DEVELOPMENT AND VALIDATION OF A PSYCHOLOGICAL SCREENING TOOL TO ASSESS PRE-ENLISTMENT PSYCHOLOGICAL FACTORS LIKELY TO IMPACT ON MILITARY WELL-BEING AND PERFORMANCE IN THE CONTEXT OF THE SRI LANKAN MILITARY

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THESIS CERTIFICATION

I, H.G. Kanthilatha, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Life Sciences, University of Hull, is wholly my own work unless otherwise referenced or acknowledged below. The document has not been submitted for qualifications at any other academic institution.

Both studies in this thesis have been previously presented in following international conferences

1. International Society for the Study of Individual Differences ISSID) 2017, Warsaw 24 - 28 July 2017
2. 31st International Congress of Psychology, organized by International Congress for Psychology (ICP) Yokohama, Japan 24th - 29th July 2016
3. 4th International conference on Psychological Interventions After Disasters (PIAD), Taipei, Taiwan. 9 – 12 November 2015

ABSTRACT

Development and validation of a psychological screening tool to assess pre-enlistment psychological factors likely to impact on military well-being and performance in the context of Sri Lankan military

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Military personnel who are directly involved in war face its most harmful consequences. However, research suggests that personality differences and characteristics might mitigate or exacerbate the impact on individual responses to war-related experiences. These characteristics could be either risk or protective factors.

The current study aimed to develop and validate a psychological screening tool to assess pre-enlistment personality factors which can contribute to the well-being of military personnel and determine whether this tool can predict variables related to military well-being and performance.

Two main studies were conducted to achieve these aims. Firstly, a cross-sectional descriptive survey was conducted with 960 junior military officers representing triforces in Sri Lanka for scale development and validation. A tool was developed combining Resilience Scale (RS25), Dispositional Resilience Scale (DRS15), and Mental Toughness Questionnaire (MTQ48). This tool was validated through EFA and CFA processes adopting a split sample cross validation method and resulting a scale with 42 items which was named as the "Resilience Inventory for Military (RIM)". These 42 items comprised two factors. One consisted of 20 resilience items, the other consisted of 22 mental toughness items. Both subscales in this scale demonstated good validity and reliability levels.

Secondly, a longitudinal study was carried out with 92 Cadet trainees to determine whether this scale can predict the turnover intention of the trainees, newcomer adjustment of trainees, training satisfaction,training performance and their general mental health condition. The results demonstrated that those who score high on the RIM scale have a greater adjustment, good level of mental health, are less likely to exibhit turnover intention and more satisfied with the training.

The findings can help Sri Lankan military forces identify the most resilient candidates for military service and minimise negative behaviour outcomes among military personnel. Also, this research suggests how mental toughness, hardiness and resilience relate together.This approach might also be of use elsewhere in South Asia.

Key words: military recruitment, military well-being, resilience, mental toughness, predictors of military performance, Sri Lankan military

DEDICATION

Dedicated to;

My ever loving mother, who weaved my dreams and faded away before they come true;

My ever loving father, who taught me poverty is a challenge not an obstacle

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For any errors and inadequacies that may remain in this work, of course, the responsibility is entirely my own.

Hull, September 2017

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CHAPTER 1: INTRODUCTION AND THE BACKGROUND OF THE STUDY

1.0 Introduction

"The soldier above all others prays for peace, for it is the soldier who must suffer and bear the deeper wounds and scars of war" – Douglas MacArthur.

"By the early 1950s, it was recognized that all soldiers have a breaking point, however well trained and motivated. As well as the link between physical and psychological casualties, it was also established that factors such as morale, leadership, regular sleep and confidence in equipment could mediate the size of the association but not the association itself."

Edgar Jones

War is one of the most devastating situations for any human to face as it is an intentional violent act by a group of people against another group of people. Hence, war can create longer and deeper wounds on human minds compared to the other disasters (Murthy & Narayana, 2006). Military personnel are the most likely to be psychologically affected by war, so maximising the well-being of military personnel is vital for any military service (The concept of well-being is defined in the second chapter).

Psychology studies human behaviour, its consequences, and its causes, so there are critical links between psychology and the military. Military psychology represents the concatenation of the different specialities and subfields of psychology within the context of the military (Laurence & Mathew, 2012). Even though formal military psychology was introduced to military settings only recently, organisational, clinical and operational psychology concepts are intertwined with the modern historical development of war (Kennedy, Hughes & McNeil, 2012). This thesis addresses some gaps found in the military psychology literature with a special focus on Sri Lankan military context. This chapter includes a brief introduction to the study background, to contextualise the study. Then, the motivation for this particular line of research is presented, as it was a demand driven project rather than a theory-laden one. A short description of the study context and rationale and the need for it in Sri Lanka are presented. Finally, the organisation of the chapters of the thesis is outlined.

1.1 Study Background

The contribution of psychology to military settings has evolved through years and expanded to a wider area. Today military psychology helps the military services to find answers to the

problems related to clinical and health psychology, training and human factors, manpower and personnel, social and organisational systems, and testing and measurement.

There is an abundance of studies which support the fact that people in the armed forces are highly susceptible to developing psychological disorders (i.e. Fear, 2013; Iversen, 2009; Sareen, 2009; Gadermann, 2012; Shawn et al. 2015; Slaven & Doyle 2015). To begin with, studies looked into the problems faced by the military and tried to find solutions to them. The following problems are the most common (Ames & Cunradi, 2004; Iversen et al., 2007; Thomas et al., 2010; Hanwella et al. 2012):

a. PTSD and psychological disorders (depression, psycho-somatoform disorders, etc.)
b. Completed and attempted suicides among military personnel
c. Substance abuse and other behavioural issues
d. Premature discharge (Attrition)

Military psychologists have been researching to find reasons and solutions to the above problems and many other specific issues (Ames & Cunradi, 2004; Iversen et al., 2007; Thomas et al., 2010; Hanwella et al. 2012).

Despite the fact that military personnel are highly susceptible to develop problems due to the nature of work and war, another line of research finds that not everyone exposed to combat will develop PTSD or any other psychological problem. The official website of the National Center for PTSD of the United States claims that most military personnel cope well with even severe combat exposure and lead healthy lives. Some researchers argue that there may be certain personality and or individual characteristics which buffer the negative effect of stressful events such as combat exposure (Bartone, 1999). So, who are more vulnerable? The Army Study to Assess Risk and Resilience in Service members (STARRS, 2015) postulated that pre-enlistment factors[1] such as exposure to trauma as a child, problematic family environment, and adverse childhood experiences, anti-social behaviour patterns and any history of psychological disorders are positively correlated with the development of psychological and behavioural issues. These risk factors have been found repeatedly around the world (Felitti et al. 1998; Dube et al. 2001; Valerie et al. 2006; Cabrera et al. 2007; Wessley et al. 2007; McManus et al. 2012; Polusny et al. 2013; Abdollah et al. 2014).

Additionally, a developing literature proposes that military personnel scoring high on personality characteristics such as Hardiness, Mental Toughness and Resilience are less likely to be affected by combat experience or any other adverse experiences in life (Bartone et al., 1999; Wagnild & Young, 1993; Maddi et al., 2012; Clough et al., 2007 Salvatore; John

[1] Pre-enlistment: Any biological, demographical, and psychosocial background of the individual before the period to which one is committed to military service

& Martin, 2013; Sandra et al., 2013; Sigurd et al., 2015). Such characteristics are protective against psychological problems. This suggests that if a military force can screen candidates for such pre-enlistment protective personality characteristics and risk factors, it will minimise the harmful outcomes of combat experience and improve the wellbeing of the military personnel. There is evidence for this hypothesis from several studies done in different parts of the world using military samples (Bartone et al., 1999; Wagnild & Young, 1993; Maddi et al., 2012; Clough et al., 2007; Salvatore et al., 2013; Sandra et al., 2013; Sigurd et al., 2015). An immediate difficulty is that Hardiness, Mental Toughness and Resilience are three similar and overlapping concepts, measured with different questionnaires that contain similar, but not identical questions.

As described above, both pre-enlistment risk factors and the protective factors contribute to the well-being of the military personnel positively or negatively. To assess the pre-enlistment protective and risk factors, an array of psychological screening tools have been used (Bachynski et al., 2012; Gubata et al., 2012; Murphy & Sharp, 2011; Ursano et al., 2014; Yen et al., 2009). Unfortunately, so far assessments have only either assessed risk factors or protective factors (Cardona & Ritchie, 2007; Garb, Wood, Schneider, Baker, & Travis, 2013; Rumsey and Arabian, 2014). Thus, it will be important to combine the two.

Cardona & Ritchie (2006) reviewed all the psychometric assessments used in the military from the onset of World War I and concluded that there is limited evidence of the success of psychological screening to predict mental health outcome after combat experience. However, they suggested that this could be due to the failures of measurement rather than screening being fundamentally useless.

1.2 Rationale for the study

Many testing instruments have been used for military recruitment and screening; most were developed and validated in North America or Europe. Subsequently, some of these have been translated, adapted and validated in the other parts of the world. However, none have been developed in the South Asian region. Despite the fact Sri Lanka has just been through a three-decade civil war, the Sri Lankan military has never used any psychological screening for military recruitment or advancement. The Sri Lankan Airforce uses a few specific psychometric tests for recruiting airmen, but these are highly specialised. Otherwise, all three forces follow the same hiring process which considers education, physical fitness, medical screening and criminal history. Educational requirements for officer candidates are higher than for other rankers, and different branches require different basic qualifications. Physical

fitness tests measure the endurance of the individual using several task based activities which are standard to military recruitment. Special Forces will have some additional tasks other than the regular fitness test. The medical test looks at basic medical requirements for serviceman, such as vision, hearing, height, weight, BMI, cardiac issues (X-ray, ECG), etc. The current medical test includes a self-report questionnaire, which asks about the history of diseases of the individual and the family, and also includes one question about psychiatric diagnosis. Candidates are asked to write a statement saying that "I am not suffering from any psychological disorders" on the form. None of these recruitment tools involves any assessment of psychological and attitudinal aspects of the person.

There is no published discussion of why Sri Lanka does not use psychological assessment tools. Based on my knowledge of the military as a naval officer and military clinical psychologist, there are several possible reasons. First, validating, administering and analysing the assessment results is a time-consuming and expensive exercise. Second, there is a lack of expertise to administer and analyse the results. Third, there is a widespread myth amongst the Sri Lankan military that psychological interventions demoralise military personnel, as they imply 'weakness' or 'inadequacy'. Fourth, military personnel can be ill-informed about the psychological consequences of combat experience and military training, for military psychology is an entirely new discipline in the Sri Lanka context.

1.2.1 Why officers?

Rumsey (2014) discussed special issues related to predicting officer performance. Rumsey (2014) differentiates officer duties from soldier duties mainly because of the leadership role officers have to play. Military leadership is the process of influencing others to accomplish the mission by providing purpose, direction, and motivation. Command is the authority a person in the military service lawfully exercises over subordinates by virtue of his rank and assignment or position. There are a variety of challenges faced by officers; in addition to the leadership related challenges mentioned above, other technical, managerial and administrative challenges. Therefore officer selection should consider the complex role of a military officer (Rumsey, 2014). In a post- war context where hard power is less utilised and soft power highly utilised, Sri Lanka forces need to recruit both physically and intellectually able officers. Officer recruitment to Sri Lanka military services happens in three ways; a) Cadet entry at an advanced level, b) direct entry with a basic degree and additional qualifications for professional categories (for example. IT, Law, Engineering, etc.), and c) service entry with service experience (senior soldiers are commissioned as officers due to

their outstanding qualifications, experience, and service). Irrespective of the recruitment method, all officers are supposed to meet the same level of performance. Officers are the decision makers and in a command and control work setting, officers can have a huge influence on soldiers' behaviour, either positively or negatively. Therefore recruiting the right people as officers is crucial. Sri Lankan military services do not have any psychological assessment in their officer recruitment procedures, although these may be even more important than for military personnel in general.

There is high prevalence of substance abuse, smoking, and other behavioural issues among Sri Lankan military personnel (Hanwella et al., 2014), although, as will be discussed in Chapter Two, the prevalence of PTSD is lower than in America and Europe. Along with these behavioural issues, there are turnover issues including demoralisation or demotivation, intending or attempting to leave the service, and attrition, which affect both the organisation and the individual (Jayawardena, 2011). According to Jayawardena, several factors influence turnover among Sri Lankan air force personnel, including a mismatch between the personality and the job and these could be reduced through proper recruitment screening.

1.3 The Context of the Study - Why Sri Lanka?

The Democratic Socialist Republic of Sri Lanka (formerly known as Ceylon) is a small island in the Indian Ocean about 18 miles off the south eastern coast of India. The land area of Sri Lanka is 65,610 sq.km with a coastline of 1,340 km. Sri Lanka is a lower middle-income country with a total population of 21 million people and a per capita income of USD 3,924 in 2015 (World Bank Overview, 2017).

It is believed that Sinhalese ancestors of Sri Lanka came from north India during the 6th Century BC. Buddhism was brought to Sri Lanka from the Northern part of India 300 years later, and it became the main religion in the country. A sophisticated irrigation system which was facilitated by Buddhist thinking and teaching was one pillar of Sinhalese civilisation. Subsequently, Sri Lanka was invaded first by Southern India several times, and then it became a colony of Portugal in 1505, the Netherlands (Dutch) in 1658 and finally the British 1815. The British established a plantation economy based on tea, rubber and coconut in Crown Colony of Ceylon. Sri Lanka became independent on 4th February 1948.

Under the influence of different invasions, Sri Lanka became a multi-ethnic and multi-religious country. According to the report issued by the Department of Census and Statistics in Sri Lanka based on the census conducted in 2012, Sinhalese, the majority make up 74.9% of the total population, and Sri Lankan Tamils (who have migrated in ancient times) make

up another 11.1%. Four per cent of the population are Indian Tamils who were brought by British as Estate workers, while Sri Lankan Moors make up 9.3%. The remaining 0.53% represents other ethnic groups, Malay, Burger, Colombo Chetty and Sri Lankan Veddas.

The majority of the population are Buddhist (70.1%) while 12.58% are Hindu. Almost all Muslims are Sunni (9.66%). Roman Catholic and Christians make up 6.34%. Sinhala, an Indo-Aryan branch of the Indo-European languages, is the native language of Sinhalese. Tamils and the majority of the Muslims speak the Tamil language. Both Sinhala and Tamil are official languages in Sri Lanka. Even though the use of English has declined since the independence, it continues to be spoken by the many of the middle and upper middle classes, and the younger generation is encouraged to use English for commercial and educational purposes.

Until independence, English was the official language in Sri Lanka. However, some of the national leaders believed that Tamils, who were the minority, were disproportionately represented in the civil administration. Another perception was that Tamils had a disproportionate share of power due to educational opportunities. Mainly because of these fears, 'Sinhala' was declared as the official language in 1956. Since then, Tamils started to feel powerless and developed a fear for their future. Some reviewers believe that this was the root cause of the ethnic conflict that emerged in the 80s (Appendix to the 2003 report on Sri Lanka by the World Bank, Published in Tamil Guardian). With the constitution in 1972 the country's name was changed from Ceylon to Sri Lanka.

1.3.1 Brief history of Civil War and military intervention during the war

The Liberation Tigers of Tamil Eelam (LTTE) was founded in May 1976. In 1983 it emerged as a terrorist group which fought for an ethnically independent Tamil state in the Northern and North-eastern part of Sri Lanka. LTTE named this state as Tamil Eelam (De Silva, 2013). The civil war which was initiated in 1983 continued for nearly three decades (26 years) until May 2009, when the Sri Lankan army killed the LTTE leader Velupillai Prabhakaran, in Mulathivu. As cited by De Silva (2013) nearly 80,000 lives were taken by this war.

In the initial stage of the conflict, the Sri Lanka government tried to control the Tamil militancy by strengthening the policing powers through legal means, which was unsuccessful. The government decided, therefore, to enact a Prevention of Terrorism Act which gave the police force powers to arrest, detain and try the suspects without a jury (Balasuriya, 2011). Balassuriya further stated that by the 1980s Sri Lankan government was

left with no other choices than to deploying three forces to face the LTTE militancy. Since then, the Sri Lankan government relied on the three military forces to battle with LTTE which was described by FBI as the "most dangerous and deadly extremist outfit in the world" (Hariharan, 2012). For example, the LTTE invented the suicide bomb belt, and is the only terrorist organisation to have managed to assassinate two world leaders (BBC, 21 May 1991; 1 May 1993).

The army, navy, and air force are the three main military services committed to ensuring the territorial defence of the mother nation. Each of these services has its own vision, mission and mandate. The total current approximate manpower strength of the three forces in Sri Lanka is 276,700 (Army = 200,000, Navy = 48,000 and Airforce = 28,700). Just under 10% of this number are officers. The forces of Sri Lanka also provide military personnel for the other UN missions in the world (e.g. Haiti). Sri Lankan military is considered as one of the most powerful militaries in the world after the victory against the LTTE in 2009. The Sri Lanka as a country has faced with three main insurgencies in recent history. Those were the 1971 JVP insurgency, the 1989 JVP insurgency and finally the LTTE militancy.

According to the Global Fire Power (GFP) report of 2017 which provides Military Strength Ranking annually, Sri Lanka ranks 84 out of 133 countries, and its GFP Power Index rating is 1.6567 (0.0000 being perfect) in comparison to the United States of America, in the first place with a power index of 0.0857; India, in 4th place with 0.1593; United Kingdom in 6th place, with 0.2131; Pakistan, in 13th place with 0.3287. The absolute value of 0.0000 is unattainable by any country due to various limitations faced by each country. The Sri Lanka government allocated $1.5 billion to the defence budget in 2017; this was the largest allocation for single ministry.

Several challenges face the Sri Lankan military services during the aftermath of 30 years of civil war. As reported in the syndicate 09 of 29th intake of General Sir John Kothalawala Defence University (KDU) Sri Lanka (2013), challenges include possible future threats from further separatism, post-conflict resettlement, ethnic reintegration, possible foreign interventions and Tamil Diaspora involvement in the current context of Sri Lanka. Moreover, this syndicate also noted indications of new Muslim insurgencies in the eastern province supported by Middle Eastern extremist organisations. In addition to the territorial defence of the country, the role of the military services was expanded to include natural disasters and events causing severe environmental damage. The role of the military was redefined according to the demands of the aftermath of the war. Among these additional responsibilities; reconstruction, rehabilitation, a de-mining programme, resettlement of Internally Displaced Peoples and ensuring reconciliation among different ethnic groups were

highlighted. Military personnel voluntarily spent their spare time in development efforts in the Northern and the Eastern provinces, which were damaged due to the military operations.

Despite the fact that Sri Lanka military services fought a gruelling war with a brutal terrorist organisation for nearly 30 years, very little published research is available on the prevalence of mental health related issues among the military personnel in Sri Lanka. Hanwella (2009, 2013) conducted two types of studies to explore the mental health status of the deployed regular Naval and Special Forces personnel. Hanawella (2009) found that regular force personnel showed more general mental health problems compared to Special Forces while Special Forces personnel were more involved in hazardous drinking than regular personnel. A study conducted three and a half years after the end of the war revealed that mental health status had improved in both groups, but their smoking rate had doubled over the time. This study also found that although prevalence of hazardous drinking is much lower compared to a UK sample (67%) and a US sample (36%), drinking behaviour is still an alarming behavioural issue (16% hazardous drinking) which could cause so many other organisational and social problems (Hanwella et al., 2012; Hanwella et al. 2014).

It is never too late to increase the well-being of the military personnel and minimise the negative outcomes of the combat experience. An appropriate instrument which screens military cadidates could help to build a professional and healthy military service for the nation.

1.4 The present study

As outlined above, military recruitment needed more accurate and sensitive tools to assess the candidates' pre-enlistment psychological factors likely to impact on well-being and performance. Any such assessment should assess both pre-enlistment risk and protective factors. It was also clear that the Sri Lankan military services have not utilised any psychological assessment, despite more than 30 years of civil war. To fill this gap; the current study developed a comprehensive psychological screening tool in the Sinhala language, which is the main language in Sri Lanka. The project consists of two main studies aimed to develop a psychological screening tool including both protective and risk assessments. For this tool, three existing scales are merged, and it is validated with a sample of 961 of military officers representing all three forces in Sti Lanka. Among the other tools available currently, none has been specifically tailored to officer recruitment. Therefore, this tool mainly focuses on the officers and was validated it with officers. The second study aimed to establish the predictive validity of the newly developed tool through a linear

relationship with identified military well-being measures. It is worth noting that this study is not theory–laden research but a demand driven project. As Steege (1981) proposed, there are three main areas of application of psychological assessment to military personnel utilisation; a) personnel management and placement, b) social-psychological and/or social science assessment and c) clinical assessment. This study focusses on clinical assessment and some applications to personnel management and placement.

1.5 Potential implications of the Study

This study has potential significance in several areas:

a) It will help in selection of the most suitable officer candidates into the Sri Lankan military forces.

It is expected that this tool will help to predict the successful completion of training as well as the duties and responsibilities assigned with deployment. Most importantly it is expected that officer recruits who score high on protective factor tools and low on risk factor tools will have a high level of coping and resilience during and after any deployment. They will not have adjustment problems in the system and have fewer complaints. They will maintain a healthy relationship with superiors, colleagues and subordinates within the work setting and will able to strike a balance between work and family lives. This effort could reduce the prevalence of mental illness within the military services and reduce actual and attempted suicide. Some of the main issues existing in the military services cannot be attributed to war itself. This kind of screening tool also will help to distinguish individual factors which are not attributed to war and military services but determine the level of impact of war. Subsequently, this may have a positive impact on intervention for war-related issues.

As a long term effect, this kind of tool can help Sri Lankan military services to reduce suicides and suicidal attempts, psychological disorders among military members, behavioural issues like substance abuse and smoking, aggressive behaviours and involvement in criminal behaviours.

b) The study could help to reduce the cost incurred by the military forces in training recruits who turn out to be unsuitable.

Sri Lankan government spendslarge sums of money on the basic military training of one individual. This amount can vary from service to service, branch to branch and officers to other rankers. These expenses include uniforms, food, accommodation and other facilities, weapons and ammunitions, etc. If a candidate deserts the service during or soon after the basic training, there is no way to recover this cost. Even though there is an agreement with the trainee and the service for a repayment of the training cost, this will be charged only if

the trainee leaves the service during training and with legal approval. However, this is a rare condition as most people find a medical reason to leave and the service where repayment is not a condition.

c) More effective recruitment procedures would help to minimise the health costs on unsuitable recruits and existing servicemen/women (medicine, hospitalisation, psychiatric and psychological treatments, wages, sick leave, sick categories, and compensation).

By minimising recruitment of unsuitable candidates into the system, military services would be able to cut some cost incurred for mental health related problems, sick leaves and compensation. At the same time providing appropriate training on protective factors will reduce the number of cases of mental health issues in a military setting.

d) The tool developed in this study will help in selection of successful servicemen/women for special operations and foreign missions.

Selecting soldiers and officers for special operations and foreign missions is a challenging task for any military service as they represent the nation. Their positive or negative behaviours will be considered as a national contribution. The proposed tool would provide useful evaluation criteria for this exercise. Different tasks require different skills, attitudes and competencies. However, hardiness, resilience and mental toughness are considered as protective factors of any person. Therefore this tool or a slightly amended version of it will meet this purpose.

e) This study can provide input to introduction of new training areas to promote and enhance mental health among services personnel who are currently serving.

If the suggested protective factors of this study (hardiness, resilience and mental toughness) can predict the successful performance of newly recruited officers, then new training aspects can be included for promotional and compulsory upgrading training for officers to inculcate these personality characters at least to a certain extent. None of the military services in Sri Lanka presently use this type of comprehensive training for their officers and soldiers.

1.6 Thesis structure

This thesis is presented in five main chapters. These chapters are presented in a logical sequence as they are built upon each other to achieve the purpose of this study as briefly outlined in this chapter. Table 1.1 presents the objectives of each chapter and its contents. In summary, Chapter 1 sets the context of the research, motivation and rationale with a short description of the study context. Chapter 2 provides a critical review of the literature on common issues faced by military service in the world, the pre-enlistment psychological factors which are likely to have an impact on military well-being, previous attempts to develop comprehensive screening tool. Based on the gaps identified in the literature, the

requirement of a new tool for Sri Lanka is justified. The objectives of the current study, conceptual framework and study hypothesis are articulated at the end of this chapter. Chapter 3 presents the research design and the methodology used in the data collection and the analysis. The first half of this chapter explains the methodological rationale for the first empirical study which was conducted for development and validation of the tool and the second half described the results and the discussion of this study study. The results section includes the reliability and validity of individual scales, validation process of the newly developed scale and exploratory and confirmatory factor analysis. Chapter 4 presents the 2nd study which was condustected to test the predictive validity of the newly developed tool. The sample of the study, measures and methods explained in the fisrt section and the second section describes the results of the predictive validity study. A brief discussion of the results regarding comparability with existing knowledge and applicability in the military context also includes in the fourth chapter. Finally, Chapter 5 summarises the general findings with their contribution to the literature and the military sector. It also discusses the limitations of the study, offers recommendation for the military services on how to use this tool and proposes recommendations and future directions for researchers.

Table 1.1

Thesis Structure

Chapter no. And Title	Chapter objectives	Chapter Summary
1. Introduction	1. To demonstrate the rationale of the study 2. To give information about the study context 3. To elaborate the thesis structure	The chapter gives an overall summary of the study including the motivation, the context and the research approach and the thesis structure.
2. Literature review and conceptual framework	1. To provide a brief history of military psychology its development and application 2. To create awareness about the commonest issues faced by the military and the solutions existing 3. To identify the gap in the military screening literature 4. To express the research objectives, hypothesis and the conceptual framework	This chapter provides details about the existing literature on the issues and the challenges encountered by the military services in the world and how military psychologist have been trying to minimise those issues. A research question is presented with the identified gap in the Sri Lankan context. Objectives and hypothesis of the study are presented to answer this research question **Research question:** What are the pre-enlistment psychological factors likely to impact military well-being and performance **Objectives;** To develop a psychological screening tool to assess the pre-enlistment psychosocial factors likely to impact on military well-being and performance.

		To establish predictive validity of this tool
3. Study One Development and validation of RIM	1. To provide a rationale for the 1st empirical studies undertaken in this research 2. To explain the and justify the sampling, and data analysis methods used in the study 3. To present the results of the validation study 4. To discuss the outcome of the scale (RIM)	This chapter presents the methods, procedures and the results of the 1st study. An explanation of the research design for the 1st empirical studies, sample selection, data collection methods and measures used in the study are discussed. DRS15, Rs25 and MTQ48 are been used to develop a new protective factor scale. Data-analysing techniques and rationale for those also discussed in detail. After presenting the demographic details of the study sample correlations between the protective scales and risks factors are presented. Then validation process of DRS 15, RS25 and MTQ48 in the Sri Lankan military context is outlined. After individual validation, the sample is split into two for exploratory factor analysis and confirmatory factor analysis purposes. The newly developed tool is purified and validated through EFA and CFA. The three-factor solution suggested by EFA is confirmed through CFA. .
4. Study Two Predictive validity of RIM	1. To describe the methods and procedures of the 2nd empirical study	A detailed description the methods and the procedure of the predictive validity study presented in the first section.

	2. To present the descriptive and correlational results of the study 3. To present the findings of the regression analysis 4. To discuss the findings of the second study	The second section presents the results of the study including descriptive and correlational analysis. Multiple regression analysis is deployed for the predictive validity analysis. The contribution of the newly develop RIM on outcomes measures are discussed in detail.
5. Discussion Conclusion, contribution recommendations	1. To discuss the general findings To identify the main contribution of the current study 2. To give recommendations for the users of the tool and the future researchers. 3. To articulate the limitations of the current study and identify areas for further research in this field.	The two scale represents resilience and mental toughness which explain military well-being and training performance. In addition to this Protective factor screening, risk factors are also recommended to use at the recruitment level as they show a relationship with military well-being outcome variables. Contributions to the military psychology literature and contributions to the Sri Lankan military are presented separately. Limitations of the current study as well as in military studies in general and some remedies to minimise them in future studies also explained.

CHAPTER TWO: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0 Introduction

This chapter provides an overview of previous research on military screening and related concepts. To answer the research question of the current study, available literature was reviewed carefully, and the gaps were identified using a narrative approach. This literature review explored the three dominant themes of the research questions: problems faced by the military; the contribution of pre-enlistment characteristics for military well-being; available military screening tools and their focus. The main source of the literature was the APA Journal of Military Psychology, although many other publications were explored. Related literature was searched using keywords such as 'military psychology', 'Sri Lanka military', 'military recruitment', 'recruitment criterion' 'screening in military', 'pre-enlistment personality characteristics', 'anti-social personality', 'military attrition', 'PTSD predictors', 'military health predisposing factors', 'hardiness', 'mental toughness', 'resilience' and 'suicide in military personnel'. A range of secondary data sources served as the key bibliographic tools for identifying relevant work for review. The most significant of these was the Web of Science database and Google Scholar search engine. Several prominent textbooks also were used:

1) Oxford Handbook of Military Psychology (edited by Laurence, J.H., & Mathews, M.D. 2012)

2) Military Psychology; Clinical and operational application (edited by Kennedy C.H., & Zillmer E. A., 2012).

3) Handbook of Military Psychology (edited by Reuven Gal & A. David Mangelsdorff, 1991)

Understanding previous work in this area provided direction for the construction of the screening tool and what questions should be included, and it guarded against the risk of overload at the primary data collection stages of the study by narrowing down the focus. Working on the findings from extant literature into a formal review throughout the study helped to maintain a sense of the topic's perspective. This chapter has four sections. First, a brief overview of military psychology and its application. Second, the concept of well-being and the usage of and challenges to well-being in military contexts are discussed. Third, the role of pre-enlistment risk, predisposition and protective factors is reviewed. Fourth, the

screening processes used by different military services are discussed. Based on the gaps identified from the previous studies, a question arose regarding which pre-enlistment factors are likely to contribute to military well-being and performance. Therefore the objectives of the study were set to address this issue. Finally, a brief conceptual framework is outlined for the research.

