 | ** | 1.05 | 1.22 |
| **Coping styles** | | | | | | | | | | | | | | | | | | |
| Acceptance | −0.62 | 0.08 | 0.54 | *** | 0.46 | 0.62 | −0.39 | 0.04 | 0.68 | *** | 0.62 | 0.73 | −0.08 | 0.09 | 0.92 | | 0.77 | 1.10 |
| Reappraisal | −0.42 | 0.07 | 0.66 | *** | 0.58 | 0.75 | −0.31 | 0.04 | 0.73 | *** | 0.68 | 0.78 | 0.01 | 0.07 | 1.01 | | 0.88 | 1.16 |
| Self-blame | 0.83 | 0.06 | 2.28 | *** | 2.03 | 2.57 | 0.50 | 0.03 | 1.64 | *** | 1.54 | 1.75 | 0.21 | 0.07 | 1.23 | ** | 1.08 | 1.40 |
| Avoidance | 0.71 | 0.11 | 2.03 | *** | 1.63 | 2.51 | 0.43 | 0.06 | 1.54 | *** | 1.39 | 1.72 | −0.17 | 0.13 | 0.84 | | 0.66 | 1.08 |
| Risk-taking | 0.84 | 0.10 | 2.32 | *** | 1.92 | 2.80 | 0.50 | 0.07 | 1.65 | *** | 1.44 | 1.88 | 0.29 | 0.15 | 1.33 | | 1.00 | 1.78 |
| Support-seeking | −0.04 | 0.04 | 0.96 | NI | 0.89 | 1.04 | −0.03 | 0.02 | 0.97 | * | 0.93 | 1.00 | 0.04 | 0.04 | 1.04 | | 0.97 | 1.11 |
| **Anger** | 0.25 | 0.02 | 1.28 | *** | 1.25 | 1.32 | 0.17 | 0.01 | 1.19 | *** | 1.16 | 1.21 | 0.06 | 0.03 | 1.06 | * | 1.01 | 1.12 |
| **Sleep problems** | 0.46 | 0.03 | 1.59 | *** | 1.50 | 1.68 | 0.33 | 0.02 | 1.39 | *** | 1.34 | 1.44 | 0.12 | 0.04 | 1.13 | ** | 1.05 | 1.22 |

*Note.* The low symptom C1 class served as the referent. OR = odds ratio; CI = confidence interval. *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001.

## LCGA summary

A series of conditional LCGAs were conducted to identify predictors of class membership for the previously identified subgroups underlying trajectories of the main outcomes. For these analyses, the largest group, which was characterised by low and stable symptoms, was utilised as the reference group for purposes of class comparisons.

- For psychological distress (K10), the results indicated that being male, having more social support and reporting more frequent use of acceptance and reappraisal coping styles was associated with greater likelihood of being in the low–stable (resilient) class.
- Reporting greater numbers of traumatic events, negative social interactions, more frequent use of self-blame, avoidance and risk-taking coping styles, and higher levels of anger and sleep problems were associated with decreased likelihood of being in the resilient group.
- The findings for posttraumatic stress symptoms (PCL-4) suggested that males, Officers and those with high social support were also more likely to be in the low–stable (resilient) group.
- Being in the Navy, number of traumatic events, more frequent use of self-blame coping style, and more frequent anger and sleep problems were associated with greater likelihood of being in the increasing scores class.

# Discussion

Throughout the early years of a military career there are a number of different transition points that military members move through. In the LASER-Resilience study there were two clear transition points that occurred during the data collection period for most personnel – the transition from civilian life (or previous role) into military training and the transition from training to their ship, unit or base. Transitions such as these often require adjustment to new geographical locations, roles, social networks and hierarchies. These transitions may be associated with a period of increased stress for some military members. By examining wellbeing trajectories over time through these transitions, the LASER-Resilience study explored the patterns of resilience in the early years of a military career and the factors that promote or erode resilience within the ADF.

This discussion will focus on the outcomes that were most consistent with our conceptualisation of resilience – that is, the absence of symptoms of mental disorder – and the statistical operationalisation of resilience. These outcomes are psychological distress (as measured by the K10) and posttraumatic stress (as measured by the PCL-4). These measures are also commonly used in studies of resilience in the military and will consequently allow comparison between the patterns of resilience that emerged in the LASER-Resilience sample and those found in previous and future research. The other measures used in the LASER-Resilience study will be explored in terms of their role as predictors of resilience. Finally, the implications of these findings for Defence will be explored.

## Patterns of wellbeing over time

Examination of patterns of mental health symptoms across the first three to four years of a military career revealed that there were distinct patterns of wellbeing over time. As described in previous LASER-Resilience reports, the *Initial Training Report* (Crane, Kehoe, et al., 2012) and the *Early Career Report* (Crane et al., 2013), the majority of both Officers and GEs had very good mental health and wellbeing at baseline (T1) and this was maintained at the end of initial training (or after one year of service for those undertaking longer periods of initial training) (T2). In terms of psychological distress from T2 to T5, three main groups emerged: 1) a stable low (resilient) group that maintained low levels of distress despite transitions (this was by far the largest group, at 84% of the sample); 2) a ‘recovering’ group (6.5%) that reported elevated mental health symptomatology at T2 with improvement over subsequent time points; and 3) a ‘deteriorating’ group (9.6%) that experienced initial low psychological distress symptoms that increased over the early years of their military career. The latter two groups were at or above the screening cut-off for the K10 at each time point.

Four groups emerged in terms of posttraumatic stress symptoms. This broadly contained the same groups as psychological distress, a stable–low group (82.5% of the sample), a deteriorating group (5.8%) and two groups that could be classified as recovering: one that experienced a mild reduction in symptoms (9.4%) and a group that started with a higher level of symptoms and demonstrated a more marked reduction in symptoms over the four time points (2.4%). Overall, these data suggest

that the majority of ADF members tolerate the period of training and subsequent transitions in the early years of their military career well. A small group of people experience difficulty at the time they completed initial training (or after one year of service) and then adjust well to military life, whereas another group experienced an increase in distress/mental health symptoms over the first four years of their military career. The implications of these three patterns are discussed below.

## Majority of military members demonstrate resilience

The results of the LASER-Resilience study indicate that most military members adjust well to their military careers and do not show signs of distress at training, nor at other potentially stressful transition points during their early military careers. This is consistent with other longitudinal studies of military members, in which most demonstrate a pattern of resilience characterised by consistently low symptoms of psychological disorder (Porter, Bonanno, Frasco, Dursa & Boyko, 2017). This finding is also evident in groups who have experienced deployment (Bonanno et al., 2012; Hart & Lancaster, 2016) and civilian-related trauma (Fink et al., 2017). Whether the groups with consistently low levels of distress and posttraumatic stress are indeed resilient or, alternatively, were not at risk of distress in the early years of their military career, depends upon the conceptualisation of resilience. Some studies have distinguished resilience as the presence of mild symptoms followed by a return to normal functioning and argue that those who display no distress in response to a stressor are resistant, rather than resilient. Others have argued that this distinction is semantic and that both groups represent minimal impact of a stressor on wellbeing and functioning (Bonanno & Mancini, 2012; Hart & Lancaster, 2016). This issue has not yet been resolved empirically, so in the absence of a clear ruling on this debate, this group is identified as the resilient group throughout the remainder of the report. Examining this resilient group will provide an indication of the factors that are associated with maintaining wellbeing during potential periods of stress.

### Some military members experience distress early in their career

Within this study there is a small proportion of military members (6.5%) who reported distress at the time they completed initial training (or after one year of service) (T2), followed by an improvement in wellbeing over subsequent time points. This suggests that some individuals have elevated levels of stress and mental health disorder during training and the very early stages of their military career, but over time adjust well to the military environment and experience a decrease in symptoms of mental health disorder.

The presence of elevated symptoms post-training could indicate an increase in distress during initial training due to the stress of adjusting to the training environment; an increase in distress at the end of training related to anticipating changes that are about to occur as they move into their new role; a pre-existing disorder; or a combination of any of these. The loss of data between the commencement of training and post-training meant that we could not model trajectories from the beginning of training, and instead modelled them from post-training onwards. This meant that for those with elevated symptoms at post-training, it was not possible to determine whether distress had increased prior to or during their military training. Regardless of the reasons for their elevated

symptoms of distress at the end of training, the findings indicate that some of the individuals who had elevated mental health symptomatology post-training subsequently improved over time and adjusted well to their military career. It may be argued that this group better characterise resilience, as they had experienced some distress initially but seem to demonstrate an ability to 'bounce back' over time. However, the work of Bonanno et al. (2012) indicates that as this group had, on average, clinically significant symptoms at post-training, the pattern displayed by this group is more consistent with *recovery* than resilience. Thus, the factors that are associated with this recovering group, which are explored in the next section, can have implications for programs that support individuals who have higher levels of distress in the very early stages of their military career.

### Some military members experience increasing distress over time

There was a minority of military members in this LASER-Resilience study who reported an increase in symptoms of psychological distress and traumatic stress over time. In terms of both psychological distress and posttraumatic stress this group represented a relatively low proportion of the sample (less than 10%); however, they are a cause for concern and require further examination. This 'deteriorating group' has emerged in other trajectory studies of military members (Bonanno et al., 2012), and has been characterised as having delayed reactions to periods of stress or having subthreshold disorders that worsen over time (Bonanno & Mancini, 2012). For the deteriorating group in this study, the average score on the K10 was just above screening cut-off at post-training and by T4 scores exceeded both epidemiological and screening cut-offs, indicating that there was self-reported psychological distress at the end of their initial training (or after one year of service) and that this distress continued to increase over their early military career. In contrast, for the posttraumatic stress measure the average score for the 'deteriorating' group post-training was indicative of only low-level symptoms; however, there was a steady increase in symptoms that were consistent with disorder by the final time point. This finding suggests that this group did not have pre-existing symptoms but developed symptoms during the early years of their military career.

## Predictors of wellbeing over time

### Demographic differences

There were a few demographic differences in terms of the different groups. Women were more likely than men to be members of the recovering or deteriorating groups compared to the resilient group. Analysis of predictors at each time point also indicated that women were more likely than men to have elevated levels of psychological distress and posttraumatic stress symptoms. This finding suggests that women report experiencing more distress in the early stages of their military career compared to men. Other studies in military populations have found that women report higher levels of distress in the post-training period (Vogt, Rizvi, Shipherd & Resick, 2008), and post-enlistment (Nock et al., 2014). Women in civilian samples have also been found to have a higher lifetime prevalence of PTSD (Ditlevsen & Elklit, 2010) and report higher rates of psychological distress (Australian Bureau of Statistics, 2015). Previous examinations of mental health in the ADF that included military members at all stages of their military career found that women reported

higher scores on the K10 but that there were no overall gender differences on the PCL-4 (McFarlane et al., 2011). This suggests women report higher levels of psychological distress across their career, whereas reporting of posttraumatic stress symptoms may equalise with men at later stages of their career. It is also important to note that the associations with gender in the current study were relatively weak and may be explained by gender differences in terms of symptom reporting (Kroenke & Spitzer, 1998). It may also be related to imbalances in terms of demands and resources. Previous evidence suggests that women in the military potentially have greater demands placed on them (e.g. more family responsibilities, more harassment in the workplace, fewer female role models and mentors), and demands are therefore more likely to exceed their available resources, resulting in higher levels of distress (Australian Human Rights Commission, 2014; Crompvoets, 2011).

There were some differences between Officers and GEs, with Officers were more likely than GEs to be in the resilient group in terms of posttraumatic stress. This may indicate that individuals selected for officer training have coping skills and other traits that mean they are better suited and adjust more easily to their military career. Studies in the US military have also found that those with deteriorating PTSD trajectories are more likely to be GEs than Officers (Bonanno et al., 2012; Fink et al., 2017; Porter et al., 2017). A suggested reason for this may be that GEs are more likely to experience combat (Bonanno et al., 2012); however, given the relatively low rate of deployment in this sample (less than 7% at T3 to 20% at T5), this is unlikely to account for the difference between GEs and Officers in this study. One possible explanation is that GEs may differ from Officers in their demographic profile. It has been reported that Officers are significantly more likely to have a university-level education, tend to be older and are more likely to be married (Williams, Bell & Amoroso, 2002), which have all been identified as protective factors. Another possible explanation is that Officers, while having a high level of responsibility, also may have a higher level of autonomy and control over their work environment; according to the job demands–resources model, those with high demands but minimal control in their work environment may be at a greater risk of poor mental health (Fink et al., 2017). It is also worth noting that many of the Officer cohort would have still been undertaking initial officer training (at ADFA or RMC) during the first several data time points. Therefore, the difference could reflect that some Officers had to adjust to fewer changes or transitions within the initial phases of their military career than the GEs.

## Psychosocial functioning

In the current study, individuals in the resilient group reported having higher levels of social support and fewer negative interactions with their family and friends and their colleagues in the ADF compared to other groups. Support from ADF supervisors, and fewer negative interactions with them, was also consistent with membership in the resilient group compared to other groups for psychological distress. In terms of posttraumatic stress, the resilient group reported more support from, and fewer negative interactions with, supervisors compared to the improving groups. Overall, social support and lower levels of negative interactions from all sources were associated with fewer symptoms of psychological disorder. This is consistent with the LASER-Resilience *Exploring Social Support in the Initial Years of Military Service* report, where reporting lower social support

was associated with higher psychological distress and posttraumatic stress symptoms even in those with previously positive social support profiles (Crane et al., 2016).

Higher levels of morale were also associated with lower levels of psychological distress and posttraumatic stress. The association between morale and mental health has been noted in previous studies of military personnel (Jones et al., 2012; McKibben et al., 2009; Whybrow et al., 2015) and is associated with the presence of supportive leadership (Britt et al., 2007). It may be that high morale within a workplace buffers against stressors that might be experienced in a military environment. Taken together, this indicates that the presence of support from family and friends, as well as good morale within the workplace, is important for maintaining wellbeing during the early years of a military career.

## Impact of previous trauma

Lifetime exposure to traumatic events was relatively widespread in the LASER-Resilience sample, with just over 70% of military members participants reporting lifetime exposure at the end of initial training (or after one year of service, at T2). Those who had a higher prevalence of lifetime potentially traumatic events were less likely to belong to the resilient group in terms of both psychological distress and posttraumatic mental health. In addition, the number of traumatic events experienced in the past year was related to higher levels of psychological distress and posttraumatic stress at each time point. This is consistent with previous studies which found that exposure to traumatic events is related to an increased risk of developing mental health symptoms (Lee et al., 2016). The 2015 LASER-Resilience *Prior Trauma Exposure and Mental Health* report indicated that low rates of mental health symptoms were found in new entrants to the ADF despite a relatively high frequency of prior exposure (O'Donnell et al., 2015). This report indicates that although the rates of psychopathology were low, individuals who have lifetime experience of traumatic events are at greater risk of developing symptoms over time.

Although the focus of a considerable amount of previous research (Bonanno et al., 2012; Eekhout et al., 2016), deployment was not a predictor of mental health status at any time point in this study. This may be attributable to the relatively low proportion of the sample who were deployed (7–20% at each time point), and potentially the type of deployment that this sample may have experienced; an even smaller proportion of the sample would have experienced combat exposure or other traumatic events while deployed, with these being a better predictor of posttraumatic stress symptoms compared to deployment (Boasso et al., 2015; Bonanno et al., 2012). Overall, these findings are consistent with the findings of the 2010 ADF *Mental Health Prevalence and Wellbeing Study*, which found that higher total lifetime exposure to traumatic events was a better predictor of psychopathology compared to deployment (McFarlane et al., 2011). This suggests that cumulative trauma experienced in members' military careers and/or in their personal life over their lifetime is a risk factor for developing mental health disorder during their military career.

## Coping styles

Individuals in the resilient groups in terms of psychological distress and posttraumatic stress were more likely to report using adaptive cognitive coping styles, such as acceptance and reappraisal.

In addition, more frequent use of these coping styles was associated with fewer symptoms of psychological distress and posttraumatic stress across all five time points. This is consistent with previous literature suggesting that certain coping styles enable individuals to more easily transition into a military career (Nakkas et al., 2016) and are associated with the development of fewer mental health symptoms (Britt, Jennings, et al., 2016). Interestingly, acceptance has been shown to be a particularly adaptive coping approach early in one's military career perhaps due to the low autonomy context (Britt, Crane, et al., 2016). In contrast, use of support-seeking strategies was not a good predictor of wellbeing. This may be because the way people seek and receive support is highly variable and, while good support can ameliorate distress, support that is unhelpful or inappropriate may compound distress (Jones et al., 2012; Shrout et al., 2006).

Maladaptive coping styles, such as self-blame, avoidance and risk-taking, are associated with increased psychological stress (Cai et al., 2017; Kearney et al., 2001). In the LASER-Resilience dataset, more frequent use of maladaptive coping styles was associated with increased symptoms of psychological distress and posttraumatic stress at every time point. In addition, individuals in the sub-optimal groups in terms of psychological distress and posttraumatic stress were more likely to report using maladaptive coping styles. It is also worth noting that the recovering group were more likely to report using maladaptive coping styles post-training, even compared to the deteriorating group, this may explain why their distress was elevated at this time point. Of all the coping styles, frequency of self-blame emerged as the strongest predictor of increasing posttraumatic stress scores during initial training. In the initial LASER-Resilience *Report 2*, maladaptive coping styles were linked with psychological distress during military training (Crane et al., 2013). These findings suggest that this association holds true across the first three to four years of a military career.

## Anger problems

Higher levels of reported anger post-training were strongly associated with membership of both the deteriorating and recovering groups in terms of posttraumatic stress and psychological distress. This may indicate that individuals with higher levels of anger are less able to cope with the demands of a military career or, indeed, that anger-oriented and externalising appraisal styles interfere with more adaptive responding to challenging situations and required emotional processing. However, as anger is commonly reported among those experiencing symptoms of posttraumatic stress (Forbes et al., 2004), scoring higher on measures of anger may also indicate the presence of pre-existing disorder, which would require assessment. Building on previous Defence initiatives to refine and deliver evidence-based anger interventions tailored to military personnel is critical.

## Sleep

Sleep problems post-training were strongly associated with membership of the high distress and high posttraumatic stress symptom severity groups. In addition, at each subsequent time point there was an association between sleep problems and poorer mental health. The relationship between poor sleep and mental health difficulties is well documented and bidirectional in nature

(Seelig et al., 2016; Vyas et al., 2016). Individuals who experience difficulty adjusting to new routines and environments may experience a decline in sleep quality and quantity, which could affect their mental health symptomology; however, pre-existing distress and mental health disorder could also impair sleep over time. Previous studies of military members in the US have found that sleep is an important factor in whether individuals graduate from basic training (Williams et al., 2016), deploy or discharge early from the military (Seelig et al., 2016). There also is evidence from the US military to suggest that leadership behaviours that model and promote good sleep patterns and conditions are associated with improving sleep quantity (Adler, Saboe, Anderson, Sipos & Thomas, 2014). Given the disruptions to sleep that can occur during training and the early years of a military career (Crane et al., 2013), it may be beneficial to focus on improving sleep in order to support resilience during an early military career.

## Alcohol

Cross-sectional analysis indicated that there was a moderate-to-weak positive association of alcohol consumption with posttraumatic stress and psychological distress at each time point. This association has previously been found in new enlistees to the US military (Stein et al., 2017) and may indicate the use of alcohol as a maladaptive coping strategy (Bonanno et al., 2012). In general, there was a relatively high degree of alcohol misuse in this sample, with just under half scoring above the cut-off for risky alcohol consumption. This is a higher proportion than was found in the 2010 *ADF Mental Health Prevalence and Wellbeing Study* (McFarlane et al., 2011) and the 2015 *Mental Health Prevalence, Mental Health and Wellbeing Transition Study* (Van Hooff, Forbes, et al., 2018). It is important to note that both the prevalence study and transition study used the full AUDIT rather than the abbreviated AUDIT-C and, as a result, the numbers are not directly comparable. Regardless of this comparison, this finding indicates that potentially risky levels of drinking are a significant problem among relatively newer entrants to the military.

## Summary of predictors

The majority of participants in this study were classified into a group characterised by consistently low psychological distress and posttraumatic stress symptoms. When considering whether this group does indeed reflect resilience, the associations with predictor variables provided some further insight. The patterns of the predictor variables explored above indicate that groups other than the resilient group are non-optimal groups. Negative factors, such as use of maladaptive coping styles, anger and sleep problems, correlate more highly with the recovering groups than they do with the resilient group. In addition, positive factors, such as use of adaptive coping styles and social support, correlate more strongly with the resilient group than the recovering group. This suggests that the resilient group have in place supports and strategies that mitigate any distress that they may experience and/or assist them to effectively adapt to the various points of transition they will encounter during the early years of their military career. Some of the key factors associated with resilience are modifiable and could be targeted through screening, training and other interventions. Other factors are not as readily modifiable and may need further research to tease out the associations. The potential implications for Defence are outlined below.

# Implications

This LASER-Resilience report highlights some of the protective and risk factors associated with individuals being able to begin a career in the ADF with minimal impact on their wellbeing versus experiencing elevated psychological distress in their early career. This has implications not only for the overall wellbeing and functioning of early career ADF members, but potentially also for retention and for effective transition back into the civilian community for those who voluntarily or involuntarily discharge after a short period of service. Potential considerations for Defence include the following.

## Mental health screening

- The findings of this study indicate that most military members maintain their wellbeing through the early years of their military career, but there are some individuals who may be vulnerable to deteriorations in mental health. This may be due to contextual factors (e.g. lack of leadership support) or individual factors (e.g. application of maladaptive coping approaches and anger and sleep problems). This 'deteriorating group' was identified as a group of people who have some risk factors and may have mildly elevated levels of posttraumatic stress but do not score above cut-offs on standardised measures in the first 3–12 months of their military career. Identifying these individuals at an early stage – for example, during their first one or two years of service – may help prevent the deterioration of their wellbeing over time. Their early career may be an opportune time to deliver shorter, less-intensive second-tier interventions, which target sub-syndromal mental health concerns and maladaptive coping styles, rather than treatments designed for diagnosable conditions.
- The association of exposure to potentially traumatic events with increased psychological distress and posttraumatic stress highlights the need to continue to screen for prior trauma experiences on entry to the ADF and to identify those who need additional support through the various ADF mental health screening protocols that occur at different points across the military lifecycle.
- The recently introduced ADF Periodic Mental Health Screen (PMHS) will provide more opportunities for the screening of early-career ADF personnel in primary health care settings, and referral for early intervention as indicated. The findings of this report and considerations for early-career ADF personnel could be incorporated into initial and refresher training for Defence health and mental health care providers administering ADF mental health screens.
- The finding that some individuals will experience significant distress during the early part of their career, coupled with the research findings of increased risk of mental health concerns (Van Hooff, Forbes, et al., 2018) and suicide (AIHW, 2018) in those who transition out of the ADF after a short career (and particularly those who are discharged involuntarily), indicate the requirement for comprehensive mental health screening prior to discharge. This should be conducted regardless of the length of service or the type of discharge.