2.1 A brief overview of military psychology and its application

Military psychology is the application of psychological principles and methods to military operations. Each military service has unique features and a culture based on its mission and tradition. At the same time, all military services have similar traditions, factors, and issues because they have similar duties, requirements and demands. Psychology has a number of different relevant sub disciplines including, clinical, social, industrial, organisational and occupational, developmental, cognitive and problem-solving, and forensic. Military psychology is the intersection of diverse military issues and psychology (Gal & Mangelsdorff, 1991). Military psychology represents the concatenation of the different specialities and subfields of psychology within the context of the military (Laurence & Mathew, 2012).

Amongst the commonalities across military organisations is that they tend to be hierarchical and rely on leaders and that they need to recruit, train and motivate servicemen to perform tasks and routines in adverse, life threating environments. Early military concerns were screening, selecting, classifying and placing recruits. Psychologists were utilised to develop mechanisms to resolve these concerns (Gal & Mangelsdorff, 1991).

Despite the fact that military psychology is only about a century old, organisational, clinical and operational psychology concepts are intertwined with the historical development of war (Kennedy, Hughes & McNeil, 2012). World War I (WWI) is considered to be the official birth of military psychology in the USA. “The first ever team of psychologists devoted to determining how psychology could help the war included James McKeen Cattell, G. Stanley Hall, Edward L. Thorndike and J.B. Watson” (Kennedy & Zillmer, 2012, p. 5). Robert Yerkes, then the head of American Psychological Association (APA) was the first commissioned psychologist in the USA in 1917 and subsequently another 132 psychologists were commissioned to work in the division of psychology in the US army where they undertook psychological testing and screening, such as Army Alpha (Kennedy & Zillmer, 2012). This was a remarkable spurt in the history of psychological testing in general.

It is also worth noting that the development of military psychology as a discipline was driven by the demands of the situations of war and conflict of different nations. The contribution of psychology to military settings has evolved through the years and expanded to a wider area. Today military psychology helps the military services to find answers to problems related to clinical and health psychology, training and human factors, workforce and personnel, social and organisational systems, and testing and measurement.

The discipline of military psychology further developed during World War II (WWII), and psychologists were high in demand in all the branches of the military. A comprehensive book published by Boring in 1945 outlined "seven fields of the psychological business of the Army and Navy": observation, performance, selection, training, personal adjustment, social relations and opinion and propaganda (Kennedy & Zillmer, 2012). The demand for psychology in the military was reflected in the APA reorganisation in 1945 which included a new subdivision for military psychology (Laurence & Matthews, 2011).

During this time, the results of classification and screening tests were interpreted differently depending on an individual's geographical and socioeconomic background, attempting a culturally fair psychological testing. Personality tests were highly utilised in the military during WWII. In 1943 the US army started using the Minnesota Multiphasic Personality Inventory (MMPI), as a screening and selection tool (Kennedy & Zillmer, 2012). It was observed that 40% of early discharge from service was attributed to combat fatigue, irrespective of screening (Neil, 1993). The idea that personality could predict combat fatigue was not supported, and later the military had to accept the fact that, despite screening, they should do timely interventions near the frontline. It gradually became recognised that combat fatigue reactions were a normal response to the combat experience rather than being due to a weakness of personality and that these stress reactions need psychological interventions.

In the United Kingdom, utilisation of psychological testing and psychologists' services in war started little later compared to the USA. Initially, the Royal Navy recruited eight civilian psychologists to help in the selection process in 1941. There were ten industrial psychologists and nearly 300 assistants in the Royal Navy by 1943. The British War Office recruited another 19 psychologists to work for the Adjutant General Department to assist with selection and screening. These psychologists worked along with the psychiatrists to conduct various formal and advanced psychological testing (Kennedy & Zillmer, 2012).

Contributions of the psychologists in war expanded during WWII from selection to further psychological diagnosis and screening. Malingering was identified as one of the main issues, and it became a big burden to military services, as malingeres were the main pension and compensation seekers. Therefore those who were malingering were labelled as psychopaths and disqualified from service (Campbell, 1943). Psychologists thought that the range of existing diagnoses was inadequate to describe complicated behavioural issues among the military and emphasised the need to develop further diagnostic criteria. This was the main force behind the development of the Diagnostic and Statistical Manual of Mental Disorders (DSM) by the American Psychiatric Association in 1952 (Kennedy & Zillmer, 2012).

Another significant contribution of military psychology was the development of the discipline of Aviation Psychology with the establishment of Army Air Forces Aviation Psychology programme in 1941. Later the US Airforce became an independent service and led several significant studies in the field. Simultaneously the British Air Ministry also started employing a psychologist to select their air and ground crews. All three military services used psychologists for more industrial and warfare purposes, especially to find solutions to human factor issues. Because of the severity and the complexity of WWII and its impact on people, much attention was given to PTSD related psychological problems after WWII. As a result, military clinical psychology emerged in the USA (Kennedy & Zillmer, 2012).

2.2 What is well-being?

From a philosophical perspective, "Well-being" is an idealistic state that we all strive to achieve, but may not fully achieve. Put simply; it is "what is good for you" (Tiberius, 2016). The concept of well-being emerged and was operationalized with the seminal work of Bradburn (1969) who believed that happiness is the balance between negative and positive affect. Theories of well-being are two fold; some theories define well-being regarding people's subjective psychological status whereas the other theories define well-being in terms of objective values or the perfection of human nature (Tiberius, 2016). The Value Fulfilment Theory (VFT) of well-being introduced by Valerie Tiberius (2016) tries to strike a balance between these two extremes. According to VFT, well-being (to live well) is to succeed in terms of our own values. The Oxford Companion to Philosophy defines Wellbeing as: 'living and faring well', 'flourishing', 'bound up with ideas about what constitutes human happiness and the sort of life it is good to lead' (Tiberius, 2016 p. 2).

Dodge et al. (2012) in their paper titled "The challenge of defining well-being" reviewed different perspectives and theories of the concept of psychological well-being to construct a definition for well-being. According to Dodge et al., differentiation of psychological well-being from psychiatric diagnosis emerged in 1969 from the classic work of Bradburn who tried to conceptualise well-being according to Aristotle's idea of *Eudaimonia* which means well-being in modern language. Bradburn, as cited in Dodge et al. (2012) looked at how individuals coped with the difficulties they face in day to day life. They specified that "an individual will be high in well-being in the degree to which he has an excess of positive over negative affect and be low in well-being in the degree to which negative affect predominates over positive" (p. 9). Dodge et al. (2012) state that defining well-being is remain as largely unresolved. Citing the work of Forgeard, Jayawickreme, Kern & Seligman's work in 2011, Dodge et al. further mention that this effort "has given rise to blurred and overly broad definitions of well-being" (p 222). Regarding the structure of the well-being, Dodge et al., citing Diener and Suh (1997) stated that well-being consists of three interconnected components; life satisfaction, pleasant affect, and unpleasant affect.

Headey and Wearig (1991) as cited in Doge et al. have proposed that subjective well-being (SWB) is stable to a greater extent for most of the people. Well-being is stable as far as the equilibrium is stable. SWB changes only due to an external force in which a person deviates from his or her equilibrium pattern of the event (Heady & Wearing, 1992). They presented their model of SWB in a dynamic equilibrium between stock levels, psychic income flows. Social backgrounds, Personality and social network considered as the shock of a person. Flows or psychic income are gained by favourable events (yield satisfaction) whereas adverse events becomes, psychic income loss which yields distress. Consequently, these lead to life satisfaction, positive affect or negative affect (Dodge et al., 2012) which determines the subjective well. This theory introduced by Headey and Wearing (1991) is called as the dynamic equilibrium theory of well-being or set point theory. Based on this theory Reber (1995) tried to define well-being as a state " a condition of a system in which the essential qualities are relatively stable" (p. 750).

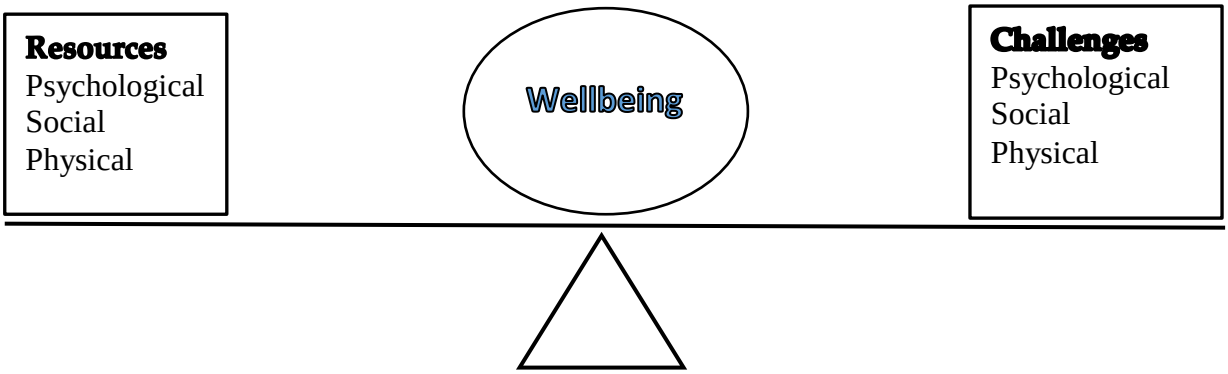
Concluding Cummins' (2010) theory of well-being Dodge et al. state that the term 'equilibrium' has been replaced by 'homeostasis'. When there are no challenges the set point or the homeostasis is stable, and when mild challenges are there SWB is challenged slightly but still within the set point, and homeostasis tries to defend the person. However, when the challenge is too strong SWB starts falling and resources within the person and the

environment help to minimise this fall, which can differ from individual to individual (Dodge et al., 2012).

After reporting all these viewes, Dodge et al. (2012) presented the following definition of the concept of well-being. Well-being is the "balance point between an individual's resources pool and the challenges faced"(p. 230). They summarised their idea in a simple diagram presented below.

Figure 2.1

Definition of well-being (Dodge et al. 2012, p. 230)



The well-being of military personnel is considered as fragile due to the nature of military duties, which involve combat exposure, challenging environments, constant relocation and deployment. Thus, soldiers should be both physically fit and psychologically resilient (Skomorovsky, 2013). According to the website of the US Army Well-being programme, Army well-being is the "the physical, material, mental, and spiritual needs of all Army people – Soldiers, civilians, retirees, veterans, and their families." [2]. This can be generalised to the other military services too.

It is obvious that the activities involved in which a military person is involved (such as military operations) have a negative impact on the well-being of the individual. While accepting this as a fact, military services still expect their members to maintain the state of "well-being" as it is the key to their readiness to perform the mission of the military service. Therefore the aim of any military wellbeing programme should be to maximise well-being to the extent possible, accepting the challenges to well-being within the military context.

In this study context, well-being is taken in a broader sense, which considers individual well-being and organisational well-being as equally important. As the above website indicated

[2] https://www.army.mil/aps/2003/realizing/people/well-being.html

when the individual well-being is in danger, organisational well-being also at risk. For example, if a service member is having psychological issues or behavioural problems due to military or non-military reasons, it can reflect on the organisation in several ways. High turnover, dissatisfied employees, increased suicidal behaviours and lack of performance are common outcomes. Thus, the following section will discuss the threats/challenges to organisational well-being, which can also contribute to breakdown of individual well-being.

2.3 Common threats to military wellbeing

2.3.1 Psychological disorders (PTSD, depression, psycho-somatoform disorders etc.)

Recent studies have reported that the prevalence of any mental health disorders among military personnel in the USA, the UK and Canada is approximately 37%, 43% and 17% respectively (Fear, 2013; Iversen, 2009 & Sareen, 2009). While these figures give an overall picture of the nature of mental health issues in military settings there is abundant research about the particular country, service, and the type of the problem. According to a study done by Bridger et.al (2009) exploring the acute and chronic strain in naval personnel in the UK, psychological strain, the basic threat to the psychological well-being is very high soon after deployment (31%); it can reduce with organizational intervention such as changing the work role (Bridger, Kilminster, & Slaven, 2007). Iversen et al. (2009) conducted a clinical interview base study (n = 821) of the prevalence of mental health problems and PTSD in the UK and found the prevalence of common mental disorders is 27.2% and the prevalence of PTSD is 4.8%. The commonest mental disorder was alcohol misuse (18.0%) and the second most common disorder was neurotic disorders (13.5%). Interestingly they found that reservists who had been deployed in Iraq were more vulnerable to develop PTSD compared to the regular servicemen who were not deployed. This PTSD trend has not been observed in regular military personnel (Iversen et al., 2009). Authors have compared the UK sample with a US sample and found that regular service members from both countries had similar deployment experiences, while the UK sample reported more feeling in danger of being killed. However, the authors accepted this comparison had some limitations, such as differences in data collection methods and PTSD diagnosis methods (Iversen et al., 2009). A cohort study conducted by Goodwin et al. (2015) found that the prevalence of common mental health conditions in the UK military men aged 18-44 years was twice that of working men in same age in general population (18.2 vs 9.2%). Fear et.al. (2007) reported that 67% of men and 49% of women in the UK military are involved in hazardous drinking in comparison to 33% of men and 16% of women in the general population while another 48% of men and 31% of women reported binge drinking (consuming at least 6-8 units in one day).

Contrary to these findings another study carried out by Iversen et al. (2009) found that the prevalence of neurotic disorders (generalized anxiety, depression and panic) in the military was less (13.0%) than in the UK general population (16.4%). This study also compared other mental disorders in military and the general population and reported as below. "Prevalence estimates of depression were similar between the military (11.0%) and the general population (11.0%), as was panic disorder (military 1.1%, general population 0.7%), major depression (military 3.7%, general population 2.6%) and somatisation (military 1.8%, general population 2.6%)". Iversen et al. explain the reason for some disorders to be less prevalent in the military sample compared to the general population. They assume that the screening methods used by the military at recruitment must have screened out individuals with neurotic disorders, or they must have left the service soon after recruitment, due to psychological problems (Iversen et al., 2009, p.9).

A meta-analysis of 25 epidemiological studies conducted by Gadermann et al. (2012) estimated the prevalence of recent Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) major depression (MD) among U.S. military personnel. This study revealed that 12% of currently deployed, 13.1% of previously deployed and 5.7% of never deployed met the DSM-IV criteria for major depression (Gadermann, 2012). They found strong correlates between major depression and being female, enlisted young (17-25), being unmarried and having a low education level.

Another study that focused on mental health diagnoses (MHD) and attrition among US Air Force recruits reported that there was a 7.9% prevalence of mental health diagnoses (Shawn et al. 2015). Those who were recruited with MHD were more likely to separate from the service within the first 14 months compared to the non-MHD recruits. Shawn et al. (2015) cite a report from 2012 on military attrition and morbidity that highlighted that neurotic disorders, personality disorders and other non-psychotic mental disorders were the most common reasons for hospitalisation within first few years of accession, and they suggest that military services could benefit from screening for mental health disorders (Shawn et al. 2015).

Slaven and Doyle (2015) researched work-related strain in naval personnel in the UK with a large sample (n = 1,714) and found their GHQ case rate was high at 32%. The authors described this as a consequence of the highly demanding nature of the naval duties (Slaven & Doyle 2015). A comparison study was done by Gawkill et al. (2015) using the medics who were deployed in Iraq and Afghanistan and found that forward located medics (FMs) were not different from rear-located medics (RLMs) when comparing mental health

outcomes. However, FMs perceived their duties as demanding and beyond their skill and experience more than RLMs. They also showed more PTSD symptoms.

2.3.1.1 Psychological disorders in the context of the Sri Lanka Military

Sri Lankan culture in general has some unique features compared to western culture. These features include; "dependency, lack of self-confidence and lack of freedom, accepting the status quo, attitude towards work, respect for authority, loyalty, and collective human rights (Gamage & Wickramasinghe, 2012, p.65). Stigma related to mental health is likely to be "more prominent in Asian countries, Sri Lanka included, where communities are family-orientated" (Samarasekare, Davies, & Siribaddana, 2012, p.94). This culture may problematise a person admitting that they are struggling compared to others in their group. Moreover, the Sri Lankan military context is also unusual, because for nearly three decades there was a civil war against the Tamil Tiger terrorists, who were finally defeated. Protracted combat very probably had an impact on the well-being and mental health of military personnel. Additionally, compared to the UK and North America, there are some relevant cultural differences. Hanwella, de Silva and Jayasekara (2012) cited the Global Status Report on Alcohol and Health which has revealed that the abstinence (the practice of restraining oneself from indulging in something, typically alcohol or sex) rate among males in Sri Lanka (83 %) which is much more higher than in the US (28.3 %) or UK (10.4 %).

Only a very limited number of studies have been conducted in Sri Lankan military mental health context. Paragraphs below report those studies and findings.

Hanwella and de Silva (2011) compared the mental health status of 259 Sri Lanka Navy Special Forces personnel to 412 regular forces personnel. Despite the fact that 80% of the Special Forces personnel had been exposed to significant traumatic events, compared to 2.9% of regular forces, they reported fewer mental health problems. Using the GHQ, the most frequent mental health problems among the regular forces were fair or poor general health (21.1%) and fatigue (18.4 %).

Hazardous drinking was the most common problem amongst Special Forces (17%). Surprisingly special force members reported lower PTSD symptoms (1.9%) compared to the regular forces. Hanwella suggests that this could be due to high group cohesion among elite troops like the Special Forces. However, elite forces personnel are self-selected and require special abilities, which might both protect them against general mental health issues, and might also make them more likely to under-report or minimise any mental health symptoms that they had experienced.

A similar study with new participants was conducted by the same authors (Hanwella et al., 2014) three and half years after the end of combat operations in Sri Lanka. It explored the changes in the mental health status of the special (n=220) and regular (n=275) forces. Compared to the previous study, there was an increase in psychological distress and fatigue among the special force members, whereas their hazardous drinking and multiple physical symptoms showed a marginal decrease. In contrast, in the regular forces, there was a decrease of the psychological distress, fatigue and multiple somatic symptoms while hazardous drinking had increased from 16.5% to 25.7% over the period. The smoking rate had doubled in both groups over the period. PTSD symptoms in both groups had declined, in Special Forces it declined from 1.9% to 0.9% while in regular forces it declined from 2.07% to 1.1%.

Overall, these rates are much lower than the incidences of mental health issues in the UK, the USA and the Canadian military forces reported above. Several reasons for this difference are discussed below, but none of those has been researched formally. The first possible reason is that soldiers in the Sri Lankan military are treated as heroes by the community, and they have very strong family and social support. Soldiers were fighting for the freedom of their mother nation. During the war, there was a strong media campaign to boost the morale of the soldiers. Roads and bus stops were named after soldiers who died in battle. Their parents and family also were looked after by the rest of the community and the government had special priorities for them. Soldiers were given the feeling that the entire nation was with them and that people lived safe lives just because of the soldiers. Soldiers were proud of their duties and responsibility, and they believed that they protected their own family, relations and the community by fulfilling their duties and compromising their comfort. This aspect is generally lacking in Western forces, especially North American ones, as most recent military actions have occurred abroad. Soldiers cannot see the direct benefits of their fighting for their families or community. The second reason for these lower rates could be lack of proper screening and assessment of the mental health status of military members in the Sri Lankan context. Another possible reason emerges from Hanwella et al. (2014). Mental health issues such as PTSD in the Special Forces increased three and a half years after the end of the war. This was when all the celebrations of the victory and limelights on soldiers faded within the community, and their responsibilities were diluted to a certain extent. This meant that soldiers had spare time to reflect on their combat experience. This may have given rise to hazardous drinking and smoking as a maladaptive behavioural way of coping with ditressing memories and thoughts.

2.3.2 Substance abuse and other behavioural issues

Substance abuse and problematic drinking is another major mental health and behavioural issue among military personnel. Heavy drinking can be associated with accidents, violent behaviour, and self-harm behaviours (Fear et al., 2007; Hanwella et al., 2012). A study which paid special attention to the drinking problem in the UK Armed Forces reported that 67% of male and 47% of female participants were involved in hazardous drinking with reference to the AUDIT scale (Fear et al., 2007). It is important to remember that according to the statistical report of Health and Social Care Information Centre (2015), young adults in the general population report the highest rates of hazardous/ binge drinking (18%). General risk factors relevant to this age group may apply also to military members as most of the military represent the same age group. According to this study in which 8686 military personnel participated, there are some socio-demographic characteristics such as young age, being single and being a smoker associated with heavy drinking within the military. Iversen et al.'s (2009) prevalence study also found that alcohol misuse is the commonest (18.0%) reported psychological problem among the UK military personnel (Iversen et al., 2009). However, these studies e used self-report methods to gather data. Respondents may not reveal true consumption due to social desirability. Thus these results may not represent the true prevalence of problems related to alcohol consumption.

In contrast, alcohol abuse by military personnel in Sri Lanka is much less compared to the UK and the US statistics. Hanwella et al. (2009) conducted a study to explore the alcohol use in a military population deployed in combat areas in Sri Lanka. They also had tested alcohol usage using the AUDIT scale and found that the prevalence of drinking was 71.2% of the sample while the median AUDIT score was 2.0. However, out of this total usage 54.8% was infrequent users (frequency once a month or less) while 37.9% consumed 2-3 times per month. The problematic drinkers, in other words, hazardous drinking (AUDIT $\geq$ 8) was 16.7%. This was a lot less compared with the UK status mentioned above (67% and 47% for male and female respectively). The authors think the reason for this difference could be the drinking pattern and attitudes towards drinking in the general public. Drinking is not a socially acceptable behaviour in Sri Lanka (Hanwella, 2012). On the other hand, this might increase under-reporting in a self-report data collection method.

2.3.3 Premature discharge (Attrition)

Retaining qualified and trained personnel is a challenge faced by the military services just like any other organisation. Attrition can be defined as the military equivalent of personnel turnover in the civil organisation (Laurence, 1986). To be more specific "attrition refers to

when a service member fails to complete his or her contractual enlistment obligation" (Laurence, Naughton, & Harris, 1996, p.55). This can happen in two ways, the candidate decides to separate from the service, or the service decides to discharge the individual due to unsuitability. Those who leave prematurely tend to do so during the first year of enlistment and one-third of them leave during first six months (Gibson, Hackenbracht, & Tremble, 2014). Attrition rates for USA services are 19.8% for Army, 17.8% for Navy and Maritime and 15.6% for Airforce (Gubata et al., 2012). The U.S military has calculated the cost of attrition for one enlistee as $75,000 (Gubata et al., 2012). Therefore research on attrition is a key focus of military psychology.

Early research on attrition paid more attention to who left, rather than why they left. Buddin (1984) emphasised that the pre-enlistment work history of the candidate could give an indication of first term attrition among military recruits; recruits who had a history of changing jobs more frequently and no higher education qualification were more likely to leave.

McCloy, DiFazio and Carter (1993) used an event history analysis method, taking biographical and temperament data of the candidates to predict their attrition. They suggested that the Army can improve the prediction of first-term attrition by gathering biodata/temperament information before enlistment and other information like enlistment test scores. They also suggested that the determinants of early attrition and the determinants of the later attrition can differ (McCloy, DiFazio & Carter, 1993).

The U.S Army Center for Health Promotion and Preventive Medicine published a comprehensive report in 2004 reviewing the literature on "risk factors for attrition and strategies to reduce attrition" (Knapik et al., 2004). The report summarised these factors as follows:

a) Demographic factors

Individuals with an education higher than a high school diploma were less likely to leave. Being a female, white ethnicity, being married and younger than 18 years of age or older than 24 years of age also as risk factors for leaving.

b) Psychological risk factors

Candidates with lower scores in the Armed Forces Qualification Test (AFQT) and moral character (conflict with law, breaching rule and regulations, suspension from school, rebelliousness, being charged with criminal behaviours, traffic violations, fighting while

intoxicated and being arrested for crime) are more likely to leave or get adverse discharge from the service. Job satisfaction after training is correlated with attrition in the long term but does not relate to 6-month attrition or attrition from basic training.

c) Mental Health –Related Factors

A history of pre-enlistment physical or sexual abuse is considered as a significant risk factor for attrition. Pre-enlistment medical treatment for psychological problems or having had counselling or hospitalisation for mental health-related issues are also considered as risk factors for attrition. During the training, if a trainee's pessimistic attitudes towards the training, lack of motivation, and symptoms of depression are associated with higher risk of attrition. Another important factor revealed in this report is that, 2/3 of the trainees who got mental health-related hospital referrals during basic training left within the first term. Of people hospitalised for a mental health issue, 61% leave the service within 6 months after the hospitalisation.

d) General Health factors

Those who did not meet a satisfactory level of physical health during recruitment, including hearing, vision, skin problems, depression, back problems, and prior knee injuries, but still waived from medical rejection were more likely to leave. Pre-service injuries and injuries during the basic training was another risk factor. However, waivers for asthma, ADHD and behaviour problems did not predict attrition.

Even though there is evidence that alcohol abuse and smoking are risk factors for attrition, this report was inconclusive on the influence of pre- enlistment drug and alcohol use on attrition as different studies define alcohol and substance use and abuse in different ways.

e) Physical activity and physical fitness

Lower fitness prior to recruitment was another risk factor, as measured by: Greater body weight; higher BMI; low muscle strength; lower performance on physical tests (i.e. one-mile run, push ups).

Knapik et al. (2004) further described that different Military Occupational Specialities (MOS) have different attrition rates depending on the policies of the particular service, leadership styles, physical demand, physical hazards, environmental conditions, enlistment bonuses, and the jobs available for them in the civil job market. Buddin (1981) reported attrition for men in the Army and Air Force in a 1978 cohort. Results showed that after controlling for other confounding factors such as demographics, aptitude, duty location and career

turbulence, MOS was an independent predictor of attrition. For the Army, the attrition rate was 5% for teletypewriters and 28% for combat engineers. The attrition rate for radio communication/security was 10% and for audio-visual services 45%. Knapik et al. (2004) cited Sealy's study which examined four years' attrition rates in the US navy using DOD (Department of Defence) standard categories, They reported that attrition rates for women were varied from 28% to 39% and for men 24% to 33% (exclusive of the "nonoccupational" category which included patients, prisoners, and personnel in training). Women from the "Infantry/Gun Crew/Seamanship" categories reported the highest attrition while men from "Electrical/Mechanical Equipment Repairers" reported the highest attrition. Nevertheless, it is difficult to conclude how MOS influence attrition, as different services use different service categories (Knapik et al., 2004).

Kubisiak, et al. (2009) from the US Army Research Institute of Behavioural and Social Sciences, recognised attrition as a big challenge. They suggested screening of applicants, then if a risky individual was recruited, whenever possible they should receive special attention, helping them to resolve the personal problems which hinder the training progress. Lytell and Drasgow (2009) emphasised that leaving is the final act of a process. Therefore it is important to find out when it happens and what happened before. Withdrawal intention, history of withdrawal from previous jobs and organisational commitment were the strongest predictors of turnover rates in the military and surprisingly they did not observe any significant contribution of satisfaction with the military to their turnover model.

Mafini and Dubihlela (2013) conducted an empirical case analysis to identify the determinants of military turnover among technical Air-force specialists (n=231) in South Africa. They found that job satisfaction, management style, job content, employment equity, individual cognition and personality, economic and employment opportunities were responsible for 64.9% of the variance in turnover behaviour. Out of this, the most significant factor was job satisfaction, while internal equity was the least important factor that contributed to the attrition of aircraft technicians.

A study conducted with 459 male non-commissioned members of Canadian Forces by Godlewski and Kline (2013) tested several pre-entry personal characteristics that can predict turnover behaviour. These are; the pre-entry personal commitments (such as being married, responsibility at home front), desire for a military career, mental toughness, post entry work attitudes, newcomer adjustment, and turnover intention. The results demonstrated that all of the above mentioned factors except newcomer adjustment had a direct contribution to the turnover model. The authors also recommended using mental toughness as a pre-enlistment

screening measure. However, newcomer adjustment did not show any significant contribution to the model (Godlewski &Kline; 2013).

Niebuhr et al. (2013) carried out a retrospective cohort study with 15,082 US Army recruits to examine how well Tailored Adaptive Personality Assessment System (TAPAS), the personality assessment questionnaire used by the US military, can predict military attrition. They reported that those who scored low on the physical conditioning aspect of TAPAS had the highest rates of attrition. This study further confirmed the relationship between diagnosis with a mental disorder during early accession and attrition (Niebuhr et al., 2013). However, this study only tested army recruits and it may be difficult to generalise the findings to other forces.

Gibson, Hackenbracht, and Tremble (2014) conducted a longitudinal study with 14,808 first-term enlisted soldiers of the US army. Their main intention was to find out why soldiers leave the army early. They found that confidence in being able to complete the obligation can be a predictor of attrition. This relationship was observed in individuals who were less on ambivalence (who thought the decision to enlist was right) of their decision to enlist compared to high ambivalence (who thought their decision was wrong). This means those who were confidence that their decision was correct were more likely to complete the training and vice versa. These findings suggest that if a military service could improve the confidence of enlistees then it might reduce attrition. However, authors have accepted that not being able to assess the normative belief /subjective norm (the perceived social pressure to perform or not to perform a particular behaviour) about attrition as a limitation of the study. If the participant believes attrition as unacceptable behaviour this can also influence attrition. They conclude that attrition is a complex behavioural intention moderated by a number of latent factors (Gibson et al., 2014).

One of the most recent studies done in the US was by White, Rumsey, Mullins, Nye and LaProt (2014). They challenged existing attrition predictors based on educational qualifications and wanted to establish a new attrition paradigm that can manage and reduce attrition in the US army. They combined TAPAS and the Armed Services Vocational Aptitude Battery (ASVAB) to assess personality and other characteristics relevant to attrition, calling the combination the Tier Two Attrition Screen (TTAS). This combined new model could predict attrition better than individual model. They found that soldiers who score high in both education qualification (ASVAB) and temperament (TAPAS) were less likely to attrite within first 18 months of enlistment. Authors claim that TTAS could add substantial

validity to the existing system, which relies primarily on educational qualifications (White, et al., 2014).

2.3.2.1 Attrition in SL military

Jayawardena (2011) conducted a case study with 400 gunners of the Sri Lankan air force who were about to complete the initial engagement (12 years) of service. The aim was to test the Blau and Boal's model (Blau and Boal, 1987) a causal model of turnover, based on the assumption that job involvement and organizational commitment predict turnover using a questionnaire. The tested model has explained only 6% of the turnover behaviour of SL Military with 'organisational commitment' being the key variable. As this model only explained 6% of total variance Jayawardena (2011) developed a new model including several other factors which influence turnover behaviour of Sri Lankan military personnel. Among those factors, 'morale', 'job satisfaction', 'organizational commitment', 'stress', 'perceived employment opportunities', are significant. This new model has explained 25.3% of turnover in the SL military context. Further, this study was extended to a cohort study using both qualitative and quantitative methods to see any other predictors of turnover. This extended study found several personal, family, job, organisational and external environmental factors affecting the turnover behaviour. This study also explored whether different personality types have any influence on turnover behaviour and found no significant difference between those who re-engaged and those who took their discharge after the first term contract. Jayawardena used Bortner's (1996) Personality Analysis to observe the impact of personality type on turnover, and Cattell's (1990) personality traits analysis to identify the personality traits among the Gunners who are re-engaged and discharged. Personalities with 'social boldness', 'apprehension', 'self-reliance', 'perfectionism' and 'tension' were significant amongst the gunners, who were re-engaged than the gunners who were discharged (Jayawardena 2011).

2.3.4 Military suicide: The problem and the prevalence

Suicidal acts among military personnel is another issue. Suicide is one of the ten main causes of death in the general population and it is the second or third cause among young people aged 15-34 years, the age of most military personnel (Soltaninejad et al. 2014). Military personnel are additionally vulnerable because they have additional risk factors related to military life, including easy access to weapons and the skill to use them and high levels of stress.

Most of research on military suicide is from the USA. Until 2008, military suicide rates were lower than age-matched civilian rates (Griffith, 2012; Cassimatis & Rothberg, 1997). It was

also known that, suicide rates in the military usually decline during wartimes (Griffith, 2012, Rothberg, Holloway, & Ursano, 1987). Even though none of these papers discuss the possible reasons for this, it is possible that during war, people who do not care if they live or die, have more options to die heroically in battle in ways that are not described as taking their own life; this is frequently described in novels and other literature about war, but does not appear to have been researched. Nevertheless, Cassimatis and Rothberg (1997), while accepting the same idea, question the reliability of the statistics. Moreover, after 2008, there is strong evidence for the elevation of suicide risk after deployment in a war zone (Guerra & Calhoun, 2010; Pietrzak et al., 2010). Currently, in the USA the suicide rate among the military population is higher than among civilians (Jobes et al., 2012; Luxton, et al., 2010; Guerra & Colhoun, 2010). The military suicide rate amongst active and reserve personnel has been continuously increasing since 2008. According to the US Department of Defence Suicide Event Reports (DoDSER),[3] there were 268 suicides in 2008, 309 deaths in 2009 and 295 deaths in 2010. DoDSER 2014 report indicates that by March 2015, total suicides were 269 for active military and 169 for the reserve component. It is estimated that one active duty US military service member dies by suicide approximately every 36 hours (Kinn et al., 2011, McLean, et al., 2017). One reason for this increase could be that in modern military operations, soldiers have fewer opportunities for heroism but more opportunities to acquire PTSD, despite less life threat to life in battle. However, when carefully analysed, DoDSER has only reported 2008, 2009, 2010 suicides in the US military, then a decrease in 2015. Even though there was an increase for three consecutive years, it is still too early to predict a continuous increase. These could be fluctuations and US authors may have misinterpreted them without considering the general increasing trend for youth suicide, due to more access to drugs (Griffith, 2012).

Predictors of suicide

Pietrzak et al. (2010) examined risk and protective factors associated with military suicidal ideation amongst 272 veterans of Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF) through a cross sectional survey. They found that suicide contemplators had shown several psychological issues related to suicidal behaviour. Suicidality was predicted by PTSD, depression, alcohol problems, other psychological difficulties including somatoform difficulties, low resilience and low social support (Pietrzak, et al. 2010). Guerra and Calhoun (2010) found that US soldiers who were deployed in OEF/OIF had increased risk of

[3] The DoDSER system, and the resulting Annual Report, is designed to improve and standardize data surveillance across the Air Force, Army, Marine Corps and Navy in the USA

suicidality and this was associated with PTSD symptoms. Among those symptoms, emotional numbing was most strongly correlated with suicidal thoughts (Guerra & Colhoun, 2010). A comparison study was done by Black, Gallaway, & Bell (2011) using 874 suicide cases obtained from Army Behavioural Health Integrated Data Environment (ABHIDE), which maintains records on all suicide cases involving U.S. Army soldiers from 2001 to 2009. This study found that completed suicides were disproportionably male, Caucasian, younger in age (18 to 24 years) and had been previously deployed in combat areas. Almost half had prior mental health diagnoses.

Griffith (2012) examined the records of army completed suicides in the USA from 2007 to 2010 to see whether military exposure increased suicidality. Nearly two third had been treated for a mental health problem; 17% had received relevant inpatient care and 48% had received outpatient care. Moreover, 79% had life stressors including relationship problems, job related problems, and physical health problems. Griffith (2012) also reconfirmed the links between suicide and childhood neglect and abuse, other childhood adversities, and recent major bereavement. This study also found that being male, young and White were risk factors. With these findings authors suggest the military represent the three primary factors associated with suicides in the general population. They further argue that the common characteristics of male youth including aggression and competitiveness, plus exposure and familiarity with weapons, so having less inhibition to use them could be the main reasons for the male military members completing suicide. Griffith (2012) reports that his findings did not support the military stressors model for suicides in Army National Guards (ARNG) because military related variables showed little relationship to suicidal acts. Rather: "The primary risk factors for suicide are then being young in age, male, and white, with behavioural health conditions, for the most part untreated, and early childhood trauma and abuse. Although the likelihood for such individuals to commit suicide is greater, not everyone having one or more of these risk factors will commit suicide. It is believed these factors combine with a unique set of concurrent circumstances (largely yet to be identified) and can lead to suicide" (Griffith, 2012, p.117). In contrast to the other studies which emphasised increased of military suicide, Griffith tried to generalise the increased suicide rates in the military to the civil population and underestimated the contribution of military exposure to the mental health issues and suicides.

Soltaninejad et al. (2014) conducted a correlational study with 1463 young Iranian soldiers during 2012. The Beck Scale for Suicide Ideation (BSSI) and the NEO-Five factor Inventory were used. They found a significant positive correlation between suicidal ideation and

neuroticism. They also found that extroversion, conscientiousness and agreeableness correlated negatively with suicidal ideation. The authors argue that as neuroticism has components of depression, anger, impulsivity and vulnerability, the positive correlation between neuroticism and suicidal ideation is justifiable. They further discuss that the dimensions related to extroversion, conscientiousness and agreeableness are connected to vitality, joy and sociability, which can protect the person from isolation and despair (Soltaninejad et al. 2014). The limitation of this study is that the reserchers did not consider the contribution of military combat exposure to mental health issues and suicidality. The authors also accepted that the self-report method might facilitate malingering.

Khazem, et al. (2015) studied the relationship between coping strategies and suicidal desire in US military personnel. These relationships were examined through the lens of the Interpersonal–Psychological Theory of Suicide (ITPS - which will be discussed in the latter part of this section). ITPS assumes that the desire for death is derived from the feeling of burdensomeness and lack of social connection (Wolfe-Clark & Bryan, 2016). Participants (n=903) were clustered into adaptive and maladaptive based on the scores of 28—items Brief COPE (Carve, 1997) and their suicidal ideation was assessed with BSSI. Results revealed that the maladaptive cluster showed higher levels of both thwarted belongingness and perceived burdensomeness compared to the Adaptive Coping cluster (Khazem, et al. 2015). However, the cross-sectional nature of the study prevented examining the relationship between the variables over different time points to reflect the changes of suicidal ideation and thwarted belongingness over time. They also did not consider other psychological diagnoses of the participants which may have influenced their responses to IPTS and BSSI.

McLean et al. (2017) tested a predictive model for suicidal ideation among 366 treatment-seeking active duty military personnel with PTSD. All the participants had been deployed in Iraq or Afghanistan. The predictive model tested the contributions of combat exposure, social support, PTSD severity, depressive symptoms, guilt, and trauma-related cognitions to suicidal ideation (McLean et al. (2017). The results of this study revealed that depression and trauma-related cognitions have a significant effect on suicidal ideation. They further revealed that depression has a direct effect on suicidal ideation, while the severity of PTSD has an indirect effect on suicidal ideation through PTSD symptoms especially trauma related cognitions. This study could not demonstrate the well-established association between interpersonal social support and PTSD (DeBeer et al., 2014). The findings of this study also did not demonstrated the contributions of unit cohesion or trauma-related guilt to suicidal ideations. The authors found that low social support contributed to the relationship between

depression and suicidal ideation instead. However, due to the very specific nature of their sample, which only consisted of treatment seeking personnel with PTSD, it is difficult to generalise these findings to other samples.

2.3.4.1 Theories to explain military suicide

Interpersonal Theory of Suicide IPTS

The Interpersonal-Psychological Theory of Suicide (Joiner et al., 2005) has been utilised to explain military suicide. IPTS proposed that the most dangerous form of suicidal desire is caused by the simultaneous presence of two interpersonal constructs: *perceived burdensomeness*, which represents the belief that one's life is a burden to family, friends, and/or society and *thwarted belongingness*, which surrounded with feelings of alienation or social isolation from family and other valued groups. The *hopelessness* about these two states increased the *acquired capability* for suicide (Joiner et al., 2009; 2011; Wolfe-Clark & Bryan 2016). "thwarted belongingness and perceived burdensomeness are socially charged risk factors that indicate a desire for death, but suicide will occur only when an individual also has the capacity to inflict lethal self-harm" (Wolfe-Clark & Bryan 2016 p.5).

A further complication is that, it is theorised that people are born with an innate instinct of self-preservation, which protects against self-inflicted harm (Joiner 2005). Due to this fear of self-harm, even when an individual feels social isolation and a burden to others, suicidal behaviour would not activate. However, as the person practises self-harming thoughts and behaviour, they become habituated to this fear, which can reduce the feeling of danger. Only when self-preservation is reduced in this way suicidal thoughts can become an act (Joiner et al., 2005; 2009; Wolfe-Clark & Bryan, 2016). It is debated as to whether there are individual differences in self-preservation. Selby et al. (2010) suggested that military personnel may have reduced self-preservation. This is because, at least amongst non-conscripted forces, people who have very high self-preservation would not enlist because they would be unwilling to risk their lives. Also, military training can involve activities that deliberately habituate personnel to potentially self-harmful behaviour, for instance training under live fire, or parachuting. Additionally, exposure to violence, destruction and near-death experiences under combat conditions may also habituate the person. So, for the military, it is not just previous suicidal and self-harming behaviours but also those particular military factors that increase suicide capability. The capability for suicide still has to be combined with a desire to die by suicide, which comes from "thwarted belongingness" and "perceived burdensomeness"; when the person feels that they do not have a source of love and that they

have become a burden to others, then the desire for death is increased (Selby et al. 2010; Wolfe-Clark & Bryan, 2016). Even though military personnel can be protected with mutual dependence, strong social cohesiveness, and a feeling of ‘‘brotherhood’’ toward comrades, out of the military context they may feel isolated and not belonging to anyone (Wolfe-Clark & Bryan, 2016). This feeling can be triggered especially when they feel they are not functional as a military member anymore, or feel bullied or excluded.

IPTS provides an aetiological understanding of military suicide. However, a weakness is that it does not consider many of the other risk factors discussed above, such as youthfulness, impulsivity and having a prior history of childhood adversity and mental health problems. However, it would be possible to extend IPTS by including childhood adversity and mental health problems in its conceptualization as factors which increase suicide capability, perceived burdensomeness and thwarted belongingness. Another weakness is that the dynamic nature of the suicide risk is not well explained by IPTS (Wolfe-Clark & Bryan, 2016).

The Fluid Vulnerability Theory (FVT)

The Fluid Vulnerability Theory introduced by Rudd, (2006) is another theory of suicidal behaviour which considers the dynamic nature of suicidality (Rudd, 2006; Wolfe-Clark & Bryan, 2016). Rudd proposes that suicide episodes are time-limited and determined by fluctuating interactions among cognitive, affective, behavioural and physiological factors. This helps to understand the onset of the thoughts and their transformation into an action.

FVT theorises three assumptions in a suicide episode: a) baseline risk which describes the individual vulnerabilities such as persistent negative experience, which vary across individuals, b) an acute suicidal episode, which is triggered by additional stress on top of the baseline risk, and is time limited, c) if the person survives or resolves the acute suicidal episode, they come back to the baseline risk level automatically but each attempt can add on to baseline risk (Rudd, 2006). The risk for suicide, therefore, can be explained in two ways; either the person is in a baseline risk state, which is stable and chronic, or in an acute suicidal risk state, which is dynamic and fluctuating. When assessing the risk of suicide of an individual both these factors have to be assessed at the same time. Rudd (2006) assume that in individuals who have undergone developmental adversities like abuse, predisposition for mental health issues is at increased baseline risk and they can come to activate suicide mode even with a minor trigger factor. The baseline risk is the “set point” for each individual and some have this set point at a high level and some have it at a low level. Inherently the baseline

risk is chronic and static. In contrast, the acute risk is short-lived and formed by a recent stressful life event such as relationship failures, stressors of military training, a forthcoming examination, etc. While the baseline dimension "pulls" individuals to their baseline set point, the acute risk dimension "pushes" the individual away from the set point. If the acute risk is strong enough to push the individual far away from the set point, a suicidal crisis can occur; if not the individual will come back to the set point as the acute situation resolves (Rudd, 2006; Wolfe-Clark & Bryan, 2016).

Empirical studies on the effectiveness of FVT theory to explain suicidal behaviour are still growing. Alexander, Reger, Smolenski, & Fullerton (2014) launched a study to identify factors that differentially determine suicide employing a prospective case-control design. There had been 111 suicide cases but according to the case selection method only 27 cases were studied. In this study, the reserchers explored how relationship failures influence suicidal behaviour as suggested in FVT in military personnel and found that only recent relationship failures have a significant effect on suicidal behaviour (Alexander et al., 2014). They also found that no deployment related risk factors were associated with suicide. However, outpatient mental health history, mood disorders, substance abuse and history of self - harm were shown to be reported for suicide cases.

There are some practical problems in applying FVT to understand suicide risk. According to critics, FVT has failed to determine which risk factors should be prioritised during a suicide crisis and how these risk factors contribute to the set point and acute status of suicidal behaviour of the individuals (Wolfe-Clark & Bryan, 2016).

Considering the fact that the above-mentioned theories (IPTS and FVT) of suicide are the better options to explain military suicide over other theories, and accepting that each of these theories has its own limitations, Wolfe-Clark & Bryan (2016) suggested an integrated approach. While IPTS explains who attempt suicide and why, FVT gives an idea when this could happen. In such a context, both pre-enlistment risk factors (baseline risk) and the impact of combat exposure or any other current stressors (acute suicide mode) will be assessed along with perceived burdensomeness and thwarted belongingness of the military member (Wolfe-Clark & Bryan, 2016). Precent research evidence (Bryan et al., 2015) supported the idea that potential for suicide does not increase just after painful and provocative combat experience but this acquired over time (Wolfe-Clark & Bryan, 2016). Therefore the relationship between combat experience and suicide capability is bi-directional, suggesting capability is a trait-like variable and relatively stable over time but can increase the likelihood of combat exposure. According to Wolfe-Clark and Bryan this

view has been supported by Bryan, et al. (2014) and Nock et al. (2013). In this light they postulate that the reason for the recent increase of military suicide is personnel who are entering military are coming with greater capability for suicide than in the past. Wolfe-Clark and Bryan further presume that military services may attract individuals who are high is capability for suicide. However still there is not enough evidence to prove this assumption.

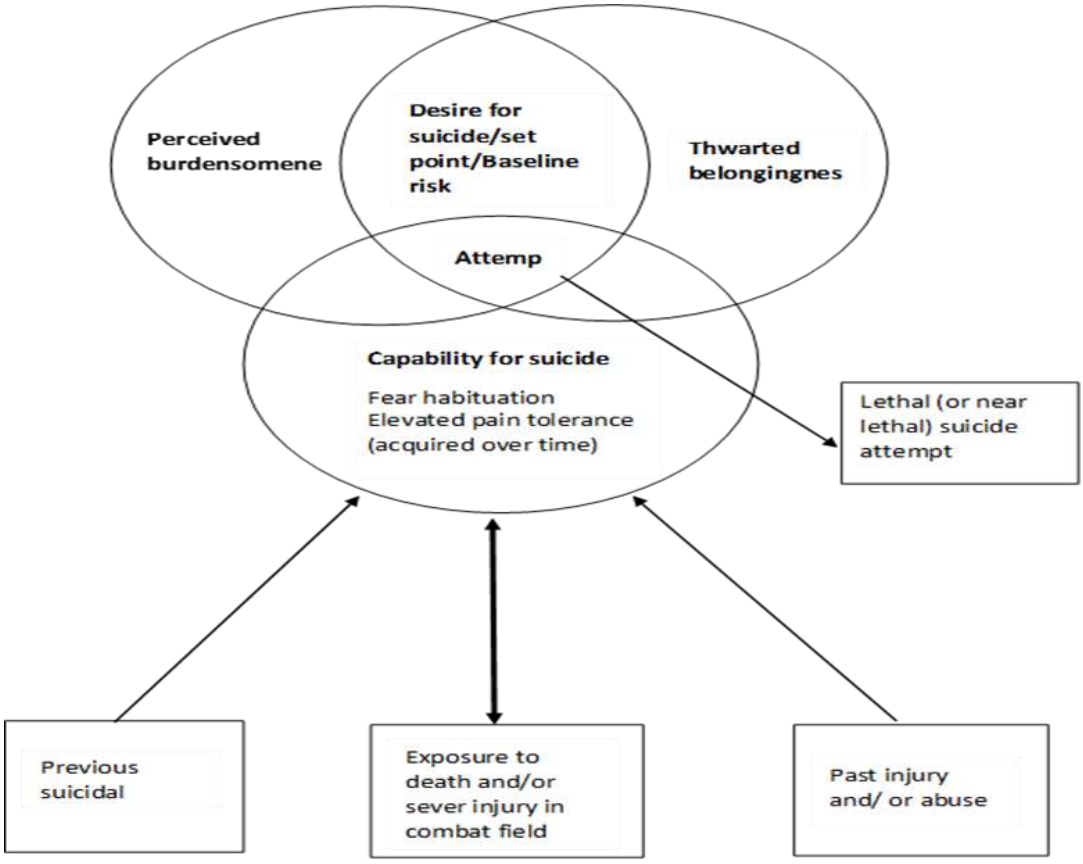
It is important to notice that tis integrated model tries to keep the military services away from the responsibility of increased suicides among military personnel and putting that responsibility on the soldiers' shoulders.

The following figure (Figure 2.2) displays the integrated model for military suicide suggested by Wolfe-Clark and Bryan (2016) based on the IPTS and FVT theories.

Summarising this section (2.3), there has been research with military personnel in four main areas mental health issues, substance abuse, attrition and suicide. Similar factors appear to be related to all four types of problem, including prior adversity and mental health problems, prior suicide and self-harm, youthfulness and low education. Therefore, it is worthwhile for military services to assess recruits for the above factors to minimize the aforesaid issues in the military. Previous literature has suggested that if proper screening and assessments are conducted at recruitment, these problems might be reduced, even in the context of the challenges and stresses of military life. The next section will discuss the pre-enlistment contributing factors that emerged from the previous section.

Figure: 2.2

Integrated new model for military suicide



(Source: adapted from Bryan & Cukrowicz 2011, p. 127 and Wolfe-Clark & Bryan, 2016)

2.4 Contribution of pre-enlistment factors towards the wellbeing and performance of a service person

Combat exposure, highly demanding work environments and boredom are the main negative characteristics of military services. The challenges discussed previously can be caused in part by these features. However, recent studies have paid attention to the "personal characteristics and previous experiences that might mitigate or exacerbate the individual's response to an extreme stressor" (King et al., 1996, p 520). This section will outline some of the most important pre-enlistment risk and protective factors which contribute to military wellbeing.

2.4.4 Pre-enlistment risk factors to well-being

"A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury" (WHO website, 2017). For military personnel, this may include both mental and physical health, military performance, attrition,

behavioural issues, suicidal behaviour. There is a great deal of research on risk factors in the military. Some of the most important ones are reviewed below.

2.4.1.1 Education level

General intelligence is considered to be the best predictor of performance for most of the professions (Schmidt, 2002). Researchers have attempted to generalize this idea to the military context too. Only a few recent examples of hundreds of studies done to emphasise the importance of cognitive ability in military performance and wellbeing are discussed below.

Pitman, Orr, Lowenhagen, Macklin and Altman (1991) looked at performance on the Arithmetic reasoning subtest of the Armed Forces Qualification TEST (AFQT) at military enlistment in the USA and found that those who scored low were more likely to develop chronic PTSD symptoms compared to those who scored high. Macklin et al. (1998) tested this hypothesis with a sample of 90 (59 PTSD and 31 non-PTSD) Vietnam combat veterans. They found that those who displayed lower pre-combat intelligence assessed by AFQT at recruitment were more likely to develop PTSD symptoms after combat exposure. Macklin et al. (1998) suggest that people with lower intelligence may perceive more threats, and believe that they have fewer coping skills and feel more overwhelmed than more intelligent people. Consequently, this increases the risk of PTSD. Another reason for this relationship is that people with higher cognitive resources are good at coping with the emotional impact of events. Citing the work of Schnurr, Rosenberg, & Friedman (1993) and Basoglu et al. (1994), Macklin et al. (1998) further state that people with higher intelligence have more ability to put traumatic experiences into words and assign a meaning to them.

A longitudinal study was conducted by Bartone, Snook & Tremble (2002) to determine the factors predicting leadership performance of the USA West-Point Cadet trainees. Cognitive factors assessed through college entrance score, social judgment and logical reasoning were amongst the factors which contributed to leader performance. However, the model with these factors was not shown to be a strong predictor of leadership and there were several other personality factors that equally or better explain leadership performance. Also, vital leadership aspects such as problem solving and spatial judgment were not associated with leader performance in this study. Hence, it is difficult to conclude the relationships between factors considered in this study and military leadership. As reviewed above, Knapik et al. (2004) found that attrition was predicted by lower educational attainment, and lower scores on military aptitude (AFQT). In a systematic review (DiGangi et al., 2013) of 54 longitudinal studies of PTSD there were 10 studies that examined cognitive abilities prior to the index

trauma. All 10 found that lower pre-trauma cognitive abilities were the most important risk factor for PTSD.

Rumsey and Arabian (2014a) reviewed the available military assessment and selection procedures and identified two different paradigms in assessment processes used by the US military. The first paradigm prioritises cognitive abilities (Armed Services Vocational Aptitude Battery - ASVAB). The second paradigm prioritises personality (Tailored Adaptive Personality Assessment System -TAPAS). Rumsey and Arabian (2014a) suggest that a combination of both would predict performance better.

2.4.1.2 Prior antisocial behaviour patterns

Before moving into research on antisocial behaviour patterns as a pre-enlistment personality aspect, it is important to distinguish anti-social behaviour from anti-social personality. Much criminological literature does not make this distinction, which create confusion. Most people with anti-social personality disorder do not engage in overt law breaking or aggressive behaviours and many people who behave antisocially do not have an anti-social personality (McManus et al. (2012). Having been traumatised is one of the predictors of anti-social behaviour. In this context, anti-social behaviour is the focus, not anti-social personality disorder.

Anti-social behaviour (ASB) is demonstrated through aggressive and violent behaviour, breaking the law etc. This may be a reaction to traumatic experience or reflect any other influential developmental problem. There are researches that suggests pre-enlistment anti-social behaviour patterns could contribute to PTSD in military members with exposure to combat. For an example, Helzer et al. (1987) reported a study done with the general population and claimed anti-social behaviour increased the probability of combat service which increases the risk for PTSD. Few recent literature suggest military personnel are prone to exhibit violent behaviours after returning from deployment. McManus et al. (2012) found the prevalence of violent behaviour in UK military personnel to be 12.6%. They also found that 34% of their sample has had a history of pre-enlistment anti-social behaviour patterns. There is also an indirect relationship between violent behaviour and PTSD development in military personnel. Pre-enlistment ASB was associated with increased risk of negative behavioural outcomes such as severe alcohol misuse, outbursts of anger or irritability, fighting or assaultive behaviour and risk-taking behaviour (McManus, et al., 2012; Gubata, et al., 2012). Military candidates who have demonstrated anti-social behaviour tend to continue those behaviours during their military career and sometimes these can be multiplied after exposure to combat experience. Therefore researchers suggest that it is worth exploring

the pre-enlistment behaviour patterns of candidates prior to the enlistment (McManus, et al., 2012; Gubata, et al., 2012). However, no studies have made any comparison with the general population; therefore, we cannot conclude that these features are unique to military members. On the other hand, in today's world military professions are self-selected and people utterly opposed to violence would not enlist. Another important factor to mention here is that military personnel are trained to be violent, through training and work but there are no properly established mechanisms to demilitarize them when they go home. Thus, it is not surprising that they retain these behaviours afterwards.

2.4.1.3 Childhood adversities and childhood trauma

It is well established that there is a relationship between childhood adversity and adult problems, probably via multiple pathways including lowered self-esteem, depression, and increased likelihood of encountering further difficulties. Developmental theorists have hypothesised a strong association between childhood adversity and behavioural difficulties in later life (Erikson, 1964). Childhood adversities such as parental psychopathology and interpersonal traumas, in general, these are associated with increased psychopathology in adulthood, including depression (Kessler, Davis, & Kendler, 1997). This association has been confirmed by many empirical studies (e.g. Cole, Putnam, 1992; Kang, et al. 2003; Pagura et al., 2006). Felitti and Anda (1998) conducted a retrospective study to explore how childhood adversity experience (ACE) impacts on health in later life and revealed that exposure to substance abuse, mental illness, violent treatment of the mother, and criminal behaviour in the house are associated with physical and mental health in adult life. Other ACE researchers have reconfirmed this relationship and found that ACE was related to other key health outcomes, such as alcohol abuse and smoking behaviours (Anda, et al., 1999; Edwards, et al., 2003). Pagura et.al (2006) have reported that neglectful parenting or absence of parents is associated with several psycho-behavioural issues, particularly antisocial behaviours and self-criticism. As a result, those individuals can develop psychological disorders as adults or are at increased risk of developing combat-related PTSD. However, with the findings of the Kauai Longitudinal Study reported by Werner, (2005) this perspective has begun to change. According to latest follow up of this study, one third of individuals with a high risk childhood developed as healthy, competent, confident and caring adults. As reported by Werner (2005, p.12), "Their very existence challenges the myth that a child who is a member of a so called "high-risk" group is fated to become one of life's losers".

The proposition that childhood adversities are associated with adult mental health has been tested in the military context too. Cabrera et al. (2007) compared 4529 soldiers who had not been deployed in Iraq and 2392 who had been deployed in Iraq to explore whether individuals with childhood trauma were affected differently by exposure to combat. The likelihood of screening positive for depression and post-traumatic stress disorder was significantly higher for individuals reporting exposure to two or more categories of childhood adversity. Additionally, adverse childhood experiences were a significant predictor of depression and PTSD symptoms, above and beyond the expected contribution of combat exposure (Cabrera et al., 2007). It is worth noting that this study suggested that ACE independently predicted higher depression and post-traumatic stress symptoms (Cabrera et al., 2007). However, as the authors acknowledge, this was a retrospective study and it may suffer from selective recollection bias.

Julia et al. (2013) systematically reviewed 52 journal articles examining pre-trauma factors. Out of those 52 studies, the majority were with high-risk groups including active military personnel and veterans. Childhood family and social environment were predictive factors for PTSD. According to this meta-analysis, five studies found that family related adverse factors correlated with the later development of PTSD whereas three studies found that adversity in the environment beyond the family predicted PTSD in military people. One of these studies found that experiencing poverty before the age of 11 is a risk factor for PTSD development. This review has identified six pre-trauma predictors: 1) cognitive abilities; 2) coping and response styles; 3) personality factors 4) psychopathology; 5) psychophysiological factors; and 6) social ecological factors (e.g., family of origin, social support, poverty) historically thought to be consequences of trauma, are the most likely risk factors for PTSD. (Julia et al., 2013). The last category, which is social ecological factors, is the broadest group, which includes most of the childhood adversities that happen within the family and outside the family (i.e. assault, conflict, witnessing traumatic events etc.). Findings vary depending of the measures used and the sample. Five studies confirmed that family of origin related variables were significant predictors of PTSD (Julia et al., 2013)

Engel et al. (1993) studied Desert Storm veterans to ascertain the association between precombat abuse (sexual and physical) and combat related PTSD with both male and female veterans. Female military members who reported pre-combat abuse reported more PTSD symptomatology than those with no abuse history. This results were repeated in a later study by Owen et al. (2009)) with 299 male veterans who had been exposed to combat and diagnosed with PTSD. They were looking at the relationship between childhood trauma,

combat exposure, depression and the severity of PTSD symptoms. High combat exposure and depression levels were associated with higher levels of PTSD severity (Owen et al., 2009). A complex relationship between childhood trauma and PTSD suggested that individuals with higher childhood trauma are less likely to develop PTSD if their combat exposure is high. For individuals reporting low combat exposure levels, however, increasing levels of childhood trauma were associated with higher PTSD severity. Childhood trauma alon showed a major effect on the severity of PTSD symptom; however, when depression was added to the model this effect disappeared (Owen et al., 1993 p. 122).

Both of these studies suggest that childhood trauma can have a significant influence on PTSD development on military members who are exposed to relatively low combat-related trauma.

In this section, some of the main risk factors for the well-being of individuals were discussed and the impact of those on military personnel particularly was observed. The next section will explore the protective factors that promote well-being.