## Training/education

- The different patterns of wellbeing that emerged in the first four years of a military career indicate that resilience training should focus on the entire military career and not just initial training and pre-deployment, as there are many other transition or vulnerability points at which military members may experience increased psychological distress.
- Recognising the importance of morale within teams more explicitly and exploring ways to increase it may be an appropriate policy and strategic consideration that could help individuals to promote resilience. Leaders have a role to play in terms of building morale within their teams. Morale and team identity are understood to play a protective role when it comes to resilience not only directly but also indirectly by encouraging adaptive coping styles (i.e. effective support provision). The mechanisms for encouraging team morale include techniques empowering team members; bringing team members into discussions about team-related challenges and goals; and leadership that aims to create a shared identity. Emphasising this at an organisational level to increase a culture of support may be valuable.
- Instructional staff and other leaders/supervisors should be provided with training on how to reinforce adaptive coping styles – including the development of effective support networks in the workplace – with ADF personnel during the early stages of their career. This should be a consideration not only for training institutions but also for all ships/units/bases. Other training could help Defence health and mental health providers understand the link between prior trauma exposure and vulnerability to mental health problems.
- Focus needs to be placed on embedding and consolidating these targeted skills throughout the lifecycle in the trained force – that is, encouraging these skills to be actively practised during exercises.
- It also needs to be acknowledged that each of the services has its own resilience plans, and hence it is critical that the learnings from this study inform not only Joint Health Command policy and practice but also the resilience enhancement plans of the single Services.

## Interventions

- The association between alcohol use and poorer mental health outcomes was relatively weak. However, given the other known impacts on physical health and performance, early intervention may be required to address the elevated levels of hazardous drinking in military members in the early stages of their career.
- Given the implication of anger and sleep problems in the development of psychological distress in a subpopulation, attention should be paid to the potential to identify problems and provide early intervention through command and evidence-based interventions through mental health services.
- It may be useful to design a program targeting some of the modifiable factors associated with resilience, tailored to individuals who are starting to display decreases in wellbeing. It may be useful for Defence to target individuals who are identified through routine metal health screening as those who may benefit from extra support (or a ‘boost’ in skills) and provide them

with a refresher in specific elements of BattleSMART or other relevant training. Based on the findings in this study, key areas to focus on would be:
    - adaptive coping styles that aid in managing distress (i.e. acceptance, reappraisal) coupled with training on reducing reliance on maladaptive coping styles, particularly, self-blame, avoidance and risk-taking;
    - how to helpfully manage anger and use it productively, i.e. as a motivating force, to reduce its impact on mental health;
    - simple practical tips around sleep hygiene to establish good habits around sleep in the longer term; and
    - information on looking after yourself and your colleagues, and the importance of establishing and maintaining social support networks.

- There is also an opportunity to target sleep behaviours through organisational interventions that recognise the role of leaders in modelling and promoting good sleeping patterns and sleep conditions for members under their command. These organisation-wide interventions will need to appeal to all members and not just those experiencing mental health problems, and so could be pitched in terms of improving overall performance rather than focusing specifically on mental health.

# Future research

Examining these longitudinal trajectories was extremely valuable in terms of determining what happens to patterns of wellbeing over the early stages of a military career. Future research could expand on this by examining these patterns over longer periods and exploring the predictors of those patterns. Tracking the recovering group over longer periods may illuminate whether members of that group did genuinely experience improvement in terms of their ability to cope with stressors; alternatively, if their mental health symptomology increases again it could indicate they are simply reactive to periods of increased stress. The deteriorating group is also of interest in terms of follow-up; further examination of this group over time may reveal whether members return to their previous levels of wellbeing or whether there are other vulnerability points in their military career that contribute to ongoing increase in their distress. This could be done by following up with the LASER-Resilience sample again.

The gender differences that emerged also require further examination. The patterns and predictors of resilience identified in this report may be different amongst women. For example, as women in the minority within the ADF it is possible that their experience of social identification, morale and support from colleagues is different from their male peers. Developing a stronger understanding of the factors that impact on resilience and vulnerability for women in the ADF, may aid in the development of effective supports or interventions.

A subgroup that may also warrant further investigation is those individuals who have experienced previous trauma. For example, it would be useful to examine the effect of interpersonal versus non-interpersonal trauma, and childhood trauma exposure versus exposure in adulthood, on resilience trajectories. Examination of this subgroup would also enable an exploration of the

predictors of wellbeing specifically amongst individuals who have experienced trauma. For example, it may help to determine whether there is a cumulative effect of exposure to potentially traumatic events, that is, whether experiencing a certain amount of trauma exposure puts individuals at greater risk of poor outcomes.

In addition to examining traumatic life events, it may be illuminating to examine the impact of recent stressful life events (e.g. financial difficulties, relationship problems, loss of loved ones) on patterns of wellbeing over time, to identify circumstances when personnel might need extra support or monitoring.

This report presented the prevalence of ADF members who were above cut-offs on key outcome variables on the overall level; however, it did not examine how this differed within different subgroups within the ADF. This provides the opportunity for future analysis to examine prevalence of those above cut-offs for mental health disorder within the ADF in more detail – for example, looking at the differences by service, rank or gender.

Operational deployment (indicated by self-report and not yet confirmed by data linkage) appeared to have minimal impact on the indicators of mental health in this study; however, future research using samples comprising only those who had deployed would enable a closer examination of this relationship. For example, research into deployed samples may be able to explore whether there are different effects according to the type of deployment and/or whether or not people were involved in direct combat. Following up with the LASER-Resilience sample at another time point would also likely yield a larger sample of those who have deployed.

The LASER-Resilience dataset lacked a measure of level of functioning and therefore the functioning aspect of the resilience definition could not be fully explored in this study. Future research that links other Defence datasets with LASER measures of wellbeing or performance – for example, performance data – could explore this component of resilience. Alternatively, the LASER-Resilience sample could be re-surveyed at a later stage with added measures assessing functioning. The inclusion of such functioning variables could provide an indication of how individuals develop their occupational skills and capacity over a military career. This, in turn, could allow the investigation of the concept of personal growth following traumatic experiences, also known as posttraumatic growth.

Patterns of early discharge from the military is another important area for future research. Military personnel who discharged early from the military were also lost to follow up from the LASER-Resilience study, and consequently this study was unable to provide an understanding of this group. Linking early time points of the LASER-Resilience dataset with other datasets that contain information about discharge could provide more information on the link between mental health and continued military service, identifying the factors that are linked to early discharge.

# Limitations

A limitation of this study is the reliance on self-report data, which may contain inaccuracies and cannot be independently verified. For example, approximately 9% of the sample reported

experiencing direct combat at the end of initial training, which is not a plausible figure. There are a range of potential explanations for this figure, including the possibility that respondents counted non-military experiences prior to their entry to the military as direct combat, or may have experienced combat as part of previous military experience either within the ADF or another defence force. This highlights that the use of self-report data relies on people understanding the questions and providing accurate responses, and this cannot be guaranteed in all cases. Motivation to appear desirable or competent may also impact the way that people respond to surveys and thus affect the reliability of the data. For example, a large proportion of the sample were administered the survey before they started training, when there could be pressure to 'fake good'. Analysis of the data indicated that there were increases in the proportion of participants meeting cut-offs for disorder at T2 compared to T1, which may reflect increase in disorder rates or underreporting of disorder at T1.

There was a substantial amount of data missing from the sample from T1 to T2, caused by data administration errors and contextual factors, which meant that a unique study ID could not be matched between time points. As a consequence, there were limitations in terms of the analyses that could be carried out across all five time points. Analysis of T1 and T2 data indicated there was little evidence of systematic bias in terms of this attrition, so although it may have led to fewer numbers for analysis, it is reasonable to assume it did not bias the results.

There were some potentially confounding variables introduced by timing of the collection of data from Officers vs GEs. GEs were asked to complete T1 prior to starting recruit training, whereas Officers did not complete the T1 data collection until they were already undergoing training. Therefore, GEs may have been experiencing fewer pressures and adjustment issues at the time of data collection compared to Officers. Similarly, there were differences at T2 data collection. For GEs, the timing of T2 aligns with the completion of training, which may be a period of elevated mood and may not adequately capture initial adjustment to the military and recruit training. In contrast, Army and ADFA Officers were undertaking their initial officer training at T2, with the training completion not for another six months to two years. These very different experiences may influence self-reports and mean that wellbeing at these time points may not be directly comparable between the ranks.

As is the case in many longitudinal studies, there were relatively high levels of attrition from the study. For the current report, we were unable to calculate response rates because we could not determine the proportion of attrition that was due to early discharge from the military and the proportion that was due to non-completion of LASER-Resilience surveys. Regardless of the reason for the attrition, the decreased amount of available data over the time points limited the analyses that could be conducted on this dataset. For example, there were insufficient numbers to examine the impact of different types of trauma exposures – interpersonal, childhood abuse, combat etc. – on coping and resilience over time. It is also worth highlighting that the sample examined in this report comprised individuals who remained in the military and were sufficiently motivated and conscientious to continue completing the survey across all five time points. This may represent a resilient subgroup that is distinct from those who transitioned out of the military or stopped participating in the study. This may be particularly relevant in interpreting the trajectory of the

'recovering group', which is only made up of those who were able to remain in the military. Individuals who had elevated levels of distress post-training but did not experience an improvement in symptoms may have left the military and thus have been excluded from the analysis. Examining transition may have provided more information about those with sub-syndromal disorder at the earlier stages of analysis (T2–T3). *The 2015 Mental Health Prevalence, Mental Health and Wellbeing Transition Study* (Van Hooff et al., 2018b) indicated that those who left the military within 3–4.5 years of service were at higher risk of mental health disorder. This underscores the need for future research comparing indicators of resilience in those who have discharged from the military early and those who pursued a military career.

The LASER-Resilience study included two military career transition points that were approximately matched to data collection points, that is, the transition into military training and the transition from training into a unit, base or ship. However, there are other transition points within a military career that were not as well captured in the study. This is partly because these transition points vary substantially depending on an individual's job role. Having more information about the transition points that had occurred during the data collection period, or timing data collection to individuals' early to mid-career transition points, may have provided more information about how wellbeing is affected in the early stages of a military career.

Defining resilience solely on the basis of the absence of symptoms of mental disorder limits the conceptualisation of resilience. It does not incorporate other possible facets of resilience, such as functioning or positive change, that could be measured by promotions or other indicators of performance. Not being able to measure these other facets of resilience means that the findings cannot be broadened to implications for improving performance or ensuring a successful career within the military.

# Conclusion

The LASER-Resilience study indicated that there are variations in patterns of wellbeing among military members during the first three to four years of a military career. Most individuals within the military maintain good levels of wellbeing across their early career. A subgroup of individuals reported elevated levels of distress around the completion of training that subsides over time. Other individuals report increasing distress in the later stages of their early career, which indicates further periods of potentially increased stress and change. The LASER-Resilience study also indicated that there are modifiable factors that were associated with maintaining wellbeing during the early years of a military career. Consideration should be given to the changes in wellbeing that can occur during an early military career and to ensuring that screening, training and early intervention mechanisms are in place to assist people in managing these changes.

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# Appendices

# Appendix A: Key findings from previous LASER-Resilience reports

## Pre-enlistment report (Crane, Kehoe, et al., 2012)

This report was a preliminary analysis of the LASER-Resilience sample at T1.

- Most respondents (> 93%) reported high levels of psychological resilience, as measured by the CDRISC-2 and good mental health.
- Most were satisfied with their sleep; however, almost 20% stated that it interfered with their daily functioning.
- Respondents reported high levels of social support from their family and friends.
- There was high endorsement of adaptive coping strategies, and these were positively correlated with resilience.
- Self-efficacy, or the confidence to perform well and achieve goals, was high for most respondents and was moderately positively correlated with resilience.
- Generally, respondents reported feeling little stigma about either mental health disorders or perceived barriers to care.

## Initial training report (Crane, Lewis, Forbes & Elliot, 2012)

This initial report examined how key indicators of mental health and wellbeing changed for ADF members pre- to post-initial training.

- In general, data indicated that general enlistees (GEs) and Officers had very good mental health and wellbeing at T1.
- There were some small to moderate changes from T1 to T2, which reflected the impact of the physical and mental demands and significant life changes that occur during initial training – for example:
    - increased psychological distress, self-reported posttraumatic stress symptoms, and experience of physical symptoms (e.g. pain); and
    - decreased quality of sleep.
- There were some changes that were specific to males.
    - Male Officers: small to moderate increases in alcohol consumption.
    - Male GEs: small to moderate increases in expressed anger.
- For most categories of respondents, there were no changes in self-reported psychological resilience (as measured by the CDRISC-2 item) from T1 to T2.
- Overall, the BattleSMART training initiative aims to increase psychological resilience by promoting key processes relevant in a military context. The preliminary data from LASER suggested that not all respondents had acquired the set of knowledge, attitudes and behaviour promoted through their limited exposure to BattleSMART during training.

## Contributors to change following training report (Crane, Lewis, Forbes, & Elliot, 2013)

The contributors to change report examined the factors that influenced mental health and wellbeing of ADF members during their initial training.

- From T1 to T2, the predictors and correlates of greatest note were coping styles, social support, personality, and sleep problems.
- Coping styles.
    - Greater use of an avoidant coping style at T1 predicted increased psychological distress, posttraumatic stress symptoms, and days of reduced functioning at T2.
    - Interestingly, at T2, greater use of a self-blame coping style was associated with increased psychological distress and posttraumatic stress symptoms.
- Social support (i.e. positive and negative interactions with friends, family, and partners).
    - Frequent negative interactions with family at T1 predicted increased psychological distress at T2.
    - Interestingly, at T2, frequent negative and positive interactions were associated with decreased psychological distress, suggesting that any form of interaction with family was associated with decreased distress.
    - Among males, frequent negative partner interactions at T1 predicted increased posttraumatic stress symptoms at T2.
    - Among females, infrequent negative partner interactions at T1 predicted increased posttraumatic stress symptoms at T2.
- Personality.
    - More neuroticism at T1 predicted increased psychological distress and posttraumatic stress symptoms at T2.
    - Less conscientiousness at T1 predicted more days of reduced functioning at T2.
- Physical wellbeing (sleep quality and somatic symptoms).
    - Poor sleep quality at T1 predicted increased posttraumatic stress symptoms at T2.
    - At T2, poor sleep quality and more somatic symptoms were associated with increased psychological distress, posttraumatic stress symptoms, and reduced functioning.
- Predictors of anger.
    - Greater use of avoidant and risk-taking coping styles at T1 predicted increased expressed anger at T2.
    - Poor sleep at T1 predicted greater expressed anger at T2.
- Predictors of alcohol consumption (Officers only).
    - At T1, neither coping style nor rumination predicted alcohol consumption at T2.
    - However, personality emerged as a significant predictor; more extroversion at T1 predicted increased alcohol consumption at T2, whereas less agreeableness at T1 predicted increased alcohol consumption at T2.
    - Frequent negative interactions with friends at T1 predicted increased alcohol consumption at T2.

## Early career mental health and wellbeing (Crane, Lewis, Forbes, & Elliott, 2013)

The early career report examined the health and wellbeing of ADF members following the first year of their service. There were some noteworthy observations on the key indicators of health and wellbeing.

- Mental health (as measured by K10).
    - The mental health of GEs and Officers appeared to be largely stable from initial training to the first year of service (T2 to T3).
    - For GEs only, there was a suggestion of some improvement in mental health following a decrease in mental health from enlistment/appointment to initial training (i.e. T1 to T2).
    - For both GEs and Officers, approximately a quarter met K10 cut-off criteria for psychological distress at the end of T2 and T3.
    - Overall, the extent to which psychological distress interfered with functioning appeared to be relatively stable after T2.
- Posttraumatic stress symptoms (as measured by PCL-4).
    - For GEs but not Officers, there was a continued increase in reported symptoms associated with posttraumatic stress.
    - Navy personnel represented the highest proportion of service personnel meeting the PCL-4 cut-off criteria at all three time points.
- Physical wellbeing.
    - ADF members rated their physical health as ‘very good’ overall at all three time points.
    - The frequency of somatic symptoms was relatively stable from T1 to T3.
    - The decrease in sleep quality that was observed from T1 to T2 appeared to stabilise from T2 to T3.
- Alcohol consumption and smoking.
    - The increases observed from T1 to T2 appeared to be sustained at the end of T3, including an increase in alcohol consumption for Officers and an increase in the proportion of daily smokers.
- Traumatic events.
    - During the first year of service (T3), a small proportion of respondents reported a range of negative events, including mild and more serious traumatic head injury, traumatic life events, and stressful life events since starting their career.
- Coping styles
    - The most commonly used coping styles from T1 to T3 were reappraisal and acceptance.
    - Respondents reported a high level of coping flexibility at all time points.
    - Frequency of rumination increased at each time point.

- External support
    - At the end of first year of service (T3), respondents were more likely to be using ADF support services for problems than external services.
    - Perceived stigma was lowest at enlistment/appointment (T1) and increased at each time point.
    - Barriers to care increased at each time point.
    - From T1 to T3, respondents were very confident in their ability to support their mates.
- Social support
    - Overall, respondents reported more positive social interactions than negative ones.

## Detailed report 1: Prior trauma exposure and mental health (O'Donnell et al., 2015)

This report explored the relationship between pre-military trauma exposure, coping style and mental health outcomes.

- Mental health problems at initial training.
    - Among GEs and Officers, there were low rates of psychological distress and posttraumatic stress symptoms.
- Prior exposure to potentially traumatic events at entry to ADF.
    - Among GEs and Officers, rates of overall prior trauma exposure appeared comparable to rates observed in the Australian community.
    - However, there was a larger proportion of ADF members who reported exposure to multiple traumatic events than found in the general community. That is, a sub-group (26%) of ADF members reported four or more different trauma events prior to entry.
- The role of prior trauma in predicting mental health symptoms.
    - While prior trauma exposure predicted posttraumatic stress symptoms and psychological distress at T2, its overall impact was small.
- The influence of coping style on mental health symptoms in the context of prior trauma exposure.
    - The coping styles (e.g. reappraisal, acceptance, self-blame, support-seeking, avoidance, risk-taking) that GEs and Officers reported using at T1 were not found to influence the relationship between prior trauma exposure and mental health symptoms reported at T2, when controlling for their mental health at T1.
    - This finding can be attributed to the strong relationship between mental health symptoms at T1 and at T2. That is, it appeared that any relationship between prior trauma exposure and T1 coping styles was reflected in the mental health of individuals when they commenced training, and it is this level of mental health symptomatology that subsequently impacted on later mental health symptomatology reported at T2.

## Detailed report 2: Alcohol and tobacco use, coping and mental health (Lewis et al., 2015)

This report examined alcohol and tobacco use in the first one to two years of service and reported on patterns of and associations with alcohol and tobacco use.

- Alcohol use.
    - Overall alcohol consumption increased significantly from T1 to T3.
    - Groups (GEs, ADFA, Cadets and other Officers) were more similar in their level of alcohol consumption at T3 compared with T1.
    - Most respondents were not drinking at harmful levels at either T1 or T3.
    - Males were more likely than females to report harmful alcohol use.
    - At T3, the proportion of respondents using alcohol at harmful levels ranged from 14–38%.
    - There was no clear relationship between symptoms of psychological distress and alcohol use (either alone or in association with coping styles). This demonstrated that changes in alcohol consumption were not accounted for by a person's mental health symptoms, either at T1 or T3.
    - In terms of coping styles, greater use of a support-seeking coping style at T3 predicted lower alcohol consumption, and greater use of a risk-taking coping style at T3 predicted higher alcohol consumption.
    - Overall, the most influential factors predicting changes in alcohol consumption were; initial alcohol use, being younger and being male.
- Smoking.
    - The overall proportion of daily smokers increased significantly from T1 to T3.
    - No gender differences were significant, although men smoked more than women overall.
    - The prevalence of daily smoking increased over time.
    - Very few respondents quit smoking from T1 to T3.
    - Five theoretically-relevant smoking categories were created by comparing responses at T1 and T3: 'new daily smoker', 'relapsed daily smoker', 'continuing daily smoker', 'ex-daily smoker' and 'never daily smoker'
        - Mental health was not a predictor of smoking category. This demonstrated that changes in daily smoking behaviour were not accounted for by a person's mental health symptoms at either T1 or T3.
        - In terms of coping styles, greater use of avoidance coping at T3 predicted being a 'new daily smoker' and an 'ex-daily smoker', whereas, less use of avoidance predicted being a 'continuing daily smoker'.
        - Overall, the most influential factors determining the take-up of daily smoking were lower education level and being a GE.

## Detailed report 3: Exploring social support in the initial years of military service (Crane et al., 2016)

Detailed Report 3 explored the role of social support over the first two years of military service.

- Over time, most individuals tended to either maintain consistently good social support or reported increased positive interactions with social supports.
- In the early stage of military life, personnel fell into one of three categories:
    - those who reported consistently higher levels of positive interactions;
    - those who reported consistently medium levels of positive interactions; and
    - those who reported consistently lower levels of positive interactions.
- Profiles were consistent in terms of their reported positive interactions across the different support domains (friends, family and colleagues). As time within the military progressed, the social support profiles changed.
- Within the first year of service (T3), a new profile emerged, those who reported frequent positive interactions with family but low levels of positive interactions with colleagues (13.6% of respondents).
- Individuals who reported more positive interactions with leadership also reported more positive interactions with colleagues (or had more supportive social networks, generally). Individuals who reported more negative interactions with leadership tended to report less supportive interactions with colleagues (and had less positive support profiles).
- Leadership behaviours were related to an individual's movement between profiles over time.
    - More frequent positive leadership behaviours were related to movement to higher support profiles, whereas less frequent positive leadership behaviour was related to movement into profiles with less support.
    - Frequent negative leadership behaviours were related to transition into a profile characterised by low colleague support. This suggests a possible role for leaders in determining the culture of support received by an individual within their team.
- Lower social support tended to be related to increased psychological distress and posttraumatic stress symptoms at all three time points
- Positive colleague interactions were particularly associated with lower psychological distress. This indicates that social support that is immediately available to an individual may have the greatest impact on their mental health.

# Appendix B: Response rates and drop-out across time

Table B1 shows the breakdown of respondents at each time point by rank. Across all time points, more Officers than GEs completed the surveys.

***Table B1.*** *Survey response numbers and response rates by respondent rank for each time point relative to T2 and the immediately preceding time point ($T_{-1}$)*

| | | T1 | T2 | T3 | T4 | T5 |
|---|---|---|---|---|---|---|
| GEs | Surveys matched with analytic sample | 1940 | 3288 | 697 | 693 | 582 |
| | Response rate (%) relative to T2 for analytic sample | | | 21.2 | 21.1 | 17.7 |
| | Response rate (%) relative to $T_{-1}$ for analytic sample | | | 21.2 | 99.4 | 84.0 |
| Officers | Surveys matched with analytic sample | 1494 | 1964 | 1061 | 572 | 607 |
| | Response rate (%) relative to T2 for analytic sample | | | 54.0 | 29.1 | 30.9 |
| | Response rate (%) relative to $T_{-1}$ for analytic sample | | | 54.0 | 53.9 | 106.1 |

*Note.* GE = general enlistee.

***Table B2.*** *Logistic regression models specifying the T4 dropout indicator as endogenous, with explanatory variables including sociodemographics and T2 levels of outcome variables.*

| Variable | Odds Ratio | 95% CI | 95% CI |
|---|---|---|---|
| | | Lower CI | Upper CI |
| Gender (male) | 1.53*** | 1.29 | 1.81 |
| Age (years) | 0.92*** | 0.91 | 0.93 |
| Relationship status | | | |
| Single | | | |
| Married/Cohabiting | 0.60*** | 0.53 | 0.69 |
| Divorced/Separated/Widowed | 0.43** | 0.25 | 0.75 |
| Dependent children (number) | 0.74*** | 0.68 | 0.81 |
| ADF Service | | | |
| Army | | | |
| Navy | 1.12 | 0.95 | 1.33 |
| Air Force | 0.61*** | 0.51 | 0.72 |
| K10 | 0.99 | 0.98 | 1.01 |
| PHQ-S | 0.94*** | 0.92 | 0.97 |
| PCL-4 | 1.00 | 0.97 | 1.04 |
| DAR | 1.03*** | 1.01 | 1.04 |
| CDRISC-2 | 1.00 | 0.94 | 1.06 |
| SII | 0.98* | 0.95 | 1.00 |

*Note.* *p ≤ 0.05, **p < 0.01, ***p < 0.001. CI = confidence interval; K10 = Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = PTSD Checklist (Civilian Version) 4-item; DAR = Dimensions of Anger; CDRISC-2 = Connor Davidson Resilience Scale 2-item; SII = Sleep Impairment Index.

***Table B3.*** *Logistic regression models specifying the T5 dropout indicator as endogenous, with explanatory variables including sociodemographics and T2 levels of outcome variables.*

| Variable | Odds Ratio | 95% CI | 95% CI |
|---|---|---|---|
| | | Lower CI | Upper CI |
| Gender (male) | 1.56*** | 1.31 | 1.85 |
| Age (years) | 0.95*** | 0.94 | 0.96 |
| Relationship status | | | |
| Single | | | |
| Married/Cohabiting | 0.76*** | 0.66 | 0.87 |
| Divorced/Separated/Widowed | 0.64 | 0.37 | 1.19 |
| Dependent children (number) | 0.85*** | 0.77 | 0.93 |
| ADF Service | | | |
| Army | | | |
| Navy | 1.01 | 0.86 | 1.20 |
| Air Force | 0.47*** | 0.40 | 0.56 |
| K10 | 1.01 | 0.99 | 1.02 |
| PHQ-S | 0.99 | 0.97 | 1.02 |
| PCL-4 | 0.99 | 0.95 | 1.03 |
| DAR | 1.02** | 1.01 | 1.04 |
| CDRISC-2 | 1.00 | 0.95 | 1.07 |
| SII | 1.01 | 0.98 | 1.03 |

*Note.* **p < 0.01, ***p < 0.001. CI = confidence interval; K10 = Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = PTSD Checklist (Civilian Version) 4-item; DAR = Dimensions of Anger; CDRISC-2 = Connor Davidson Resilience Scale 2-item; SII = Sleep Impairment Index.

# Appendix C: Sociodemographic information

Change in sociodemographic and time invariant military predictor variables are reported in Table C1, as these are relevant to the predictive models included in the results section. Note: mean age at T1 was 20.00 years old (SD = 5.59, range = 18–54) and mean age at T2 was 22.19 (SD = 5.17, range = 18–54).

***Table C1:*** *Sociodemographics of sample at T1 and T2 (n and %)*

| | | T1 | T1 | T2 | T2 |
|---|---|---|---|---|---|
| | | *n* | % | *n* | % |
| Gender | | | | | |
| | Male | 2942 | 84.74 | 4527 | 85.58 |
| | Female | 530 | 15.27 | 763 | 14.42 |
| Relationship status | | | | | |
| | Single/Never Married | 2663 | 76.83 | 3730 | 70.39 |
| | Married/Partner | 767 | 22.13 | 1514 | 28.57 |
| | DSW | 36 | 1.04 | 55 | 1.04 |
| Number of children | | — | — | — | — |
| Education | | | | | |
| | Completed Year 10 | 440 | 12.73 | — | — |
| | Completed Year 12 | 2070 | 59.88 | — | — |
| | Post school training | 477 | 13.80 | — | — |
| | Tertiary Qualification | 470 | 13.60 | — | — |
| ADF Service | | | | | |
| | Army | 2278 | 65.65 | 3351 | 63.11 |
| | Navy | 685 | 19.74 | 1145 | 21.56 |
| | Air Force | 507 | 14.61 | 814 | 15.33 |
| Rank | | | | | |
| | Officers | — | — | 1964 | 36.9 |
| | Other rank | — | — | 3288 | 61.7 |
| Prior military experience (Yes) | | 822 | 23.63 | — | — |

*Note*. DSW – Divorced/Separated/Widowed; GE – General Entry/Enlistee.

***Table C2:*** *Exposure to Potentially Traumatic Events in the past 12 months*

| | **T3** | **T3** | **T4** | **T4** | **T5** | **T5** |
|---|---|---|---|---|---|---|
| | n = | 1764 | n = | 1271 | n = | 1194 |
| | *n* | *%* | *n* | *%* | *n* | *%* |
| Direct combat | 18 | 1.02 | 14 | 1.10 | 13 | 1.09 |
| Life-threatening accident | 97 | 5.50 | 88 | 6.92 | 67 | 5.61 |
| Fire, flood or natural disaster | 173 | 9.81 | 114 | 8.97 | 96 | 8.04 |
| Witness someone badly injured or killed | 158 | 8.96 | 117 | 9.21 | 117 | 9.80 |
| Rape | 11 | 0.62 | 3 | 0.24 | 8 | 0.67 |
| Sexual molestation | 14 | 0.79 | 2 | 0.16 | 9 | 0.75 |
| Serious physical attack or assault | 75 | 4.25 | 64 | 5.04 | 52 | 4.36 |
| Threatened/harassed without a weapon | 120 | 6.80 | 90 | 7.08 | 71 | 5.95 |
| Threatened with a weapon/held captive/kidnapped | 17 | 0.96 | 13 | 1.02 | 15 | 1.26 |
| Tortured or victim of terrorists | 6 | 0.34 | 2 | 0.16 | 6 | 0.50 |
| Domestic violence | 25 | 1.42 | 23 | 1.81 | 22 | 1.84 |
| Witness domestic violence | 50 | 2.83 | 34 | 2.68 | 47 | 3.94 |
| Finding dead body | 21 | 1.19 | 19 | 1.49 | 30 | 2.51 |
| Witness someone suicide or attempt suicide | 66 | 3.74 | 58 | 4.56 | 46 | 3.85 |
| Any other stressful event | 114 | 6.46 | 106 | 8.34 | 101 | 8.46 |
| Did you suffer a great shock because one of these events happened to someone close to you | 108 | 6.12 | 81 | 6.37 | 61 | 5.11 |

*Note:* Values for the denominator in calculations of proportions may vary slightly because of item-level missing data.

# Appendix D: Descriptive statistics for key outcomes and predictors

***Table D1.*** *Descriptive statistics (n, Med, M, and SD) associated with the key outcome measures*

| Variable | | T1 | | | | T2 | | | | T3 | | | | T4 | | | | T5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *n* | *Med* | *M* | *SD* | *n* | *Med* | *M* | *SD* | *n* | *Med* | *M* | *SD* | *n* | *Med* | *M* | *SD* | *n* | *Med* | *M* | *SD* |
| K10 | 10–50 | 3383 | 12 | 13.04 | 3.08 | 5262 | 14 | 15.1 | 4.54 | 1756 | 13 | 14.5 | 5.3 | 1268 | 14 | 15.5 | 6.17 | 1191 | 14 | 15.6 | 6.13 |
| PHQ-S | 0–22 | 3462 | 0 | 0.92 | 1.63 | 5289 | 2 | 2.06 | 2.23 | 1734 | 1 | 1.76 | 2.09 | 1258 | 1 | 2.08 | 2.38 | 1183 | 2 | 2.21 | 2.46 |
| PCL-4 | 4–20 | 3339 | 4 | 4.47 | 1.15 | 5213 | 4 | 4.94 | 1.77 | 1716 | 4 | 5.11 | 2.12 | 1242 | 4 | 5.4 | 2.38 | 1165 | 4 | 5.6 | 2.6 |
| DAR | 5–25 | 3176 | 8 | 9.17 | 2.84 | 5079 | 11 | 12.1 | 4.69 | 1599 | 10 | 11.3 | 4.81 | 1139 | 10 | 11.7 | 5.14 | 1090 | 10 | 11.9 | 5.06 |
| CDRISC | 0–8 | 3365 | 7 | 7.15 | 1.02 | 5243 | 7 | 6.99 | 1.15 | 1754 | 7 | 6.82 | 1.23 | 1268 | 7 | 6.72 | 1.34 | 1188 | 7 | 6.71 | 1.34 |
| SII | 0–16 | 3444 | 1 | 2.23 | 2.38 | 5276 | 2 | 3.01 | 2.78 | 1734 | 3 | 3.33 | 3.13 | 1254 | 300 | 3.84 | 3.41 | 1185 | 3 | 4 | 3.56 |
| AUDIT-C | 0–12 | 3301 | 5 | 4.50 | 2.64 | 1907 | – | – | – | 1721 | 5 | 5.36 | 2.72 | 1148 | 4 | 5.72 | 2.38 | 1163 | 4 | 5.13 | 2.74 |

*Note.* TR = Theoretical Range for scale; K10 = Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = PTSD Checklist (Civilian Version) 4-item; DAR = Dimensions of Anger; CDRISC-2 = Connor Davidson Resilience Scale 2-item; SII = Sleep Impairment Index; AUDIT-C = Alcohol Consumption.

***Table D2.*** *Descriptive statistics (n, Med, M, and SD) associated with the key continuous predictor measures*

| | TR | T1 | | | T2 | | | T3 | | | T4 | | | T5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n | M | SD | n | M | SD | n | M | SD | n | M | SD | n | M | SD |
| Morale | 1– 5 | | | | – | – | – | 1675 | 3.66 | 0.96 | 1208 | 3.39 | 1.06 | 1145 | 3.39 | 1.08 |
| Social Support | | | | | | | | | | | | | | | | |
| Family/Friend Support | 4–16 | 3406 | 15.1 | 1.31 | 5243 | 14.72 | 1.56 | 1710 | 14.39 | 1.84 | 1239 | 14.09 | 2.09 | 1165 | 14.13 | 2.02 |
| Family/Friend Negative Social Interactions | 4–16 | 3397 | 8.26 | 2.19 | 2513 | 8.65 | 2.28 | 1711 | 8.63 | 2.34 | 1237 | 8.45 | 2.34 | 1160 | 8.34 | 2.36 |
| ADF Peer Support | 2–8 | | | | 5075 | 6.94 | 1.20 | 1474 | 6.73 | 1.32 | – | – | – | – | – | – |
| ADF Peer Negative Social Interactions | 3–12 | – | – | – | 4989 | 7.03 | 1.91 | 1472 | 6.62 | 1.91 | – | – | – | – | – | – |
| ADF Superior Support | 2–8 | | | | 5049 | 6.00 | 1.54 | 1478 | 6.25 | 1.51 | – | – | – | – | – | – |
| ADF Superior Negative Social Interactions | 3–12 | – | – | – | 5099 | 6.86 | 2.06 | 1476 | 6.20 | 1.94 | – | – | – | – | – | – |
| Lifetime Traumatic Events | 0–16 | | | | 5253 | 2.21 | 2.40 | 1671 | 0.51 | 1.25 | 1194 | 0.54 | 1.21 | 1139 | 0.53 | 1.41 |
| COPING | | | | | | | | | | | | | | | | |
| Acceptance | 2 – 8 | 3357 | 7.07 | 1.05 | 5198 | 7.09 | 1.09 | 1632 | 6.93 | 1.19 | 1158 | 6.73 | 1.27 | 1103 | 6.65 | 1.36 |
| Reappraisal | 2 – 8 | 3342 | 6.36 | 1.4 | 5147 | 6.18 | 1.43 | 1623 | 5.82 | 1.56 | 1151 | 5.79 | 1.59 | 1101 | 5.69 | 1.52 |
| Self–blame | 2 – 8 | 3265 | 3.49 | 1.36 | 5116 | 3.87 | 1.52 | 1619 | 3.84 | 1.55 | 1155 | 3.97 | 1.61 | 1098 | 4.01 | 1.6 |
| Avoidance | 1 – 4 | 3349 | 1.95 | 0.83 | 5194 | 2.08 | 0.87 | 1634 | 1.96 | 0.84 | 1154 | 2.06 | 0.88 | 1095 | 2.11 | 0.84 |
| Risk–taking | 1 – 4 | 3354 | 1.16 | 0.48 | 5189 | 1.3 | 0.64 | 1626 | 1.25 | 0.59 | 1158 | 1.32 | 0.65 | 1099 | 1.31 | 0.65 |
| Support-seeking | 4–16 | 3247 | 10.21 | 2.89 | | 5096 | 9.71 | 2.91 | | 1609 | 9.85 | 3.07 | | 1144 | 9.76 | 3.06 |

***Table D3.*** *Descriptive statistics (frequency) associated with the key categorical predictor variables*

| Variable | T3 | | T4 | | T5 | |
|---|---|---|---|---|---|---|
| | n | Frequency % | n | Frequency % | n | Frequency % |
| Deployment | 116 | 6.70 | 223 | 17.45 | 250 | 20.75 |

*Note*. Data on these descriptive variables is only presented for T3–T5, as this information was not collected at T1 and T2.

# Appendix E: LASER-Resilience measures

***Table E1:*** *Measurement construct, scale source, number of items per scale and time points administered*

| Measure | Source and scale development information | No. of items | T1 | T2 | T3 | T4 | T5 |
|---|---|---|---|---|---|---|---|
| Connor and Davidson 2-item resilience measure (CDRISC-2) | Vaishnavi S, Connor K, Davidson JRT: An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2: Psychometric properties and applications in psychopharmacological trials. Psychiatry Res 2007; 152: 293–297. | 2 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Psychological distress (K10) | Kessler RC, Andrews G, Colpe LJ, et al.: Short screening to monitor population prevalence and trends in non-specific psychological distress. Psychol Med 2002; 32: 959–976. | 10 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Impact on functioning | Adapted from Slade T, Johnson A, Browne MAO, Andrews G, Whiteford, H: 2007 National Survey of Mental Health, Aust NZ J Psychiatry 2009; 4: 594–605. | 4 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Global self-rated health measure | Sargent-Cox K, Anstey KJ., Luszcz MA. Patterns of longitudinal change in older adults self-rated health: The effect of the reference point. Health Psych, 2010; 29:143–152. | 1 item | ✓ | ✓ | ✓ | ✓ | ✓ |
| Somatic symptoms from Patient Health Questionnaire | Adapted from: Broadbent E, Petrie KJ, Main J, Weinman J. The brief illness perception questionnaire. J Psychosom Res 2006; 60:631–637. | 11 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sleep impairment index (SII) | Adapted from Morin CM, Stone J, McDonald K, et al.: Psychological management of insomnia: A clinical replication series with 100 patients. Behav Ther 1994; 25: 291–309. | 6 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Traumatic stress symptoms \| (PCL-4) | Adapted from Weathers FW, Litz BT, Herman DS, et al.: The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. Presented at the Annual Meeting of International Society for Traumatic Stress Studies, San Antonio, TX, 1993. | 4 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Self-efficacy | No reference: developed for use in the military setting. | 7 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Mild traumatic brain injury prior to enlistment | Scale based on the Diagnostic Criteria for Mild Traumatic Brain Injury by the American Congress of Rehabilitation Medicine (ACRM). Ontario Neurotrauma Foundation, Guidelines for mTBI and Persistent Symptoms. | 2 items | | ✓ | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Perceived stigma and barriers to care | Adapted from the ADF Mental Health Prevalence and Wellbeing Study: http://www.defence.gov.au/health/DMH/i-MHRP.htm | 5 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Life satisfaction | Adapted from the Household Income and Labour Dynamics in Australia Study: http://www.melbourneinstitute.com/hilda/ | 1 item | | | ✓ | ✓ | ✓ |
| Tobacco smoking | Adapted from Borland, Cancer Council Victoria, available from: http://www.cancervic.org.au/about-our-research/researchers/prof-ron-borland.html | 1 item | ✓ | ✓ | ✓ | ✓ | ✓ |
| Alcohol consumption (AUDIT-C) | Bush K, Kivlahan DR, McDonell MB, Fihn SD, Bradley KA The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. Arch Intern Med 1998; 158:1789–95. | 3 items | ✓ | Officers only | ✓ | ✓ | ✓ |
| Dimensions of anger scale | Forbes D, Hawthorne G, Elliott P, McHugh T, Biddle D, Creamer M, et al. A concise measure of anger in combat-related posttraumatic stress disorder. J Traumatic Stress. 2004; 17:249–56. | 7 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Personality index (TIPI) | Gosling SD, Rentfrow PJ, Swann WB Jr. A very brief measure of the big-five personality domains. J Res Pers; 37: 504–528. | 10 items | ✓ | | | | |
| Supportive and negative interactions scale: partner, family, friends | Adapted from Schuster TL, Kessler RC, Aseltine RH Jr. Supportive interactions, negative interactions, and depressed mood. Am J Community Psychol. 1990; 18: 423–438. | 12 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Supportive and negative interactions scale: instructor, superior staff, peers | As above. | 16 items | | ✓ | ✓ | | |
| Social identification with ADF membership | Adapted from Cameron JE. A three factor model of social identity. Self and Identity. 2004; 3:239–262. | 6 items | | ✓ | ✓ | ✓ | ✓ |
| Community participation | Adapted from Berry H, Shipley, M. Longing to Belong: Social Capital and Mental Health in an Australian Coastal Community. 2007. The Australian National University: Canberra.<br>Scale shortened on the basis of collaboration with scale author. | 9 items | | | ✓ | ✓ | ✓ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Use of social networking sites | No reference: developed for use in the military setting. | 7 items | | | ✓ | ✓ | ✓ |
| Sense of morale in the smallest work/ training group membership | From the Australian Defence Attitudes Survey, 2008. | 1 item | | ✓ | ✓ | ✓ | ✓ |
| Mate support scale | Developed in collaboration with United States Army research advisors | 4 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Coping strategies | Adapted from Carver, CS. You want to measure coping but your protocol's too long: Consider the Brief COPE. Int J Behav Med. 1997; 4: 92–100. | 24 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Location and length of deployment | Adapted from the ADF Mental Health Prevalence and Wellbeing Study: http://www.defence.gov.au/health/DMH/i-MHRP.htm | 1 item | | | ✓ | ✓ | ✓ |
| Access to professional support services | Adapted from the ADF Mental Health Prevalence and Wellbeing Study: http://www.defence.gov.au/health/DMH/i-MHRP.htm | 2 items | | | ✓ | ✓ | ✓ |
| Mental health literacy items | Developed in collaboration with United States Army research advisors. | 12 items | | ✓ | ✓ | ✓ | ✓ |
| Thought control questionnaire | Wells A, Davies MI. The thought control questionnaire: A measure of individual differences in the control of unwanted thoughts. Behaviour Research and Therapy. 1994; 32: 871– 878. | 8 items | | ✓ | ✓ | ✓ | ✓ |
| Ruminative response scale | Adapted from Treynor W, Gonzalez G, Nolen-Hoeksema S. Rumination Reconsidered: A Psychometric Analysis. Cognit Ther Res. 2003; 27:247–259. | 5 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Flexible coping scale. | Developed in collaboration with United States Army research advisors | 6 items | ✓ | ✓ | ✓ | ✓ | ✓ |
| Stressful events checklist | Developed on the basis of piloting within Australian military populations. | 8 events | | ✓ | ✓ | ✓ | ✓ |
| Potentially traumatic events checklist | As above | 18 events | | ✓ | ✓ | ✓ | ✓ |
| Participants response to survey completion | Scotti et al. How much is enough? Reducing response to research participation questionnaires to their essential elements. Presented at Conference on Innovations in Trauma Research Methods; Chicago, November 2008. | 3 items | ✓ | ✓ | ✓ | ✓ | ✓ |

# Appendix F: Item-level screening and missing data analysis

Once the analytic sample had been defined, a series of frequency analyses were conducted at the item-level to identify out-of-range (OOR) and implausible values. There were small numbers of such values evident on items that were based on Likert-scale response formats (which were recoded as missing), whereas top-coding was used to address implausible values for items characterised by open response formats; for example, two demographic variables were top-coded to address implausible values, namely: age (recoded to < 17 years and > 55 years) and number of dependent children (5–9 children recoded as '5' and 10+ children recoded as 'missing'). Values that represented 'N/A' or 'prefer not to answer' were recoded as missing, except for two items from the SII where relevant values were recoded to zero (given that NA for these items were plausibly viewed as indicating no sleep impairment).

In order to quantify the extent of missing data at the item-level across measures that were considered in this study, the proportion of responses missing for each item was also calculated and tabulated. Table F1 shows the mean level of proportion missing across items at each time point, as well as the range (indicating variables with both the lowest and highest levels of proportion missing at the item level).

*Table F1. Item level missing data analysis*

| Time point | *M* | Range | Range |
|---|---|---|---|
| | | Low | High |
| T2 | 3.9% | < 0.1% | 64.1% |
| T3 | 5.7% | 0.3% | 19.2% |
| T4 | 7.3% | 0.2% | 55.5% |
| T5 | 8.0% | 0.1% | 86.3% |

*Note*. M = mean % of missing data across all outcome and predictor variables.

As shown, there were generally small amounts of proportion missing for items at T2 when considered across variables, with the exception of the AUDIT-C. Levels of missing data > 60% were recorded for this scale, due to the fact that the AUDIT-C was administered to Officers but not GEs at T2. For this reason, AUDIT-C data pertaining to T2 was omitted and only AUDIT-C data pertaining to T3 to T5 was included for relevant analyses. From T3 to T5, the key outcome measures had generally low levels of missing data, although there were two items from the SII which had higher levels of missing data at T4 (around 22%) and T5 (around 30%) respectively. This was not attributable to a 'Not Applicable' option for these SII items (which had already been recoded to zero), and was instead likely due to issues with the administration of the electronic survey. Further, the items addressing social support from supervisors and colleagues evidenced very high levels of missing data at T4 (around 55%) and T5 (around 86%). This was again likely due to issues with administration, or participants not wanting to answer these particular questions.

On this basis, the decision was made to exclude the two SII items from measures at all time points, and thus define sleep impairment in terms of the remaining four items which were unaffected by

substantive missing data issues. The decision was also made to exclude the measures of ADF Peer Support, Supervisor Support, and Negative Social Interactions, at T4 and T5 only. Once these items were excluded from the missing data analyses, item level missing data was closer to acceptable ranges (around 20% or less; see Table F2).

***Table F2.*** *Item level missing data when excluding AUDIT-C, SII and Training Support variables*

| Time point | *M* | Range | Range |
|---|---|---|---|
| | | Low | High |
| T2 | 2.3% | < 0.1% | 19.3% |
| T3 | 5.6% | < 0.1% | 19.3% |
| T4 | 4.7% | < 0.1% | 23.1% |
| T5 | 4.0% | < 0.1% | 16.4% |

# Appendix G: Psychometric analysis

A series of preliminary analyses were also conducted to examine the psychometric properties of scales which operationalised the main outcome variables considered in this study. Given that most of the measures have been widely used and supported by existing evidence, the analyses described were not intended to provide an in-depth examination and interpretation of measurement properties. Rather, a series of cursory analyses were conducted to verify the main psychometric features of scales, including unidimensionality and internal consistency reliability.

Scale unidimensionality was evaluated through production of eigenvalues for the two largest factors underlying items using the ***eigen()*** function in Program R. These can be used to determine whether there is a dominant first factor capturing the majority of variance in each item pool, with unidimensionality assumed when the ratio of the first to second eigenvalues is approximately equal to, or greater than, 2.5:1 (Hall, Snell & Foust, 1999). Internal consistency reliability was also estimated for scales through production of Cronbach's α coefficients. The results of these analyses for scales including the K10, PHQ-S, PCL-4, DAR and the SII when considered across time points are shown in Table G1. The same analyses were conducted for the following predictor scales: social support (family/friend, ADF peer, and ADF superior support), support-seeking and coping. Alpha scores were not calculated for single- and two-item measures, as it is not possible to conduct these types of analyses with so few items. Instead, correlations were conducted for all two item measures. Comparable analyses were not conducted for the CDRISC-2, which consists of only two items (thus, values for Pearson's r are reported instead), or for the AUDIT-C, given that this measure is not based on principles of 'reflective' measurement which require assumptions of dimensionality or internal consistency.