2.4.2 Pre-enlistment protective factors of well-being

Although many studies have demonstrated the vulnerability of military personnel to develop psychological problems, including PTSD, due to combat exposure, relatively few examine why not everyone exposed to war develops psychological symptoms (Bartone, 1999). Recent studies have looked at individual differences in reaction to combat exposure (Bartone, 1999; Bartone & Snook, 1999; Maddi et al., 2006; Maddi et al., 2010). In general, the ability to cope in the midst of stress and adversity is referred to as resilience (Herlihy, 2014). However, different researchers have described this concept in different ways and used different labels. The three main related but separate constructs are resilience, hardiness, and mental toughness (Bartone et al., 1999; Wagnild & Young, 1993; Maddi et al., 2012; Clough et al., 2007 Salvatore; John & Martin, 2013; Sandra et al., 2013; Sigurd et al., 2015). These three constructs have been widely used in military research and all can predict military well-being (Bartone et al., 1999; Wagnild & Young, 1993; Maddi et al., 2012; Clough et al., 2007 Salvatore et al., 2013; Sandra et al., 2013; Sigurd et al., 2015). The following sections describe these three constructs and their relevance to the military context.

2.4.2.1 Resilience: What is resilience and what does it measure?

"Resilience" is a broad conceptual umbrella, covering many concepts related to positive patterns of adaptation in the context of adversity. It cannot be defined as a static trait or characteristic (Masten & Obrandovic, 2006). The concept of 'resilience' gives a sense of the

emotional stamina possessed by people who display courage and adaptability in the adverse situations (Wagnil & Young 1993). Wagnil and Young further state "Resilience is a personality characteristic that moderates the negative effects of stress and promotes adaptation…frequently, the quality of resilience is attributed to individuals who, in the face of overwhelming adversity, can adapt and restore equilibrium to their lives and avoid the potentially deleterious effects of stress" (p. 165). Resilience functions as a buffering factor that protects individuals from psychological disorders. Those who are resilient possess higher self-esteem, higher self-efficacy, better problem-solving, and skills at maintaining good interpersonal relationships (Rutter 1987; Wagnild &Young, 1993).

Masten and Obrandovic (2006) argue that resilience is not a single trait or process and there are many attributes and processes involved in resilience. Expected adaptation of the individual has two aspects; adapting to the environment (Coping I) and maintaining internal integration (Coping II). Therefore both the environment and the internal capacity of the individual are important. Resilience is a process in which internal and external factors contribute equally. Thus, "there are no magic bullets for producing resilience" (Masten & Obrandovic, 2006, p. 23). Wagnild and Young (1993) also put forward the idea that resilience is not either a 'trait' or a 'state' and resilience is a very complex phenomenon. Wagnild and Young further stated that resilience of an individual could be strengthened. However, Rutter (2007) strongly argues that resilience is not and cannot be a personality trait and individuals become resilient only in the presence of adversity (Rutter, 2007).

How does resilience develop? Researchers have been trying to answer this question for a long time. As emphasised by Masten (2001), there are two critical conditions which are necessary for resilience to develop; a) exposure to significant threat, severe adversity, or trauma b) the achievement of positive adaptation despite major assaults on the developmental process. Hersberger (2013) reported some factors that affect resiliency development. *Hardiness;* which helps to reduce the negative effect of the stress, *Locus of control;* individual perception control over his or her own destiny, *Learned resourcefulness;* cognitive skills such as information seeking and using behaviours, *Experience;* gained from learning for future use, *self-efficacy;* the individual belief of one's own capability to perform as expected in stressful situations.

Furthermore, researchers have paid attention to the construct and patterns of resilience. As cited by VanBreda, (2001) in his report on the resilience literature, Polk (1997) has introduced four patterns in the literature. These are:

a) Dispositional pattern: physical and ego-related psychological attributes that promote resilience. The sense of autonomy, self-reliance, a sense of self-worth, good health and good physical appearance play a role here.
b) Relational pattern: the individual's role in society and his/her relationship with close and intimate others and with the broader societal system.
c) Situational pattern: the link between the individual and the stressful environment/ situation. Individual problem-solving capability, proper evaluation of the situation and response appropriately, and the ability to take action according to the situation are important.
d) Philosophical pattern: the individual's view about the life paradigm such as believing in optimism, belief that self-development is important, and belief that life has a purpose. These philosophical views facilitate resilience.

Resilience also has to be distinguished from recovery and coping. Regarding the difference between resiliency and coping, Fletcher and Sarkar (2013, p.16) reported that "…. the key messages to emerge from the literature are that: resilience consists of various factors that promote personal assets and protect individuals from the negative appraisal of stressors; recovery and coping should be conceived as conceptually distinct from resilience; and resilience influences the stress process at multiple stages, namely an individual's appraisal of stressors, his or her meta-cognitions in response to felt emotions, and his other selection of coping strategies".

The application of resilience to the organisational and occupational context emerged from the studies carried out by Kobasa (1979) and Kobasa and Maddi (1984) with an American telephone company. According to this study hardiness and resilience can be used interchangeably. However, there is a slight difference between these two constructs. Matsen and Wright, (2006) emphasised that resilience could emerge only in the presence of adversity and risk. Resilience amalgamates many processes and interactions which extend beyond the boundaries of an individual organism, including close relationships and social support. Resilience can be dynamic. Therefore an individual may be resilient in the face of some stressors and not in other situations. The same individual may show resilience at one time and maladaptive behaviours at other times. Hardiness seems to be static and cannot develop over time (Hystad et al., 2015).

2.4.2.1.1 Significance of resilience in military context

The argument of Masten (2001) and Masten and Wright (2006) that resilience emerges only during adversity and trauma is highly relevant to the military. In research on military samples,

resilience and hardiness have been used interchangeably, so it is difficult to separate the two. Some researchers have considered hardiness to be a necessary component of resilience. Therefore, resilience and hardiness are reviewed together.

Most of the military resilience studies have used the definition developed by the Technical Cooperation Programme (TCP). According to this panel, resilience is "the total of dynamic psychological processes that permit individuals to maintain or return to previous levels of well-being and functioning in response to adversity" (The Technical Cooperation Programme, 2012, p.4). TTCP conducts longitudinal resilience research programme through five nations, the USA, UK, Canada, Australia and New Zealand.

Maguen et al. (2008) investigated risk and resilience variables among the Airforce medical personnel (n = 328) before and after deployment. Resilience was assessed using Connor and Davidson's (2003) Resilience Scale (CD-RISC). Along with CD-RISC, participant were assessed for pre-deployment stressors, life vent checklist, positive military experience, PTSD check-list military version and Positive and Negative Affectivity Schedule. The results of this study failed to show that resilience can predict PTSD when life stressors, previous trauma experience, and positive military experience are included in the model. However, it demonstrated a positive relationship between resilience and positive affect of military members, which ultimately lowers the effect of negative experience. Even though this positive affect could be temporary, it accumulates in the individual and eventually functions as cumulative assets which will be used in future adverse situations (Maguen et al., 2008). However, this study did not investigate the predictors of resilience, and the sample was not a good representation of the military population as it included only medical personnel.

The biggest contribution of the resilience concept to the military context was the introduction of the Comprehensive Soldier Fitness programme (CSF) to the US Army by Cornum, Matthews, & Seligman from 2009 to 2013. This programme was based on positive psychology and designed to increase psychological strength and positive performance and to reduce the incidence of maladaptive responses for the entire U.S. Army (Cornum, et al., 2011). CSF proactively provided soldiers with the skills needed to be more resilient in the face of adversity. It included four programme elements: (a) the assessment of emotional, social, family, and spiritual fitness; (b) individualized learning modules to improve fitness in these domains; (c) formal resilience training; and (d) training of Army master resilience trainers (MRTs) to instil better-thinking skills and resilience in their subordinates. (Cornum, et al., 2011). CSF was extended to the family members of the soldiers so that they also could

cope with the stress of soldier deployment. The ultimate goal of this was to improve support and psychological services for spouses and children of deployed soldiers, to improve families' quality of life while their family members are deployed.

The CSF programme was unprecedented for several reasons. It was the first ever psychology-based approach to improving the psychological fitness of all members of an organisation with over 1.1 million members. It was claimed to have made a big impact on military psychology: "The Army, despite its traditional focus on material and arms, recognises the fundamental importance of the human component in successful military operations in the 21st century" (Cornum, et al., 2011, p.8).

However, the CSF programme has been criticised, mainly for methodological flaws. Publishing a paper on his website titled "Dark Side of Comprehensive of Soldier Fitness", Eidelson (2011) asks, "Why is the world's largest organisation of psychologists so aggressively promoting a new, massive, and untested military programme? The APA's enthusiasm for mandatory "resilience training" for all U.S. soldiers is troubling on many counts". Eidelson and Soldz (2012) in their working paper for the Coalition for an Ethical Psychology highlighted the following issues: (1) the failure to measure the important outcomes of PTSD, depression, or other psychological disorders, despite the availability of validated measures for doing so, (2) the flawed research design that fails to control for important confounding variables, (3) significant problems with the method of data analysis, (4) the failure to acknowledge plausible risks of the CSF intervention.

Furthermore, Brown (2014) had the following criticisms: " (a) whether a program based on resiliency training for school-aged children can hope to address the serious mental trauma, including PTSD, faced by soldiers deployed to war zones; (b) whether the instruments used to measure the performance of the programme are reliable, valid, and appropriate for the circumstances in which they are being used, and (c) whether the design and delivery of the programme takes sufficient account of the conflicting real-world demands placed on the individuals involved (Brown, 2014, p.15). Adler et al. (2015) studying 1,939 US soldiers found no significant difference between soldiers who were given the CSF training and military history training in terms of psychological well-being outcomes. However, CSF training increased confidence and was better rated.

Crane et al. (2012) reported a protocol for the longitudinal study of psychological resilience in the Australian Defence Forces (ADF), which was launched in 2009. This study anticipated providing psychological resilience training and mental health policy within ADF, acronym

LASER. (Longitudinal ADF Study Examining Resilience). The LASER programme has adopted a working definition of resilience from the Technical Cooperation Panel (TTCP-13). There were several tools utilised in this study to assess resilience, psychological well-being, PTSD symptoms, and somatic symptoms. As this was a protocol report, results are not yet available.

Sudom and Lee (2016) summarised a decade of longitudinal resilience studies conducted across TTCP programmes. It also included some non-longitudinal military resilience research. The following is a summary of the studies considered in their summary report:

Skomorovsky and Sudom, (2011) found that hardiness, which is a main component of resilience, was significantly associated with positive outcomes in Canadian service members. These positive outcomes included psychological well-being and a favourable perception of training. Schaubroeck et al. (2011) studied US Army personnel who had been deployed in Iraq, finding that higher order resilience was strongly associated with better psychological and physical health, particularly amongst those who had been exposed to severe combat experience. The Readiness and Resilience National Guard Soldiers (RINGS) cohort study and the related prospective National Guard cohort studies conducted with US National Guard by Polusny et al. (2011 and 2014) assessed National Guard members one month prior to deployment to Operation Iraqi Freedom and two months after the deployment. They found that at the baseline stage prior to deployment, 3.7% of soldiers were at risk of PTSD, whereas, post-deployment the percentage rose to 13.8%. Further analysis showed that reporting more stressors prior to deployment and feeling less prepared for the deployment predicted new-onset probable PTSD (Polusny et al., 2011 and 2014).

According to Sudom and Lee (2016), other studies examined resilience after exposure to traumatic experiences when there were no prior mental health problems. Segovia et al. (2013) studied Vietnam veterans 37 years after the end of the war, they defined resilience as not having been diagnosed with any psychiatric disorder. They found that Repatriated Vietnam Prisoners of War (RPWs) who never complained of sleep difficulties before, during or after captivity were more resilient and never developed a psychological disorder. From this, they concluded that sleep quality plays a major role in protecting the person through a traumatic experience (Segovia et al., 2013), although good sleep could be a result of lack of PTSD symptoms, rather than a cause.

Sudom and Lee further report a study of Boasso et al. (2015), conducted to examine the longitudinal course of lifetime PTSD symptoms following combat exposure by

disaggregating deployed U.S. Marines into upper, middle, and lower tertiles of combat exposure. Participants have been tested at three time points: one month prior to deployment (T0), I month after (T1), 5 (T2) and eight months (T2) post deployment. Those with higher combat exposure showed a temporary but clinically significant increase in PTSD symptoms after exposure, but this gradually decreased afterwards. This was named as "true resilience" by the authors. The other group was those who reported lower levels of combat experience and lower levels of symptoms. This was labelled as "artificial resiliency" (Boasso et al., 2015). The authors report that they measured the frequency of traumatic events not the perceived severity of the event. However, the severity of PTSD symptoms is not a simple function of the objective severity of the experiences but depends on some other factors, including the person's perception of the potential, rather than actual, severity of the outcomes. Thus someone who saw very severe combat but always felt relatively safe might have less PTSD than someone who saw less severe combat but experienced several "near misses".

Hourani et al. (2012) found that US Marines who scored higher in resilience assessed in the weeks before retirement from the military had lower odds of demonstrating chronic mental health problems at the follow-up nine months after leaving the military. Also, Elbogen et al. (2014) found that resilience and self-determination were associated with lower levels of violence and aggression in US military deployed in Operation of Enduring Freedom or Operation Iraqi Freedom.

Sudom and Lee (2016) conclude that due to the multidimensionality of resilience, different studies have operationalised different aspects of resilience, leading to different results. Moreover, when resilience is treated as a unidimensional variable, its predictive effectiveness is reduced. Hence they recommend measuring different facets of resilience. Additionally, longitudinally, a range of mediator and moderator variables also need to be considered, including coping appraisals of the individual; the social environment; social support; unit cohesion; quality of the leadership during deployment; personal issues (Liddell, Roesch, Aldridge, Vickers et al., 2009; Bridger et al., 2011; Roesch, Aldridge, Vickers et al., 2009; Vogt et al., 2008; Meis et al., 2010; Polusny et al., 2011; Sudom & Lee, 2016). Next, the main research on hardiness will be reviewed.

2.4.2.2 Hardiness: What is hardiness and what does it measure

The term "Psychological hardiness" was first introduced by Kobasa (1979), who described it as a personality variable that distinguished those who became ill under stress from those who remained healthy. The hardiness concept emerged in a 12-year natural experiment study conducted by Kobasa and Maddi from 1975 to 1987 with the US Illinois Bell Telephone

Company which underwent tremendous change during that time (Kobasa 1979; Maddi & Kobasa 1984). People who were more hardy were more resilient to the changes and were more successful afterwards, while those who were low in hardiness developed psychological and fatal physical diseases (Maddi, 2007). As already discussed, hardiness is a pattern of attitudes and skills that provides courage and strategies to transform stressful circumstances from potential disasters into growth opportunities for enhanced performance, leadership, conduct, health and psychological growth (Maddi, 1987, 2002; Maddi & Kobasa, 1984). Kobasa (1982) stated that hardy individuals try to make positive changes in the work environment and are less affected by work stress. Barton (1999, p.73) defines hardiness as a "personality variable that develops early in life and is reasonably stable over time, although it is amenable to change under certain conditions". Kobasa (1979) and Maddi and Kobasa (1984) conceptualised hardiness as follows: "…hardy individuals maintain a high sense of *commitment* (vs alienation) to their work and life in general, remaining vigorously engaged or involved with others and activities. They also possess a high sense of *control* (vs powerlessness) that keeps them trying to influence events and outcomes. Finally, hardy individuals appraise difficult and trying situations as a *challenge to grow* (vs. a threat to be avoided) and consequently have a greater openness to variety and changes as opportunities to develop through what they learn in living" (Maddi, Matthews, Kelly, Villarreal, & White, 2012, p.21). These three facets subsequently were named as the 3Cs.

Maddi et al. (2010) explained hardiness as a personality dimension that facilitates resilience and growth in stressful situations.

Hardiness concept was adapted to different fields later on with different applications. Hardiness has been able to predict performance and psychological well-being in various samples including bus drivers (Bartone, 1989), firefighters (Giatras, 2000), lawyers (Kobasa, 1982), nurses (Keane, Ducette, & Adler, 1985); and undergraduates (Lifton, Seay, & Bushko, 2000; Maddi, 2002; Bartone 1999). Bartone (2007) renamed hardiness as Dispositional Resilience in his studies.

2.4.2.2.1 Hardiness in military contexts

Since hardiness is a construct of resilience, some of the hardiness studies have already been reported in the resilience section above. The following studies are some of the unique studies on the "hardiness" concept in military context.

Hardiness should be relevant to military settings due to the highly demanding and stressful nature of the work. Validating the 15 item-short hardiness scale, Bartone (1995) stated that

hardiness was a good predictor of military admission; which means those who were selected through military selection process were high in hardiness. It has been recommended for both assessment and training (Maddi, 2007; Bartone, 1999). Bartone (1999) studied military personnel in stressful situations during combat and peacekeeping missions in the Persian Gulf War. There was a negative relationship between hardiness and the psychological symptoms developed after combat experience and missions. Bartone (1999) also reported that there was a three-way interaction between hardiness, combat stress, and stressful life events. Personality variables, such as hardiness, can partly explain why some soldiers remain healthy despite life stressors and combat exposure.

Bartone and Snook (1999) explored the relationship between hardiness and the transformational leadership of Cadet Trainees at West Point Military Academy and found that hardiness was the best predictor of leadership. Similarly, high scores on hardiness were also found to be effective in predicting successful training completion by Israeli military recruits (Westman, 1990). The same effect has been demonstrated in firefighter trainees (Maddi, et al., 2006). Further studies support the conceptual mechanisms whereby hardy attitudes lead to hardy actions, thereby having positive effects on performance, conduct, and health. Bartone (1999) surveyed 777 members of Army National Guard and reserve medical unit who had been deployed in the Gulf war. In addition to the hardiness scale, stress level and the few other mental health assessment were used. The results of this study confirmed that hardiness interacted with combat stress to predict fewer symptoms. Bartone (1999) further confirmed through the result of this study that even though the effect of hardiness on positive mental health is modest in lower stress conditions, it has a greater effect on mental health under high-stress conditions. Dolan and Adler (2006) assessed military-specific hardiness, deployment stressors, psychological and physical health in US soldiers during peacekeeping deployment. They were assessed again after deployment for mental health issues. They found that, when depression during the deployment was adjusted, military hardiness moderated the effect of deployment stressors on post-deployment depression. It was observed that those who experienced a high level of stressors during deployment and possessed higher levels of hardiness showed fewer symptoms.

In addition to its association with mental health symptoms, hardiness has been linked to more positive attitudes toward mental health care. An evaluation of hardiness training among New Zealand military personnel indicated a reduction over time in mental health stigma, an increase in supportive attitudes toward seeking mental health care, and an increase in mental health literacy, following the training (Gerling, 2015).

Special Forces members potentially undergo higher stress levels compared to other military groups. Therefore candidates are trained to tolerate and cope with the demanding conditions. Any failure of members could be costly as this is considered as an occupation which highly relies on the performance of the employee. Bartone, Ronald, Picano, and Williams (2008) studied 1138 male US Special Force members to see whether hardiness could predict their training successfulness. They assessed all the candidates using a short version of Dispositional Resilience Scale and scores were compared between successful and unsuccessful candidates. Successful candidates scored more highly, and hardiness made a small but significant contribution to success.

Hystad, Eid, Laberg & Bartone (2011) studied whether hardiness could predict the military admission of candidates undergoing selection to the Norwegian Military Officer School. It was hypothesised that hardiness would be a better predictor than the big five personality factors. Hardiness had a significant effect on selection outcome, controlling for all other compounding factors including big five (Hystad et al., 2011).

Hardiness can also be a good predictor of health risk behaviours such as alcohol and drug abuse. Eid, Brevik, Hystad and Bartone (2012) with a Norwegian military sample found that those who were low in hardiness, high in avoidance, with longer and more severe combat experience were more involved in health risk behaviours. Maddi (2012) explored the role of hardiness and grit, which Duckworth et al., (2007) defined as the perseverance and passion for long term goals, on predicting performance and the retention of US military cadets; hardiness was the strongest predictor of both retention and performance. Lo Bue, Taverniers, Mylle & Euwema (2013) studied Belgian service personnel to examine the relationships between hardiness, work engagement, and burnout. They found that hardiness was positively related to dedication and vigour, and negatively related to cynicism and emotional exhaustion. They suggested that work engagement and burnout are the two ends of the same continuum where hardiness plays a role of moderator in between. However, they did not find a moderation effect of Hardiness in the Dedication–Cynicism relationship.

Hardiness is also considered as a potential protective factor against PTSD after combat exposure. Escolas, Pitts, Safer & Bartone, (2013) studied 561 US service members who had been deployed in combat areas. Individuals high in hardiness displayed fewer PTSD symptoms. However, the researchers did not observe any significant interaction between hardiness and time spent on deployment and number of deployments, which are well-known predictors of PTSD. They concluded that time spent in deployment and number of

deployments directly affect PTSD, whatever the hardiness level of the individual (Escolas et al., 2013). Hardy people can withstand more combat related stress, but not indefinitely.

Despite more than 35 years of research into hardiness and its effectiveness in predicting military performance, there is disagreement as to whether hardiness is a fluid aspect of personality that could be trained, or a fixed trait (Matthews, Deary, Whiteman, 2003; Maddi, 2004, 2006). Jackson, Thoemmes, Jonkmann, Lüdtke, & Trautwein, (2012) asked the question, "Does the military make the man, or does the man make the military?" Using the big five model as a framework, they found some association between military experience and personality change. Notably, agreeableness reduced after military training, although hardiness may be separate from the big 5 (Kardum, 2012). Indeed, assuming that the big 5 is the best superordinate model of relatively stable personality traits, the finding that hardiness does not correlate well with those traits suggests that it may not be as stable.

Two studies have examined whether hardiness increases with training. Zach, Raviv & Inbar, (2007) found an increase in hardiness after the nine-month training of the Israeli state security officers (Zach et al., 2007). Hystad, Olsen, ESpevik & Safvenbom (2015) studied 330 Norwegian military trainees at the Norwegian Military Academy from 2007 to 2011. Hardiness did not increase after three years training. However, Israeli training assumes a high level of combat readiness compared to Norwegian training, so the two programmes may not be comparable. More generally, that a specific training does not alter hardiness is not evidence that it is a stable, untrainable, trait.

2.4.2.3 How to measure resilience and hardiness?

There are a number of tools/scales developed to measure resilience. The table below (Table 2.1) is based on Windle, Bennett & Noyes (2011), which considered 15 resilience measures. It presents a few of them with the names of the authors, target group, the number of items and dimensions, and what each measures.

As can be seen, all the scales are self-report and have been validated with different age groups. Almost all of them are in English. However several of them have been translated and validated in different countries and languages (i.e. DSR 15, RS 25, CYRM). It is notable that nothing has been developed in the Asian region except the Adolescent Resilience Scale developed by Oshio et al. (2003). However, several scales have been validated in Asian countries. Wong et al. (2014) validated DSR 15 in the Chinese language with elderly Chinese women in Hong-Kong. The Resilience scale has been validated in Sri Lanka in Sinhalese with adolescents by Munasinghe (2012). Despite the criticism of validation samples and

themes identified through qualitative work, RS 25 has the widest usage around the world (Windle, Bennett & Noyes 2011).

According to the review by Windle et al. (2011), who used five main criteria to evaluate the measures (content validity, internal consistency, criterion validity, construct validity, reproducibility, responsiveness, floor and ceiling effects and interpretability) only three out of fifteen scales met the highest rating they defined. Those scales were the Connor Davidson-RISC (25 items), the RSA (37 items) and Brief Resilience Scale. Even these scales are only moderate when considering quality criteria (Windle et al. 2011). Thus, none of the available scales is fully satisfactory in terms of psychometric properties.

Scale	Authors	Validation group	Number of dimensions & items	What does it measure?
The Dispositional Resilience Scale (USA/English) 3 scales	Paul T. Bartone 1989 1991 1995;2007	Adults	3 (45) 3 (30) 3 (15)	Designed to measure psychological hardiness (commitment, control, and challenge). Has been applied to evaluate change over time. Hardiness
The Connor-Davidson Resilience Scale (CDRISC) USA/English	Connor & Davidson (2003)	Adults	5 (25)	Developed for clinical practice as a measure of stress coping ability. Five factors (personal competence, trust/tolerance/strengthening effects of stress, acceptance of change and secure relationships, control, spiritual influences). The measure has been used to evaluate the change in response to a drug intervention.
The Connor-Davidson Resilience Scale (CDRISC) USA/English	Cambell-Sills & Stein (2007)	Young adults	1 (10)	The short version of CDRISC. Developed for clinical practice as a measure of stress coping ability.
The Brief Resilience Scale USA/English	Smith et al. (2008)	Adults	1 (6)	Designed as an outcome measure to assess the ability to bounce back or recover from stress. The authors suggest that assessing the ability to recover of individuals who are ill is important. No clinical applications are reported.

The Resilience Scale for Adults (RSA) Norway/Norwegian	Friborg et al. (2003)	Adults	5 (37)	To examine intrapersonal and interpersonal protective factors presumed to facilitate adaptation to psychosocial adversities (personal competence, social competence, family coherence, social support, personal structure
The Resilience Scale (RS) (Australia/English)	Wagnild & Young (1993)	Adults(some application with 16-23)	2 (25)	To identify the degree of individual resilience (personal competence and acceptance of self and life); a positive personality characteristic that enhances individual adaptation. The measure has had some limited use in evaluating change and has been applied to all age groups from adolescents upwards. Data ranges are suggested which are categorised as low, medium and high.
The Child and Youth Resilience Measure (CYRM) (11 countries/11 languages)	Ungar et al. (2008)	Youth at risk (age 12 to 23)	4 (28)	To develop a culturally and contextually relevant measure of child and youth resilience across four domains (individual, relational, community and culture). No clinical applications are reported.
Resilience Scale for Adolescents (READ) (Norway/Norwegian)	Hjemdal et al. (2006)	Adolescents aged 13-15 years	5 (39)	To assess the protective resources of personal competence, social competence, structured style, family cohesion and social resources to understand stress adaptation

Adolescent Resilience Scale (Japan/Japanese) Japanese	Oshio et al. (2003)	Youth (19-23 years)	3 (21	To measure the psychological characteristics (novelty seeking, emotional regulation, positive future orientation) of resilient Japanese Youth. No clinical applications are reported.
Psychological Resilience (UK/English) .	Windle, Markland & Woods (2008)	Older Adults (subscales previously used with adolescents)	3 (19)	To assess psychological resilience (self-esteem, personal competence and interpersonal control) that acts as a protective factor against risks and adversities. No clinical applications are suggested, although one application examines the moderating effect of psychological resilience on the relationship between ill-health and well-being. The original dimensions have been used to assess change over time
Ego Resiliency (2) (USA/English)	Bromley, Johnson and Cohen (2006)	Adolescents and young adults	4 (102)	To assess the ego resiliency traits of confident optimism, productive activity, insight and warmth, and skilled expressiveness

Table 2.1

Commonly used Resilience and Hardiness scales used in research and clinical work

Source: Windle et al. Health and Quality of Life Outcomes 2011, 9:8 http://www.hqlo.com/content/9/1/8 (pp 8-9)

2.4.2.4 Mental toughness

The term "Mental Toughness" was initiated by Clough, Earle and Sewell (2002). Mental toughness is an extension of the concept of "hardiness". Hardiness has three components (3Cs): Control, Challenge and Commitment (Kobasa, 1979). Clough et al. (2002) identified a fourth component (another C) in this psychological concept and they named is as "confidence". Clough et al. (2002) therefore redefined the hardiness concept as Mental Toughness and provided new interpretations for the 4Cs. They also added two subscales to both the Control and Confidence components. Thus there are six components altogether, and mental toughness is supposed to subsume resilience/ hardiness. Those six components and the definition of mentally tough person are presented below as Clough et al. explained in 2002.

"Individuals high in Mental Toughness tend to be sociable and outgoing as they can remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they control their own destiny, these individuals can remain relatively unaffected by competition or adversity" (Clough et al., 2002, pp 38).

(1) Control: Individuals who score high on this scale feel that they are in control of their work and of the environment in which they work. They are capable of exerting more influence on their working environment and are more confident about working in complex or multi-tasked situations. Clough et al. identified two subcomponents in the control component
    a) Emotional Control: Those who are high in emotional control are better at controlling their emotions. They can control over their anxieties, and less likely to reveal their negative emotions to others.
    b) Life Control: Those who score high on this subscale believe that they have control over their lives.
(2) Challenge: This describes the extent to which individuals see challenges as opportunities. Individuals who see them as opportunities will actively seek them out and will identify problems as ways for self-development
(3) Commitment: Sometimes described as "stickability", this describes the ability for an individual to carry out tasks successfully despite any problems or obstacles that arise while achieving the goal.
(4) Confidence: Individuals who are high in confidence have the self-belief to successfully complete tasks, which may be considered too difficult by individuals

with similar abilities but with lower confidence. Less confident individuals are also likely to be less persistent and may make more errors. Clough et al. suggested two subscales into this component.

a) Confidence (Abilities): Individuals scoring highly on this scale are more likely to believe that they are a truly worthwhile person and
b) Confidence (Interpersonal): Individuals scoring highly on this scale tend to be more assertive. They are less likely to be intimidated in social settings and are more likely to push themselves forward in groups. They are also better able to cope with difficult or awkward people

(Clough et al., 2002)

Based on this concept, several mental toughness scales have been developed in different fields, especially in the sports sector. Among theseare: The Mental Toughness Questionnaire - 48 (MTQ-48) (Clough, et al., 2002); the Mental Toughness Inventory (MTI); Middleton, Marsh, Martin, Richards, & Perry, 2004; 2005); the Sport Mental Toughness Questionnaire (SMTQ); Sheard et al., 2009); and the Cricket Mental Toughness Inventory (CMTI) (Gucciardi and Gordon, 2009). Hardy et al. (2013) developed an informant-rated behaviour based Mental Toughness Inventory (MTI) in an elite sports context. They provided a subtly different definition of mental toughness; "the ability to achieve personal goals in the face of pressure from a wide range of different stressors" (Hardy et al. 2013, p. 5). Based on the Mental Toughness Inventory (Hardy et al., 2013), another scale was developed by Hardy, Beattie, Arthur, Fitzwater, Beattie & Bell (2015) to measure mental toughness amongst military trainees. This scale was named as the Military Training Mental Toughness Inventory (MTMTI) and it "assesses the ability to maintain optimal performance under pressure from a range of different stressors experienced by recruits during infantry basic training" (Hardy et al., 2015, p.1). This scale consisted of six items developed based on the environmental stressors specified to basic infantry trainees, and this followed the behavioural approach of MTI (Hardy et al., 2013). The MTMTI scale demonstrated good psychometric properties (construct validity, test-retest reliability, Concurrent validity, and predictive validity) in several studies done with military samples (Hardy et al., 2015). However because this mental toughness scale was specifically focused on military trainees, it is difficult to generalise it to combat stress-related coping Hardy et al., 2015).

The Mental Toughness Questionnaire (MTQ48), is the most used questionnaire on mental toughness. This scale/questionnaire has obtained acceptable levels of reliability and validity (Clough et al., 2002; Nicholls et al., 2008; Horsburgh, Schermer, Veselka, & Vernon, 2009).

MTQ48 initially was utilised in sports sector research. MTQ48 has been completed by more than 2000 sportsmen as a part of the psychometric assessment of the scale (cf. Clough, et al., 2002; Horsburgh, et al., 2009). Kaiseler et al. (2009) also used MTQ48 with 482 athletes and found higher levels of mental toughness to be significantly related to experiencing less stress and more control. It is also has been proved that individuals with higher mental toughness remain relatively unaffected by competition and adversity. They use problem-focused strategies rather than emotion-focused strategies (Clough et al. 2002; Gucciardi et al., 2008).

There is a debate whether mentally tough people are less emotionally reactive and experience emotions less intensely. This hypothesis was tested by Crust (2009) with regular sports participants and found no relationship between affect intensity measured with the Affect Intensity Measure (Larsen, 1984) and mental toughness which was measured using MTQ48. Therefore they concluded that mentally tough people also feel the same emotions to the same intensity, but cope with them better (Crust, 2009). There are a few more studies in which mental toughness has been utilised in the sports sector. These studies have demonstrated that mentally tough individuals have positive attitudes towards risk taking (Bull et al., 2005; Crust & Keegan, 2010). Nicholls et al. (2008) reported that mental toughness has a significant positive correlation with coping and optimism.

The application of the mental toughness concept is now expanding to the fields other than sports research. Gerber et al. (2012) tested the mental toughness levels of 284 high school students from Switzerland and another 140 undergraduates of sports and health science. This study aimed to see whether mental toughness is related to general levels of perceived stress and depressive symptoms and if mental toughness is associated with stress resilience outside the realm of sport. They found higher levels of mental toughness associated with lower levels of stress and depressive symptoms. It was evident that the influence of mental toughness as a resilience resource is significant Gerber et al., 2012). Further, they found that mental toughness works as a moderating factor between stress and depressive symptoms (Gerber et al., 2012). St Clair-Thompson et al. (2014) applied mental toughness concept in the education sector. They found that some aspects of mental toughness, especially the control of life subscale, is significantly associated with academic attainment and attendance, and less counterproductive behaviour in the classroom. Further, they report that confidence in abilities and interpersonal subscales are significantly associated with better peer relationships.

2.4.2.4.1 Relevance of Mental Toughness in military

As articulated in the above section, performance, well-being and positive behaviour in work settings are highly influenced or moderated by mental toughness, measured through hardiness and resilience. All these three characteristics play a significant role in the military.

Clough, et al. (2002, p.4) proposed that "mental toughness is not merely a genetic predisposition factor, but it is a dynamic personality characteristic which can change over time with experience and training". This is promising that if these aspects are included in a military training, we can develop those positive characteristics in armed forces personnel (Clough et al., 2002). This has led to some research in the military context. Godlewski and Kline (2012) studied 459 male Canadian Forces personnel. The objective of this study was to develop a model to explain voluntary turnover amongst recruits. They included mental toughness along with few other pre-entry individual characteristics including measures of normative commitment (feeling of commitment to military service) and a desire for a military career. They also assessed some post-entry variables including turnover intention and actual turnover. Mental toughness significantly predicted attitudes: normative commitment, affective commitment and newcomer adjustment. Because mental toughness had a strong relationship with newcomer adjustment, the authors suggest that mental toughness should be included in the military recruitment criteria (Godlewski & Kline, 2012). Hardy et al. (2015) also found that mental toughness measured by MTMTI (6) predicted objective performance and fitness.

However, do the same resilience characteristics apply in challenging and competitive environments such as sport and business, and extreme and life-threatening environments such as combat? For example, high confidence in sport may lead a person to take risks in order to win, but the penalties for failure are not drastic. High self-confidence in combat may also be useful, even heroic, but failure may be fatal, not only to the person but also to their comrades. Athough Hardy et al. (2015) attempted to adopt the mental toughness concept to the military context they only focused on the military training period. Mental toughness required in a military training has some similarities with the toughness required by sportsmen, as challenges in military training are virtual. Therefore this question remains unanswered.

2.5 History and evolution of using psychometric testing in military recruitment and their effectiveness

The official website for the Armed Services Vocational Aptitude Battery (ASVAB) summarised the history of military testing prior to ASVAB as follows. This explain how military tests have eveolved through cognitive tests to non cognitive tests.

The military has used aptitude tests since World War I to screen people for military service. In 1917-1918, the Army Alpha and Army Beta tests were developed in the US so that military commanders could have some measure of the ability of their personnel. The Army Alpha was a group-administered test that measured verbal ability, numerical ability, ability to follow directions and knowledge of information. The Army Beta was a non-verbal counterpart to the Army Alpha. It was used to evaluate the aptitude of illiterate, unschooled, or non-English speaking draftees and volunteers. Both Army Alpha and Army Beta were cognitive tests which used to identify those who were capable of serving in a military and classify them into different military jobs. During the WWI approximately 1.5 million recruits were tested using Alpha and Beta tests.

Army General Classification Test (AGCT) and Navy General Classification Test (NGCT) were popular during WWII and replaced the Army Alpha nd Army Beta tests. The main objective of the AGCT and NGCT were to test the general learning abaility of army, marines and navy. Based on the performance on the test recruits were assigned into different military jobs. Some 12 million recruits had been tested using AGCT and 3 million navy recruits had tested using NGCT during WWII. In addition to AGCT and NGCT which test general ability, some supplement tests were developed. Those are: Specialised aptitude tests for technical fields such as mechanical, electrical and electronics, Clarical and administrative tests, Driver selection tests, language tests. By the end of the WWII each individual services developed their own selection aptitude tests which included vocabulary, arithmetic, and spatial telationship items.

Again in 1950 Services decied to use single tests rather than individual tetsfor different branches. Armed Forces Qualification Tests (AFQT) was developed tp meet his requirement. AFQT modeled after AGCT and NGCT. However, AFQT was mainly designed for screening purpose unlike previous general abaility tests. The aiams of AFQT were to; (a) Measure recruits' general ability to absorbe the military training (b) provide a uniform measure of the recruit and his/her potential contribution to the service.

AFQT was utilised by all the services until 1972. As AFQT did not mean to classify recruits to different jobs other specific tetst were used for that purpose. Army Classification Battery, Navy Basic Test Battery and Airman Qualification Examination are only some of many classification tests.

Armed Services Vocational Aptitude Battery (ASVAB) which was developed in 1968 and operationailed from 1973 was one of the most popular military tests in the historyas. Initially, airforce started using ASVAB and it was followed by marines in 1974. During 1973-1975 Army and Navy were using their own classifications as they were not ready to use ASVAB. However in 1974, the US Department of Defence decided that all military services should use ASVAB for both selection and classification. The decision to combine both selection and classification tests made testing process more efficient. Military services used ASVAB to match recruits for the available job vacancies in the military and those who were qualified gave an assurance of the job. Until 1976 ASVAB was used by all services for selection and classification. However, after 1976 there were a variety of changes added to the tests to meet diffrenet requirements of different services.

A computer-adaptive version of ASVAB was evealuated by the US Department of Defence in 1979. After extensive research which went on for 20 years, in 1996-1997 Computer Adaptive version of ASVAB was (CAR-ASVAB) launched and this was used by Military Entrance processing Stations (MEPS).

2.5.1 Recent developments

The Tailored Adaptive Personality Assessment System (TAPAS) was developed to assess personality and motivational factors of the military recruits. The initial intention of the test was to predict motivational outcomes such as commitment to the job, physical fitness, and drive to perform at a high standard (Gubata et al., 2012). TAPAS is an adaptive computer-based test which assesses both proficiency and motivational aspects of the military career. This test has been designed to minimise the social desirability issue where the respondent tends to give a favourable answer (Gubata et al., 2012). In 2013, Gubata, Niebuhr, Oetting, Weber, Feng & Cowan published a paper to report the utilisation of TAPAS as a predictor of mental health fitness. This study found that the physical conditioning dimension of TAPAS could predict the attrition. Gubata et al. (2013) reported that the lowest physical conditioning quintile had the highest rate of attrition and those with high scores had the lowest level of attrition. The physical conditioning dimension of TAPAS also has effectively predicted problems related to mental health (Gubata et al., 2013).

The Assessment of Individual Motivation (AIM) is a non-cognitive test developed by the U.S. Army Research Institute for the Behavioural and Social Sciences (ARl) as an accession screen for attrition and overall individual success as a soldier. AIM collects self-reported personality information about past experiences and behaviours, identifying applicants not well adapted or motivated for military service. Because mental health disorders existing before service are a major cause of disability discharges, hospitalisations, ambulatory care and early attrition, AIM's ability to select applicants not well-suited for military life may have an important alternative use in predicting mental disorder diagnosis (Gubata et al., 2012).

The US air force recently started using Biographical Evaluation and Screening of Troops (BEST) to identify trainees with serious mental health problems. This instrument, developed according to the requirements of the Airforce and History Opinion Inventory (HOI) which was introduced by Feilder (1997), and was used until 2001 with a revision, HOI-R. HOI-R assessed the enlistee on health concerns, school success, composure, antisocial behaviour, family support, parental conflict, immaturity, emotional instability and interpersonal agreeableness using different subscales. This tool has shown moderate predictive validity for unsuitability discharge (Garb, Wood, & Feilder, 2012). Finally, this screening tool evolved into the Lackland Behavioural Questionnaire-LBQ (Garb, 2005), which measures the history of severe mental health and behavioural problems. LBQ consists of 61 items designed to assess temper/anger; anxiety/ depression; trouble with the police; history of

psychiatric medication; suicidal thoughts and attempts; conduct problems in high schools; alcohol abuse; history of counselling and psychotherapy; destruction/theft of property; history of evaluation and treatment for substance abuse. This tool is not meant to be used as an exclusion tool prior to enlistment. Rather it should be used during training to identify trainees at risk for mental health issues, then make appropriate referrals based on the nature of the problem. LBQ also recommend conducting a further psychological assessment of at-risk trainees before making referrals (Garb et al., 2013).

2.5.2 Problems related to the implementation of non-cognitive tests and how to overcome them

The Army Research Institute for Behavioural and Social Science has emphasised the importance of utilising non-cognitive questionnaires at recruitment and selection, as they are effective in predicting entry-level soldier performance and retention (Knapp & Tremble, 2007). Rumsey (2014) further emphasised the importance of incorporating non-cognitive assessment into officer selection because the modern officer role demands soft skills like management and leadership skills as well as hard skills such as technical and physical skills.

Even with increased interest in accommodating non-cognitive measures into the selection procedure, there have been obstacles. A major concern is that the self-reported nature of such assessments means that people can try to present themselves positively. Therefore reliability and accuracy might be compromised. Some researchers have tried to employ a forced-choice methodology to minimise this issue. In this way, respondents are forced to choose between two desirable answer options and two undesirable answer options without a middle point where most desirable answer options are not obvious. (Young & White, 2006).

The US Special Forces started using another approach to minimise fake responses which were called “actual bio data” to look at the past behaviour and reactions to the life events of the candidate to test the accuracy of the information or answers provided by the candidate at the assessment/ test. Some items also were included in tests to directly detect the tendency of providing fake answers (Rumsey, 2014).

Rumsey introduced hardiness and grit (defined above on p. 50 and 52 respectively) as two main personality dimensions, which can effectively predict officer performance. Grit, which emphasis on long-term stamina rather than short-term intensity help gritty individuals not only finish tasks at hand but pursues a given aim over the years (Duckworth et al., 2007, p, 1089).

Organisations, in general, resist changes, and this applies to the military context too. Therefore, Rumsey (2014) suggested a few mechanisms to reduce barriers to testing. Firstly, the researchers and the test developers should communicate clearly why, by whom, how and when a test should be administered and whether this tool should be used to screen out or categorise individuals. If the tool is meant for training, at what stage of the training should it be administered? Secondly, the effectiveness of the tool should be demonstrated. The benefit of the tool should be able to measure, and indicators should be identified (e.g. attrition rate, mental health diagnoses, suicide rate etc.). How the military service will benefit in the long term should be articulated clearly. This will increase the motivation to use it. Thirdly, the feasibility of implementation should be assessed. This can be done in terms of cost effectiveness, the time consumed, resources required for the assessment, qualification of those who administer the tool, and influence of any external factor which can hinder the process. Test developers also have to make sure that the organisation does not compromise any of its other priorities to implement this tool.

Cardona and Ritchie (2006) launched an extensive study on psychological screening of recruits prior to enrolement in the US military and brought forward the idea that more in-depth psychological screening can minimise the psychological problems after combat experience. They have reviewed the psychological screening from World War I, WW II and post WW II and its effectiveness to predict psychological problems and attrition. They suggested that there is limited evidence of the success of psychological screening in predicting mental health outcomes after combat experience, but this could be due to failures of measurement rather than failures of screening in principle. However, they suggest the following aspects should be assessed prior to enlistment (Cardona & Ritchie, 2006).

a) Mental health history
b) Family history of mental health
c) Trauma history, Adaptation skill
d) Personality composition
e) Severity of psychological symptoms
f) Presence of other psychological stressors in personal life
g) Motivation for continued service
h) Safety factors

Cardona and Ritchie (2006) further recommend using screening tools to identify the relevant psychological information about recruits, help to identify the individuals who would struggle to adjust and also help to predict attrition. The basic training should then include specific

resilience training which can overall boost the resilience level of the individuals, especially who are at risk of developing problems.

2.6 What don't we know? The gap of the knowledge

There is enough evidence to suggest that it is worthwhile to use psychological screening tools in military recruitment and advancement irrespective of lack of effectiveness of some of the tools already in use. Cardona and Ritchie (2006) emphasised that the insufficient evidence for the effectiveness of currently available assessment tools is does not mean that screening tools are useless, but that available tools are not sensitive enough to assess the risk and protective factors. Most of the tools are theory-laden, and developers strove to confirm the theory rather than accepting variable differences they saw. Some tools were developed in civil contexts then directly applied to the military context. For example, the mental toughness concept emerged in the sports context, but MTQ48 has been used in military context on the assumption that the same toughness qualities are applicable to the military. Some were developed in Western contexts and have some cross cultural barriers to application to other cultures. There are some tools developed only considering the typical role of a military personnel but ignoring the changes of the roles of a military person in a modern military organisation. This is a big challenge in front of military researchers, as the military has its unique characteristics on top of the challenge of the uniqueness of individual personality faced by any other psychologists. Hence, researchers should continue to work on it. Sometimes it may not be realistic to use a single global tool to assess all the aspects of the personality of recruits in all cultural contexts.

As postulated in the literature, individuals who undergo adversities in childhood can develop psychological problems as adults (Cabrera et al., 2007; Felitti et al., 1998; D. Macmanus et al., 2012b; Pagura, Cox, Sareen, & Enns, 2006). In contrast, other researchers argue that despite such adversities, individuals can develop a very positive and resilient personality with or without subsequent positive experiences (Adler, Williams, McGurk, Moss, & Bliese, 2015; Bartone, 1999; Clough, 2014; Connor & Davidson, 2003; Eidelson & Soldz, 2012). Some individuals with adverse childhoods may become very effective and competent individuals while others develop some mental health issues and other personal issues in adult life (Wenner, 2009). Therefore it is unfair to an individual to be rejected from a recruitment process just because that person has experienced childhood adversities, without knowing the resilience level of the person. To determine the effcet of adversity, proper longitudinal studies are required, which consum a lot of time and resources.

Hence, if the cross sectional approach is adopted, both protective and risk factors have to be looked at the same time. Thus there is a requirement for a comprehensive assessment tool which can merge both pre-enlistment risk and protective factors of the individual. This kind of tool has the potential of being cost effective and time-saving.

Some would argue that the "Big five" personality factors can predict the success of any profession. Hystad, Olsen, Espevik, & Säfvenbom, (2015) has cited two studies done by Hartmann and colleagues (Hartmann & Grønnerød, 2009; Hartmann, Sunde, Kristensen, & Martinussen, 2003) with naval special forces candidates. They reported that none of the big five factors had predicted military training performance. This reconfirms the requirement of unique tools for the military context.

To fulfil this requirement Hardy, Beattie, Arthur, Fitzwater, & Bell (2015) developed a new tool called the Military Training Mental Toughness Inventory (MTMTI) and validated it in the British military context. They adopted Hardy et al.'s (2013) proposal that mental toughness should be assessed via observer rather than self-report and trainees were rated by their trainer on their behaviours and performance. However, there are a few limitations of this study; on the one hand, the tool was validated only with army candidates. The three forces have different visions, and mandates so do their training programmes. Thus, concerns can arise from using a tool validated with only one service in another service. On the other hand, this study did not establish whether this tool can predict coping skills or the psychological well-being of the trainees.

In addition to that, resilience has been defined differently in different contexts and there are several terms used by the researchers alternatively. Also, there are several scales which measure resilience related trait or personality facets (Bartone, 1991; Clough, et al., 2002; Connor & Davidson, 2003; Wagnild & Young, 1993). Since different scales have been used in the military context to measure resilience, it would be economical to have one resilience scale validated with an appropriate military sample, to be used by military services.

Sri Lanka, as a country which faced a brutal war for more than three decades, has strong armed forces, but currently, is not using any psychological screening. There is no research evidence to tell whether psychological assessments are effective or not in the Sri Lankan military context. There are some constraints (as explained above) on using already available psychological assessments developed and validated in mainly in English speaking countries. Therefore Sri Lanka needs to develop its own tool to assess military recruits.

As described in the introduction chapter (1.2.1), Rumsey (2104) pointed out that officer recruitment is crucial because their responsibilities and work demands are high compared to more junior ranks. Therefore any psychological screening tool to be used at the officer recruitment has to be customised to officers.

2.7 Conceptual Framework of the study

The framework of this study is buIlt on following concepts.

Resilience and risk factors predict well-being of military personnel

For this study, a few main assumptions are combined. As supported by the literature in the above sections there are risk factors before enlistment, during training and after training (i.e. Cabrera et al., 2007; Julia et al., 2013; Pagura et al., 2006). A few examples of risk factors before enlistment are childhood adversities, abuse, poverty, away from parents, psychological disorders and anti-social behaviour as a result of those experience. Examples during training include physical injuries, dissatisfaction with the training, and negative life events. After training, combat exposure, dissatisfaction with the job, and negative life events can be regarded as risk factors to well-being. These risk factors have a negative effect and increase the vulnerability to developing psychological problems. On the other hand, there are protective factors which come with the individual, such as resilience, hardiness and mental toughness. These improve and protect the well-being. Every single individual has both type of factors to a varying degrees, however, some have more protective factors than risk factors or vice versa. However, military training and combat exposure are strong mediating factors which adjust the influence of either of these factors. Therefore maintaining well-being in such situations is complex.

Knowing what determines the well-being of a military person requires inventigation of the question, “what are the indicators of military well-being? Previous literature provides extensive evidence regarding how some personality facets like resilience, hardiness and mental toughness lead to good organizational outcome and well-being (i.e. Polusny et al., 2011 and 2014; Sudom & Lee, 2016; Eid et al., 2012; Maddi et al., 2012; Godlewski & Kline, 2012; Hardy, et al. 2015). The commonest way of measuring individual well-being is to measure the psychological health symptoms of the individual (Skomorovsky, 2013). Therefore, the previous literature supports the idea that if the members are high in protective factors they should show low symptoms which can be measured using any general mental health assessment (e.g. GHQ)

Resilience and risk factors predict turnover intention

While mental health problems affect the individual directly they can create problems in the organisation, directly and indirectly, such as medical expenses and compensation, sick leave, the risk of error decisions made by the affected individual, suicidal behaviours etc.). There are a few other indicators which influence both individual and organisation well-being directly. One such measure is job satisfaction (satisfaction of the individual about his/her job and the superiors and colleagues). If the individual is not satisfied with the system and work, they tend to be ineffective, avoid responsibilities, less accountable etc. Another good indicator of well-being is the turnover intention and actual turnover, which reflect individual willingness to continue or discontinue the job. Tett and Meyer define turnover intention as "the conscious and deliberate willfulness to leave the organisation' (1993, p. 262). Meyer and Allen (1991) proposed three types of commitment which keep the individual within the organisation; affective commitment (emotional attachment with the organisation), continuance commitment (perceptions that the social or economic costs of leaving the organization are too high), and normative commitment (a feeling of obligation to the organisation). In the absence of one or more of these commitments, the possibility of turnover increases. Some individuals have high turnover intention, but they do not leave the job due to legal and other personal reasons (continue commitment). However, if an opportunity arises, they will decide to leave. Despite the negative consequences, some individuals decide to turnover due to high burn-out level. Thus, intention to leave is an indicator of the threatened well-being of both individual and the organisation. Previous studies suggested that, those who have good resilience levels tend to stay in the job despite high stress levels (Polusny et al., 2011 and 2014; Sudom & Lee, 2016; Eid et al., 2012; Maddi et al., 2012; Godlewski & Kline, 2012; Hardy et al. 2015). Turnover intention is also considered as a result of job dissatisfaction and threatened well-being (Rich, 2013; Meyer, et al., 1993; Bothma & Roodt 2013). Thus, it is believed that turnover intention is positively correlated with mental health issues in military personnel.

Resilience and risk factors predict newcomer adjustment

Adjustment to the organisational structure, work setting, and knowledge of the organisational culture as a newcomer is called "newcomer adjustment". Failure to adjust also has an impact on reflects in the compromised well-being of the organisation and the individual (Bauer et al. 2007; Thomas & Anderson, 2014). Bauer et al. (2007) reported that "information seeking and organisational socialisation tactics are the proposed antecedents of newcomer adjustment, and job satisfaction, organisational commitment, job performance,

intentions to remain, and turnover are the outcomes of newcomer adjustment" (p.707). Military research has found that newly recruited members with high resilience profiles easily adjust to the organisation and score high on newcomer adjustment scales. Due to easy adjustment, their well-being is better than that of those who cannot adjust easily (i.e. Godlewski & Kline, 2012; Escolas, Pitts, Safer & Bartone, 2013; Lo Bue, Taverniers, Mylle & Euwema 2013). Hence, it is presumed that resilient individuals will score high on newcomer adjustment scales. They will also show low levels of mental health symptoms.

Resilience and risk factors predict job/training satisfaction of military personnel

Resilient individuals are satisfied with their lives and what they do, irrespective of their challenging nature (Lo Bue, et al., 2013; Hardy et al., 2015). Satisfied members adjust to organisations easily, and they do not think of leaving the organisation. Therefore, an assumption can be made that resilient people are satisfied with their jobs and they settle well into the job.

Resilience and risk factors predict training performance of military trainees

Resilient characteristics such as mental toughness have been demonstrated to have a positive relationship with successful training completion and good training performance (Hardy et al., 2015; Lo Bue, et al., 2013). Thus it can be predicted that highly resilient individuals perform well in training.

Taking count of all the above concepts, the following model was developed for the current study. According to Figure 2.4, individual risk factors accumulate and build up the main risk factors, and different resilience factors make up the protective factors. Both risk factors and protective factors have either negative or positive relationship with the well-being measures. Individual risk factors such as childhood adversity, antisocial personality, psychological disorders, suicidal behaviours and traumatic experience also can have a direct connection to well-being measures. A tool which measures this risk and protective factor should be able to predict these outcome variables.

Having reviewed previous literature, conceptualised the relevant concepts and identified the gap in military literature, the following research question been roused; which the current study addresses.

2.8 Research question and the objectives of the study

2.8.1 Research question

What are the pre-enlistment risk and protective psychosocial factors likely to contribute to the performance and well-being of a military officer in Sri Lanka?

Two sub-questions under this research problem are addressed by this study

a) What pre-enlistment risk and protective factors are likely to impact on military well-being and performance and how to measure them?

b) Can these pre-enlistment factors predict military well-being and performance?

2.8.2. Research objectives

Based on the above research questions, the main objective of the study is to develop and validate a psychological screening tool to assess the psychological factors likely to impact on military well-being and performance. In so doing this research will:

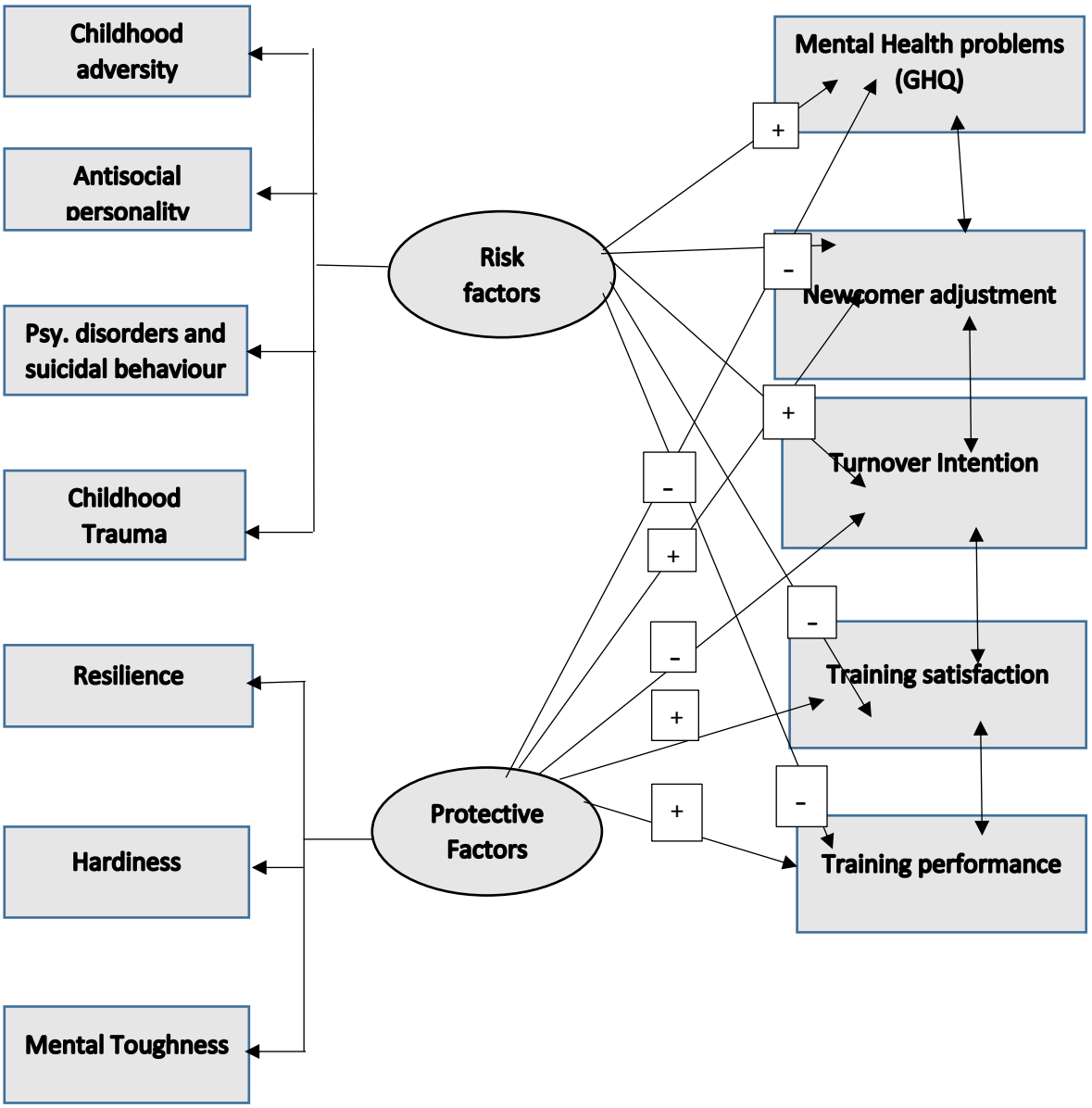
a) develop and validate a psychological screening tool which can be used in the recruitment process of armed forces in Sri Lanka

b) correlate scores of psychometric assessment at recruitment with the training achievement and psychological well-being of the person during and after recruitment training in order to determine whether this scale can predict outcome variables.

To address the research question and meet the general and specific objectives mentioned above, two empirical studies were conducted.

Figure 2.4

Predictive Model of Military well-being and training performance



2.9 Summary of the chapter

This chapter provided background to the study and a conceptual framework for the research questions. The chapter started with a brief overview of military psychology and its application in the military context since WWI. Then the concept of well-being was explored in the military and main challenges to military well-being identified. Some major challenges were highlighted; psychological disorders, substance misuse among military members, suicides and suicidal behaviours and military attrition. Studies relating to these problems done in Sri Lanka also were reported wherever available. Next, the focus was on the pre-enlistment risk and protective factors which can contribute positively or negatively to the well-being of military member. As a response to these problems, various assessment methods have been utilised by military services to screen problematic candidates. Some of these psychological assessments were developed for the military and others have been adapted from more general psychometric tools. After having reviewed this literature, a research need was identified: "What are the pre-enlistment risk and protective psychosocial factors likely to contribute to the performance and well-being of a military officer?". Research objectives were set to answer this research question. Finally, putting all these information together, a simple conceptual framework was developed for the current study.

Having studied the background, critically reviewed the previous relevant literature and identified concepts, the next two chapters present the objectives, methodological approaches, data collection, results and a brief discussion of the two studies conducted to answer the identified research question.

CHAPTER THREE: STUDY I - DEVELOPMENT AND VALIDATION OF THE RESILIENCE INVENTORY FOR MILITARY

3.0 Introduction

The central question of the study includes two sub questions in it; a) what pre-enlistment risk and protective factors are likely to impact on military well-being and performance? b) Can these pre-enlistment factors predict military well-being and performance? This study was conducted to answer the frist question by developing a comprehensive psychological screening tool, which we called the "Resilience Inventory for Military (RIM)" to assess the pre-enlistment psychological resilience of officer recruits in Sri Lankan military services. This screening tool includes both vulnerability/risk factors and protective factors which might have a relationship with military performance. Appropriate items were generated to assess vulnerability by looking at the screening tools used by the other military services in both western and eastern parts of the world, and also by reviewing recent relevant literature. Protective factors were assessed using three existing standard scales that have been tested and extensively used in military samples. This screening tool was, therefore, a combination of these existing scales and newly developed items. Development and validation used the 8 step process suggested by DeVellis (2012). After identifying scales and developing new items for the tool, it was reviewed by a panel of experts. Then it was pretested with 40 military officers before it administered with a validation sample and feedback was obtained. Then the tool was validated using a cross-sectional survey with a triforces military sample in Sri Lanka (n=960).