As can be seen there was evidence of a dominant first factor underlying items across time points for the K10, PCL-4, DAR and the reduced (4-item) version of the SII. Similarly, there was evidence of a dominant first factor underlying the main predictor variables, namely the social support measures, as well as support-seeking. This suggests that a unidimensional model may provide a suitable account of the observed data, and thus supports usage of summed scale scores based on aggregation of item-level data. The ratio of eigenvalues for the PHQ-S was generally smaller, which was attributable to a larger second factor underlying these items. Although this suggests that the PHQ-S may not be entirely unidimensional, the ratio of values was sufficiently close to 2.5:1 to support the tentative interpretation of a single summed scale score. All measures demonstrated Cronbach's α values exceeding Nunnally and Bernstein's (1994) criteria of α ≥ .70 (i.e. acceptable). Further, the acceptance, reappraisal and self-blame coping subscales consisted of too few items to conduct EFA; therefore, correlations were conducted to assess that items were sufficiently correlated to indicate they measured the same underlying construct.

***Table G1.*** *Eigenvalues from exploratory factor analysis (EFA) models and Cronbach's α internal consistency estimates for all outcome measures across time.*

| Variable | Time point | Eigenvalues > 1.0 1 | Eigenvalues > 1.0 2 | Ratio [1:2] | Cronbach's α (Pearson's r) |
|---|---|---|---|---|---|
| Outcome | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | T2 | 4.56 | 1.06 | 4.30 | 0.85 |
| K10 | T3 | 5.51 | 1.03 | 5.33 | 0.90 |
| | T4 | 5.84 | 1.00 | 5.83 | 0.91 |
| | T5 | 5.86 | 0.91 | 6.41 | 0.91 |
| | T2 | 3.17 | 1.23 | 2.57 | 0.72 |
| PHQ-S | T3 | 3.04 | 1.32 | 2.31 | 0.70 |
| | T4 | 3.10 | 1.39 | 2.22 | 0.70 |
| | T5 | 3.39 | 1.38 | 2.46 | 0.73 |
| | T2 | 2.44 | 0.62 | 3.96 | 0.77 |
| PCL-4 | T3 | 2.72 | 0.48 | 5.72 | 0.84 |
| | T4 | 2.79 | 0.45 | 6.16 | 0.85 |
| | T5 | 2.87 | 0.47 | 6.15 | 0.86 |
| | T2 | 3.99 | 0.80 | 5.02 | 0.86 |
| DAR | T3 | 4.38 | 0.70 | 6.23 | 0.89 |
| | T4 | 4.58 | 0.64 | 7.12 | 0.91 |
| | T5 | 4.52 | 0.74 | 6.14 | 0.90 |
| | T2 | 2.34 | 0.68 | 3.44 | 0.75 |
| SII | T3 | 2.53 | 0.65 | 3.93 | 0.80 |
| | T4 | 2.58 | 0.60 | 4.27 | 0.81 |
| | T5 | 2.62 | 0.57 | 4.59 | 0.82 |
| | T2 | — | — | — | (0.75) |
| CDRISC-2 | T3 | — | — | — | (0.80) |
| | T4 | — | — | — | (0.81) |
| | T5 | — | — | — | (0.82) |
| Predictor | | | | | |
| Social Support | | | | | |
| Family/Friend Support | T2 | 2.16 | 1.20 | 1.80 | 0.71 |
| | T3 | 2.30 | 1.18 | 1.94 | 0.75 |
| | T4 | 2.54 | 0.99 | 2.56 | 0.81 |
| | T5 | 2.53 | 1.06 | 2.39 | 0.81 |
| Family/Friend Negative Interactions | T2 | 2.25 | 0.89 | 1.13 | 0.74 |
| | T3 | 2.27 | 0.94 | 1.13 | 0.74 |
| | T4 | 2.34 | 0.87 | 1.17 | 0.76 |
| | T5 | 2.37 | 0.88 | 1.19 | 0.77 |
| ADF Peer Support | T2 | — | — | — | (0.67) |
| | T3 | — | — | — | (0.75) |
| | T4 | — | — | — | — |

| | | | | | |
|---|---|---|---|---|---|
| | T5 | — | — | — | — |
| ADF Peer Negative Interactions | T2 | 2.25 | 0.89 | 1.13 | 0.74 |
| | T3 | 2.25 | 0.89 | 1.13 | 0.74 |
| | T4 | — | — | — | — |
| | T5 | — | — | — | — |
| ADF Superior Support | T2 | — | — | — | (0.69) |
| | T3 | — | — | — | (0.76) |
| | T4 | — | — | — | — |
| | T5 | — | — | — | — |
| ADF Superior Negative Interactions | T2 | 2.25 | 0.89 | 1.13 | 0.74 |
| | T3 | 2.25 | 0.89 | 1.13 | 0.74 |
| | T4 | — | — | — | — |
| | T5 | — | — | — | — |
| Coping | | | | | |
| Support-seeking | T2 | 3.01 | 0.48 | 6.27 | 0.89 |
| | T3 | 3.25 | 0.38 | 8.55 | 0.92 |
| | T4 | 3.25 | 0.35 | 9.29 | 0.92 |
| | T5 | 3.20 | 0.40 | 8.00 | 0.92 |
| Acceptance | T2 | — | — | — | (0.65) |
| | T3 | — | — | — | (0.67) |
| | T4 | — | — | — | (0.70) |
| | T5 | — | — | — | (0.71) |
| Reappraisal | T2 | — | — | — | (0.69) |
| | T3 | — | — | — | (0.76) |
| | T4 | — | — | — | (0.76) |
| | T5 | — | — | — | (0.74) |
| Self-blame | T2 | — | — | — | (0.66) |
| | T3 | — | — | — | (0.68) |
| | T4 | — | — | — | (0.70) |
| | T5 | — | — | — | (0.72) |

*Note.* K10 = Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = PTSD Checklist (Civilian Version) 4-item; DAR = Dimensions of Anger; SII = Sleep Impairment Index.

# Appendix H: Outcome measure correlations

Table H1 provides the within-measure (across-time) associations among repeated measurements of the same variable, which can be viewed as indications of the rank-order 'stability' of target constructs over time. This means that this tested how reliably these measures tapped into the same construct across time. For this table, all correlation coefficients are significant at the $p < 0.001$ level. In general, there was a pattern of weaker associations (for example, when compared to the cross-sectional between-measure correlations in Table 2) which were in the low-to-moderate range. The smallest associations were generally with T2 measures, suggesting greatest instability of scores relative to T2, while the largest associations were between adjacent measures at the latter time points. There were no clear patterns of overall differences in associations across measures, with the exception of AUDIT-C scores (from T3 to T5), which appear to be highly stable compared to other scales.

***Table H1.*** *Prospective associations with repeated measure of outcome measures across time points*

| | | T2 | T3 | T4 |
|---|---|---|---|---|
| | T2 | | | |
| K10 | T3 | 0.40 | | |
| | T4 | 0.34 | 0.59 | |
| | T5 | 0.35 | 0.35 | 0.54 |
| | T2 | | | |
| PHQ-S | T3 | 0.42 | | |
| | T4 | 0.35 | 0.47 | |
| | T5 | 0.33 | 0.49 | 0.47 |
| | T2 | | | |
| PCL-4 | T3 | 0.33 | | |
| | T4 | 0.27 | 0.39 | |
| | T5 | 0.25 | 0.32 | 0.51 |
| | T2 | | | |
| DAR | T3 | 0.48 | | |
| | T4 | 0.39 | 0.53 | |
| | T5 | 0.35 | 0.36 | 0.54 |
| | T2 | | | |
| | T3 | 0.38 | | |
| | T4 | 0.30 | 0.46 | |
| | T5 | 0.33 | 0.39 | 0.49 |
| | T2 | | | |
| SII | T3 | 0.45 | | |
| | T4 | 0.34 | 0.56 | |
| | T5 | 0.37 | 0.43 | 0.52 |

| | | | | |
|---|---|---|---|---|
| | T2 | | | |
| AUDIT-C | T3 | — | | |
| | T4 | — | 0.64 | |
| | T5 | — | 0.65 | 0.65 |

*Note.* All correlations are significant at $p < 0.001$. K10 = Kessler Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = 4-item PTSD Checklist; DAR = Dimensions of Anger; CDRISC-2 = Connor-Davidson Resilience Scale 2-item; SII = Sleep Impairment Index; AUDIT-C = AUDIT Consumption Scale.

Table H2 provides an overview of cross-sectional correlations between various predictor and outcome measures across time. There is a pattern of moderate range associations between the different measures. The AUDIT-C measure had the smallest cross-sectional associations with all other outcome measures (approaching 0), and this was true at all time points. Across the time points, the strongest association appeared to be between the PCL-4 and K10 measures.

***Table H2.*** *Correlations between key outcome measures at $T_1$, $T_3$, $T_4$, and $T_5$*

| | | K10 | PHQ-S | PCL-4 | DAR | CDRISC-2 | SII | AUDIT-C |
|---|---|---|---|---|---|---|---|---|
| | K10 | | | | | | | |
| | PHQ-S | 0.57 | | | | | | |
| | PCL-4 | 0.55 | 0.51 | | | | | |
| $T_1$ | DAR | 0.53 | 0.46 | 0.48 | | | | |
| | CDRISC-2 | 0.38 | −0.26 | −0.28 | −0.23 | | | |
| | SII | 0.58 | 0.52 | 0.47 | 0.43 | −0.33 | | |
| | AUDIT-C | 0.13 | 0.10 | 0.10 | 0.16 | −0.03 | 0.16 | |
| | K10 | | | | | | | |
| | PHQ-S | 0.45 | | | | | | |
| | PCL-4 | 0.61 | 0.47 | | | | | |
| $T_3$ | DAR | 0.48 | 0.32 | 0.42 | | | | |
| | CDRISC-2 | −0.38 | −0.23 | −0.32 | −0.28 | | | |
| | SII | 0.50 | 0.43 | 0.45 | 0.32 | −0.26 | | |
| | AUDIT-C | 0.09 | 0.01 | 0.09 | 0.17 | −0.03 | 0.07 | |
| | K10 | | | | | | | |
| | PHQ-S | 0.44 | | | | | | |
| | PCL-4 | 0.65 | 0.44 | | | | | |
| $T_4$ | DAR | 0.54 | 0.33 | 0.42 | | | | |
| | CDRISC-2 | −0.51 | −0.28 | −0.36 | −0.34 | | | |
| | SII | 0.55 | 0.45 | 0.47 | 0.39 | −0.35 | | |
| | AUDIT-C | 0.09 | 0.07 | 0.09 | 0.17 | 0.03 | 0.10 | |
| | K10 | | | | | | | |
| | PHQ-S | 0.49 | | | | | | |
| | PCL-4 | 0.64 | 0.46 | | | | | |
| $T_5$ | DAR | 0.60 | 0.36 | 0.52 | | | | |
| | CDRISC-2 | −0.49 | −0.28 | −0.36 | −0.32 | | | |
| | SII | 0.56 | 0.46 | 0.52 | 0.45 | −0.35 | | |
| | AUDIT-C | 0.11 | 0.03 | 0.08 | 0.17 | −0.05 | 0.09 | |

*Note.* For these associations, correlation coefficients > r = 0.06 are significant at p < 0.05 level, while coefficients > r = 0.1 and r = 0.2 are significant at p < 0.01 and p < 0.001 levels, respectively. K10 = Psychological Distress; PHQ-S = Patient Health Questionnaire – Somatic Symptoms; PCL-4 = PTSD Checklist (Civilian Version) 4-item; DAR = Dimensions of Anger; CDRISC-2 = Connor-Davidson Resilience Scale 2-item; SII = Sleep Impairment Index; AUDIT-C = Alcohol Consumption. Within-time correlations for T2 are included in the main body of the report results.

# Appendix I: Regressions to predict K10 and PCL-4 outcomes

***Table I1.*** *Poisson regression to predict K10 and PCL-4 outcomes at T4*

| | K10 | | | | | PCL-4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Poisson Regression Estimate | | SE | p | β | Poisson Regression Estimate | | SE | p | β |
| Gender (Male) | −0.08 | *** | 0.02 | 0.000 | −0.08 | −0.12 | *** | 0.03 | 0.000 | −0.11 |
| ADF Service (reference: Army) | | | | | | | | | | |
| Navy | 0.07 | *** | 0.02 | 0.000 | 0.07 | 0.10 | *** | 0.03 | 0.001 | 0.10 |
| Air Force | −0.01 | | 0.02 | 0.491 | −0.01 | 0.01 | | 0.03 | 0.728 | 0.01 |
| Family/Friend Social Support | −0.05 | *** | 0.00 | 0.000 | −0.30 | −0.05 | *** | 0.01 | 0.000 | −0.28 |
| Family/Friend Negative Social Interactions | 0.02 | | <0.01 | 0.000 | 0.13 | 0.01 | | 0.01 | 0.005 | 0.08 |
| Coping styles | | | | | | | | | | |
| Acceptance | −0.09 | *** | 0.01 | 0.000 | −0.30 | −0.07 | *** | 0.01 | 0.000 | −0.21 |
| Reappraisal | −0.08 | *** | 0.00 | 0.000 | −0.32 | −0.07 | *** | 0.01 | 0.000 | −0.24 |
| Self-blame | 0.11 | *** | 0.00 | 0.000 | 0.46 | 0.10 | *** | 0.01 | 0.000 | 0.39 |
| Avoidance | 0.10 | *** | 0.01 | 0.000 | 0.23 | 0.08 | *** | 0.01 | 0.000 | 0.16 |
| Risk-taking | 0.15 | *** | 0.01 | 0.000 | 0.28 | 0.17 | *** | 0.02 | 0.000 | 0.27 |
| Support-seeking | −0.02 | *** | 0.00 | 0.000 | −0.14 | −0.01 | | 0.00 | 0.093 | −0.05 |
| Sleep impairment (SII) | 0.06 | *** | 0.00 | 0.000 | 0.55 | 0.06 | *** | 0.00 | 0.000 | 0.47 |
| Anger (DAR) | 0.04 | *** | 0.00 | 0.000 | 0.54 | 0.03 | *** | 0.00 | 0.000 | 0.42 |
| Alcohol risk (AUDIT-C) | 0.01 | *** | 0.00 | 0.000 | 0.09 | 0.02 | ** | 0.01 | 0.003 | 0.09 |
| Morale | −0.03 | *** | 0.01 | 0.000 | −0.31 | −0.04 | *** | 0.01 | 0.000 | −0.25 |
| Number of Traumatic Events (past year) | 0.03 | *** | 0.01 | 0.000 | 0.08 | 0.05 | *** | 0.01 | 0.000 | 0.16 |
| Deployment (past year) | −0.01 | | 0.02 | 0.546 | −0.01 | 0.00 | | 0.03 | 0.910 | 0.00 |

***Table I2.*** *Poisson regression to predict K10 and PCL-4 outcomes at T5*

| | K10 | | | | | PCL-4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Poisson Regression Estimate** | | **SE** | **p** | **β** | **Poisson Regression Estimate** | | **SE** | **p** | **β** |
| Gender (Male) | −0.10 | *** | 0.02 | 0.000 | −0.11 | −0.17 | *** | 0.03 | 0.000 | −0.15 |
| ADF Service (reference: Army) | | | | | | | | | | |
| Navy | 0.01 | | 0.02 | 0.456 | 0.01 | 0.06 | | 0.03 | 0.078 | 0.05 |
| Air Force | −0.05 | ** | 0.02 | 0.004 | −0.06 | −0.03 | | 0.03 | 0.295 | −0.03 |
| Family/Friend Social Support | −0.05 | *** | 0.00 | 0.000 | −0.30 | −0.06 | *** | 0.01 | 0.000 | −0.27 |
| Family/Friend Negative Social Interactions | 0.03 | | <0.01 | 0.000 | 0.16 | 0.02 | | 0.01 | 0.000 | 0.11 |
| Coping styles | | | | | | | | | | |
| Acceptance | −0.07 | *** | 0.01 | 0.000 | −0.24 | −0.07 | *** | 0.01 | 0.000 | −0.20 |
| Reappraisal | −0.07 | *** | 0.00 | 0.000 | −0.28 | −0.05 | *** | 0.01 | 0.000 | −0.17 |
| Self-blame | 0.10 | *** | 0.00 | 0.000 | 0.45 | 0.11 | *** | 0.01 | 0.000 | 0.41 |
| Avoidance | 0.09 | *** | 0.01 | 0.000 | 0.19 | 0.09 | *** | 0.01 | 0.000 | 0.16 |
| Risk-taking | 0.15 | *** | 0.01 | 0.000 | 0.27 | 0.17 | *** | 0.02 | 0.000 | 0.27 |
| Support-seeking | −0.02 | *** | 0.00 | 0.000 | −0.12 | 0.00 | | 0.00 | 0.577 | −0.02 |
| Sleep impairment (SII) | 0.06 | *** | 0.00 | 0.000 | 0.56 | 0.07 | *** | 0.00 | 0.000 | 0.52 |
| Anger (DAR) | 0.04 | *** | 0.00 | 0.000 | 0.60 | 0.04 | | 0.00 | 0.000 | 0.52 |
| Alcohol risk (AUDIT-C) | 0.02 | *** | 0.00 | 0.000 | 0.11 | 0.01 | ** | 0.00 | 0.003 | 0.08 |
| Morale | −0.13 | *** | 0.01 | 0.000 | −0.37 | −0.12 | *** | 0.01 | 0.000 | −0.28 |
| Number of Traumatic Events (past year) | 0.03 | *** | 0.00 | 0.000 | 0.12 | 0.05 | *** | 0.01 | 0.000 | 0.20 |
| Deployment (past year) | −0.03 | | 0.02 | 0.156 | −0.03 | −0.02 | | 0.03 | 0.457 | −0.02 |

***Table I3.*** *Logistic regression to predict K10 and PCL-4 outcomes at T1*

| | K10 | | | | | | | PCL-4 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Logistic regression Estimate | | SE | p | OR | 95% CI LB | 95% CI UB | Logistic regression Estimate | | SE | p | OR | 95% CI LB | 95% CI UB |
| Age | −0.04 | *** | 0.01 | 0.001 | 0.96 | 0.94 | 0.98 | 0.00 | | 0.01 | 0.732 | 1.00 | 0.98 | 1.03 |
| Gender (Male) | −0.62 | *** | 0.13 | 0.000 | 0.54 | 0.42 | 0.70 | −0.79 | *** | 0.18 | 0.000 | 0.45 | 0.32 | 0.65 |
| Relationship status (reference: Single) | | | | | | | | | | | | | | |
| Married/cohabitating | −0.06 | | 0.13 | 0.662 | 0.94 | 0.73 | 1.22 | 0.16 | | 0.61 | 0.371 | 1.17 | 0.82 | 1.66 |
| DSW | −1.56 | | 1.01 | 0.124 | 0.21 | 0.01 | 0.98 | 0.53 | | 0.81 | 0.388 | 1.69 | 0.40 | 4.80 |
| Number of children | 0.04 | | 0.09 | 0.631 | 1.04 | 0.87 | 1.22 | 0.17 | | 0.10 | 0.093 | 1.18 | 0.96 | 1.41 |
| Education (ref: Completed Year 12) | | | | | | | | | | | | | | |
| Completed Year 10 | −2.07 | *** | 0.36 | 0.000 | 0.13 | 0.06 | 0.24 | −2.11 | *** | 0.59 | 0.000 | 0.12 | 0.03 | 0.32 |
| Post school training | −0.95 | *** | 0.21 | 0.000 | 0.39 | 0.25 | 0.57 | −0.51 | | 0.27 | 0.061 | 0.60 | 0.34 | 0.99 |
| Tertiary | 0.43 | ** | 0.13 | 0.001 | 1.54 | 1.18 | 2.00 | 0.59 | ** | 0.18 | 0.001 | 1.81 | 1.25 | 2.57 |
| ADF Service (reference: Army) | | | | | | | | | | | | | | |
| Navy | 0.79 | *** | 0.13 | 0.000 | 2.21 | 1.72 | 2.83 | 0.93 | *** | 0.18 | 0.000 | 2.53 | 1.77 | 3.59 |
| Air Force | 0.81 | *** | 0.14 | 0.000 | 2.24 | 1.70 | 2.94 | 0.97 | *** | 0.20 | 0.000 | 2.64 | 1.78 | 3.86 |
| Military experience (Yes) | 0.52 | *** | 0.12 | 0.000 | 1.68 | 1.34 | 2.10 | 0.58 | *** | 0.16 | 0.000 | 1.79 | 1.29 | 2.44 |
| Family/Friend Social Support | −0.21 | *** | 0.04 | 0.000 | 0.81 | 0.75 | 0.87 | −0.30 | *** | 0.05 | 0.000 | 0.74 | 0.68 | 0.81 |
| Family/Friend Negative Social Interactions | 0.22 | *** | 0.02 | 0.000 | 1.25 | 1.19 | 1.31 | 0.21 | *** | 0.03 | 0.000 | 1.24 | 1.16 | 1.33 |
| Coping styles | | | | | | | | | | | | | | |
| Acceptance | −0.44 | *** | 0.05 | 0.000 | 0.64 | 0.58 | 0.71 | −0.45 | *** | 0.06 | 0.000 | 0.64 | 0.56 | 0.72 |
| Reappraisal | −0.29 | *** | 0.04 | 0.000 | 0.75 | 0.70 | 0.81 | −0.28 | *** | 0.05 | 0.000 | 0.75 | 0.68 | 0.83 |
| Self-blame | 0.64 | *** | 0.04 | 0.000 | 1.89 | 1.75 | 2.05 | 0.68 | *** | 0.05 | 0.000 | 1.97 | 1.78 | 2.18 |
| Avoidance | 0.47 | *** | 0.06 | 0.000 | 1.59 | 1.41 | 1.80 | 0.55 | *** | 0.09 | 0.000 | 1.73 | 1.46 | 2.05 |
| Risk-taking | 0.87 | *** | 0.08 | 0.000 | 2.39 | 2.03 | 2.82 | 0.85 | *** | 0.10 | 0.000 | 2.35 | 1.91 | 2.86 |
| Support-seeking | −0.08 | *** | 0.02 | 0.000 | 0.93 | 0.89 | 0.96 | −0.08 | ** | 0.03 | 0.006 | 0.93 | 0.88 | 0.98 |
| Sleep impairment (SII) | 0.48 | *** | 0.02 | 0.000 | 1.62 | 1.55 | 1.70 | 0.45 | *** | 0.03 | 0.000 | 1.57 | 1.49 | 1.66 |
| Anger (DAR) | 0.33 | *** | 0.02 | 0.000 | 1.39 | 1.34 | 1.44 | 0.30 | *** | 0.02 | 0.000 | 1.36 | 1.30 | 1.41 |
| Alcohol risk (AUDIT-C) | 0.08 | *** | 0.02 | 0.000 | 1.09 | 1.05 | 1.13 | 0.11 | *** | 0.03 | 0.000 | 1.12 | 1.05 | 1.18 |

*Note*. ADF = Australian Defence Force; SE = standard error; LB = lower bound; UB = upper bound. *p < 0.05, **p < 0.01, ***p < 0.001.