This chapter has two main sections. The frist[t] section presents the methodology used to develop and validate the scale, and the second section presents the results of the validation study which based on exploratory and confirmatory factor analysis. An organisational structure for chapter three is presented in figure 3.1 below

Figure 3.1

Chapter Three organisation structure

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3.1 Development of the scale

3.1.1 Phase 1 – Item generation and development of RIM

To find the answer to the first research question, "what pre-enlistment risk and protective factors are likely to impact on military well-being and performance?" several standard scales and measures were used in the current study. Knowing the fact that Sri Lanka does not use any psychometric tool to assess the pre-enlistment personality of candidates, there is a practical demand for such a tool. A question may arise inquiring the requirement for developing a new scale and why not validate an existing scale and use it in Sri Lanka. Though the answer for this question is not straight forward, there are many valid reasons for doing this. Firstly, it has been a known practice in the west to use one or more psychological screening tools and aptitude tests at recruitment from World War I onwards. These have been changed and modified from time to time. For example, the Armed Services Vocational Aptitude Battery (ASVAB), The Assessment of Individual Motivation (AIM) and The Tailored Adaptive Personality Assessment System (TAPAS) are commonly used tests (Garb, Wood, Schneider, Baker, & Travis, 2013). In addition to these for initial screening, military services conduct some other tests as ongoing assessments at different points in the military career, before or after specific deployments (Brooks et al., 2014). However, it is difficult to find a single comprehensive scale which measures all these aspects, which would save time and resources on recruitment.

Secondly, the screening tools and tests used in other parts of the world cannot be directly used in Sri Lanka, due to cultural sensitivity.

Thirdly, most of these tests are computer based tests; which candidates are supposed to complete the test on the computer and the results are also produced by the computer. These testings demand highly skilled human resources and a level of physical resources, which are limited in the Sri Lankan context. There are not enough facilities to conduct computer-based tests at any of the recruiting centres of the triforces in Sri Lanka. Therefore it was decided to develop a comprehensive screening tool which is culturally appropriate and includes most of the phenomenoa related to military recruitments and can be administered on paper.

Item generation and selection of scales

The initial survey tool has two main sections; the frist section which has 34 items, measures the vulnerability/risk factors of the military recruits and the second section, which includes three existing scales, measures the protective factors of the recruits (Please see appendix 3.1 and 3.2 for English and Sinhala versions of for full questionnaire respectively).

To develop the risk factor scale, a large number of relevant studies on military assessment were studied (Cabrera, et al., 2007; Guerra & Calhoun, 2011; Iversen et al., 2007; James, et al., 2013; John, et al., 2014; Lemaire & Graham, 2011; Lin et al., 2014; Macklin et al., 1998; Macmanus et al., 2012; Murphy & Sharp, 2011; Soltaninejad et al., 2014; Tracie et al., 2013; Ursano et al., 2014). Commonly used items to assess general vulnerabilities included: educational level; family income level; parental education level; parental absence during childhood; childhood adversities; antisocial behaviours; history of mental health problems; suicide attempts and history of suicide in the family, and childhood trauma. A few questions on attitudes about the job role of the military officers, characteristics and background of successful military officers, motivation factors and the individual expectation of the job were also included in the question pool. These were adopted from previous military research (Alfred, et al., 2014; Börjesson, Österberg, & Enander, 2011; Bradley & Nicol, 2006; Congard, Antoine, & Gilles, 2012; Darr, 2011; Ford, Gibson, DeCesare, Marsh, & Griepentrog, 2013; Garb, et al., 2013; Hystad et al.2011; Jakupcak, Blais, Grossbard, Garcia, & Okiishi, 2014; King et al., 2013; Maddi, et al. 2012; Meyer, et al., 2013; Momen et al., 2010; Skomorovsky, 2013; Stricker, Alderton, & Rock, 2011). Once these items were pooled, they were checked for any repetition and arranged in a logical order. Then the answer format for each item was determined. Some of them expected dichotomous answers, and some of them had scales, numeric or normative answers. All the descriptive answers were given a numeric code with a tick box in front of the answer so that participants only have to tick the answer. Whenever and whereever possible an option called "other" was given, and participants were asked to specify their answer if it was not stated in the list. Where questions inquired about sensitive information like psychiatric diagnosis participants were given an option "do not wish to mention" to protect their dignity. All survey items were checked for double-barrelled, confusing, and leading questions.

3.1.1.1 Items for the vulnerability factors

3.1.1.1.1 Demographic data and family back ground

Questionnaire items 1-14 were designed to gather relevant demographic data. The first three questions asked about the participant's service rank, the category of service (regular or volunteer), and years of service. The intention of these three questions was to see any relationship between these factors and other personality factors and outcome measures. Questionnaire items 4-11 explored age, sex, marital status, ethnicity, religion, highest education level, extracurricular activities, and perceived socioeconomic status. When questions asked about ethnicity and religion answers were not presented with the dominant ethnicity or religion first, so that any prejudice could be avoided. When there were multilevel

answers, the answers were presented in lowest to highest order (for example; education, socio economic status). Question numbers 12 and 13 explored parents' education level. Finally, the demographic section asked if participants had any close family members who had worked or were working for the military services. There is a belief in Sri Lankan military service that children of military families would remain and perform well in the services, and therefore they are given priority in the selection process.

3.1.1.1.2 Adverse childhood experience

Questionnaire items 15-20 were designed with the intention of gathering information about different types of childhood adversities, based on Pagura et al. (2006), who examined 17 childhood adversities in their study and observed an association between childhood adversities and self-criticism, which is a major source of adult psychopathology. These adversities included interpersonal loss, childhood abuse, traumatic experiences, parental psychopathology and neglect. However, not all these 17 factors were included in this study considering the relevance and the time factor. Question numbers 15-18 inquired about the absence either parent for more than a six month period and the reason for that. Question number 19 asked yes/no questions about: living with an alcoholic person during childhood, and living with a mentally ill person. Questionnaire item 20 included four adverse experiences; physical abuse, sexual abuse, psychological abuse and having witnessed violence against the respondent's mother. The answer format was a 1-5 scale (1=never and 5=very often)

3.1.1.1.3 Antisocial behaviour patterns

An 8 item sub scale was used in question number 21 to assess the pre enlistment anti-social behaviour patterns of the respondent. This question was adapted from a scale used by MacManus et al. (2012) with a UK military sample. However, not all the items in that study were included here. There were eight questions following the stem statement 'When I was growing up…; for example ''I used to get into physical fights at school', 'I was suspended or expelled from school'. Participants were asked to say if these statements were 'true' or 'false'. According to MacManus et al. if a participant answers "yes" to the statement, "I used to get into physical fights at school" and one more statement, they can be identified as having anti - social behaviour patterns.

3.1.1.1.4 Early trauma experiences

In questionnaire item 22 the PTSD Checklist Civilian (PCL) short version (Lang et al., 2012) was used to assess early trauma experiences and their effect on the person. The PCL-C is a general civilian version that is not linked to a specific event; the questions refer to "a stressful

experience from the past". This includes six items and has been validated to different languages including Sinhalese and Tamil (Fernando 2008). The rating of the severity of the symptoms of PTSD is proceeded by the statement "Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, and put an "X" in the box to indicate how much you have been bothered by that problem in the past month". A sample symptom description was "feeling very upset when something reminded you of a stressful experience from the past". The answers were expected on a 1-5 rating scale (1= not at all, 5= extremely). An individual is considered to have screened positive if the sum of these items is 14 or greater (Lang & Stein, 2005; Lang et al., 2012).

3.1.1.1.5 Psychological disorders of the candidate and the family

Questionnaire items 23-26 were designed to explore any history of psychological disorder or problems suffered/experienced by the participants. They started with a general question to ask whether they had been treated by a psychiatrist or a psychologist then moved to a more specific question on the diagnosis or the nature of the problem. This was an optional question which participants could bypass if they answered 'no' to the previous question. The question which asked about the diagnosis or the nature of the problem offered 18 answer options including most possible and common problems and participants also had the option to describe the symptoms rather than naming the diagnosis. They also were given a chance not to tell the diagnosis or problem if they were concerned about confidentiality or dignity.

One of the main issues faced by the mental health sector in Sri Lanka is the stigma towards mental health issues and seeking help. Stigma can be a barrier to help seeking behaviour in military settings (Schreiber & McEnany, 2015). Therefore question number 25 asked about any psychological problems that had not received professional help. Then, question number 26 asked the reason for not seeking help, with eight possible options including an open option. It was hoped that this question would encourage participants to reveal further information that they had not disclosed in the previous questions.

The history of mental health issues within family members also an important factor to be considered as this could reveal any genetic tendencies for psychological disorders within the person, which could be triggered by combat experiences or stressful life events (DiGangi et al., 2013; Kessler et al., 1997). Question number 27 asked whether any family member was treated for any mental health issue and, if yes, participants were asked to record who and the nature of the problem.

3.1.1.1.6 Suicidal attempt or ideation of the candidate and the family

Suicide is an important issue among the military population (Felitti et al., 1998; Friedman, 2015). Ideally, a full suicide risk assessment should be administered at the recruitment level. Considering the time factor only selected items from Beck's suicidal risk assessment scale (Beck, 1979) were used in the questionnaire, with no intention of overall score calculation for suicide risk. Questionnaire item 28-31 asked about suicidal ideation and attempts. Questionnaire item 32 asked about family history of suicidal attempts or completed suicides.

3.1.1.1.7 Motivation for the job

Different people join with military services with different motivations. Understanding the pre-enlistment motivation of the candidates helps the services to categorise them and helps individuals to assess their job satisfaction (Ford et al., 2013; Rumsey, 2014). Questionnaire item 33 was devoted to assessing the expectation of the participants of the job. This question provided several options in terms of individual expectations of joining or working for the military services and the participants were asked to rate their importance on a 0-4 scale where 0=indicates "not important at all" and 4 = "extremely important". Motivational aspects included salary and benefits, job satisfaction, prestige, power and control, fun, new experience, opportunity to grow and helping the nation.

3.1.1.1.8 Expectation of the job

According to Ford, Gibson, DeCesare, Marsh and Griepentrog (2013) pre-entry expectations, attitudes, and intentions can be considered as predictors of tenure among military members. The last items of the questionnaire assessed the perceived characteristics of a successful military officer. Eight characteristics were presented in a list and participants were asked to rate their importance on a 0-4 scale. 0 indicated "not important at all", and 4 indicated "extremely important". Characteristics included: physical fitness; psychological fitness; leadership; motivation; teamwork; patience; decision making; and ability to understand others' feelings.

3.1.1.2 Scales for the protective factors

Three well-known and validated scales assessing dispositional or personality traits known to promote resilience were used. The logic behind selecting these three scales was the relevance of the constructs of those scales in the military community. These assess similar constructs but in slightly different ways. It was decided to use all three scales initially, then reduce them by factor analysis, because all three have been used in different military studies, and there was no evidence-based justification for choosing one rather than the other.

3.1.1.2.1 Dispositional Resilience Scale (DRS 15)

The Dispositional Resilience Scale (DRS-15; Bartone, 2007) is a 15-item self-report Hardiness Scale. The initial long version of this has 45 items. In developing this short scale, the authors considered the reviews of previous versions and have changed some idioms into more simple English, making translation into other languages easier. The authors considered the short version as better balanced and more culture-free than earlier versions. Items are scored using a 4 point Likert-type scale, with responses ranging from 0 (not at all true) to 3 (completely true) and higher scores reflecting higher overall levels of Hardiness-Resilience. The DRS-15 items measure three factors of hardiness: Commitment, Control, and Challenge. There are five items to measure each factor, and six items are negatively-keyed (Bartone, 2007). Research has suggested that hardiness buffers stress in various samples, such as in working adults (Bartone, Ursano, Wright & Ingraham, 1989; Britt, Adler & Bartone, 2000). Moreover, the DRS-15 has been used extensively to measure resilience in U.S. military samples (e.g., Bartone, Roland, Picano, & Williams, 2008).

Cronbach's alpha reliability coefficients for the 15-item DRS have been reported at a=.82 for the total Hardiness scale (Bartone et al., 2008). Test-retest reliability coefficient for DSR 15 has been observed as r = .78 with a sample of 104 military academy cadets (Bartone, 2007).

A study with elderly Chinese women obtained a Cronbach's α coefficient = .78 (Wong et al., 2014). The Norwegian version of DRS 15 demonstrated that the scale has satisfactory internal consistency, as evident in Cronbach's alphas within the range typically reported for the 15-item scale and subscales, between 0.60–0.70 range for each sub scale (Hystad et al. 2009).

3.1.1.2.2 Mental Toughness Scale (MTQ 48)

The Mental Toughness Questionnaire developed by Clough et al. (2007) was used to measure the mental toughness of the candidates. MTQ has been tested with diverse groups such as sports personnel, military personnel, and managers (Clough, Earle, Perry, Crust, 2012; Marchant, Polman, Clough, 2009; Godlewski & Kline, 2012).

MTQ has 48 items and consists of 4 main construct or facets. Those are:

1. Control; how individuals are in control of their work and of the environment in which they work. This has two sub facets; Emotional control and Life control

2. Commitment: the ability for an individual to carry out tasks successfully despite any problems or obstacles that arise while achieving the goal

3. Challenge: to what extent the individuals see problems as threats versus opportunities

4. Confidence: the self-belief to successfully complete challenging tasks. This also has two sub sets; Confidence in Abilities and Confidence in Interpersonal.

MTQ 48 requires responses to statements on a 5-point Likert scale ranging from (1) strongly disagree, to (5) strongly agree. Twenty two items of 48 are riverse worded. Example items include ‘‘Challenges usually bring out the best in me” (challenge); ‘‘I don’t usually give up under pressure” (commitment); ‘‘I can usually control my nervousness” (emotional control); ‘‘I generally feel in control” (life control); ‘‘I am generally confident in my own abilities” (confidence in abilities); and ‘‘I usually speak my mind when I have something to say” (interpersonal confidence).

Reliability of MTQ48

MTQ48 has obtained good internal consistency (Cronbach's α coefficient = .91) with 963 sample of Students (n=619), Administrators/Managers (n=136), Engineers (n=42) and Athletes (n=166) (Clough, Marchant & Earle, 2007).

3.1.1.2.3 Resilience Scale (RS 25)

The Resilience Scale (RS25), originally developed by Wagnild and Young (1993), is a 25-item self-report questionnaire to identify the degree of individual resilience. Here the Sinhala version (Munasinghe, 2012) was used. This scale measures 5 characteristics of resilience: Self-reliance - a belief in oneself and one’s capability; Purpose - the realization that life has a purpose and valuation of one’s contribution; Equanimity - a balanced perspective of one’s life and experience; Perseverance - the act of persistence despite adversity or discouragement; Authenticity - the realization that each person’s life path is unique (Wagnild & Young, 1993).

The respondents are asked to select a response on a seven-point Likert scale with two anchoring statements from 1, disagree to 7, agree. The possible scores range from 25 to 175 and the higher the score, the stronger resilience. Scores of 147 and above are considered high, scores from 121 to 146 falls within the mid-range, and scores lower than 121 are considered to reflect weaker resilience.

The RS has performed as a reliable and valid tool to measure resilience. RS has been administered in a wide range of populations and has been considered as one of the best assessment tools evaluate resilience in the adolescent population, due to good psychometric

properties and applications in a variety of age groups (for reviews see Ahern et al., 2006; Wagnild, 2009).

The internal consistency of the RS (α = .91; Wagnild & Young, 1993; and α = .93; Wagnild, 2010) is exceptionally good. The RS has been translated into various languages, and the internal consistency of the Russian (Aroian et al., 1997), Spanish (Heilemann et al., 2003), Swedish (Nygren et al., 2005), Japanese (Nishi et al., 2010) and Nigerian (Abiola & Udofia, 2011) versions have also been reported acceptable (α between .83 and .93). The stability of the RS over time (test-retest correlations ranging from .67 to .84) has been reported (Wagnild & Young, 1993), and the test-retest coefficient of the Swedish version (after one month) was .78, but further research about stability is needed (Lundman et al., 2007).

Munasinghe (2012) conducted a study with Sri Lankan school students (N=150) to adapt and validate the Resilience scale in the Sinhala language. There was strong content and consensual validity, high test-retest reliability (0.92; n=30), and internal consistency with Cronbach's α = 0.89 (Munasinghe, 2012). This Sinhala translation was used in the current study.

3.1.1.3 Process of Translation and back translation

The final questionnaire comprised 122 main items (see Appendix 3.1 for a full copy of the survey tool). Demographic and vulnerability assessment included 34 items (there were three questions which include five or more items in it)[4], the other main three scales had 88 items (DSR 15 items, MTQ 48 items and RS 25 items). The Resilience scale has been adapted and validated into Sinhala (Munasinghe, 2012) and the PCL checklist Civilian version has been translated and validated in Sri Lanka (Fernando, 2008). Therefore these two scales were not translated into Sinhala. All the other questions went through the translation then back translation process.

Initially, the items for demographic and vulnerability assessment were developed in the English language, and then they were translated into Sinhala[5] according to systematic scale validation criteria recommended by Harkness (2003). The translated questionnaire was sent to five Sinhala speaking discipline experts for translation review. All were familiar with both psychological testing and military services in Sri Lanka (some of them were working abroad). Panel members were given three options: 1. the translation is appropriate; 2. the

[4] PCL Short version has 6 items in the scales but PCL was taken as 1 question in the tool, Childhood adversity was assessed in one question but it had five sub items in it, Antisocial personality also assessed using one question it has 6 sub items in it.

[5] Sinhala is the official language of Sri Lanka and majority of the population speak Sinhala. Standard recruitment forms of military services are in Sinhala.

translation should be revised; 3. the translation should be removed. They were also asked to provide suggestions for a more suitable translation if they felt the translation should be revised/ removed. Based on the feedback given by the expertis, some of the questions were rephrased and more answer options added to some questions. Overall, 95% of items were rated to remain unchanged. DRS15, MTQ 48 were also translated, back translated and reviewed by a panel of experts. Content and consensual validity were independently rated for each item using a 0-10 rating scale (0=not acceptable at all and 10= fully acceptable), and all items received acceptable ratings (≥ 7). The Sinhala versions of DRS-15 and MTQ48 were obtained after modification and refinements on semantic equivalence (same meaning with grammatical consideration), idiomatic equivalence (same expression), experiential equivalence (same application), and conceptual equivalence (validity of the concept) in the Sri Lankan context (Guillemin, Bombardier& Beaton, 1993).

3.1.2 Phase 2 – Pilot study

To see whether the questionnaire items and the scales were understandable in the military context, how long it would take to complete the questionnaire and other possible concerns about the content from the military point of view, a pilot was conducted.

Methods

Following sections summarise the method of the pilot study

3.1.2.1 Sample for the pilot

Forty officers participated in the pilot on two different locations. There were 20 Navy officers and another 20 Airforce officers, including 12 female.

3.1.2.2 Administration of the pilot

The researcher gathered the participants and explained the objectives of the study and what was expected from them. Then they were given the opportunity to ask any questions or clarifications. It took 15 minutes to explain the objectives of the study and to answere the questions. The information sheet and the consent form also were distributed so the actual time for the main study could be calculated. After they completed the questionnaire along with the standard scales, participants were given a five item feedback form to complete. This form included questions regarding the readability, clarity, simplicity of the questions, language and importance of this type of screening tool at the recruitment level. They were also asked whether there was any particular question(s) that they could not answer or did not want to answer. At the end of the feedback form, they were asked to give any suggestions to improve the questionnaire and mechanisms to get more accurate answers to the survey

questionnaire. Finally, they were asked to give any feedback in an informal discussion, where they were encouraged to talk freely.

3.1.2.3 Results and feedback from the pilot study

Completion took 25-45 minutes. Therefore it was decided to allocate an hour for testing in the main study. Participants reported that the language and terminology were suitable for military officers and there were no questions that were emotionally distressing. There were no complaints about clarity, font size, or the readability of the questionnaire.

Seventy-four per cent of the participants said that this type of screening is extremely important for military recruitment. During the discussion, they gave some examples from their colleagues and explained why they should have been screened at recruitment. They also gave ideas about the prevalence of psychological problems among military officers and agreed that conducting screening at recruitment is one of the best solutions for this.

Among their ideas to improve the questionnaire, they felt it would be very important to maintain the informality of the session, as the principal investigator was a senior officer and that could be an obstacle to the accuracy of the answers. They also suggested including some questions about addictions and about the relationships of the candidates, to assess pre-enlistment problems.

In addition to the above descriptive analysis, a preliminary factor analysis was also done with the items of the three main scales, to determine their factor structures and weak items. However, the factor loading was not meaningful and could not establish the factor structure of the original scales. Therefore none of the items was deleted at this stage, as there was not a sufficient basis to remove any item. Hence, it was decided to carry forward all the items for the main validation study. A further consideration was that, in this pilot study, there were only 40 participants whereas the number of variables in three scales was 88. Thus, factor analysis at this level was not meaningful as this did not meet the proportionate sample requirement for a factor analysis (1:10).

3.1.3 Phase 3 – Testing validity and reliability of the tool

3.1.3.1 Design

To test the validity and the reliability of the newly developed items and the standard scales selected for the study a cross sectional survey study was designed. The questionnaire used for the survey was self-administered after the introductory session to the study. However, the investigator was physically available for any clarification.

3.1.3.2 Sample selection

The proposed psychological screening tool is to be used in the recruitment process in military services in Sri Lanka. Thus this tool had to be validated in a relevant population: ideally a sample of potential applicants for the military officer recruitment scheme. However, realistically it was impractical to have a sample of potential candidates who are planning to apply for military service, as these recruitments are periodic rather than regular. A large cross-sectional sample of recently recruited officers was not feasible either because there are only a limited number of new officers at any given time. Therefore, it was decided to sample existing junior officers in the three services (Navy, Army, and Airforce). According to recent statistics reported on the official website of the Ministry of Defence, the total strength of the tri forces is approximately 276700 (Army= 200,000, Navy, 48,000 and Airforce= 28,700). Of these, less than 10% are officers. Given the nature of the study and its population, random sampling was not realistic. Therefore a convenience purposive sampling method was adopted for both the validation study and the predictive validity study. However, it had some features of stratified sampling, as it was a cross section of all the services, all the branches and units, all the operational areas and both males and females.

Sample size Calculation

Online sample size calculation was run to determine the sample size of the study using a few software calculators. The following table presents the values used and suggested sample sizes.

Table 3.1

Results of various Sample calculation

Software used	Margin of error/Con interval	Estimated population	Response distribution	Sample size Conf. Level 95
Raosoft	5%	267,000	50%	384
The survey system	3.16	267,000	50%	959
Surveymonkey.com	3.16	267,000	50%	959

For these calculations, the estimated population was taken as 267,000. This is the total current population of all the three forces of Sri Lanka. However, as mentioned above roughly 10% of this total population are officers. Two of the above calculation methods suggested 959 as the accurate sample size for the entire three forces, considering the confidence level at 95% and margin of error/ confidence interval at 3.16. The sample size for the validation

survey was 960 junior military officers (both male and female) representing all three military services in Sri Lanka which surpasses the sample size requirement for the estimated population and the margin of error. This sample represented all the branches and units of the triforces and all the operational areas. The initial plan for the stratification for the sample was to maintain a proper ratio between the three forces. However, due to time constraints, the researcher originating in the Navy and logistical problems, the navy was relatively oversampled and the army undersampled. Still the highest sample was from the army.

Exclusion criteria

Combat experience and exposure to war trauma could be the main underpinning factor for senior officers' current personality and behaviour. Therefore all the officers who were recruited before 2009 were excluded from the sample, as they may have had combat experience. Military service lasts a maximum of six years, so most of the participants were in very junior ranks; in the Army, from Captain Rank and below, in the Navy, Lieutenant and below and in the Airforce, Fight Lieutenant and below.

3.1.4 Ethical clearance

'Research ethics' refers to the moral principles guiding research from its inception through to completion and publication of results. Good psychological research is only possible if there are mutual respect and trust between investigators and participants, as psychological investigators are potentially interested in all aspects of human behaviour and experience (BPS, 2010).

Data collected in this study are directly from military personnel, and some of the data are related to military functions and activities. Even though this study was conducted in Sri Lanka it was designed, technically supported and supervised in the University of Hull, United Kingdom. Therefore this study was approved by both the Sri Lanka Ministry of Defence (MoD) and the University of Hull, whose ethics procedures follow the Declaration of Helsinki (see appendix 3.5 for University approval).

3.1.4.1 MOD approval

Military services function under the Ministry of Defence (MoD) in Sri Lanka. Any research study conducted regarding or involving military personnel should seek approval from the MoD. Therefore, approval for this study was sought from the Secretary of Defense. A letter requesting approval was sent to the MoD via the Commander of the Navy as the principal investigator was a naval officer. This letter was supported by a letter from the research supervisor and an ethically approved copy of the research proposal stating the significance

of the study to the Sri Lanka military services. The Secretary of Defence granted approval (see appendix 3.6) and delegated responsibility to the commanders of the three forces to coordinate with the principal investigator (PI).

3.1.4.2 Informed consent

Written informed consent was obtained from all participants in both studies. Participants were given an information sheet including a brief description of the study and the aims of the study. After that, each participant signed the consent form. Participants were given the freedom to decide to participate or not to participate without any penalty or negative consequences.

3.1.4.3 Ensuring anonymity and full consent in military settings

Informed consent in military research adheres to many of the same fundamental principles and regulations that govern other civilian research. However, research in the military has to take additional measures to preserve service members' informed consent rights. This is mainly because of the special nature of the superior–subordinate relationship in the military. Therefore, it is necessary to avoid perceptions of coercion or undue influence on a military subject (McMunas et al., 2005). In this study, the principal investigator was part of the Sri Lanka Navy, and all the participants were junior to the investigator. Therefore the investigator tried hard to create an informal and no-'chain of command' atmosphere during the data collection process. She dressed in formal civilian attire instead of military uniform. It was reemphasised that individuals had the right to decide whether to participate in this study or not without any penalty or loss. They were asked to consider this participation as a request, not as a command by a senior officer. They were also informed that if they did not wish to participate, they could either leave the room or stay in the room without completing the questionnaire and return it empty. To maintain confidentiality, including confidentiality of participation, only the PI collected the completed questionnaire, which was sealed in an envelope before return.

To further ensure anonymity, consent forms were not matched to questionnaires and kept separate from them.

3.1.5 Procedure

a) Logistic and other arrangements

After completion of the pre-test of the tool, the schedule for the survey was finalised in collaboration with the Headquarters of each service. According to the guidance of commanders and other relevant authorities, specific bases and areas were selected for data

collection. Data collection was done during 28th October to 9th December 2015. Each service provided participants in six or seven areas.

Navy – Western Command, Southern Command, Eastern Command, Northern Command, North East Command and Naval and Maritime Academy

Air Force – Rathmalana, Katunayake, China Bay, Diyathalawa Training Centre, Anuradhapura, Vavuniya, and Hingurakgoda

Army - Panagoda, Kilinochchi, Vavuniya, Mullathiev, Palali, Diyathalawa Training Centre.

After adjustments from pilot feedback, the final questionnaire was printed and distributed to these bases on an agreed schedule. Each base was committed to organizing a place and time for testing and a substantial number of potential participants.

b) Survey administration procedure

On the agreed date the investigator visited each base. After reporting to the officer in charge, the investigator was directed to the hall where all the officers who could participate in the study were waiting for the investigator. The number of the officers depended on the strength of the base, other duties they had to perform during that particular day and the selection criteria for the participants.

After the investigator was introduced to the group, the senior officers left the hall at the investigator's request. Then, a brief description of the study was given including its objectives, why they were considered as participants and what they were supposed to do. Then the information sheet of the study and consent forms were distributed (all these documents were in the Sinhala language). Then they were asked to read the information sheet carefully and sign the consent form if they agree to participate. They could ask any question about the study and how the information was going to be used. Participants were encouraged to complete the questionnaire without leaving blanks. After this process, the questionnaire was handed to the participants. The questionnaire contained all the instructions for participants.

Participants were allowed to leave the hall when they had completed the questionnaire or to stay inside quietly. Questionnaires were returned in sealed envelopes. In military settings, there may be an element of implicit or even explicit coercion to participate, due to being ordered to do so. Therefore, participants could opt to stay in the hall but in reality not complete the questionnaire but simply return it blank. Lastly, a debriefing was conducted to

ensure that respondents were not in any psychological distress, and participants were encouraged to meet counselling officers in their bases should they have any discomfort after answering the questions in the survey. As they went through the questionnaire, they could ask any questions regarding the content of the questions and the rationale behind them. Participants used this opportunity to clear their doubts and were happy about the process. At the end of each data collection day, all the questionnaires were opened by the principal investigator privately and checked for blank or extremely incomplete questionnaires, which were removed from the study. However, if a participant had completed the majority of the questions, their response was considered for further analysis.

3.1.6 Data tabulation and analysis

A code sheet was prepared before the data collection, and all the variables were given short names. This code sheet was used as a guide for data entry, which was performed by a qualified data entry officer using double-entry and cross checking procedures. Once entered, data were checked for inconsistencies. There were some participants who had completed most of the questions but missed a few. They were retained.

Data were analysed using SPSS 22.0. Negatively worded items of the MTQ and Hardiness scales were reverse coded before analysis.

Statistical analysis.

The split-sample cross validation method was adopted to validate the protective scale as per the recommendations of previous researchers (Costello & Osborne, 2005; Camacho, 2012; Nadal & Davidof, 2015). IBM SPSS version 22.0 and AMOS version 24.0 were used for data analysis. Before the validation process frequencies and descriptive statistics were calculated for the total sample (n=960) and each scale.