***Table I4.*** *Logistic regression to predict K10 and PCL-4 outcomes at T2*

| | K10 | | | | | | | PCL-4 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Logistic regression Estimate | | SE | p | OR | 95% CI LB | 95% CI UB | Logistic regression Estimate | | SE | p | OR | 95% CI LB | 95% CI UB |
| Age | −0.02 | *** | 0.01 | 0.000 | 0.98 | 0.96 | 0.99 | −0.02 | * | 0.01 | 0.012 | 0.98 | 0.96 | 0.99 |
| Gender (Male) | −0.33 | *** | 0.08 | 0.000 | 0.72 | 0.61 | 0.85 | −0.37 | ** | 0.11 | 0.001 | 0.69 | 0.56 | 0.87 |
| Relationship status (reference: Single) | | | | | | | | | | | | | | |
| Married/cohabitating | −0.01 | | 0.07 | 0.877 | 0.99 | 0.87 | 1.13 | −0.15 | | 0.10 | 0.131 | 0.86 | 0.71 | 1.04 |
| DSW | −0.41 | | 0.34 | 0.231 | 0.66 | 0.32 | 1.25 | 0.55 | | 0.36 | 0.120 | 1.74 | 0.82 | 3.35 |
| Number of children | −0.13 | * | 0.06 | 0.025 | 0.88 | 0.79 | 0.98 | −0.05 | | 0.08 | 0.528 | 0.95 | 0.81 | 1.10 |
| ADF Service (reference: Army) | | | | | | | | | | | | | | |
| Navy | 0.36 | *** | 0.07 | 0.000 | 1.43 | 1.24 | 1.66 | 0.19 | | 0.10 | 0.069 | 1.21 | 0.98 | 1.47 |
| Air Force | 0.01 | | 0.09 | 0.921 | 1.01 | 0.85 | 1.20 | −0.13 | | 0.13 | 0.299 | 0.87 | 0.67 | 1.12 |
| Family/Friend Social Support | −0.27 | *** | 0.02 | 0.000 | 0.76 | 0.73 | 0.79 | −0.28 | *** | 0.02 | 0.000 | 0.76 | 0.72 | 0.79 |
| Family/Friend Negative Social Interactions | 0.15 | *** | 0.01 | 0.000 | 1.16 | 1.13 | 1.20 | 0.17 | *** | 0.02 | 0.000 | 1.18 | 1.14 | 1.23 |
| Peer Social Support | | | | | | | | | | | | | | |
| ADF Peer Negative Social Interactions | 0.30 | *** | 0.01 | 0.000 | 1.35 | 1.30 | 1.39 | 0.28 | *** | 0.02 | 0.000 | 1.32 | 1.26 | 1.38 |
| Superior Social Support | | | | | | | | | | | | | | |
| ADF Superior Negative Social Interactions | 0.27 | *** | 0.02 | 0.000 | 1.30 | 1.26 | 1.35 | 0.21 | *** | 0.02 | 0.000 | 1.24 | 1.19 | 1.29 |
| Coping styles | | | | | | | | | | | | | | |
| Acceptance | −0.43 | *** | 0.03 | 0.000 | 0.65 | 0.61 | 0.69 | −0.42 | *** | 0.04 | 0.000 | 0.66 | 0.61 | 0.71 |
| Reappraisal | −0.30 | *** | 0.02 | 0.000 | 0.74 | 0.71 | 0.77 | −0.31 | *** | 0.03 | 0.000 | 0.73 | 0.69 | 0.77 |
| Self-blame | 0.47 | *** | 0.02 | 0.000 | 1.59 | 1.53 | 1.66 | 0.52 | *** | 0.03 | 0.000 | 1.68 | 1.59 | 1.77 |
| Avoidance | 0.35 | *** | 0.04 | 0.000 | 1.42 | 1.33 | 1.52 | 0.47 | *** | 0.05 | 0.000 | 1.60 | 1.45 | 1.76 |
| Risk-taking | 0.46 | *** | 0.05 | 0.000 | 1.59 | 1.45 | 1.74 | 0.54 | *** | 0.05 | 0.000 | 1.72 | 1.54 | 1.91 |
| Support-seeking | −0.02 | | 0.01 | 0.058 | 0.98 | 0.96 | 1.00 | −0.03 | * | 0.02 | 0.028 | 0.97 | 0.94 | 1.00 |
| Sleep impairment (SII) | 0.36 | *** | 0.01 | 0.000 | 1.43 | 1.39 | 1.47 | 0.33 | *** | 0.02 | 0.000 | 1.39 | 1.35 | 1.44 |
| Anger (DAR) | 0.20 | *** | 0.01 | 0.000 | 1.22 | 1.20 | 1.24 | 0.17 | *** | 0.01 | 0.000 | 1.19 | 1.17 | 1.21 |
| Alcohol risk (AUDIT-C) | 0.02 | | 0.02 | 0.422 | 1.02 | 0.98 | 1.05 | 0.04 | | 0.02 | 0.123 | 1.04 | 0.99 | 1.09 |
| Peer Social Support | −0.34 | *** | 0.03 | 0.000 | 0.71 | 0.67 | 0.75 | −0.37 | *** | 0.03 | 0.000 | 0.69 | 0.65 | 0.74 |
| Leader Social Support | −0.24 | *** | 0.02 | 0.000 | 0.78 | 0.75 | 0.82 | −0.252 | *** | 0.0279 | 0.000 | 0.78 | 0.74 | 0.82 |
| Traumatic events | 0.08 | *** | 0.01 | 0.000 | 1.09 | 1.06 | 1.11 | 0.1318 | *** | 0.0158 | 0.000 | 1.14 | 1.11 | 1.18 |

*Note*. ADF = Australian Defence Force; SE = standard error; LB = lower bound; UB = upper bound. *p < 0.05, **p < 0.01, ***p < 0.001.

***Table I5.*** *Logistic regression to predict K10 and PCL-4 outcomes at T3*

| | K10 | | | | | | | PCL-4 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Logistic regression Estimate | | SE | p | OR | 95% CI LB | 95% CI UB | Logistic regression Estimate | | SE | p | OR | 95% CI LB | 95% CI UB |
| ADF Service (reference: Army) | | | | | | | | | | | | | | |
| Navy | 0.40 | ** | 0.14 | 0.005 | 1.49 | 1.13 | 1.95 | 0.61 | *** | 0.16 | 0.000 | 1.83 | 1.33 | 2.51 |
| Air Force | −0.08 | | 0.14 | 0.556 | 0.92 | 0.70 | 1.21 | −0.11 | | 0.18 | 0.553 | 0.90 | 0.63 | 1.27 |
| Family/Friend Social Support | −0.25 | *** | 0.03 | 0.000 | 0.78 | 0.73 | 0.82 | −0.22 | *** | 0.03 | 0.000 | 0.80 | 0.75 | 0.85 |
| Family/Friend Negative Social Interactions | 0.10 | *** | 0.02 | 0.000 | 1.11 | 1.06 | 1.16 | 0.05 | | 0.03 | 0.068 | 1.05 | 1.00 | 1.12 |
| Peer Social Support | −0.46 | *** | 0.05 | 0.000 | 0.64 | 0.58 | 0.70 | −0.37 | *** | 0.05 | 0.000 | 0.69 | 0.63 | 0.77 |
| ADF Peer Negative Social Interactions | 0.28 | *** | 0.03 | 0.000 | 1.32 | 1.24 | 1.42 | 0.20 | *** | 0.04 | 0.000 | 1.23 | 1.14 | 1.32 |
| Superior Social Support | −0.28 | *** | 0.04 | 0.000 | 0.76 | 0.70 | 0.82 | −0.18 | *** | 0.05 | 0.000 | 0.83 | 0.76 | 0.91 |
| ADF Superior Negative Social Interactions | 0.22 | *** | 0.03 | 0.000 | 1.25 | 1.17 | 1.33 | 0.16 | *** | 0.04 | 0.000 | 1.17 | 1.09 | 1.26 |
| Coping styles | | | | | | | | | | | | | | |
| Acceptance | −0.33 | *** | 0.05 | 0.000 | 0.72 | 0.65 | 0.79 | −0.33 | *** | 0.05 | 0.000 | 0.72 | 0.65 | 0.80 |
| Reappraisal | −0.24 | *** | 0.04 | 0.000 | 0.79 | 0.73 | 0.85 | −0.13 | ** | 0.04 | 0.002 | 0.88 | 0.80 | 0.95 |
| Self-blame | 0.53 | *** | 0.04 | 0.000 | 1.70 | 1.57 | 1.84 | 0.47 | *** | 0.04 | 0.000 | 1.60 | 1.46 | 1.74 |
| Avoidance | 0.53 | *** | 0.07 | 0.000 | 1.71 | 1.50 | 1.95 | 0.55 | *** | 0.08 | 0.000 | 1.73 | 1.48 | 2.02 |
| Risk-taking | 0.66 | *** | 0.09 | 0.000 | 1.94 | 1.64 | 2.32 | 0.64 | *** | 0.09 | 0.000 | 1.89 | 1.57 | 2.28 |
| Support-seeking | −0.05 | ** | 0.02 | 0.007 | 0.95 | 0.91 | 0.99 | −0.02 | | 0.02 | 0.340 | 0.98 | 0.94 | 1.02 |
| Sleep impairment (SII) | 0.33 | *** | 0.02 | 0.000 | 1.39 | 1.33 | 1.45 | 0.31 | *** | 0.02 | 0.000 | 1.36 | 1.31 | 1.43 |
| Anger (DAR) | 0.21 | *** | 0.01 | 0.000 | 1.23 | 1.20 | 1.26 | 0.16 | *** | 0.01 | 0.000 | 1.18 | 1.15 | 1.21 |
| Alcohol risk (AUDIT-C) | 0.06 | ** | 0.02 | 0.008 | 1.06 | 1.01 | 1.10 | 0.06 | * | 0.02 | 0.010 | 1.07 | 1.02 | 1.12 |
| Traumatic events | 0.10 | * | 0.04 | 0.015 | 1.11 | 1.02 | 1.20 | 0.17 | *** | 0.04 | 0.000 | 1.18 | 1.08 | 1.29 |
| Deployment | 0.38 | | 0.21 | 0.071 | 1.46 | 0.96 | 2.18 | 0.49 | * | 0.24 | 0.044 | 1.63 | 0.99 | 2.57 |
| Morale | −0.53 | *** | 0.06 | 0.000 | 0.59 | 0.52 | 0.66 | −0.39 | *** | 0.07 | 0.000 | 0.68 | 0.60 | 0.77 |

Note. ADF = Australian Defence Force; SE = standard error; LB = lower bound; UB = upper bound. *p < 0.05, **p < 0.01, ***p < 0.001.

***Table I6.*** *Logistic regression to predict K10 and PCL-4 outcomes at T4*

| | K10 | | | | | | | PCL-4 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Logistic regression Estimate** | | **SE** | **p** | **OR** | **95% CI LB** | **95% CI UB** | **Logistic regression Estimate** | | **SE** | **p** | **OR** | **95% CI LB** | **95% CI UB** |
| ADF Service (reference: Army) | | | | | | | | | | | | | | |
| Navy | 0.29 | | 0.16 | 0.066 | 1.34 | 0.98 | 1.82 | 0.41 | * | 0.18 | 0.020 | 1.51 | 1.06 | 2.14 |
| Air Force | 0.04 | | 0.16 | 0.817 | 1.04 | 0.76 | 1.41 | 0.22 | | 0.18 | 0.214 | 1.25 | 0.88 | 1.76 |
| Family/Friend Social Support | −0.27 | *** | 0.03 | 0.000 | 0.76 | 0.72 | 0.81 | −0.27 | *** | 0.03 | 0.000 | 0.76 | 0.71 | 0.81 |
| Family/Friend Negative Social Interactions | 0.12 | *** | 0.03 | 0.000 | 1.12 | 1.07 | 1.18 | 0.09 | *** | 0.03 | 0.003 | 1.09 | 1.03 | 1.16 |
| Coping styles | | | | | | | | | | | | | | |
| Acceptance | −0.46 | *** | 0.05 | 0.000 | 0.63 | 0.57 | 0.70 | −0.44 | *** | 0.06 | 0.000 | 0.65 | 0.58 | 0.72 |
| Reappraisal | −0.37 | *** | 0.04 | 0.000 | 0.69 | 0.63 | 0.75 | −0.38 | *** | 0.05 | 0.000 | 0.69 | 0.63 | 0.75 |
| Self-blame | 0.60 | *** | 0.05 | 0.000 | 1.82 | 1.66 | 2.00 | 0.57 | *** | 0.05 | 0.000 | 1.77 | 1.61 | 1.96 |
| Avoidance | 0.53 | *** | 0.08 | 0.000 | 1.70 | 1.47 | 1.97 | 0.41 | *** | 0.08 | 0.000 | 1.51 | 1.29 | 1.78 |
| Risk-taking | 0.75 | *** | 0.10 | 0.000 | 2.11 | 1.75 | 2.56 | 0.72 | *** | 0.10 | 0.000 | 2.05 | 1.69 | 2.50 |
| Support-seeking | −0.10 | *** | 0.02 | 0.000 | 0.90 | 0.87 | 0.94 | −0.04 | | 0.02 | 0.072 | 0.96 | 0.91 | 1.00 |
| Sleep impairment (SII) | 0.37 | *** | 0.03 | 0.000 | 1.45 | 1.38 | 1.52 | 0.30 | *** | 0.02 | 0.000 | 1.35 | 1.29 | 1.42 |
| Anger (DAR) | 0.21 | *** | 0.02 | 0.000 | 1.23 | 1.19 | 1.27 | 0.18 | *** | 0.01 | 0.000 | 1.19 | 1.16 | 1.23 |
| Alcohol risk (AUDIT-C) | 0.06 | * | 0.03 | 0.028 | 1.06 | 1.01 | 1.12 | 0.08 | * | 0.03 | 0.012 | 1.08 | 1.02 | 1.15 |
| Traumatic events | 0.11 | * | 0.05 | 0.030 | 1.12 | 1.01 | 1.23 | 0.23 | *** | 0.05 | 0.000 | 1.25 | 1.13 | 1.40 |
| Deployment | 0.07 | | 0.16 | 0.678 | 1.07 | 0.78 | 1.46 | −0.18 | | 0.19 | 0.350 | 0.84 | 0.57 | 1.21 |
| Service Use | | | | | | | | | | | | | | |
| Morale | −0.61 | *** | 0.06 | 0.000 | 0.54 | 0.48 | 0.61 | −0.42 | *** | 0.07 | 0.000 | 0.66 | 0.58 | 0.75 |

*Note*. ADF = Australian Defence Force; SE = standard error; LB = lower bound; UB = upper bound. *p < 0.05, **p < 0.01, ***p < 0.001.

***Table I7.*** *Logistic regression to predict K10 and PCL-4 outcomes at T5*

| | K10 | | | | | | | PCL-4 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Logistic regression Estimate** | | **SE** | **p** | **OR** | **95% CI LB** | **95% CI UB** | **Logistic regression Estimate** | | **SE** | **p** | **OR** | **95% CI LB** | **95% CI UB** |
| ADF Service (reference: Army) | | | | | | | | | | | | | | |
| Navy | 0.25 | | 0.16 | 0.115 | 1.29 | 0.94 | 1.76 | 0.24 | | 0.18 | 0.170 | 1.27 | 0.90 | 1.79 |
| Air Force | −0.17 | | 0.16 | 0.277 | 0.84 | 0.62 | 1.14 | −0.26 | | 0.18 | 0.145 | 0.77 | 0.54 | 1.09 |
| Family/Friend Social Support | −0.31 | *** | 0.03 | 0.000 | 0.73 | 0.68 | 0.78 | −0.28 | *** | 0.03 | 0.000 | 0.76 | 0.71 | 0.81 |
| Family/Friend Negative Social Interactions | 0.11 | *** | 0.03 | 0.000 | 1.11 | 1.06 | 1.18 | 0.11 | *** | 0.03 | 0.000 | 1.11 | 1.05 | 1.18 |
| Coping styles | | | | | | | | | | | | | | |
| Acceptance | −0.29 | *** | 0.05 | 0.000 | 0.74 | 0.68 | 0.82 | −0.29 | *** | 0.05 | 0.000 | 0.75 | 0.68 | 0.83 |
| Reappraisal | −0.34 | *** | 0.05 | 0.000 | 0.71 | 0.65 | 0.78 | −0.27 | *** | 0.05 | 0.000 | 0.77 | 0.70 | 0.84 |
| Self-blame | 0.56 | *** | 0.05 | 0.000 | 1.76 | 1.60 | 1.93 | 0.58 | *** | 0.05 | 0.000 | 1.78 | 1.62 | 1.97 |
| Avoidance | 0.35 | *** | 0.08 | 0.000 | 1.42 | 1.22 | 1.66 | 0.33 | *** | 0.08 | 0.000 | 1.39 | 1.18 | 1.64 |
| Risk-taking | 0.63 | *** | 0.10 | 0.000 | 1.88 | 1.55 | 2.29 | 0.68 | *** | 0.10 | 0.000 | 1.97 | 1.62 | 2.40 |
| Support-seeking | −0.08 | ** | 0.02 | 0.001 | 0.92 | 0.88 | 0.97 | −0.05 | * | 0.02 | 0.049 | 0.95 | 0.91 | 1.00 |
| Sleep impairment (SII) | 0.34 | *** | 0.02 | 0.000 | 1.40 | 1.34 | 1.48 | 0.34 | *** | 0.03 | 0.000 | 1.40 | 1.34 | 1.48 |
| Anger (DAR) | 0.24 | *** | 0.02 | 0.000 | 1.27 | 1.23 | 1.31 | 0.22 | *** | 0.02 | 0.000 | 1.25 | 1.21 | 1.29 |
| Alcohol risk (AUDIT-C) | 0.07 | ** | 0.02 | 0.004 | 1.07 | 1.02 | 1.12 | 0.03 | | 0.03 | 0.187 | 1.03 | 0.98 | 1.09 |
| Traumatic events | 0.09 | * | 0.05 | 0.048 | 1.09 | 1.00 | 1.20 | 0.20 | *** | 0.05 | 0.000 | 1.22 | 1.11 | 1.34 |
| Deployment | 0.15 | | 0.15 | 0.316 | 1.16 | 0.86 | 1.57 | −0.07 | | 0.174 | 0.681 | 0.93 | 0.66 | 1.30 |
| Morale | −0.66 | *** | 0.06 | 0.000 | 0.52 | 0.46 | 0.59 | −0.56 | *** | 0.07 | 0.000 | 0.57 | 0.50 | 0.65 |

*Note*. ADF = Australian Defence Force; SE = standard error; LB = lower bound; UB = upper bound. *p < 0.05, **p < 0.01, ***p < 0.001.

Similar to the findings of the linear Poisson regressions, the same pattern of variables were predictive of the K10 and PCL-4 across the time points, indicating that the effect of these variables on outcome is consistent across time. Of particular note, across time the coping styles again were significantly predictive of K10 and PCL-4 outcomes. In particular, higher self-blame, avoidance and risk-taking were associated with greater likelihood of scoring above the cut-off for the K10 and PCL-4 at each time point. Higher acceptance, reappraisal and support-seeking were associated with reduced likelihood of scoring above the cut-offs for both main outcomes across time, with support-seeking having the least association with outcome. In addition, higher social support (family/friend, peer and leader support) was significantly associated with reduced likelihood of scoring above the cut-off for the K10 and the PCL-4 across time. Similarly, more sleep impairment and more anger, as well as higher alcohol use, were all associated with increased likelihood of being categorised as 'high' (i.e. above the cut-off) for both the K10 and PCL-4 at all times. Service branch was also significantly associated with both outcomes – namely, being in the Navy (compared to in the Army) was associated with significantly greater likelihood of being above the cut-off on both the K10 across all time points except T2, but not the PCL-4. Being in the Air Force was only significantly associated with greater likelihood of being 'high' on the K10 and PCL-4 at T1. Other variables only available at latter time points (T3–T5), such as deployment, were either not or not consistently associated with K10 and PCL-4 outcomes. Where there were significant associations, these were very small. Higher morale at T3–T5 was associated with significantly reduced likelihood of scoring above the cut-off on the K10 and PCL-4.

# Appendix J: Regressions to predict PHQ outcome

***Table J1***. *Poisson regression to predict PHQ outcome at T1*

| | Poisson Regression | | | | |
|---|---|---|---|---|---|
| | **Estimate** | | **SE** | **p** | **β** |
| Age | 0.00 | | 0.00 | 0.539 | 0.01 |
| Gender (Male) | −0.81 | *** | 0.04 | 0.000 | −0.21 |
| Relationship status (reference: Single) | | | | | |
| Married/cohabitating | 0.16 | *** | 0.04 | 0.000 | 0.04 |
| DSW | −0.24 | | 0.20 | 0.225 | −0.01 |
| Number of children | 0.03 | | 0.03 | 0.280 | 0.01 |
| Education (reference: Completed Year 12) | | | | | |
| Completed Year 10 | −1.55 | *** | 0.11 | 0.000 | −0.15 |
| Post school training | −0.37 | *** | 0.06 | 0.000 | −0.06 |
| Tertiary | 0.62 | *** | 0.04 | 0.000 | 0.17 |
| ADF Service (reference: Army) | | | | | |
| Navy | 0.71 | *** | 0.04 | 0.000 | 0.17 |
| Air Force | 0.63 | *** | 0.05 | 0.000 | 0.13 |
| Military experience (Yes) | 0.42 | *** | 0.04 | 0.000 | 0.11 |
| Family/Friend Social Support | −0.16 | *** | 0.01 | 0.000 | −0.14 |
| Family/Friend Negative Social Interactions | 0.13 | *** | 0.01 | 0.000 | 0.17 |
| Coping styles | | | | | |
| Acceptance | −0.24 | *** | 0.02 | 0.000 | −0.16 |
| Reappraisal | −0.17 | *** | 0.01 | 0.000 | −0.14 |
| Self-blame | 0.39 | *** | 0.01 | 0.000 | 0.38 |
| Avoidance | 0.23 | *** | 0.02 | 0.000 | 0.11 |
| Risk-taking | 0.47 | *** | 0.03 | 0.000 | 0.19 |
| Support-seeking | −0.02 | *** | 0.01 | 0.001 | −0.04 |
| Sleep impairment (SII) | 0.25 | *** | 0.01 | 0.000 | 0.52 |
| Anger (DAR) | 0.16 | *** | 0.00 | 0.000 | 0.46 |
| Alcohol risk (AUDIT-C) | 0.07 | *** | 0.01 | 0.000 | 0.10 |

***Table J2.*** *Poisson regression to predict PHQ outcome at T2*

| | Poisson Regression | | | | |
|---|---|---|---|---|---|
| | **Estimate** | | **SE** | **p** | **β** |
| Age | 0.00 | * | 0.00 | 0.015 | 0.02 |
| Gender (Male) | −0.51 | | 0.02 | 0.000 | −0.20 |
| Relationship status (reference: Single) | | | | | |
| Married/cohabitating | 0.09 | *** | 0.02 | 0.000 | 0.04 |
| DSW | 0.23 | ** | 0.09 | 0.009 | 0.02 |
| Number of children | 0.02 | | 0.02 | 0.293 | 0.01 |
| ADF Service (reference: Army) | | | | | |
| Navy | 0.27 | *** | 0.02 | 0.000 | 0.11 |
| Air Force | 0.07 | * | 0.03 | 0.015 | 0.02 |
| Social Support | | | | | |
| Family/Friend Social Support | −0.10 | *** | 0.01 | 0.000 | −0.15 |
| Family/Friend Negative Social Interactions | 0.05 | *** | <0.01 | 0.000 | 0.11 |
| Peer Social Support | −0.14 | *** | 0.01 | 0.000 | −0.17 |
| ADF Peer Negative Social Interactions | 0.12 | *** | 0.01 | 0.000 | 0.23 |
| Superior Social Support | −0.08 | *** | 0.01 | 0.000 | −0.12 |
| ADF Superior Negative Social Interactions | 0.18 | *** | 0.02 | 0.000 | 0.17 |
| Coping styles | | | | | |
| Acceptance | −0.13 | *** | 0.01 | 0.000 | −0.15 |
| Reappraisal | −0.10 | *** | 0.01 | 0.000 | −0.14 |
| Self-blame | 0.16 | *** | 0.01 | 0.000 | 0.25 |
| Avoidance | 0.12 | *** | 0.01 | 0.000 | 0.10 |
| Risk-taking | 0.16 | *** | 0.01 | 0.000 | 0.10 |
| Support-seeking | 0.00 | | 0.00 | 0.252 | −0.01 |
| Sleep impairment (SII) | 0.14 | *** | 0.00 | 0.000 | 0.42 |
| Anger (DAR) | 0.06 | *** | 0.00 | 0.000 | 0.33 |
| Morale | −0.21 | *** | 0.01 | 0.000 | −0.19 |
| Number of Traumatic Events (lifetime) | 0.07 | *** | 0.00 | 0.000 | 0.17 |

***Table J3.*** *Poisson regression to predict PHQ outcome at T3*

| | Poisson Regression | | | | |
|---|---|---|---|---|---|
| | **Estimate** | | **SE** | **p** | **β** |
| Gender (Male) | −0.52 | *** | 0.04 | 0.000 | −0.20 |
| ADF Service (reference: Army) | | | | | |
| Navy | 0.07 | | 0.05 | 0.157 | 0.02 |
| Air Force | −0.20 | *** | 0.05 | 0.000 | −0.07 |
| Family/Friend Social Support | −0.11 | *** | 0.01 | 0.000 | −0.19 |
| Family/Friend Negative Social Interactions | 0.03 | *** | 0.01 | 0.000 | 0.06 |
| Peer Social Support | −0.38 | *** | 0.04 | 0.000 | −0.24 |
| ADF Peer Negative Social Interactions | 0.18 | *** | 0.02 | 0.000 | 0.17 |
| Superior Social Support | −0.15 | *** | 0.01 | 0.000 | −0.19 |
| ADF Superior Negative Social Interactions | 0.07 | *** | 0.01 | 0.000 | 0.12 |
| Coping styles | | | | | |
| Acceptance | −0.12 | *** | 0.01 | 0.000 | −0.13 |
| Reappraisal | −0.07 | *** | 0.01 | 0.000 | −0.09 |
| Self-blame | 0.18 | *** | 0.01 | 0.000 | 0.25 |
| Avoidance | 0.17 | *** | 0.02 | 0.000 | 0.13 |
| Risk-taking | 0.25 | *** | 0.03 | 0.000 | 0.16 |
| Support-seeking | −0.02 | ** | 0.01 | 0.001 | −0.05 |
| Sleep impairment (SII) | 0.14 | *** | 0.00 | 0.000 | 0.43 |
| Anger (DAR) | 0.06 | *** | 0.00 | 0.000 | 0.32 |
| Alcohol risk (AUDIT-C) | 0.01 | | 0.01 | 0.375 | 0.01 |
| Morale | −0.25 | *** | 0.02 | 0.000 | −0.22 |
| Number of Traumatic Events (past year) | 0.08 | *** | 0.01 | 0.000 | 0.12 |
| Deployment (past year) | 0.07 | | 0.07 | 0.356 | 0.01 |

***Table J4.*** *Poisson regression to predict PHQ outcome at T4*

| | Poisson Regression | | | | |
|---|---|---|---|---|---|
| | **Estimate** | | **SE** | **p** | **β** |
| Gender (Male) | | *** | 0.04 | 0.000 | −0.18 |
| ADF Service (reference: Army) | | | | | |
| Navy | −0.04 | | 0.05 | 0.434 | −0.01 |
| Air Force | −0.08 | | 0.05 | 0.102 | −0.03 |
| Family/Friend Social Support | −0.10 | *** | 0.01 | 0.000 | −0.20 |
| Family/Friend Negative Social Interactions | 0.05 | *** | 0.01 | 0.000 | 0.10 |
| Coping styles | | | | | |
| Acceptance | −0.10 | *** | 0.02 | 0.000 | −0.12 |
| Reappraisal | −0.11 | *** | 0.01 | 0.000 | −0.16 |
| Self-blame | 0.15 | *** | 0.01 | 0.000 | 0.23 |
| Avoidance | 0.19 | *** | 0.02 | 0.000 | 0.15 |
| Risk-taking | 0.24 | *** | 0.03 | 0.000 | 0.16 |
| Support-seeking | −0.04 | *** | 0.01 | 0.000 | −0.11 |
| Sleep impairment (SII) | 0.13 | *** | 0.01 | 0.000 | 0.45 |
| Anger (DAR) | 0.06 | *** | 0.00 | 0.000 | 0.33 |
| Alcohol risk (AUDIT-C) | 0.03 | *** | 0.01 | 0.000 | 0.07 |
| Morale | −0.09 | *** | 0.02 | 0.000 | −0.23 |
| Number of Traumatic Events (past year) | 0.10 | *** | 0.01 | 0.000 | 0.15 |
| Deployment (past year ) | −0.17 | ** | 0.05 | 0.002 | −0.05 |

***Table J5.*** *Poisson regression to predict PHQ outcome at T5*

| | Poisson Regression | | | | |
|---|---|---|---|---|---|
| | **Estimate** | | **SE** | **p** | **β** |
| Gender (Male) | −0.52 | *** | 0.04 | 0.000 | −0.21 |
| ADF Service (reference: Army) | | | | | |
| Navy | 0.05 | | 0.05 | 0.320 | 0.02 |
| Air Force | −0.14 | ** | 0.05 | 0.004 | −0.05 |
| Family/Friend Social Support | −0.11 | *** | 0.01 | 0.000 | −0.23 |
| Family/Friend Negative Social Interactions | 0.15 | *** | 0.03 | 0.000 | 0.14 |
| Coping styles | | | | | |
| Acceptance | −0.09 | *** | 0.01 | 0.000 | −0.12 |
| Reappraisal | −0.09 | *** | 0.01 | 0.000 | −0.13 |
| Self-blame | 0.15 | *** | 0.01 | 0.000 | 0.23 |
| Avoidance | 0.09 | *** | 0.02 | 0.000 | 0.07 |
| Risk-taking | 0.27 | *** | 0.03 | 0.000 | 0.19 |
| Support-seeking | −0.03 | *** | 0.01 | 0.000 | −0.07 |
| Sleep impairment (SII) | 0.13 | *** | 0.00 | 0.000 | 0.46 |
| Anger (DAR) | 0.06 | *** | 0.00 | 0.000 | 0.36 |
| Alcohol risk (AUDIT-C) | 0.01 | | 0.01 | 0.129 | 0.03 |
| Morale | −0.23 | *** | 0.02 | 0.000 | −0.24 |
| Number of Traumatic Events (past year) | 0.09 | *** | 0.01 | 0.000 | 0.17 |
| Deployment (past year) | 0.09 | * | 0.05 | 0.050 | 0.03 |

***Table J6.*** *Time-lagged regression to predict PHQ outcome from T1 to T2*

| | Poisson Regression | | | | |
|---|---|---|---|---|---|
| | **Estimate** | | **SE** | **p** | **β** |
| T1 PHQ (stability coefficient) | 0.12 | | 0.01 | 0.000 | 0.25 |
| Age | 0.00 | * | 0.00 | 0.046 | 0.02 |
| Gender (Male) | −0.40 | *** | 0.03 | 0.000 | −0.15 |
| Relationship status (reference: Single) | | | | | |
| Married/cohabitating | 0.05 | | 0.03 | 0.064 | 0.02 |
| DSW | 0.23 | * | 0.11 | 0.041 | 0.02 |
| Number of children | 0.01 | | 0.02 | 0.597 | 0.01 |
| Education (reference: Completed Year 12) | | | | | |
| Completed Year 10 | 0.18 | *** | 0.04 | 0.000 | 0.06 |
| Post school training | 0.09 | * | 0.04 | 0.012 | 0.03 |
| Tertiary | −0.01 | | 0.04 | 0.683 | −0.01 |
| ADF Service (reference: Army) | | | | | |
| Navy | 0.19 | *** | 0.03 | 0.000 | 0.07 |
| Air Force | −0.03 | | 0.04 | 0.345 | −0.02 |
| Military experience (Yes) | −0.09 | ** | 0.03 | 0.002 | −0.04 |
| Family/Friend Social Support | −0.02 | ** | 0.01 | 0.008 | −0.03 |
| Family/Friend Negative Social Interactions | 0.07 | *** | 0.02 | 0.000 | 0.07 |
| Coping styles | | | | | |
| Acceptance | −0.07 | *** | 0.01 | 0.000 | −0.07 |
| Reappraisal | −0.02 | | 0.01 | 0.094 | −0.01 |
| Self-blame | 0.02 | | 0.01 | 0.102 | 0.01 |
| Avoidance | 0.05 | ** | 0.01 | 0.001 | 0.03 |
| Risk-taking | −0.01 | | 0.03 | 0.704 | 0.00 |
| Support-seeking | 0.01 | * | 0.00 | 0.030 | 0.03 |
| Sleep impairment (SII) | 0.03 | *** | 0.01 | 0.000 | 0.04 |
| Anger (DAR) | 0.01 | ** | 0.00 | 0.005 | 0.03 |
| Alcohol risk (AUDIT-C) | −0.01 | | 0.00 | 0.126 | −0.02 |

# Appendix K: Latent trajectory models

For each model, a series of statistical indices were produced to identify models that fit the data in absolute sense (criteria which suggest very good fit in parentheses), and included the CFI (> 0.95), SRMR (< 0.05) and RMSEA (< 0.06). The AIC and BIC were examined to facilitate comparisons across models (with smaller values indicating superior fit).

These fit indices for alternative models describing attributes of the latent trajectories underlying repeated measures across time are presented in Table K1. These include separate models which were estimated for each outcome variable including the K10, PHQ-S, PCL-4, DAR, SII, AUDIT-C and the CDRISC-2. All these analyses were conducted in Mplus version 8 (Muthén & Muthén, 2017) using robust maximum likelihood (MLR) estimation (which is robust to violations of the normality assumption), and full information maximum likelihood (FIML) to utilise all available data. Parameter estimates are presented separately by measure for the best-fitting model only.

*K10*

Table K1 indicates that the intercept-only model provided poor fit to data about change in K10 scores, as indicated by CFI and RMSEA values well outside acceptable ranges. The linear model was associated with relative improvements according to the AIC and BIC, but still provided poor fit according to the CFI and SRMR. The inclusion of a quadratic term that captured curvature in trajectories suggested further improvements in fit according to the AIC and BIC, as well as approximate fit indices which were in the desired ranges. This quadratic model was thus accepted as ‘best fitting’.

Parameter estimates for the best fitting (quadratic) model of change in K10 scores are shown in Table K2. These suggest trajectories which are decreasing modestly on average across the early time points of assessment (as indicated by the negative mean estimate for the instantaneous slope), but with attenuation in declines and increasingly positive slopes across later time points. The latter suggest modestly increasing escalation in levels of psychological distress over time.

The general shape of this mean trajectory is illustrated in panel (a) of Figure 4. Statistically significant variance terms for all parameters suggest meaningful between-person differences in starting points (intercept), rate of change (slope) and the degree of attenuation (quadratic).

*PHQ-S*

Fit indices for analyses of the PHQ-S indicate that the quadratic model was preferred, while the linear model was also acceptable (although the CFI was marginal). The quadratic model encountered initial estimation difficulties which required that the variance of the quadratic term (indicting individual differences in the degree of curvature in slopes) was constrained to zero.

Table K2 shows parameter estimates for the best fitting (quadratic) model of change in PHQ-S scores. These also suggest trajectories which are decreasing modestly on average across the

early time points of assessment, and with attenuation in declines and increasingly positive slopes across the latter time points. The general shape of this mean trajectory is illustrated in panel (b) of Figure 4. The variance estimates indicated significant between-person variation in starting points (intercept) and the instantaneous rate of change (slope), but no such heterogeneity in the degree of attenuation (quadratic).

*PCL-4*

Approximate fit indices indicated good fit for the linear and quadratic models (Table K1), with CFI, SRMR and RMSEA values well above (or below) the maximum (minimum) values. However, the linear model was identified as preferred on the basis of model parsimony (whereby relatively simple models are preferred when all else is equal), as well as the AIC and BIC which were lowest for this model. Table K2 shows parameter estimates for the linear model of change in PCL-4 scores. These suggest trajectories which are increasing on average across the duration of the study, with significant between person variation in both starting points and the rates of change. The general shape of this mean trajectory is illustrated in panel (c) of Figure 4.

***Table K1.*** *Unconditional growth curve models across all measures*

| Model | Model fit | *Psychological distress (K10)* | *Somatic symptoms (PHQ-S)* | *Traumatic stress (PCL-4)* | *Anger (DAR)* | *Sleep impairment (SII)* | *Alcohol use (AUDIT-C)* | *Resilience (CDRISC-2)* |
|---|---|---|---|---|---|---|---|---|
| Intercept | $X^2$ (df) | 133.75 (8) | 59.84 (8) | 119.75 (8) | 54.55 (8) | 247.44 (8) | 26.88 (4) | 143.59 (8) |
| | CFI | 0.70 | 0.88 | 0.50 | 0.90 | 0.64 | 0.95 | 0.71 |
| | SRMR | 0.12 | 0.06 | 0.11 | 0.08 | 0.12 | 0.05 | 0.11 |
| | RMSEA | 0.06 | 0.04 | 0.05 | 0.03 | 0.08 | 0.05 | 0.06 |
| | AIC (BIC) | 56856.57 (56896.01) | 41402.35 (41441.81) | 39025.60 (39064.99) | 52368.18 (52407.45) | 45647.6 (45687.11) | 18360.08 (18389.36) | 28917.31 (28956.73) |
| Linear | $X^2$ (df) | 60.53 (5) | 40.43 (5) | 3.66 (5) | 26.75 (5) | 29.73 (5) | 19.46 (3) | 10.99 (5) |
| | CFI | 0.87 | 0.92 | 1.00 | 0.95 | 0.96 | 0.97 | 0.99 |
| | SRMR | 0.07 | 0.04 | 0.02 | 0.05 | 0.04 | 0.05 | 0.03 |
| | RMSEA | 0.05 | 0.04 | 0.00 | 0.03 | 0.03 | 0.05 | 0.02 |
| | AIC (BIC) | 56743.40 (56802.56) | 41381.01 (41440.19) | 38828.99 (38888.08) | 52328.89 (52387.80) | 45390.19 (45449.36) | 18354.84 (18389.84) | 28767.95 (28827.08) |
| Quadratic | $X^2$ (df) | 18.66 (1) | 5.85 (4) | 0.16 (1) | 3.41 (1) | 1.76 (1) | | 5.28 (4) |
| | CFI | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 |
| | SRMR | 0.02 | 0.02 | 0.00 | 0.01 | 0.01 | | 0.02 |
| | RMSEA | 0.06 | 0.01 | 0.00 | 0.02 | 0.01 | | 0.01 |
| | AIC (BIC) | 56668.14 (56753.58) | 41331.57 (41397.33) | 38830.07 (38915.43) | 52297.14 (52382.23) | 45362.58 (45448.05) | | 28763.32 (28829.02) |

*Note.* CFI = comparative fit index; SRMR = standardised root mean square residual; RMSEA = root mean square error of approximation; AIC (BIC) = Akaike's information criterion (Bayesian information criterion).

***Table K2.*** *Parameter estimates for the main outcomes from the best fitting LTM analyses*

| | | ***Psychological distress (K10)*** | | ***Somatic symptoms (PHQ-S)*** | | ***Traumatic stress (PCL-4)*** | |
|---|---|---|---|---|---|---|---|
| Latent factors | | Estimate | SE | Estimate | SE | Estimate | SE |
| Intercept | Mean | 15.07** | 0.06 | 2.05 ** | 0.03 | 4.93** | 0.02 |
| | Variance | 10.01** | 2.81 | 1.94** | 0.19 | 1.22** | 0.20 |
| Slope | Mean | −0.62** | 0.16 | −.40** | 0.06 | 0.22** | 0.02 |
| | Variance | 19.39** | 5.21 | 0.18** | 0.06 | 0.30** | 0.07 |
| Quadratic | Mean | 0.30** | 0.06 | 0.16** | 0.02 | — | — |
| | Variance | 2.29** | 0.63 | 0.00⁺ | 0.00⁺ | — | — |

*Note.* *p < 0.05, **p < 0.001. SE = standard error; ⁺ = constrained at 0 to achieve convergence.

***Table K3.*** *Parameter estimates for the secondary outcomes from the best fitting LTM analyses*

| | | ***Resilience (CDRISC-2)*** | | ***Anger (DAR)*** | | ***Sleep impairment (SII)*** | | ***Alcohol use[#] (AUDIT-C)*** | |
|---|---|---|---|---|---|---|---|---|---|
| Latent factors | | Estimate | SE | Estimate | SE | Estimate | SE | Estimate | SE |
| Intercept | Mean | 6.98** | 0.02 | 12.04** | 0.07 | 3.00** | 0.04 | 5.43** | 0.05 |
| | Variance | 0.50** | 0.05 | 13.23** | 2.80 | 5.49** | 0.85 | 4.84** | 0.20 |
| Slope | Mean | −0.11** | 0.01 | −0.54** | 0.15 | 0.35** | 0.08 | — | — |
| | Variance | 0.06** | 0.02 | 10.41* | 4.56 | 6.13** | 1.28 | — | — |
| Quadratic | Mean | — | — | 1.00** | 0.05 | 0.00 | 0.03 | — | — |
| | Variance | — | — | 1.08* | 0.45 | 0.49** | 0.13 | — | — |

*Note.* *p < 0.05, **p < 0.001. SE = standard error; [#] = data only available for T3, T4 and T5.