Exploratory Factor Analysis (EFA)

After the initial descriptive analysis, individual exploratory factor analysis was conducted on each protective scale to see whether their original factor structures were preserved in the current sample. Data were tested for normality and homogeneity assumptions using Kolmogorov-Smirnov tests prior to the parametric statistical analyses. Factorability and sample adequacy were tested with the Kaiser-Meyer-Olkin criterion. Initial factor analysis for each scale was conducted separately as suggested by the authors of the original scales. Retention of item was guided by the use of multiple criteria including an examination of the scree plot (Cattell, 1966; Floyd & Widaman, 1995), and application of the Kaiser Guttman criterion, which suggests that factors with eigenvalues equal to or greater than 1.0 be retained

(Guttman, 1954; Kaiser, 1960). Items with initial loading .5 or more were retained. Principal Component Analysis (PCA) was preferred over Common Factor method in EFA. PCA is known as a good data reduction method (Costello & Osborne, 2005) which was the main objective of EFA process in the current study. PCA yields one or more composite variables that capture much of the information originally contained in a larger set of items. Several principal component analyses were performed to identify the possible latent factors in three scales (DeVellis, 2012). The Oblique rotation method was used, giving freedom to the variables to correlate while rotating.

Split sample

Secondary to the EFA conducted for each scale, the total sample was split into two halves using the SPSS split sample command and two samples derived, representing nearly 50% of the total sample for each half. Sample 1, used for EFA, comprised 476 cases and sample 2, used for CFA, consisted of 484 cases.

Both samples exceeded the minimal size requirements considered necessary for factor analysis (Costello & Osborne, 2005). The exploratory factor analysis was used to identify the items comprising the final scale and for the investigation of factor structure, where each item was selected according to its performance in exploratory factor analysis (EFA) and considerations regarding the item contribution to the conceptual coherence of the scale.

Exploratory Factor Analysis (EFA)

Criteria for EFA were determined as per the initial EFAs conducted for each scale. Items with low primary factor loadings and cross-loadings were deleted. Low primary loadings were defined as a primary loading of .40 or less (Bosworth, Espelage, & Simon, 1999; Cicero, Kerns, & McCarthy, 2010; Floyd & Widaman, 1995; Ford, MacCullum, & Tait, 1986). Cross-loading items were defined as having a secondary factor loading of .30 or higher or having a small gap between the primary and secondary loading (i.e., less than .20 apart). A final PCA was carried out with the resultant scale, which was looking for a two factor solution with oblique rotation to identify potential factor structure.

Internal consistency reliability for each sub scale was assessed using Cronbach's alpha. Alpha values of.70 or higher indicate acceptable internal consistency (George & Mallery, 2003). Content/ face validity of the tool had already been established using expert reviews and a pilot study.

Confirmatory Factor Analysis (CFA)

CFA was conducted with the second half of the sample (n=484) using SPSS AMOS 24. 0 version. Maximum Likelihood was used as the estimation method of the CFA. Chi-square score and several other fit indices were identified in line with the objectives of the study.

Model fit was evaluated using the indices provided by the AMOS output, which included the X2/df, RMSEA, CFI, TLI/NNFI, PCLOSE, BIC, PNFI, PCFI (These are explained in detail in the results section). The items to be included for the final scale were determined after testing the model fit.

3.2 RESULTS

This section presents the results and findings of the frist study in two main sections. The first section describes the findings of the descriptive statistics including sample characteristics, observation of risk/vulnerability factors, and scores of Resilience 25, MTQ 48 and DRS 15 scales. The first section also discusses the correlations among risk factors and correlations among protective factors. The second section explains the validation of the tool, which adopted the split sample cross validation method. This includes stand-alone validation of the individual scales and the validation of the new scale which merged the three protective scales. The results of EFA and CFA are also outlined in the second section. The results were analysed using SPSS 22 and AMOS 24.

3.2.1 Findings of the descriptive and correlation analysis

3.2.1.1 Sample characteristics and demographic information

Data were collected from 1000 military officers from the three forces and all branches and areas of Sri Lanka, during October- December 2015. There were 28 questionnaires which were incomplete and unusable, and another 12 had been left blank. Therefore, those data were removed. The remaining 960 participants were coded by data codes using a code sheet prepared by the author. Then the entered data were checked for accuracy and consistency. Subsequently, the data were examined by using descriptive statistics in SPSS 22 to explore the means, standard deviations, missing data and rage of the data as recommended by Field (2009). Junior military officers (n =960) representing the tri forces in Sri Lanka constituted a convenient sample based on easy accessibility. Various characteristics of the sample are detailed in following sections.

3.2.1.1.1 Service representation in the sample

Maximum effort was made to recruit a proportionate sample to the study in line with the military population ratio. The achieved sample ratio of the study was 39.4% (n=377) from

the Army, 36.7% (n= 353) from the Navy (the PI's home service) and 23.9% (n=230) from the Air Force.

3.2.1.1.2 Age of the respondents

As the sample consisted of junior military officers the mean age of the sample was 26.9 years (SD= 4.9). Both median and mode were 23 years. The minimum age was 23 and the maximum was 41. Overall 79.7% of respondents were below age 28 years, which was similar to the intended population of military officer recruits. There were 376 Cadet trainees who represented different entrees/batches, and they are currently in training.

3.2.1.1.3 Ranks and years of service

Table 3.2 shows the represented ranks in the sample and 38.6% (n=371) of them were cadet officers who are still in training. 33.2% (n=319) in the Captain (army)/Lieutenant (navy) and Flight Lieutenant (air force) level. Another 21.1% (n=203) represented the Lieutenants (army) Sub Lieutenant (navy) and Flying Officer (air force) level and the last 7.1% (n=68) was from the 2nd Lieutenant (army) Assistant Sub Lieutenant (navy) and Pilot officer (air force) category.

3.2.1.1.4 Gender representation in sample

Women comprised 9.3% (n=89) of the sample, which is representative, as under 10% of military personnel are women. This proportion is even lower amongst officers.

3.2.1.1.5 Education level of the respondents

Education level was used as a proxy for intellectual ability. The Sri Lankan military services do not use intelligence tests, but they do look at the General Certificate of Education as a basic requirement. When they directly recruit officers into special branches (other than cadets) the bachelor's degree is considered as the basic qualification. In this sample, 54.3% (n= 522) had studied up to A/L which is the minimum requirement for an officer. Another 30.1% (n=289) were graduates. While 8.4% (n=81) respondents had got a diploma, 18 people had a postgraduate qualification. There were 13 respondents who had technical training as an entry qualification. Interestingly there were 4% (n=38) of respondents without the minimum education qualification. These officers had been promoted from the ranks due to their performance. They had more service experience than a similar ranking officer.

3.2.1.1.6 Military members in the family

As can be seen in Table 3.2 almost half the sample came from families with other members who had served.

Table 3.2

Demographics of the study sample

Item	Frequency	Percentage
Type of Military service		
Army	377	39.4%
Navy	353	36.7%
Airforce	230	23.9%
Ranks		
Officer cadet/Mid shipman/Officer cadet	371	38.6%
2Lt./A. Sub Lt./Pilot toff	68	7.1%
Lt/Sub Lt./Flying officer	203	21.1%
Captain/Lt/Flight Lt	319	33.2%
Type of service		
Regular	805	83.9%
Volunteer	155	16.1%
Age		
18-25	486	50.6%
26-30	280	29.1%
31-35	118	12.3%
36-40	48	5.0%
41 and above	29	3.0%
Sex		
Male	871	90.7%
Female	89	9.3%
Years of service		
0-5 years	498	51.8%
6-10 years	312	32.5%
11-15 years	41	4.3%
More than 15 years	110	11.4%
Level of education		
Grade 1-8	7	.7%
Up to O/L	31	3.2%
Up to A/L	522	54.3%
Technical Training Certificate	13	1.4%
Diploma	81	8.4%
Graduate	289	30.1%
Post Graduate	18	1.9%
Marital status		
Married	255	26.5%
Unmarried	695	72.4%
Divorced/ separated	11	1.1%
Ethnicity		

Sinhala	951	99%
Sri Lankan Muslim	6	.6%
Others	3	.4%

Continued table 3.2

Religion		
Buddhist	899	93.5%
Hindu	11	1.1%
Christian	36	3.7%
Islam	8	0 .8%
Not stated	7	0.7%
Perceived socio-economic background		
Lower	15	1.6%
Lower middle	101	10.5%
Middle	776	80.7%
Upper Middle	57	5.9%
Not stated	12	1.2%
Total number of hobbies/extra activities		
No hobbies at all	12	1.2%
1	86	8.9%
2	122	12.7%
3	208	21.6%
4	224	23.3%
5	167	17.4%
6	86	8.9%
7	30	3.1%
8	18	1.9%
Military member in the family		
Yes	467	48.6%
No	486	50.6%
Not stated	8	0.8%

3.2.1.2 Pre-enlistment risk factors and attitudes towards military service

In the risk assessment section, a few aspects were tested. Those were childhood adversities, antisocial behaviour trends, pre-trauma exposure, history of psychological disorders, and suicidal attempts or ideations of the candidate or family members. Attitudes towards military service were also tested using two questions.

3.2.1.2.1 Childhood adversities

Childhood adversities take different forms. Four types of adversity were assessed in this study. Those were:

1. **Being away from parents,**
2. **Living with people with psychological problems**
3. **Witnessing violence against mother**

4. Being abused as a child (physical, sexual and psychological)

It is important to note that as part of the pre-questionnaire briefing, these types of abuse were defined as any activity which went beyond the socially accepted level of physical punishment for wrong done by a child or any set of words that were used repeatedly, which they caused them to feel they were worthless or miserable. This additional explanation was given to prevent any over or under reporting of abuse.

Table below summarises the responses to these questions.

Table 3.3

Responses for Childhood adversities

Type of adversity	Total response to the question	Response to the item
Away from mother or father for more than six months	947 (98.5%)	
Away mother (yes)		153 (15.9%)
For work		32 (20.9%)
No reason was given		121 (79.1%)
Away from father (yes)		228 (23.75%)
Death		47 (20.7%)
Work		59 (25.9%)
No reason given		122 (53.5%)
Living with people with psychological disorders	799 (83.1%)	16 (2%)
Being abused		
Physical abuse	895 (93.1%)	
Yes		71 (7.9%)
More than once		47 (66.2%)
Psychological abuse	898 (93.4%)	
Yes		131 (14.6%)
More than once		96 (73%)
Very often		21 (2.3)
Sexual abuse	891(92.7%)	
Yes		47 (5.3%)
More than once		27 (57.4%)
Witness violence against mother	899 (93.5%)	
Witnessed		111(12.3%)
Never witnessed		787 (81.7%)

3.2.1.2.2 Antisocial behaviour patterns

Antisocial behaviour patterns were assessed using eight true/false statements First, out of 933 respondents who responded to this question, 182 (19.5%) agreed that they were involved in physical fights as children. The second statement asked whether they played truant at

school; 266 (27.7%) respondents had played truant from school. Only 33 people (3.5%) did not answer this question. Third, 63 (6.6%) respondents reported being suspended from school while another 38 (4.1%) did not answer. Fourth, 39 (4.1%) admitted that they had been in trouble with the police and another 39 (4.2%) did not answer the question. Lying and deceiving others was the next aspect of this assessment. Seventy-nine (8%) respondents admitted that they tended to lie and deceive others. Thirty-seven respondents (4%) did not answer this question. Three hundred and fifty-four respondents (38%) reported that they were involved in impulsive behaviours before enlistment and 25 (2.8%) refused to respond to this question. Having no care about the safety of self or others is another aspect of antisocial behaviour. In this sample, 8.5% (n=82) perceived themselves as careless about the safety of themselves and or others. However, 34 (3.7 %) of the sample did not respond to the question. The last aspect of antisocial behaviour trends was growing up in a probation care due to childhood delinquency. In this sample 14 (1.5%) respondents had been in probation care. There were 38 (4.1%) respondents answered for this question. According to Macmanus et al. (2012) saying 'yes' to physical fight and one more, reflects antisocial behaviour patterns of the individual. In this military sample, there were 143 (15.1%) respondents who said 'yes' to more than three statements. Out of them, 12.9% (n=122) had reported physical fights as one of their behaviours patterns, which indicates a tendency to antisocial personality. This 8 item subscale used to measure ASB patterns obtained an acceptable level of internal consistency in this military sample (α = .64).

3.2.1.2.3 Pre-enlistment trauma exposure

Exposure to traumatic events prior to the enlistment was tested using PCL abbreviated version which has six items and respondents were asked to rate the intensity of the problem on a scale of 1-5, where 1 reflects 'not at all' and 5 indicates 'extremely'. In total 920 respondents answered this question. Scores ranged from 5 to 25, mean 9.42 (SD=3.8), Median and mode were nine and five respectively. According to PCL authors individuals who score more than 14 for these six items can be considered PTSD positive (Lang & Stein, 2005; Lang et al., 2012). Here 14% met this criterion. Internal consistency for this abbreviated version of PCL was Cronbach's alpha = .82 for this sample.

3.2.1.2.4 History of mental health issues

Only 60 respondents (6.2%) had previously sought help for psychological problems or disorders, and 900 (93.8%) did not respond to this question. However, another 119 (12.4%) respondents reported that they had needed help but had not sought it. Out of them 61 (52%) thought that their problem was not serious enough to seek help and another 13 (11%) did not

know whom to contact regarding getting help while another 12 (10.5%) reported that they felt ashamed to seek help. However overall, nearly 48% gave some reason other than the severity of the problem. Overall, 842 (87.6%) did not answer this question. The large number of non-respondents may be a reflection of the stigma towards mental health in a military setting as well as in general.

Sixty-seven (7%) of the sample reported that they had family members with psychological disorders. Interestingly another 23% reported that they did not know whether anyone in the family had a psychological disorder. This response, again, could reflect the reluctance to ackowledge this as a fact, due to social stigma.

3.2.1.2.5 Suicidal attempts and ideations

Suicidal attempts and ideation were assessed using four different questions. Table 3.4 displays the results.

Table 3.4

Suicidal attempts and thoughts

Question	Total response for the question	Response to the item
Hopelessness for the life and future	952(99%)	
Yes		171 (18%)
Have suicidal thoughts		
Yes		118 (12.4%)
Thoughts put into action		18 (1.9%)
Once		11(61.1%)
2-3 times		4 (22.25)
More than 3 times		3 (16%)
Suicide history in the family	954(99.3%)	
Yes		106 (11.1%)
Don't know		135 (14.2%)
No		713 (74.7%)

Table 3.5 compares the three services on the key risk assessment scores. Onaway ANOVA test showed only mean of the PTSD scores of three military services significantly different from each other (F= 3.69, P< 0.05).

Table 3.5:

Summary of risk factor assessment- Military service

M Service	Childhood Adversities	ASB Total	PCL Total	Suicide Attempt and thoughts Total
	Mean SD N	Mean SD N	Mean S N D	Mean SD N
Army	8.8 (SD = 2.0) N = 269	1.2 (SD = 1.4) N = 353	9.6 (SD = 3.8) N = 359	0.45 (SD = 0.8) N = 310
Navy	8.5 (SD = 1.5) N = 286	1.4 (SD = 1.3) N = 330	9.0 (SD = 3.6) N = 339	0.41 (SD = 0.7) N = 29
Airforce	8.6 (SD = 2.1) N = 192	1.1 (SD = 1.5) N = 221	9.8 (SD = 3.9) N = 221	0.44 (SD = 0.7) N = 186
Overall	**8.63 (SD = 1.8) N = 747**	**1.1(SD = 1.4) N = 904**	**9.42(SD= 3.8) N = 919**	**0.44 (S D= 0.73) N = 747**

3.2.1.2.6 Attitudes and expectations of military services

The last two questions were asked to explore how important different aspects of the job were to participant, and their perception on different personality characteristics of military officers. These two questions were answered by 957 respondents. Both questions were rated on a scale of 0-4 (0 = not important at all, 4=extremely important). Considering the nature of the question and responses the aspect(s) rated as 'extremely important' were considered as to represent participants'main expectations of the job and characteristics of the job. Individuals could rate more than one aspect as extremely important. Table 3.6 summarises the ratings for these two questions.

When the responses to the above two questions were closely observed it was noticed that most of the responses appeared to be influenced by social desirability. Respondents knew that this study was related to psychological well-being, so they highly rated psychological aspects of the answers. However, without further in-depth analysis, it is difficult to confirm this idea. There was no further analisis of the data of these two questions as self-reported attitudes can be heavily influenced by social desirability.

Table 3.6

Officers' attitudes and expectations of military services

	What is most important aspect of your job for you	
1	Salary and benefit	328
2	Prestige	445
3	Power and control	204
4	Fun	246
5	New experience	421
6	Serving to the mother nation	665
7	Helping family	440
	How would you rate following characters about a military officer	
1	Physical fitness	592
2	Psychological fitness	793
3	Leadership	714
4	Motivation	557
5	Teamwork	708
6	Patience	719
7	Decision making	778
8	Ability to understand others feeling	669

Total respondent 957

3.2.1.3 Correlation among pre-enlistment risk factors

Correlations between pre-enlistment risk factors are presented in table 3.7 It is observed that most of the risk factors are modestly positively correlated with each other ($r<0.3$). As can be seen, parental absence was related to suicidal thoughts, childhood adversities, and PTSD positivity but not to psychological disorders and ASB, which was underrepresented in the responses. There was a significant but marginal relationship between childhood adversities and psychological disorders. Suicidal thoughts and actions were related to childhood adversities in addition to above relationship. PTSD positivity also was positively related to all risk factors except ASB. As noticed in the descriptive analysis, there was considerable level of underrepresentation of responses to psychological disorders and ASB questions.

Table 3.7

Relationship between pre-enlistment risk factors

	Being away from mother	Being away from father	Diagnosed with Psy disorders	Total ASB	Total Childhood adversities	Suicidal thoughts and actions
Being away from mother						
Sig. (2 tailed)						
N						
Being away from father	.51**					
Sig. (2 tailed)	.000					
N	945					
Diagnosed with Psy disorders	.06	.04				
Sig. (2 tailed)	.067	.176				
N	940	936				
ASB	-.01	.01	.04			
Sig. (2 tailed)	.890	.856	.210			
N	897	893	895			
Childhood adversities	.11**	.10**	.09*	.04		
Sig. (2 tailed)	.003	.006	.017	.315		
N	747	744	743	704		
Suicidal thoughts and actions	.13**	.10**	.16**	.03	.20**	
Sig. (2 tailed)	.000	.004	.000	.385	.000	
N	786	782	950	745	628	
PTSD positivity	.10**	.09**	.23**	.05	.21**	.24**
Sig. (2 tailed)	.003	.005	.000	.145	.000	.000
N	950	946	793	904	794	793

***. Correlation is significant at the 0.01 level (2 tailed).*

**. Correlation is significant at the 0.05 level (2 tailed).*

3.2.1.4 Level of hardiness, resilience and mental toughness in Sri Lankan military personnel

The second half on the questionnaire consisted of the DRS15 to measure hardiness, RS25 to measure resilience and MTQ48 to measure mental toughness. This section presents the descriptive statistics for these questionnaires.

3.2.1.4.1 Level of Resilience RS25

The resilience of the sample was assessed using the RS25 scale which has a 7 point Likert scale. All the items were positively worded. The possible minimum score was 25, and the possible maximum score wass 175. Scores were highly negatively skewed, and Kurtosis also was high compared to the other scales. Table 3.8 summarises the scores for RS25

Table 3.8

Scores for RS25

RS25	N	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Overall	940	25	175	131.78	25.2	-1.519	3.154

3.2.1.4.2 Level of Hardiness

Hardiness was measured using DRS15. Table 3.9 summarises the responses.

Table 3.9

Scores for DRS15

DRS15	N	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Overall	956	14	45	31.19	4.87	-.107	-.048
Control				12.32	2.04		
Challenge				9.24	2.61		
Commitment				9.63	2.41		

3.2.1.4.3 Level of Mental toughness MTQ48

Mental Toughness Questionnaire (MTQ) consists of 48 items in four subscales. Items are scored on a five point Likert scale. Responses were ranging from 1 (Strongly Disagree) to 5 (Strongly agree). Twenty-two items were negatively worded the possible minimum score was 48, and the maximum was 235. Table 3.10 presents the scores for MTQ48

Table 3.10

Scores for MTQ48

MTQ48	N	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Overall	944	48	235	170.65	18.88	-.160	.760
Control				49.07	6.1		
Challenge				28	3.75		
Commitment				39.29	5.65		
Confidence				53.67	6.49		

Comparison of mean scores for military services

Scores were also computed for each military service. Table 3.11 displays a summary of mean and standard deviations for each scale score by each military service. One way ANOVA was conducted to see whether mean scores were significantly different in three military services (please see Appendix 3.7 for the ANOVA table). It was observed that one group significantly differed from the other two groups for Resilience $F = 6.78$, ($p<0.01$) and Hardiness $F = 3.19$, ($p<0.5$) but the means were not significantly different for MTQ

Table 3.11

Summary of protective scale scores – Military service

Service	**MTQ48**	**RS25**	**DRS15**
	Mean SD	**Mean SD**	**Mean SD**
Overall	170.6 (18.9) N = 944	131.8 (25.2) N = 940	31.2 (5.1) N = 956
Army	171.7 (18.8) N = 366	135.6 (24.5) N = 376	31.5 (4.8) N = 376
Navy	169.7 (18.8) N = 352	129.8 25.8 N = 348	31.3 (5.2) N = 353
Airforce	170.5 (19.1) N = 226	129 (24.9) N = 325	30.57 (5.21) N = 227

3.2.1.5 Testing correlation among three main scales

As shown in Table 3.12, all three scales were modestly but significantly correlated with each other.

Table 3. 12

Correlations among the three scale scores

		MTQ Total	Resilience Total	Hardiness Total
MTQ Total	Pearson Correlation			
	Sig. (2-tailed)			
	N			
Resilience Total	Pearson Correlation	.08*		
	Sig. (2-tailed)	.000		
	N	925		
Hardiness Total	Pearson Correlation	.16**	.27**	
	Sig. (2-tailed)	.000	.000	
	N	939	934	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

All these three scales (MTQ48, RS25 and DRS15) are scales used to measure resilience related characteristics of the individual. As shown in the above table these three scales are correlated positively, in other words, those who have scored high in MTQ have scored high in RS and DRS. Even though the correlation between the resilience scale and MTQ is statistically significant, it is not a strong relationship (r = .08). The relationship between resilience and hardiness is quite a strong one (r = .27). However, these relationships will be further explored in factor analysis to confirm the concurrent validity.

3.2.2 Testing the validity and reliability of the individual scales

It was decided to validate each scale for the Sri Lankan military context. Face validity, and translational validity construct validity, and the reliability of the scales were tested at this level.

3.2.2.1 Content/Face validity of the questionnaire items and scales

"**Face validity** relates more to what a test appears to measure to the person being tested than to what the test actually measures" (Cohen & Swerdlik, 2009, p.174). To establish the face validity of this tool several measures were taken, mainly a normative Delphi process and pre-testing the questionnaire. As reported in the methodology section (3.1.1 and sub sections) standard translation and back translation procedures were followed to ensure the

translational validity for the scales and items which were newly developed and adopted. Content and consensual validity were independently rated for each item using a 0-10 rating scale (0=not acceptable at all and 10= fully acceptable), and all items received acceptable ratings (≥ 7). Before administering the tool with the targeted sample it was pre- tested with 40 junior military officers to check testing time, understanding of language and terms and reactions of the respondents to the tool and changes made according to the suggestions (please refer to 3.1.1. for more details). Thus the scales and items used in this study met the content/face validity requirements.

3.2.2.2 Construct Validity and the reliability of MTQ48, RS 25 and DRS15 in the Sri Lankan military context

It was useful to explore the standalone validity and reliability of these three scales before puting them all together into one scale. This will allow them to be used separately if anyone wants to use them as individual measures. Therefore exploratory factor analysis (EFA) was conducted for MTQ48, RS25 and DRS 15 separately, using the full sample of 960.

Testing assumptions for normality and homogeneity for parametric tests

Prior to conduct EFA, as advised by Churchill (1979) normality and homogeneity assumptions of the data were tested. Univariate and multivariate outliers also were tested as recommended Field (2009).

a) Testing Normality assumption

With a large sample, violations of the normality assumption are less likely to be problematic (Field, 2009). Nonetheless, normality assumptions were tested.

According to APA recommendations, skewness should be within the range ±2 and kurtosis values should be within the range of ±7. Values were converted to z-scores.

The Z score for skewness of MTQ was 0.026, for Resilience 1.432 and DRS 0.002, all are within the criteria above. However, the Z score for kurtosis for MTQ, RS and DRS were 2.07, 13.79, and 1.66 respectively. The absolute values for MTQ is significant at the $p < .01$ level and for RS is significant at $p < .001$. RS kurtosis exceeds the APA criterion.

To correct the normality assumption few more steps also considered. The following figures (Figure 3.2, 3.3. & 3.4) present the histogram and the Q-Q plot for each scale. It is observerable that only the RS Q-Q plot diverts significantly from the expected normality.

Figure 3.2

Graphical representation of total MTQ score distribution and Q - Q plot

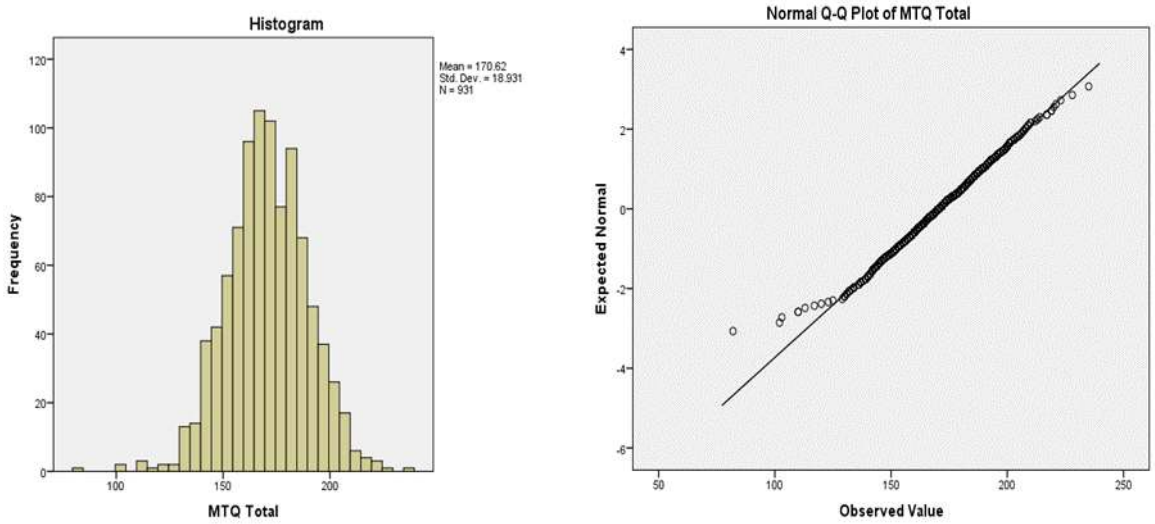


Figure 3.3

Graphical representation of resilience score distribution and Q – Q plot

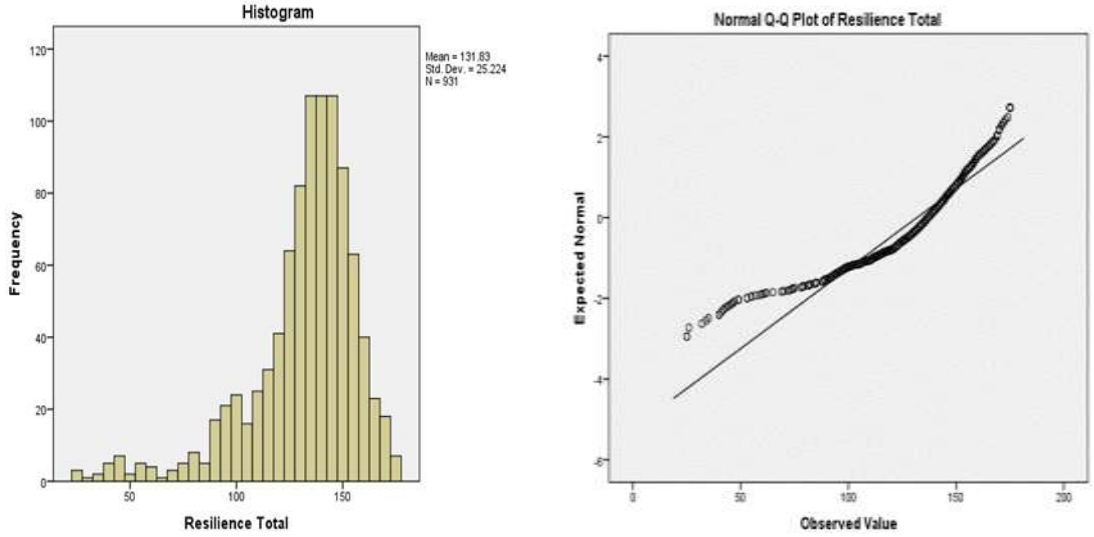
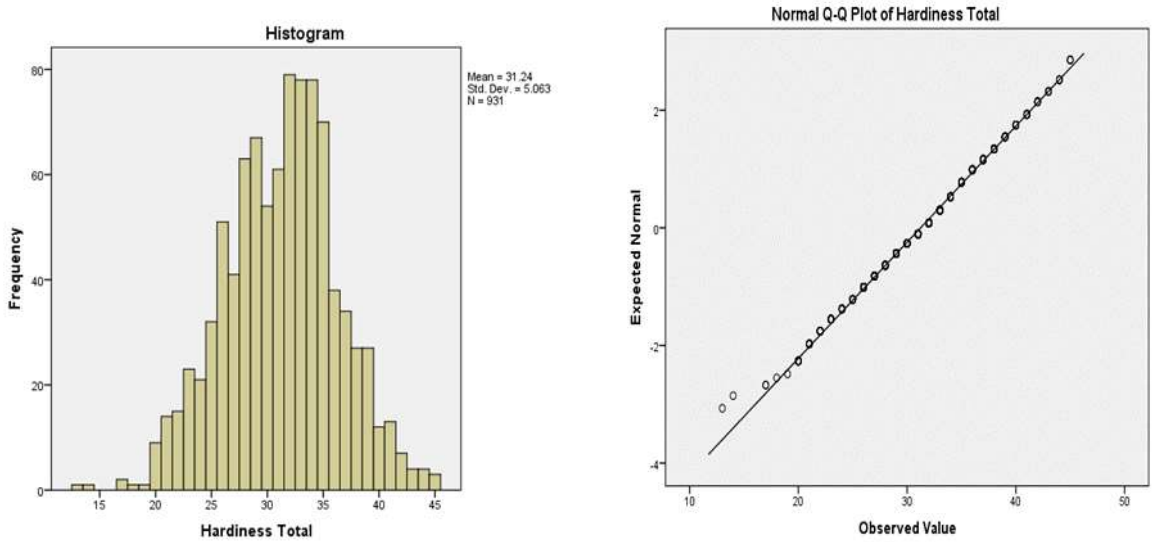


Figure 3.4

Graphical representation of hardiness score distribution and Q – Q plot



The Resilience scale histogram was negatively skewed and bi-modal, while the Hardiness histogram also showed slightly negative skewness.