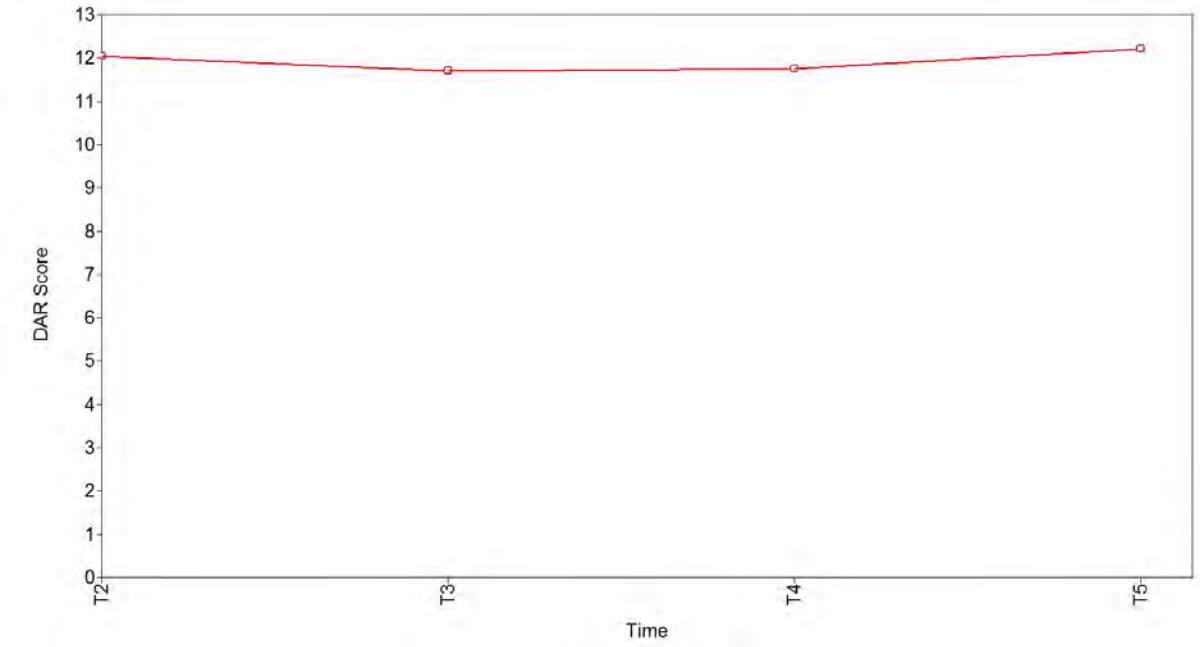


***Figure K1.*** *Overall mean trajectory for DAR scores across time*

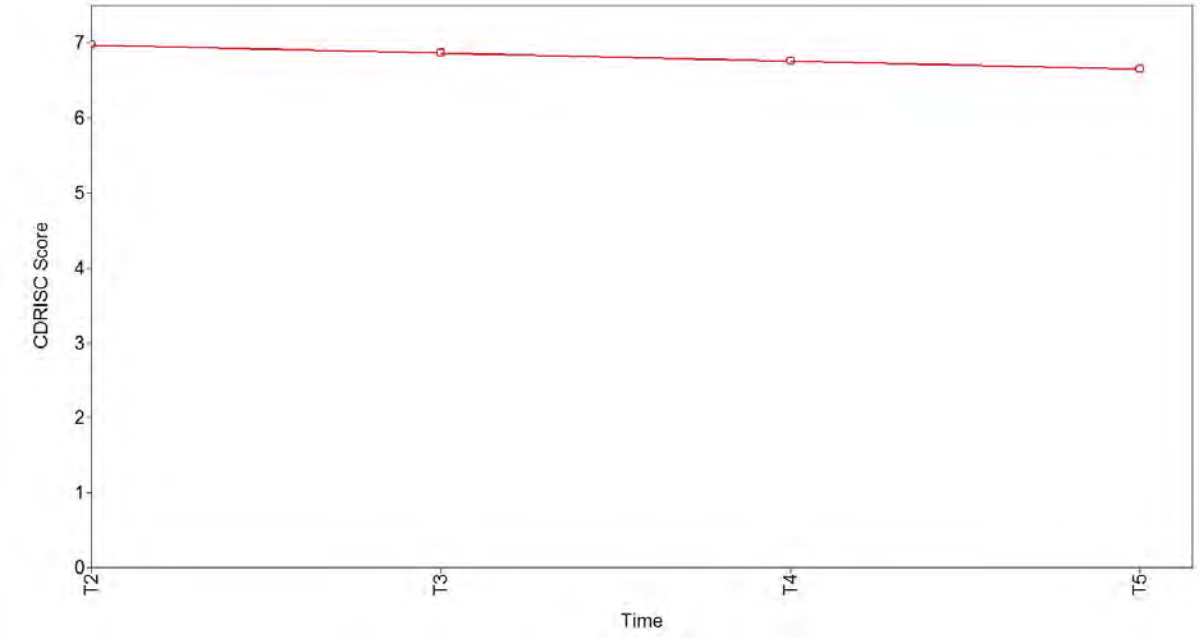


***Figure K2.*** *Overall mean trajectory for CDRISC-2 scores across time*

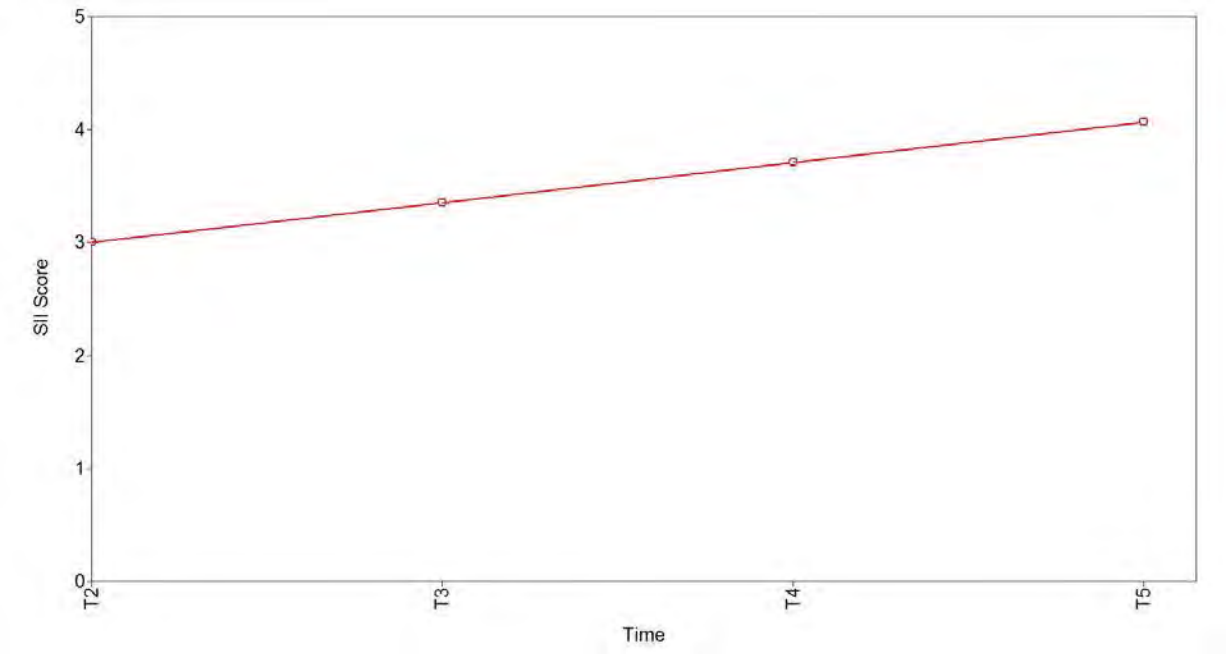


***Figure K3.*** *Overall mean trajectory for sleep impairment scores across time*

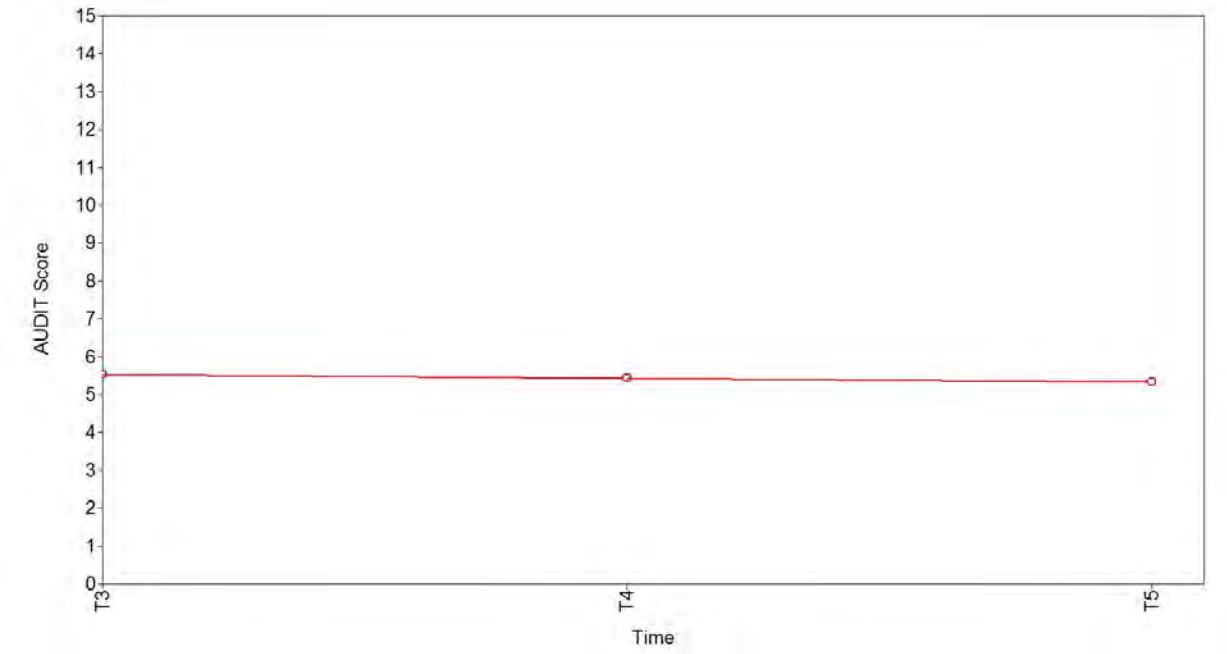


***Figure K4.*** *Overall mean trajectory for alcohol use scores across time*

### *DAR*

The quadratic model provided good fit to the data on DAR scores, as indicated by all approximate fit indices which were well above (or below) the maximum (minimum) values. The quadratic model was also superior to the linear model according to the AIC and BIC, although the linear model was acceptable according to approximate fit indices (Table K1).

Table K3 shows parameter estimates for the quadratic model of change in DAR scores. These indicate trajectories that were decreasing on average across the early time points of assessment,

and with attenuation in declines across the latter time points. This general shape of the mean trajectory is illustrated in Figure K1. Statistically significant variance terms for all parameters suggest meaningful between-person differences in starting points (intercept), rate of change (slope) and the degree of attenuation (quadratic).

### *CDRISC-2*

The quadratic and linear models were both associated with good fit to data about the CDRISC-2 and could not be clearly distinguished according to statistical indices (for the quadratic model, the variance of the quadratic term was constrained to zero to achieve convergence). In the absence of such statistical distinctions, the linear model was most parsimonious and thus preferred. Parameter estimates (see Table K3) suggest trajectories which are decreasing modestly on average across the duration of the study, with significant between person variation in both starting points and the rates of change. The general shape of this mean trajectory is illustrated in Figure K2.

### *SII*

The quadratic model provided good fit to available data on SII scores, as indicated by all approximate fit indices which were well above (or below) maximum (minimum) values. The quadratic model was also superior to the linear model according to the AIC and BIC. This general shape of the mean trajectory is illustrated in Figure K3. Generally, the model evidenced a slight increase from T2–T5 in sleep impairment. These findings should be viewed in the context of the measure having been reduced to 4-items due to large amounts of missing data on two items on this measure.

### *AUDIT-C*

This scale was not administered to GEs at T2, and there was substantial (> 65%) incomplete data at this time points which was excluded from analyses (which thus considered trajectories from T3 to T5). Given that three time points is insufficient for modelling complex trajectory patterns including quadratic models, only the intercept only and a partly constrained linear model were estimated for the AUDIT-C (the linear model only converged successfully when the variance of the slope was constrained to zero). Both these models provided good fit to the data and could not be clearly distinguished on statistical grounds. As such, the relatively parsimonious intercept only model was preferred, and thus indicates no discernible systematic changes in AUDIT-C scores over time. This general shape of the mean trajectory is illustrated in Figure K4.

## Analysis of trauma-exposed subsample

Given the interest in how these trajectories may differ between those with and without trauma exposure, the LTM analyses were repeated on a subsample of those who reported previous trauma exposure (more detail can be found in the report on page 45). The model fit indices from these analyses are shown in Table K4, which indicates a clear preference for the quadratic model of change in scores for the K10 and the PHQ-S. Both the linear and quadratic models provided good fit to data from the PCL-4 and could not be distinguished on statistical grounds (whereby the

linear model was preferable on the basis of model parsimony). These were the same models which were preferred in comparable analyses of the total analytic sample.

Parameter estimates for the preferred models are shown in Table K5, and these were also indicated comparable estimates that were obtained for the total sample. In the context of LTM analyses of change in K10 scores, for example, the mean estimates for change parameters obtained using data from the entire sample (intercept = 15.07, slope = −0.62, quadratic = 0.30) were similar to those derived from the sub-sample reporting PTE exposure (intercept = 15.32, slope = −0.58, quadratic = 0.29).

***Table K4.*** *Unconditional growth curve models across the PHQ-S, K10 and PCL-4 for those with lifetime traumatic exposure*

| Model | Model fit | ***Psychological distress (K10) n = 3659*** | ***Somatic symptoms (PHQ-S) n = 3680*** | ***Traumatic stress (PCL-4) n = 3646*** |
|---|---|---|---|---|
| Linear | $X^2$ (df) | 46.07 (5)*** | 35.29 (5) *** | 7.17 (5) |
| | CFI | 0.87 | 0.89 | 0.99 |
| | SRMR | 0.07 | 0.05 | 0.03 |
| | RMSEA | 0.05 | 0.04 | 0.01 |
| | AIC (BIC) | 39279.27 (39335.12) | 29099.04 (29154.93) | 27298.59 (27354.41) |
| Quadratic | $X^2$ (df) | 10.47 (1)** | 4.99 (4) | 0.74 (1) |
| | CFI | 0.97 | 1.00 | 1.00 |
| | SRMR | 0.02 | 0.02 | 0.01 |
| | RMSEA | 0.05 | 0.01 | 0.00 |
| | AIC (BIC) | 39225.78 (39306.45) | 29056.10 (29118.21) | 27293.96 (27374.58) |

*Note.* *p < 0.05, **p < 0.001, ***p < 0.0001. CFI = comparative fit index; SRMR = standardised root mean square residual; RMSEA = root mean square error of approximation; AIC (BIC) = Akaike's information criterion (Bayesian information criterion).

***Table K5.*** *Parameter estimates for the quadratic and linear latent growth curve modelling for the subsample*

| | | ***Psychological distress (K10)*** | | ***Somatic symptoms (PHQ-S)*** | | ***Traumatic stress (PCL-4)*** | |
|---|---|---|---|---|---|---|---|
| Latent factors | | Estimate | SE | Estimate | SE | Estimate | SE |
| Intercept | Mean | 15.32*** | 0.08 | 2.26*** | 0.04 | 5.05*** | 0.03 |
| | Variance | 10.34** | 3.50 | 1.96*** | 0.24 | 1.38*** | 0.27 |
| Slope | Mean | −0.58** | 0.21 | −0.49*** | 0.08 | 0.22*** | 0.03 |
| | Variance | 21.34*** | 6.24 | 0.22** | 0.08 | 0.31** | 0.09 |
| Quadratic | Mean | 0.29*** | 0.08 | 0.19*** | 0.03 | – | – |
| | Variance | 2.59*** | 0.74 | 0.00+ | 0.00+ | – | – |

*Note.* **p < 0.05, ***p < 0.001. SE = standard error; + = constrained at 0 to achieve convergence.

# Appendix L: Latent class growth analysis

GMM can describe a number of different models that range in complexity and computational burden, and include: (a) the latent class growth analysis (LCGA), which is the simplest form of GMM that constrains all within-class variations to zero; (b) the class invariant GMM (GMM-CI), which estimates within-class variations but constrains these to equivalence across classes; and (c) the class varying GMM (GMM-CV), which allows all variances and covariances to be freely estimated.

In the current study, preliminary analyses indicated intractable estimation problems for relatively complex models (GMM-CI and GMM-CV) which were notwithstanding relatively simple class solutions (for example, when estimating only two latent classes). These were presumably due to the relative complexity of the LTM analyses described in the previous section (for example, the quadratic models for outcomes including the K10 and PHQ-S provide the starting point and 'base model' for GMMs), as well as the decreasing sample size available across the later time points. In the context of such convergence problems, findings reported in this section were derived from LCGA models which assume homogeneity of trajectories within latent classes. Although this assumption is likely to be unrealistic, such models may still be appropriate given primary interest in modelling variation between classes; for example through inclusion of explanatory variables in subsequent 'conditional' analyses.

Analyses reported in this section were all conducted in Mplus version 8 (Muthén & Muthén, 2017) using robust maximum likelihood (MLR) estimation, and full information maximum likelihood (FIML) to utilise all available data. For each outcome variable, a series of models were estimated which extracted increasing numbers of latent classes ranging from 2–5. These class models were initially compared on statistical criteria including the AIC and BIC, and the Lo-Mendell-Rubin Likelihood Ratio Test (LMR LRT), which provides a direct significance test of the relative improve in fit for two nested models. The entropy statistic was also considered and indicates the classification accuracy of different class models. Values range from 0.0 to 1.0 and estimates > 0.70 are classified as acceptable. Finally, the size of individual classes were also used to inform determinations of preferred models (with small classes comprising less than 5% of the sample being potentially problematic), and were considered along with the substantive interpretation of statistically plausible accounts.

Table L1 shows results from analyses of K10 trajectories which considered LCGA models specifying between two and five latent classes. This table shows that relative to the 2-class model, the 3-class solution was associated with improved fit as indicated by lower values for the AIC and BIC, and a significant LMR-LRT. The entropy statistic was also lower for the 3-class model, indicating reduced classification accuracy, but was still within acceptable ranges. In contrast, the 4-class solution was associated with improved fit as indicated by the AIC and BIC, but not the LMR-LRT. The latter was not significant ($p > 0.05$) and thus indicated that the parsimonious 3-class model was preferred. The 4-class model was also characterised by a small class (comprising only 2.18% of the sample) and was unlikely to generalise. On this basis, the parsimonious 3-class

solution was identified as the preferred model of unobserved subpopulations underlying K10 trajectories.

***Table L1.*** *Fit indices for LCGA models of psychological distress (K10) ranging from 2–5 classes*

| Model | Class size (%) | Log likelihood | AIC | BIC | Entropy | LMR-LRT (*p value)* |
|---|---|---|---|---|---|---|
| 2-class | | −27887.64 | 55797.27 | 55869.57 | 0.88 | 0.00 |
| C1 | 10.47 | | | | | |
| C2 | 89.53 | | | | | |
| 3-class | | −27479.02 | 54988.03 | 55086.62 | 0.83 | 0.00 |
| C1 | 9.56 | | | | | |
| C2 | 83.99 | | | | | |
| C3 | 6.46 | | | | | |
| 4-class | | −27250.46 | 54538.93 | 54663.81 | 0.83 | 0.22 |
| C1 | 78.47 | | | | | |
| C2 | 11.60 | | | | | |
| C3 | 7.75 | | | | | |
| C4 | 2.18 | | | | | |
| 5-class | | −27047.81 | 54141.63 | 54292.80 | 0.80 | 0.11 |
| C1 | 9.63 | | | | | |
| C2 | 9.78 | | | | | |
| C3 | 2.66 | | | | | |
| C4 | 2.17 | | | | | |
| C5 | 75.76 | | | | | |

*Note*. AIC = Akaike's information criterion; BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

# Latent class growth analysis: PHQ-S

Table L2 shows results from analyses of PHQ-S trajectories which also considered LCGA models specifying between two and five latent classes. As can be seen, there were clear improvements in fit across 2-class and 3-class models, while the 4-class model was again associated with improved fit according to the AIC and BIC but not the LMR-LRT. Given that the 4-class model was also characterised by one small class (comprising only 2.7% of the sample), the relatively parsimonious 3-class solution was thus preferred.

***Table L2.*** *Fit indices for LCGA models of somatic symptoms (PHQ-S) ranging from 2–5 classes*

| Model | Class size (%) | Log likelihood | AIC | BIC | Entropy | LMR-LRT (*p value)* |
|---|---|---|---|---|---|---|
| 2-class | | −20196.78 | 40415.55 | 40487.89 | 0.87 | 0.00 |
| C1 | 86.73 | | | | | |
| C2 | 13.27 | | | | | |
| 3-class | | −19896.21 | 39822.41 | 39921.05 | 0.83 | 0.01 |
| C1 | 10.13 | | | | | |
| C2 | 7.43 | | | | | |
| C3 | 82.44 | | | | | |
| 4-class | | −19646.63 | 39331.26 | 39456.20 | 0.84 | 0.23 |
| C1 | 15.56 | | | | | |
| C2 | 75.97 | | | | | |
| C3 | 5.77 | | | | | |
| C4 | 2.70 | | | | | |
| 5-class | | −19512.11 | 39070.21 | 39221.45 | 0.84 | 0.30 |
| C1 | 0.57 | | | | | |
| C2 | 5.45 | | | | | |
| C3 | 70.90 | | | | | |
| C4 | 5.27 | | | | | |
| C5 | 17.80 | | | | | |

*Note*. AIC = Akaike's information criterion; BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

# Latent class growth analysis: PCL-4

Table L3 shows results from analyses of PCL-4 trajectories which considered models specifying between two and five latent classes. As can be seen, there were consistent indications of improved fit across indicators (including the LMR-LRT) for class solutions specifying up to four latent classes (after which the LMR-LRT suggested no significant improvements in model fit). Notwithstanding such improvements, both 3-class and 4-class models were characterised by small class sizes which comprised < 2.5% of the sample. The preferred model was the 4-class model.

***Table L3.*** *Fit indices for LCGA models of posttraumatic stress symptoms (PCL-4) ranging from 2–5 classes*

| Model | Class size (%) | Log likelihood | AIC | BIC | Entropy | LMR-LRT (*p value)* |
|---|---|---|---|---|---|---|
| 2-class | | −18142.81 | 36303.63 | 36362.72 | 0.98 | 0.00 |
| C1 | 5.12 | | | | | |
| C2 | 94.88 | | | | | |
| 3-class | | −17303.53 | 34631.05 | 34709.84 | 0.96 | 0.00 |
| C1 | 9.81 | | | | | |
| C2 | 2.32 | | | | | |
| C3 | 87.86 | | | | | |
| 4-class | | −16885.61 | 33801.23 | 33899.72 | 0.89 | 0.00 |
| C1 | 82.49 | | | | | |
| C2 | 5.75 | | | | | |
| C3 | 2.33 | | | | | |
| C4 | 9.43 | | | | | |
| 5-class | | −16550.85 | 33137.70 | 33255.89 | 0.90 | 0.40 |
| C1 | 5.04 | | | | | |
| C2 | 2.00 | | | | | |
| C3 | 13.21 | | | | | |
| C4 | 4.43 | | | | | |
| C5 | 75.32 | | | | | |

*Note*. AIC = Akaike's information criterion; BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

# Latent class growth analysis: DAR

**Table L4** shows results from analyses of trajectories underlying the DAR which considered LCGA models specifying between two and five latent classes. As can be seen, there were consistent indications of improved fit across indicators (including the LMR-LRT) for class solutions which specified up to five latent classes. However, the 5-class model was characterised an extremely small class size which represented < 2% of the sample and was thus excluded on this basis. The preferred model was the 3-class model.

***Table L4.*** *Fit indices for LCGA models of anger (DAR) ranging from 2–5 classes*

| Model | Class size (%) | Log likelihood | AIC | BIC | Entropy | LMR-LRT (*p value)* |
|---|---|---|---|---|---|---|
| 2-class | | −25649.87 | 51321.74 | 51393.74 | 0.85 | 0.00 |
| C1 | 84.27 | | | | | |
| C2 | 15.73 | | | | | |
| 3-class | | −25339.95 | 50709.90 | 50808.08 | 0.79 | 0.00 |
| C1 | 78.22 | | | | | |
| C2 | 11.62 | | | | | |
| C3 | 10.16 | | | | | |
| 4-class | | −25105.57 | 50249.15 | 50373.51 | 0.81 | 0.00 |
| C1 | 15.38 | | | | | |
| C2 | 3.42 | | | | | |
| C3 | 72.64 | | | | | |
| C4 | 8.55 | | | | | |
| 5-class | | −24981.76 | 50009.53 | 50160.07 | 0.80 | 0.03 |
| C1 | 9.02 | | | | | |
| C2 | 20.07 | | | | | |
| C3 | 62.66 | | | | | |
| C4 | 1.68 | | | | | |
| C5 | 6.58 | | | | | |

*Note.* AIC = Akaike's information criterion. BIC = Bayesian information criterion. LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

# Latent class growth analysis: SII

**Table L5** shows results from analyses of SII trajectories which considered models specifying between two and five latent classes. As can be seen, there were consistent indications of improved fit across indicators (including the LMR-LRT) for class solutions which specified up to and including four latent classes, after which class sizes became very small. The 4-class model was characterised by two smaller but acceptable class sizes.

***Table L5.*** *Fit indices for LCGA models of sleep impairment (SII) ranging from 2–5 classes*

| Model | Class size (%) | Log likelihood | AIC | BIC | Entropy | LMR-LRT (*p value)* |
|---|---|---|---|---|---|---|
| 2-class | | −22079.28 | 44192.56 | 44304.33 | 0.86 | 0.00 |
| C1 | 85.10 | | | | | |
| C2 | 14.90 | | | | | |
| 3-class | | −21919.17 | 43880.35 | 44018.42 | 0.83 | 0.01 |
| C1 | 20.96 | | | | | |
| C2 | 6.22 | | | | | |
| C3 | 72.82 | | | | | |
| 4-class | | −21780.17 | 43610.35 | 43774.72 | 0.78 | 0.00 |
| C1 | 18.51 | | | | | |
| C2 | 5.58 | | | | | |
| C3 | 5.94 | | | | | |
| C4 | 69.97 | | | | | |
| 5-class | | −21684.35 | 43426.71 | 43617.37 | 0.81 | 0.02 |
| C1 | 0.84 | | | | | |
| C2 | 8.40 | | | | | |
| C3 | 64.42 | | | | | |
| C4 | 20.92 | | | | | |
| C5 | 5.42 | | | | | |

Fit indices for the latent class growth analysis (LGCA) for the SII.

*Note.* AIC = Akaike's information criterion; BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

# Latent class growth analysis: CDRISC-2

Table L6 shows results from analyses of CDRISC-2 trajectories which also considered LCGA models specifying between two and five latent classes. Model fit improved from two to three classes but not after this, and given that the 3-class solution included an extremely small additional class (2.50%) compared to the 2-class solution, the relatively parsimonious 2-class model was preferred.

***Table L6.*** *Fit indices for LCGA models of resilience (CDRISC-2) ranging from 2–5 classes*

| Model | Class size (%) | Log likelihood | AIC | BIC | Entropy | LMR-LRT (*p value)* |
|---|---|---|---|---|---|---|
| 2-class | | −14028.24 | 28084.48 | 28176.46 | 0.82 | 0.00 |
| C1 | 62.84 | | | | | |
| C2 | 37.16 | | | | | |
| 3-class | | −13350.44 | 26736.89 | 26855.15 | 0.93 | 0.00 |
| C1 | 62.45 | | | | | |
| C2 | 35.06 | | | | | |
| C3 | 2.50 | | | | | |
| 4-class | | −12189.22 | 24422.44 | 24566.98 | 1.00 | 0.03 |
| C1 | 20.08 | | | | | |
| C2 | 2.46 | | | | | |
| C3 | 44.56 | | | | | |
| C4 | 32.90 | | | | | |
| 5-class | | −9234.98 | 18521.97 | 18692.78 | 1.00 | 0.72 |
| C1 | 2.46 | | | | | |
| C2 | 44.55 | | | | | |
| C3 | 20.08 | | | | | |
| C4 | 28.20 | | | | | |
| C5 | 4.70 | | | | | |

Fit indices for the latent class growth analysis (LGCA) for the CDRISC-2.

*Note*. AIC = Akaike's information criterion; BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

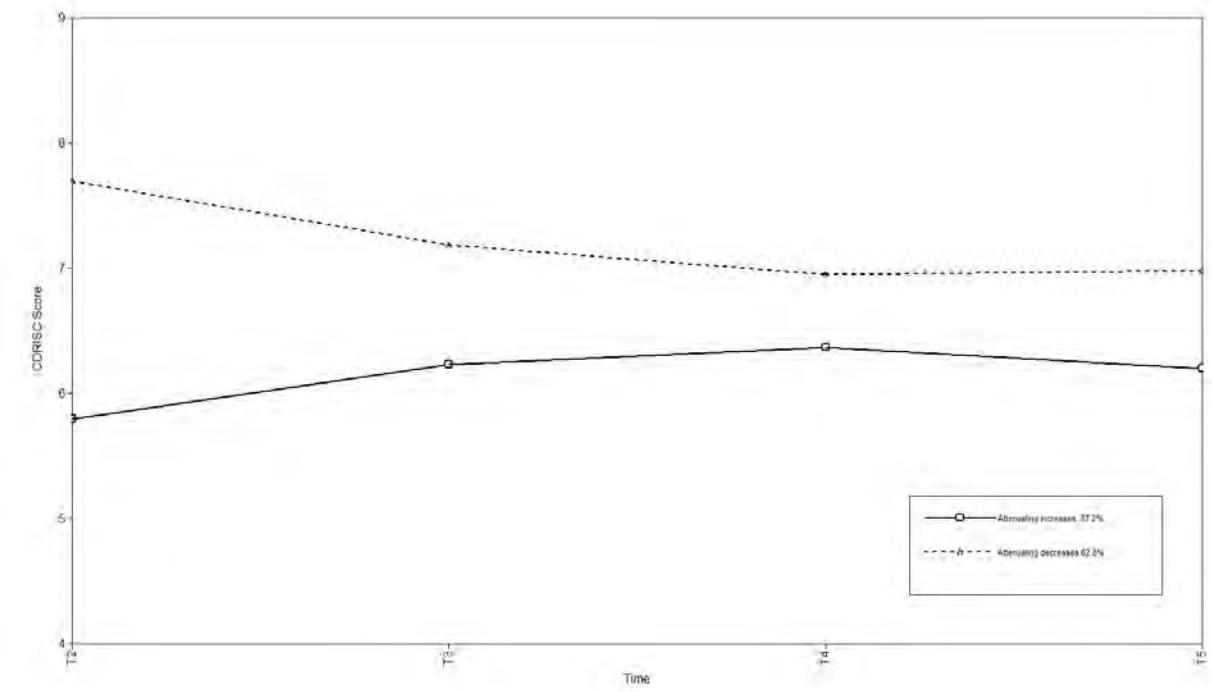


***Figure L1.*** *Class-specific mean trajectories for the 2-class model of the CDRISC-2*

## Latent class growth analysis: Alcohol use

Table L7 shows results from LCGA analyses of the AUDIT-C trajectories for class models of two to three classes. Given previously identified estimation problems for more complex solutions, and class sizes for these models were very small, it was determined that LCGA analyses were not appropriate for this measure.

***Table L7:*** *Latent Class Growth Analysis for alcohol use*

| Model | Class size (%) | Log likelihood | AIC | BIC | Entropy | LMR-LRT (*p value)* |
|---|---|---|---|---|---|---|
| 2-class | | −29267.70 | 58547.39 | 58586.84 | 0.85 | 0.00 |
| C1 | 87.21 | | | | | |
| C2 | 12.79 | | | | | |
| 3-class | | −29133.56 | 58283.13 | 58335.72 | 0.85 | 0.08 |
| C1 | 1.81 | | | | | |
| C2 | 80.99 | | | | | |
| C3 | 17.20 | | | | | |

Fit indices for the latent class growth analysis (LGCA) for the AUDIT-C.

*Note.* AIC = Akaike's information criterion; BIC = Bayesian information criterion; LMR-LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

# Appendix M: Additional conditional LCGA analysis for K10 and PCL-4 outcomes

For the K10, additional comparisons between the increasing scores and attenuating declines categories were also conducted. These indicate significant *negative* effects for social support from ADF peers and superiors, as well as acceptance and reappraisal coping styles. Participants reporting high levels of ADF social support, as well as both acceptance and reappraisal coping styles, were more likely to be in a group with declining symptom scores, compared to the group with increasing symptoms. There were also significant *positive* effects for ADF peer and superior negative social interactions, self-blame, avoidance and risk-taking coping styles as well as both anger and sleep problems, which were all associated with increased likelihood of belonging to the decreasing scores class. In general, these findings illustrate that the high with decreasing scores class is characterised by relatively high levels of psychosocial and personal maladjustment (e.g. low social support, maladaptive coping, high anger), and these do not provide a suitable approximation of resilience. Rather, these indicators of maladjustment are perhaps likely to explain the high initial levels of psychological distress, with subsequent declines accounted for by regression to the mean.

For the PCL-4, there were additional comparisons conducted involving the moderate–declining, high–declining and increasing categories. For the moderate–declining versus increasing comparison, there were significant positive effects for age, ADF superior social support, acceptance and reappraisal coping. These positive associations indicated that participants who were older and reported higher levels of ADF social support, as well as higher acceptance and reappraisal coping styles, were more likely to be in the increasing group when compared to the group with moderate initial scores which declined over time. There were additional negative effects for male gender, negative social interactions, self-blame and avoidance coping styles, as well as both anger and sleep problems, which were all associated with reduced likelihood of belonging to the increasing scores class.

For the moderate–declining versus high–declining comparison, there were significant negative associations with social support from family/friends and ADF peers/superiors, as well as acceptance coping styles. High scores on these measures were all associated with reduced likelihood of belonging to the high–declining group, relative to moderate–declining. These effects were additional to positive associations with the number of traumatic events, negative social interactions, self-blame, avoidance and risk-taking coping, as well as both anger and sleep impairment. Higher scores on the latter were all associated with increased likelihood of belonging to the high–declining group.

Finally, the increasing versus high–declining comparison produced negative effects for all forms of social support, as well as acceptance and reappraisal coping (whereby high scores on these measures were all associated with reduced likelihood of belonging to the high–declining group). In contrast, there were positive associations with negative social interactions, self-blame, avoidance and risk-taking coping, as well as both anger and sleep problems. High scores on these measures

were all associated with increased likelihood of belonging to the high–declining class, relative to increasing scores.

In general, these findings suggest that both classes characterised by initially elevated scores which decrease over time are also characterised by relatively high levels of psychosocial and personal maladjustment (e.g. low social support, maladaptive coping, high anger), and do not provide a suitable approximation of resilience. Rather, these indicators of maladjustment are perhaps likely to explain the high initial levels of psychological distress, with subsequent declines accounted for by regression to the mean.

***Table M1.*** *The remaining conditional LCGA models with T2 predictors of class membership for the preferred 3-class model of K10 scores*

| | K10 Increasing vs Decreasing | K10 Increasing vs Decreasing | K10 Increasing vs Decreasing | K10 Increasing vs Decreasing | K10 Increasing vs Decreasing | K10 Increasing vs Decreasing |
|---|---|---|---|---|---|---|
| | **Estimate** | **SE** | **Odds Ratio** | | **95% CI LB** | **95% CI UB** |
| Age | −0.01 | 0.02 | 0.99 | | 0.95 | 1.04 |
| Gender (ref: Female) | | | | | | |
| Male | −0.02 | 0.26 | 0.98 | | 0.59 | 1.64 |
| Relationship status (ref: single) | | | | | | |
| Partnered/DSW | 0.16 | 0.24 | 1.18 | | 0.73 | 1.90 |
| Number of children | −0.03 | 0.18 | 0.97 | | 0.68 | 1.39 |
| Rank (ref: GE) | | | | | | |
| Officer | −0.17 | 0.22 | 0.84 | | 0.54 | 1.31 |
| ADF Service (ref: Army) | | | | | | |
| Navy | 0.13 | 0.25 | 1.14 | | 0.69 | 1.87 |
| Air Force | 0.08 | 0.32 | 1.08 | | 0.57 | 2.03 |
| Social support | | | | | | |
| Family/Friend social support | −0.08 | 0.05 | 0.92 | | 0.84 | 1.02 |
| Family/Friend Negative Social Interactions | −0.01 | 0.05 | 0.09 | | 0.91 | 1.09 |
| ADF social support | | | | | | |
| Peer Social Support | −0.19 | 0.08 | 0.83 | * | 0.71 | 0.96 |
| ADF Peer Negative Social Interactions | 0.20 | 0.06 | 1.22 | ** | 1.08 | 1.37 |
| Superior Social Support | −0.24 | 0.07 | 0.79 | ** | 0.69 | 0.90 |
| ADF Superior Negative Social Interactions | 0.20 | 0.05 | 1.23 | *** | 1.11 | 1.35 |
| Number of traumatic events | 0.04 | 0.04 | 1.04 | | 0.96 | 1.11 |
| Coping styles | | | | | | |
| Acceptance | −0.45 | 0.08 | 0.64 | *** | 0.55 | 0.75 |
| Reappraisal | −0.33 | 0.08 | 0.72 | *** | 0.62 | 0.84 |
| Self-blame | 0.33 | 0.06 | 1.39 | *** | 1.23 | 1.57 |
| Avoidance | 0.37 | 0.12 | 1.44 | *** | 1.15 | 1.81 |
| Risk-taking | 0.28 | 0.13 | 1.32 | * | 1.03 | 1.70 |
| Support-seeking | −0.01 | 0.04 | 0.99 | | 0.91 | 1.07 |
| Anger | 0.06 | 0.02 | 1.06 | ** | 1.02 | 1.09 |
| Sleep problems | 0.17 | 0.03 | 1.19 | *** | 1.12 | 1.27 |

*Note*. CI = confidence interval. *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001.

***Table M2.*** *The remaining conditional LCGA models with T2 predictors of class membership for the preferred 4-class model of PCL-4 scores*

| | PCL-4 Moderate declining vs Increasing | | | | | | PCL-4 Moderate declining vs High declining | | | | | | PCL-4 Increasing vs High declining | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Estimate** | **SE** | **Odds Ratio** | **Nil** | **95% CI LB** | **95% CI UB** | **Estimate** | **SE** | **Odds Ratio** | | **95% CI LB** | **95% CI UB** | **Estimate** | **SE** | **Odds Ratio** | | **95% CI LB** | **95% CI UB** |
| Age | 0.06 | 0.02 | 1.06 | ** | 1.02 | 1.10 | 0.02 | 0.02 | 1.02 | | 0.98 | 1.06 | −0.04 | 0.02 | 0.96 | | 0.92 | 1.00 |
| Gender (ref: Female) | | | | | | | | | | | | | | | | | | |
| Male | −0.70 | 0.25 | 0.50 | ** | 0.31 | 0.80 | −0.30 | 0.26 | 0.74 | | 0.45 | 1.22 | 0.40 | 0.30 | 1.49 | | 0.83 | 2.70 |
| Relationship status (ref: single) | | | | | | | | | | | | | | | | | | |
| Partnered/DSW | 0.24 | 0.23 | 1.27 | | 0.80 | 2.01 | −0.02 | 0.23 | 0.99 | | 0.62 | 1.56 | −0.26 | 0.29 | 0.77 | | 0.44 | 1.36 |
| Number of children | 0.14 | 0.16 | 1.15 | | 0.83 | 1.59 | 0.06 | 0.17 | 1.06 | | 0.76 | 1.49 | −0.08 | 0.20 | 0.92 | | 0.63 | 1.36 |
| Rank (ref: GE) | | | | | | | | | | | | | | | | | | |
| Officer | −0.14 | 0.22 | 0.87 | | 0.57 | 1.33 | −0.32 | 0.21 | 0.73 | | 0.48 | 1.10 | −0.18 | 0.27 | 0.84 | | 0.50 | 1.41 |
| ADF Service (ref: Army) | | | | | | | | | | | | | | | | | | |
| Navy | 0.34 | 0.25 | 1.40 | | 0.86 | 2.30 | 0.23 | 0.24 | 1.26 | | 0.79 | 2.00 | −0.11 | 0.30 | 0.90 | | 0.50 | 1.62 |
| Air Force | 0.44 | 0.30 | 1.56 | | 0.86 | 2.83 | −0.20 | 0.34 | 0.82 | | 0.42 | 1.60 | −0.64 | 0.40 | 0.53 | | 0.24 | 1.16 |
| Social support | | | | | | | | | | | | | | | | | | |
| Family/Friend social support | 0.08 | 0.06 | 1.08 | | 0.95 | 1.23 | −0.19 | 0.05 | 0.83 | *** | 0.76 | 0.91 | −0.26 | 0.07 | 0.77 | *** | 0.67 | 0.89 |
| ADF social support | | | | | | | | | | | | | | | | | | |
| Peer Social Support | 0.09 | 0.08 | 1.10 | | 0.94 | 1.29 | −0.34 | 0.08 | 0.71 | *** | 0.61 | 0.83 | −0.43 | 0.10 | 0.65 | *** | 0.54 | 0.79 |
| Superior Social Support | 0.21 | 0.08 | 1.23 | ** | 1.06 | 1.43 | −0.20 | 0.07 | 0.82 | ** | 0.72 | 0.94 | −0.41 | 0.09 | 0.66 | *** | 0.56 | 0.79 |
| Negative Social Interactions | | | | | | | | | | | | | | | | | | |
| Family/Friend | −0.16 | 0.04 | 0.85 | *** | 0.78 | 0.93 | 0.08 | 0.04 | 1.09 | * | 1.00 | 1.18 | 0.24 | 0.05 | 1.27 | *** | 1.14 | 1.41 |
| ADF peers | −0.16 | 0.06 | 0.85 | ** | 0.76 | 0.96 | 0.15 | 0.05 | 1.16 | ** | 1.04 | 1.29 | 0.31 | 0.07 | 1.36 | *** | 1.18 | 1.57 |
| ADF superiors | −0.16 | 0.05 | 0.85 | ** | 0.77 | 0.94 | 0.16 | 0.05 | 1.17 | ** | 1.06 | 1.29 | 0.32 | 0.06 | 1.38 | *** | 1.22 | 1.56 |
| Number of traumatic events | 0.01 | 0.04 | 1.01 | | 0.94 | 1.09 | 0.13 | 0.03 | 1.14 | *** | 1.07 | 1.21 | 0.12 | 0.04 | 1.13 | ** | 1.03 | 1.22 |
| Coping styles | | | | | | | | | | | | | | | | | | |
| Acceptance | 0.31 | 0.09 | 1.37 | ** | 1.14 | 1.64 | −0.23 | 0.08 | 0.79 | ** | 0.68 | 0.93 | −0.54 | 0.11 | 0.58 | *** | 0.47 | 0.72 |
| Reappraisal | 0.32 | 0.08 | 1.38 | *** | 1.19 | 1.60 | −0.10 | 0.07 | 0.90 | | 0.78 | 1.04 | −0.43 | 0.09 | 0.65 | *** | 0.54 | 0.78 |
| Self-blame | −0.29 | 0.07 | 0.75 | *** | 0.65 | 0.86 | 0.33 | 0.06 | 1.39 | *** | 1.23 | 1.58 | 0.62 | 0.09 | 1.86 | *** | 1.57 | 2.19 |
| Avoidance | −0.61 | 0.06 | 0.55 | *** | 0.49 | 0.61 | 0.27 | 0.12 | 1.31 | * | 1.04 | 1.66 | 0.88 | 0.16 | 2.41 | *** | 1.75 | 3.32 |
| Risk-taking | −0.21 | 0.15 | 0.81 | | 0.60 | 1.09 | 0.34 | 0.11 | 1.41 | ** | 1.14 | 1.75 | 0.55 | 0.17 | 1.74 | ** | 1.26 | 2.40 |
| Support-seeking | 0.07 | 0.04 | 1.08 | | 1.00 | 1.16 | 0.00 | 0.04 | 1.00 | | 0.92 | 1.08 | −0.08 | 0.05 | 0.93 | | 0.84 | 1.02 |
| Anger | −0.11 | 0.03 | 0.90 | *** | 0.86 | 0.94 | 0.08 | 0.01 | 1.08 | *** | 1.05 | 1.11 | 0.19 | 0.03 | 1.21 | *** | 1.14 | 1.27 |
| Sleep problems | −0.21 | 0.04 | 0.81 | *** | 0.75 | 0.87 | 0.13 | 0.03 | 1.14 | *** | 1.08 | 1.20 | 0.34 | 0.04 | 1.40 | *** | 1.29 | 1.53 |

*Note*. CI = confidence interval. *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001

# Appendix N: Conditional LCGA analysis for PHQ outcome

Table N1 shows results from the conditional LCGA models which specified predictor variables at T2 in the preferred 3-class model of PHQ-S trajectories. By way of reminder, these classes also comprised: a stable–low class; a class characterised by increasing scores over time; and group defined by initially high scores that exhibited attenuating declines. The stable–low class comprised the reference category for predictive analyses which thus examined comparisons with the two alternative classes (increasing and high–declining).

As can be seen from Table N1, results from a multinomial regression analyses which compared increasing with stable–low indicated significant negative effects for gender, family/friend and ADF peer social support, morale, as well as acceptance and reappraisal coping styles. These negative effects suggest that males, participants reporting high levels of peer social support and morale, as well as both acceptance and reappraisal coping styles, were less likely to be in the increasing group, relative to the stable–low reference category. There were also significant positive effects for both Navy and Air Force service, family/friend and ADF peer negative social interactions, number of traumatic events, self-blame, avoidance and risk-taking coping styles, as well as both anger and sleep problems. These were all associated with increased likelihood of belonging to the increasing scores class.

Table N1 shows additional comparisons between the high–declining and stable–low reference category. These indicated significant negative effects (indicating reduced likelihood of belonging to high–declining, relative to stable–low) for gender, social support, morale, and acceptance (but not reappraisal) coping. Conversely, there were positive effects for number of children, number of traumatic events, negative social interactions, self-blame coping and both anger and sleep problems. These were also associated with increased likelihood of belonging to the high–declining class.

***Table N1.*** *Conditional LCGA models with T2 predictors of class membership for the preferred 3-class model of PHQ scores*

| | Stable low vs Decreasing | | | | | | Stable low vs Increasing | | | | | | Increasing vs Decreasing | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Estimate | SE | Odds Ratio | | 95% CI LB | 95% CI UB | Estimate | SE | Odds Ratio | | 95% CI LB | 95% CI UB | Estimate | SE | Odds Ratio | | 95% CI LB | 95% CI UB |
| Age | 0.00 | 0.01 | 1.00 | | 0.98 | 1.02 | 0.02 | 0.02 | 1.02 | | 0.99 | 1.05 | −0.02 | 0.02 | 0.98 | | 0.95 | 1.02 |
| Gender (ref: Female) | | | | | | | | | | | | | | | | | | |
| Male | −1.23 | 0.13 | 0.29 | *** | 0.23 | 0.38 | −1.52 | 0.20 | 0.22 | *** | 0.15 | 0.33 | 0.29 | 0.24 | 1.34 | | 0.83 | 2.15 |
| Relationship status (ref: single) | | | | | | | | | | | | | | | | | | |
| Partnered/DSW | 0.19 | 0.12 | 1.21 | | 0.96 | 1.53 | −0.02 | 0.20 | 0.98 | | 0.66 | 1.46 | 0.21 | 0.25 | 1.24 | | 0.76 | 2.02 |
| Number of children | 0.03 | 0.10 | 1.03 | | 0.85 | 1.26 | 0.24 | 0.12 | 1.27 | * | 1.01 | 1.59 | −0.20 | 0.16 | 0.82 | | 0.59 | 1.12 |
| Rank (ref: GE) | | | | | | | | | | | | | | | | | | |
| Officer | 0.24 | 0.12 | 1.27 | | 1.00 | 1.62 | −0.06 | 0.19 | 0.94 | | 0.65 | 1.36 | 0.30 | 0.24 | 1.35 | | 0.84 | 2.16 |
| ADF Service (ref: Army) | | | | | | | | | | | | | | | | | | |
| Navy | 0.76 | 0.13 | 2.15 | *** | 1.67 | 2.75 | 0.15 | 0.22 | 1.16 | | 0.75 | 1.79 | 0.62 | 0.27 | 1.86 | * | 1.10 | 3.13 |
| Air Force | 0.32 | 0.16 | 1.37 | * | 1.01 | 1.88 | −0.37 | 0.30 | 0.69 | | 0.38 | 1.25 | 0.69 | 0.36 | 1.98 | | 0.98 | 4.01 |
| Social support | | | | | | | | | | | | | | | | | | |
| Family/Friend | −0.23 | 0.03 | 0.80 | *** | 0.75 | 0.84 | −0.18 | 0.06 | 0.84 | ** | 0.75 | 0.93 | 0.05 | 0.06 | 1.05 | | 0.93 | 1.19 |
| ADF peers | −0.39 | 0.04 | 0.68 | *** | 0.63 | 0.74 | −0.24 | 0.08 | 0.79 | ** | 0.68 | 0.92 | −0.15 | 0.09 | 0.86 | | 0.72 | 1.02 |
| ADF superiors | −0.22 | 0.04 | 0.81 | *** | 0.75 | 0.87 | −0.06 | 0.06 | 0.94 | | 0.84 | 1.06 | −0.15 | 0.07 | 0.86 | * | 0.74 | 0.99 |
| Negative Social Interactions | | | | | | | | | | | | | | | | | | |
| Family/Friend | 0.13 | 0.02 | 1.14 | *** | 1.09 | 1.19 | 0.11 | 0.04 | 1.11 | * | 1.03 | 1.20 | 0.02 | 0.05 | 1.02 | | 0.94 | 1.12 |
| ADF peers | 0.34 | 0.03 | 1.41 | *** | 1.33 | 1.49 | 0.20 | 0.05 | 1.22 | *** | 1.10 | 1.35 | 0.15 | 0.06 | 1.16 | * | 1.03 | 1.30 |
| ADF superiors | 0.23 | 0.03 | 1.26 | *** | 1.19 | 1.33 | 0.05 | 0.04 | 1.05 | | 0.96 | 1.14 | 0.18 | 0.06 | 1.20 | ** | 1.08 | 1.34 |
| Morale | −0.53 | 0.05 | 0.59 | *** | 0.54 | 0.65 | −0.39 | 0.08 | 0.68 | *** | 0.58 | 0.79 | −0.14 | 0.08 | 0.87 | | 0.74 | 1.03 |
| Number of traumatic events | 0.16 | 0.02 | 1.17 | *** | 1.13 | 1.22 | 0.10 | 0.03 | 1.11 | ** | 1.04 | 1.18 | 0.06 | 0.04 | 1.06 | | 0.99 | 1.14 |
| Coping styles | | | | | | | | | | | | | | | | | | |
| Acceptance | −0.36 | 0.05 | 0.69 | *** | 0.63 | 0.76 | −0.24 | 0.07 | 0.79 | ** | 0.68 | 0.91 | −0.13 | 0.08 | 0.88 | | 0.75 | 1.04 |
| Reappraisal | −0.27 | 0.04 | 0.76 | *** | 0.71 | 0.82 | −0.11 | 0.07 | 0.90 | | 0.78 | 1.04 | −0.16 | 0.09 | 0.85 | | 0.72 | 1.01 |
| Self-blame | 0.43 | 0.03 | 1.53 | *** | 1.44 | 1.64 | 0.27 | 0.06 | 1.32 | *** | 1.18 | 1.46 | 0.15 | 0.06 | 1.17 | * | 1.03 | 1.32 |
| Avoidance | 0.27 | 0.06 | 1.31 | *** | 1.16 | 1.47 | 0.14 | 0.10 | 1.15 | | 0.95 | 1.40 | 0.13 | 0.12 | 1.13 | | 0.90 | 1.44 |
| Risk-taking | 0.42 | 0.07 | 1.52 | *** | 1.32 | 1.74 | 0.20 | 0.13 | 1.22 | | 0.94 | 1.59 | 0.22 | 0.15 | 1.24 | | 0.92 | 1.67 |
| Support-seeking | −0.01 | 0.02 | 0.99 | | 0.95 | 1.03 | 0.03 | 0.04 | 1.03 | | 0.97 | 1.11 | −0.04 | 0.04 | 0.96 | | 0.88 | 1.04 |
| Anger | 0.16 | 0.01 | 1.18 | *** | 1.15 | 1.20 | 0.13 | 0.02 | 1.14 | *** | 1.10 | 1.18 | 0.04 | 0.02 | 1.04 | * | 1.00 | 1.07 |
| Sleep problems | 0.38 | 0.02 | 1.46 | *** | 1.40 | 1.52 | 0.24 | 0.03 | 1.28 | *** | 1.19 | 1.36 | 0.14 | 0.03 | 1.15 | *** | 1.07 | 1.22 |

*Note*. The low symptom C3 class served as the referent. CI = confidence interval. *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.00

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