A Kolmogorov-Smirnov test which was designed to test normal distribution was conducted for scale scores. The total MTQ score, $D(931)=.023$, $p < .05$, was significantly normal. However, both total resilience $D(931)=.13$, $p < .005$, and total Hardiness scores $D(931)=.0$, $p < .001$, were significantly not normal.

Even though in the current study, the sample violates the normality assumption for the Resilience scale, it was decided to continue further analysis, considering the large sample size. The descriptive data table in appendix 3.4 shows that the 5% trimmed means for all three scales do not deviate much from the mean. Therefore we can assume our sample is normally distributed and drawn from a normal population. Cudeck (2001: p. 80) has stated that "virtually no variable follows a normal distribution". It is also important to note that any sample exceeding 200 participants is considered as a large sample and exploratory and confirmatory factor analysis done with such a sample are relatively robust, despite violation of normality (Coleman, 2011).

b) Levene's test for Homogeneity

The Homogeneity assumption was tested using Levene's test for scale scores (MTQ, RS, DRS) considering army, navy and air force as factor levels. The variance were equal for all

three forces, MTQ *F* (1, 93) =.214 ns, for RS *F*(1, 93)= .038 ns, and for DRS *F*(1.93)= .518 ns. This suggests that the homogeneity assumption for this data is tenable.

c) Testing for univariate and multivariate outliers

The data were screened for univariate outliers for each scale using the SPSS explore feature. There were a few outliers for each scale. The multivariate outlier analysis was obtained through the Mahalanobis Distance (D2) test. There were 40 cases, rechecking suggested they were genuine responses. Pallant (2010: p 64) stated that "if the trimmed mean values are very different, you may need to investigate these data points further". However, none of the 5% trimmed mean in this data deviated considerable amount from the initial mean (see appendix 3.8 for descriptive statistics). Therefore none of the cases or data was removed.

3.2.2.2.1 Validity and reliability of MTQ48 in Sri Lankan Military context

a) Validity of MTQ in Sri Lanka Military context

Initially, the factorability of the 48 MTQ items was examined using several well-recognized criteria for factorability. Firstly, the Kaiser-Meyer-Olkin measure verified sampling adequacy for the analysis, KMO = .91 (superb according to Field, 2009) whereas the commonly recommended value is .6. Bartlett's test of Sphericity was significant (x^2 (1128) = 10902.95, *p < .001)*, which indicated that correlation between items was sufficiently large for PCA. The diagonals of the anti - image correlation matrix were also all over .5, and the communalities were above .4 except for one item (.36). The average of communalities was .5, which further confirms that each item shared some common variance with other items. This initial factorability test suggested that factor analysis was suitable for the 48 items in the MTQ questionnaire. However, factor analysis of the MTQ proved difficult.

First, a principal component analysis (PCA) was conducted on the 48 items with orthogonal rotation as suggested by the authors of MTQ48 (Clough et al., 2007). Initial PCA was conducted asking for the factors with an eigenvalue greater than 1 and this resulted in 11 factors. These 11 factors represented 49.8% of the total variance with 18. 6% coming from the first factor. However, the factor loadings did not make much sense, as most of the factors extracted only one or two items.

Therefore, a second PCA was conducted requesting a 4-factor solution with 33 iterations and direct oblimin solution to allow items to be correlated. The output showed that 32.7% of total variance was represented in this solution, of which the frist factor accounted for 18.5%. However, this solution also did not give a clear picture and the rotated component matrix was ambiguous, with a few cross-loadings.

So, a third and final PCA was run, asking for 6-factor solution in line with the original validation of MTQ48 (Clough et al., 2007). This time, direct Oblimin rotation was suggested with 43 iterations, as the standard 25 iterations did not obtain a solution. This 6-factor solution represented 38.3% of total variance with 18.5% attributable to the frist factor. Subsequent factors were responsible for 7.5% 3.6%, 3.1%, 2.9% and 2.6% respectively. Table 3.13 presents the factor loadings of the 6-factor solution for MTQ.

Table 3.13

Six Factor solution for MTQ

Pattern Matrix

	Component					
	1	2	3	4	5	6
MTQ28R	.617					
MTQ46R	.561					
MTQ36R	.555					
MTQ27R	.505					
MTQ47R	.497					
MTQ35R	.490					
MTQ37R	.476					
MTQ41R	.472					
MTQ29R	.417					
MTQ21R	.327					
MTQ38		.578				
MTQ43		.544				
MTQ30		.512				
MTQ17		.487				
MTQ39		.484				
MTQ25		.458				
MTQ44		.447				
MTQ40		.364				
MTQ31			.557			
MTQ45			.540			
MTQ26R			.487			
MTQ24			.417			
MTQ34			.415			
MTQ23			.340			
MTQ3				-.651		
MTQ8				-.593		
MTQ12				-.556		
MTQ18R				-.491		
MTQ19				-.481		
MTQ20				-.460		
MTQ13				-.453		
MTQ2				-.427		

Continued table 3.13

MTQ4	-.407		
MTQ16	-.360		
MTQ7	-.327		
MTQ9R	-.317		
MTQ5		.651	
MTQ1		.620	
MTQ6R		-.320	
MTQ48		.278	
MTQ10R			.549
MTQ14R			.538
MTQ32R			.536
MTQ11R			.465
MTQ33R			.420
MTQ15R			.402
MTQ22R			.364
MTQ42R			.344

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.[a]
Rotation converged in 43 iterations.

Total variance explained 38.3%

Cronbach's alpha .89

MTQ43 which loaded onto factor 2 (.544) also loaded on factors 1 and 3 with .210 and .213 respectively. MTQ25 also loaded onto factor 2 and 1, but with a strong loadings for factor 2.

Also, there were a few cross-loadings between factors 4 and 5. In such cases, items were put into the comparatively highly loaded factor.

In the original MTQ48, the subscales were Control (14) and Confidence (15) Commitment (11) and Challenge (8). It was observed that items from Control and Confidence were loaded with strong eigenvalues compared to the other sub scales but not always on the target factor. Personality characteristics, reflect from these items looked more relevant to military personality. Factors were spred all over the structure, and solution was only represented 38.3% of the total variance. However, this was same with the validation of the original MTQ48, which accounted for only 38.9% of the total variance (Keith, 2007).

Overall, the factor structure of the original scale could not be obtained as expected. Therefore this study cannot recommend MTQ48 for use in the Sri Lankan military until it meets the original factor structure or establish a new factor structure is established for the Sri Lankan context with more validation studies. The original MTQ48 validation was done with other samples, but it had never been validated with a military sample (Clough et al.,

2002; SMTQ; Sheard et al., 2009; CMTI; Gucciardi & Gordon, 2009). However, the MTQ48 English version has been used with Canadian military (Godlewski & Kline, 2012). The cultural and contextual differences may influence the results of the current study.

b) The reliability MTQ48 in Sri Lankan military context.

Reliability of the MTQ48 scale was tested using Cronbach's alpha. The MTQ48 scale obtained a very good internal consistency (Cronbach's $\alpha = 0.886$).

MTQ48 obtained the required translational validity, content validity and constructed validity. Even though the original factor structure of MTQ48 could not be established in this sample, the scale obtained reasonable construct validity, with 37 items strongly loaded into six factors.

3.2.2.2.2 Validity and reliability of Resilience 25 scale in Sri Lankan Military context

a) Validity of the RS25 in Sri Lankan Military context

Factorability of the 25 item Resilience scale (RS) was examined using standard criteria described in the previous section. Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .97 (superb according to Field, 2009) whereas the commonly recommended value is .6. Bartlett's test of Sphericity was significant ($x^2(300) = 15303.83$, $p < .001$) which indicated that correlation between items was sufficiently large for PCA. The diagonals of anti - image correlation matrix were also all over .5, and the communalities were all above .4 except for three items. The average of communalities was .56, further confirming that each item shared some common variance with other items. This initial factorability test suggested that factor analysis was suitable for the 25 items in the RS questionnaire.

A PCA was conducted on 25 items with oblique rotation (Direct Oblimin). Oblique rotation was used here as the items on the scale are related, and this has been recommended by the author of the RS (Wagnild & Young, 1993). Three different PCAs were conducted, requesting (1) factors with an eigenvalue greater than 1, (2) a two-factor solution and (3) a five-factor solution. Scree plots of all three analysis showed the two-factor solution to be the best option, even though RS is assumed to have five facets in it (Wagnild & Young, 1993). After comparing different criteria, the two-factor solution, which had no cross-loadings, and a clear scree plot which levelled off at factor two, was preferred over others. Wagnild and Young (1993) also have adopted a 2-factor solution as it produced more meaningful factor loadings. The two-factor solution explained 56% of total variance for the frist and the second

factors, with 49.4% and 6.6% respectively. Table 3.14 summarises the factor loadings of two-factor solution for RS25. As the table shows, out of 25 items, 23 items were loaded into two factors with loadings of more than .5 with the highest loading of .875. Both structure and patterns matrices provided almost the same result. There were 23 items loaded onto factor 1 and three items loaded onto factor 2 (items 11, 12 and 22). Item 13 and item 25, which loaded onto factor 1, did not meet the .5 requirement, their loadings were .349 and 424 respectively. When closely examined, these two items were problematic. Item 25 may be culturally inappropriate as it says, "It is ok if there are people who don't like me". People in Sri Lanka are very concerned about the social acceptability of their behaviour, and if people do not like them, they do not consider this as "ok" but rather a personal failing. Item number 13 says "I can get through difficult times because I've experienced difficulties before." This statement might have disqualified as it expresses a negative connotation, compared to all the other positively worded statements. These two items were also problematic during the validation process of the Sinhala version of RS25 in Sri Lanka (Munasinghe, 2012).Therefore factor analysis correctly detected these problematic items. However, this scale failed to preserve the factor structure of the original scale, as did many previous studies (Aroian et al., 1997; Nishi et al., 2010; Oladipo & Idemudia, 2015; Losoi et al., 2013).

a) The reliability of RS25 in Sri Lankan military context.

The Resilience scale (RS25) was able to retain the factor structure of the original scale with higher loadings (Table 3.14). The reliability of the RS25 scale was tested using Cronbach's alpha. The RS25 scale obtained an excellent internal consistency (Cronbach's $\alpha = 0.94$) which suggests RS25 can be used in Sri Lankan military context with confidence.

If the Sri Lankan military wants to measure the resilience of newly recruiting or existing members RS 25 would be the most reliable single scale in the Sri Lankan military context.

Table 3.14

Factor loadings of the RS25

Pattern Matrix

	Component	
	1	2
REs17	.875	
REs18	.851	
REs3	.842	
REs6	.839	
REs24	.827	
REs8	.817	
REs21	.811	
REs10	.809	
REs19	.805	
REs4	.796	
REs7	.786	
REs15	.773	
REs1	.760	
REs9	.753	
REs14	.738	
REs23	.718	
REs2	.669	
REs5	.649	
REs20	.630	
REs16	.548	
REs25	.424	
REs13	.349	
REs12		.772
REs11		.691
REs22		.552

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Total variance explained 56%

Cronbach's alpha = .94

3.2.2.2.2 Validity and reliability of DRS15 scale in Sri Lankan Military context

a) Validity of the DRS15

The factorability of the 15 item hardiness scale (RS) was examined using the same criteria. The Kaiser-Meyer-Olkin measure verified sampling adequacy for the analysis, KMO = .75 whereas the commonly recommended value is .6. Bartlett's test of Sphericity was significant (x^2 (105) =1676.619, p < .001) which indicated that correlation between items was sufficiently large for PCA. The diagonals of the anti - image correlation matrix were also all over .7 and the communalities were all above .4 except for three items. The average of communalities for all the items was .47, further confirming that each item shared some common variance with other items.

PCAs were conducted on DRS15 using both Orthogonal and oblique rotation and requesting 2 factor, 3 factor and 4-factor solutions; six analyses in total. Neither the two factor nor the three-factor solutions produced any meaningful output, as there were a few cross-loadings. The four-factor solution with oblique rotation was preferred as it produced meaningful output. It explained 47% of total variance. The frist and scond factors alone explained 30% of the variance, with 19% and 11% respectively. There were two breaking points at factor 3 and factor 4 when looking at the scree plot. As the number of factors was not a matter of concern at this point, it was decided to take all four factors into consideration. All the items, except item number 3, were loaded onto one or other factor, with more than .5 loading. Table 3.15 shows the factor loadings of DSR15.

Table 3.15

Four factor solution for DRS15

Pattern Matrix

	Component			
	1	2	3	4
Hardi10R	.670			
Hardi7R	.662			
Hardi1R	.642			
Hardi9R	.567			
Hardi2R	.510			
Hardi4REV		.729		
Hardi8REV		.611		
Hardi13REV		.526		

Continued table 3.15

Hardi11REV	.459			
Hardi14REV		.729		
Hardi5R		.704		
Hardi3REV			. 325	
Hardi12R				.745
Hardi15R				.700
Hardi6R				.519

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization

Total variance explained 47%

Cronbach's alpha = .65

b) The reliability DRS15/ Hardiness scale in Sri Lankan military context.

The reliability of the DRS15 (Hardiness) scale was tested using Cronbach's alpha. The DRS15 scale obtained overall internal consistency of α = 0.65 which is the minimum criterion. Item total statistics output showed that if Hardi3Rev was deleted, the overall alpha could be improved to .66.

Although somewhat low, these reliability estimates are still comparable to estimates found in the literature, usually in the range of .6 and .7 (e.g., Bartone, Roland, Picano, &Williams, 2008; Britt, Adler, & Bartone, 2001; Hystad, Eid,Laberg, & Bartone, 2011).

However, it is difficult to recommend using this scale until and unless test- retest reliability analysis and all other validation aspects are established in the Sri Lankan context. However, the purpose of this study was not to validate DRS 15 scale as it is. The purpose of this study was to use the items in the DRS15 to develop a new tool. Thus this issue with the reliability is not a matter of concern at this stage of the study.

3.2.3 Development of a new short scale

The main objective of this study was to develop a comprehensive and succinct screening tool to assess pre-enlistment risk and protective factors of the military officer recruits. In section 3.2.1, it was found that none of the individual protective scales produced precisely the same factor structure as had been found previously. As previously discussed, theoretically and by content validity, there is also considerable overlap in the content of the

three scales. Therefore, the factor analyses so far did not provide grounds for preferring one of the three scales in the Sri Lankan military context.

Therefore, the next step was to combine items from all three scales and factor analyse them together to produce a reduced number of items for the final questionnaire that loaded highly on whatever key factors emerged. For this purpose, both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted, as recommended in the literature (Costello & Osborne, 2005). As it is recommended to conduct EFA and CFA with two separate samples, the data set was split into two samples randomly. Random splitting was done using the SPSS split file option, requesting 50% of cases to one sample. The first sample consisted of 476 cases and the second sample consisted of 484 cases. The following sections explain each of these steps and their outcomes.

3.2.3.1 Exploratory Factor Analysis (EFA)

The EFA was conducted with the first sample, which consisted of 476 cases. Principal component analysis was the best statistical model for the purpose of this study. PCA was preferred over Common factor analysis as PCA yields one or more composite variables that capture much of the information originally contained in a larger set of items. In this method, components are defined and weighted sums of the original items. Thus this would be a linear transformation of the original variables. These are grounded in and derived from actual data. In contrast, Common Factor analysis calculates hypothetical variables even though it is grounded in actual data (DeVellis, 2012).

3.2.2.1.1 Standardising scale scores

Before further analysis, all scores were standardised to Z scores because the different scales have different scoring systems. Another benefit of converting raw scores into standardised scores (Z scores) is to maximise the validity of the analysis by producing factor scores that are highly correlated with a given factor and to obtain unbiased estimates of the true factor scores (DiStefano et al., 2009).

The next step was to conduct a PCA putting all the standardised scores of the 88 items from the three scales using Oblique (Oblimin) rotations to consider reduction of items. The factorability of this 88 item scale was examined using the same criteria used in section 3.2.2.2.1 The Kaiser-Meyer-Olkin measure verified sampling adequacy for the analysis, KMO = .88 which is very good. Bartlett's test of Sphericity was significant (x^2 (3828) =16677.135, $p < .000$) which indicated that the correlation between items was sufficiently

large for PCA. The diagonals of the anti - image correlation matrix were scanned, and all of them were .4 or above.

3.2.2.1.2 Initial rotation and alternative solutions

Initial PCA requested eigenvalue greater than 1, which extracted 22 factors and explained 61.5% variance. The first factor was accounted for 13% of total variance, the second and the third factors were accounted for 8.6% and 4.1 of total variance respectively. Factor one consisted of 20 items from the resilience scale, while the other factors were representing the other two scales and the rest of the resilience scale. However, the factor loading was not meaningful, and the factors after the fifth factor were only just above 1. The pattern matrix showed that except for factor one, the factors only had 1-2 items loaded onto them. The levelling off point of the scree plot test was between the forth and the fifth factors.

8-factor solution and 5-factor solutions

Mental toughness purportedly has four sub scales, while the hardiness scale has three different sub scales. The resilience scale is unitary, although it has five latent facets. If this factor structure of the original scales were preserved, there should be eight factors or subscales in this newly merged scale. However, it has already been established that the previous factor structures were not replicated in this sample. Nonetheless, another PCA was conducted specifying an 8-factor solution, direct oblimin rotation and 75 iterations. Average communalities after extraction were 0.415. Nearly 42 % of the total variance was explained by these eight factors; factor 1 was accountable for 14.9% of total variance while the second and third factors were represented 9.8% and 4.6% respectively. However, this solution produced an unworkable number of items to be retained, and the scree plot suggested four or five factors. Therefore another EFA was conducted asking for five factors and factors with Eigenvalue greater than 5. This solution improved most of the criteria including the meaningfulness of factor loadings, minimal cross loadings, total variance explained, and the number of non-redundant residuals with an absolute value greater than 0.05(this represents the differences between the observed correlation coefficients and the ones predicted by the model). This 5 factor solution retained 20 items from Resilience which loaded onto the fristy factor, 11 items from MTQ loaded onto the second factor, another11 from MTQ as the third factor, 5 items from Hardiness as the fourth factor and another 3 items from hardiness as the fifth factor (see appendix 3.10 for the factor loadings). Altogether there were 50 items, and this was considered as the base for further analysis.

However, as per the recommendations of experts (Costello & Osborne, 2005) further observation was made on EFA criteria. A careful observation was made of the

communalities, eigenvalues, the total variance explained by the factors and the Cronbach's alphas of the factors presented in appendix 3.10 (figures of concern have been made bold for easy reference) and also the correlations among the factors (Appendix 3.11). After considering all these it was found that the contribution of factor 5, which contained only three Hardiness items was, minimal. Another reason for removing the fifth factor from EFA was to prepare the model for the CFA analysis in the next step. CFA prefers less complicated models with comparatively more than larger factors. Also, the purpose of the study was to keep the final scale as simple and short as possible for easy administration and interpretation. For these reasons, another PCA was conducted with 47 items removing the three items of factor 5.

3.2.2.1.3 Final four-factor solution with the selected 47 items

As the final step, another PCA was conducted for the selected 47 items (20 RS, 22 MTQ and five Hardiness items) to see the factor structure of the scale. This time a 4-factor solution was requested using oblique (direct oblimin) rotation. The four-factor solution explained 47.16% of total variance where factor 1 accounted for 36% of the total variance. None of the items had cross loading over .2. There were only 166 (15%) nonredundant residuals with absolute values greater than 0.05, which is excellent. Average for the communalities also improved from 0.39 to 0.47. According to Field (2009), when the sample size is 250 or above, the expected average of communalities is 0.6. However, as the sample of this study was 476, the slightly lower average was considered.

This solution is considered as the final solution, and the scale retained all 47 items. The factor structure showed theat the frist factor consisted of 20 Resilience items, and this is the single strongest factor irrespective of the different types of analysis used. The items loaded onto factor one represented all these five facets of resilience scale. The second factor which was loaded with 11 MTQ items, represented five Control items, three Commitment items, one Confidence item and two Challenge items. The third factor, which has also 11 MTQ items, consisted four 4 Confidence items, three Commitment items, three Challenge items and one Control item. These two factors represented all the sub scales of the original MTQ48, and the selected items looked more relevant to the military setting. Overall, this scale has six Control items, six Commitment items, five Confidence items and five Challenge items. This is a good mixture of all MTQ items. The last factor which has five Hardiness items represented three Control items and two Commitment items. The Challenge sub scale was not represented here. However, the challenge aspect of the personality will be covered enough by this new scale, as there are five Challenge items from MTQ in the scale. The final

scale items, their loadings, eigenvalues, communalities and Cronbach's alpha are presented in table 3.16.

Table 3.16

Factor loadings and communalities based on Principal component analysis with Oblimin rotation for items from MTQ, RS and DRS scales (N=476)

	Component				Communalities
	1	2	3	4	
REs17 My belief in myself gets me through hard times	.880				.772
REs18 In an emergency, I am someone people generally can rely on	.877				.747
REs3 I am able to depend on myself more than anyone else	.863				.730
REs6 I feel proud that I have accomplished things in my life	.824				.661
REs19 I can usually look at a situation in a number of ways	.817				.657
REs4 Keeping interested in things is important to me	.811				.667
REs24 I have enough energy to do what I want to do	.800				.666
REs14 I have self-discipline	.764				.582
REs15 I keep interested in things	.775				.654
REs10 I am determined	.780				.610
REs1 When I make plans I usually go through with them	.770				.598
REs8 I am friends with myself	.769				.640
REs5 I can be myself if I have to	.735				.521
REs7 Usually I take things in stride	.746				.605
REs21 My life has meaning	.729				.636
REs9 I feel that I can handle many things at a time	.737				.587
REs23 When I am in a difficult situation, I can usually find my way out of it	.737				.551
REs2 I usually manage one way or other	.686				.639
REs20 Sometimes I make myself do things whether I want to or not	.647				.442
REs16 I can usually find something to laugh about	.628				.400
MTQ37 When I am feeling tired I find it difficult to get going		.654			.461

Continued table 3.16

MTQ47 When I face setbacks I am often unable to persist with my goal	.647			.425
MTQ36 When I make mistakes I usually let it worry me for days after	.633			.383
MTQ6 Unexpected changes to my schedule generally throw me	.612			.352
MTQ35 I usually find it difficult to make a mental effort when I am tired	.626			.390
MTQ22 I am easily distracted from tasks that I am involved with	.551			.377
MTQ33 Things just usually happen to me	.541			.329
MTQ41 I feel that what I do tends to make no difference	.541			.344
MTQ27 I tend to worry about things well before they actually happen	.524			.308
MTQ14 I often wish my life was more predictable	.506			.270
MTQ21 I generally find it hard to relax	.517			.260
MTQ7 I don't usually give up under pressure		.707		.461
MTQ8 I am generally confident in my own abilities		.612		.412
MTQ3 I generally feel that I am a worthwhile person		.633		.433
MTQ44 I usually enjoy a challenge		.598		.363
MTQ19 I can generally be relied upon to complete the tasks I am given		.643		.352
MTQ4 Challenges usually bring out the best in me		.609		.358
MTQ20 I usually take charge of a situation when I feel it is appropriate		.568		.334
MTQ45 I can usually control my nervousness		.553		.327
MTQ23 I generally cope well with any problems that occur		.523		.330
MTQ16 I generally look on the bright side of life		.524		.263
MTQ39 I can normally sustain high levels of mental effort for long periods		.508		.359
Hardi15My choices make a real difference in how things turn out in the end			.633	.388

Continued table 3.16

Hardi7 I really look forward to my work activities				.618	.415
Hardi1 Most of my life gets spent doing things that are meaningful				.666	.484
Hardi6 How things go in my life depends on my own actions				.559	.313
Hardi2 By working hard you can nearly always achieve your goals				.602	.387
Eigenvalues	**12.22**	**5.15**	**2.82**	**1.98**	
% of Variance	**26.00**	**10.95**	**5.99**	**4.21**	
Cronbach's α	**.96**	**.79**	**.82**	**. 62**	

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
Rotation converged in 6 iterations.

As displayed in table 3.16, all 11 items in factor two are reverse worded (RW) items of MTQ, even though all the RW items were recoded before data analysis. Just to make sure no error had occurred during the recoding process an EFA was run with un recoded original items and the same factor structure was found. This issue has been observed in previous research and explained as a result of common methodological details, so RW items share communalities. As explained by Behacad (2013) "the reverse-coded items share commonalities because they all share a similar methodological detail. If you measured the same construct using a self-report questionnaire and a physiological measure, for example, you would find that the self-report and physiological indices load on different factors because they are different methods, despite measuring the same construct". This issue has been identified as inconsistency bias (Zhang, 2016; Behacad, 2013; Weijters & Bert 2013). For the time being, in this study factor two which contains only RW items will remain unchanged as the majority of the items in the scale are positively worded and any inconsistency bias could be compromised. Please refer to the discussion section for a further discussion on this issue.

It was useful to name the final scale which has four subscales (factors). As the frist factor contained all the Resilience items; 20/25 from the original scale, (80%), the frist factor was labelled as 'Resilience'. This sub scale represents all five aspects of resilience, Self- reliance, Purpose, Equanimity, Perseverance and Authenticity. Therefore it was meaningful to name this factor as 'Resilience'. Factor two comprised 11 items of MTQ representing Commitment,

Control, Confidence and Challenge. As explained before all these items were reverse worded. Therefore factor two labelled as "Mental toughness 1", irrespective of which sub scale items belong to. Factor 3 consisted of another 11 items from MTQ and represented all sub scales. Therefore this factor was temporarily named as MTQ2. The last factor was named as Hardiness as all five items were from the Hardiness scale. Hereafter this full scale is called the **"Resilience Inventory for Military" (RIM)**. This scale was subjected to a confirmatory factor analysis to establish the factor structure of the scale.

3.2.2.1.4 Reliability testing for the newly developed Resilience Inventory for Military (RIM)

Overall internal consistency for the final was very good (Cronbach's $\alpha = 0.95$, $N = 931$).

Reliability of factor 1: Cronbach's $\alpha = 0.96$, $N = 476$ (No of items 20)

Reliability of factor 2: Cronbach's $\alpha = 0.79$, $N = 476$ (No of items 11)

Reliability of Factor 3: Cronbach's $\alpha = 0.82$, $N = 476$ (No of items 11)

Reliability of factor 4: Cronbach's $\alpha = 0.62$, $N = 476$ (No of items 05)

All subscales except Hardiness showed reliability greater than 0.7 as recommended in the literature (DeVellis, 2012). Therefore, Cronbach's alpha for the Hardiness scale did not meet the minimum acceptance level. Item statistics showed that Cronbach's α did not increase if any individual item was deleted. However, Field (2009) suggested .65 as the minimum requirement to accept a scale as reliable. On that base, the Hardiness subscale falls on the borderline. Therefore it was decided to retain all the items in this sub scale for the time being for confirmatory factor analysis, as it represents a different measure. Nevertheless, special attention was paid to this subscale during the CFA process to see whether CFA suggested something similar about the reliability and factor loading of the Hardiness sub scale.

3.2.3.2 Confirmatory Factor Analysis CFA

As described in the above section (3.2.1) an EFA was conducted with the frist half of the sample and resulting in a 4-factor structure for this data: Factor 1 with 20 Resilience items, Factor 2 with 11 MTQ items, Factor 3 with another 11 MTQ items and factor 4 with five Hardiness items. The next step was to confirm this factor structure with a CFA. Some authors view CFA as essential part of validating a scale (Costello & Osborne, 2005; Henson & Roberts, 2006; Worthington & Whittaker, 2006; Cabrera-Nguyen, 2010). Other researchers argue that it is not necessary to conduct both EFA and CFA in the same study (Brown, 2006), on that one of these two is enough (Kline, 2005). As recommended by

Cabrera-Nguyen (2010), CFA was conducted with a separate sample (the second half of the sample), and the process and the results are presented below.

3.2.3.2.1 Selecting Estimation Method and fit indices for CFA on newly developed Resilience Inventory for Military (RIM)

The second sample contained 484 cases, but 12 had some missing data, so they were removed because AMOS needs special procedures to handle missing data.

There are different opinions about the sample size for a CFA. Tanaka (1987) suggested the ratio to the sample size to the number of free parameters should be 20:1. This expectation seems to be unrealistically high. Bentler and Chou (1987) suggested that this ratio could be 5:1. However, a sample of 200 is seen as a goal for SEM research. The ratio in this study sample is 10:1. Thus this study meets two of above criteria as the sample size is 472.

Maximum Likelihood Estimation (MLE)

Maximum Likelihood estimation was selected for this CFA based on previous literature (Hu, Li-tze 1999; Kenny, 2014; Al-Hajla, 2013). In this study, there was a concern about the normality of the distribution of the score of resilience scale, which is the main component of newly developed scale. Moreover, the MLE method is more suitable for scale development as it is more scale-invariant and mostly Fisher-consistent. Also, other estimation methods such as General Least Squares (GLS) Asymptotic Distribution Free (ADF) estimation have been criticized for their weaknesses in scale development with ordinal data (McDonald & Ho, 2012). Once the estimation model is decided then it is important to identify the model fit indices. Following are the model fit indices employed by the CFA.

Fit indices

The Chi-Square test is generally a reasonable measure of fit for models with about 75 to 200 cases. However X^2 is known to be sensitive to the sample size. The chi square is almost always statistically significant if the sample size is more than 400. Therefore it is worth noting that it was highly unlikely that a nonsignificant chi-square score would appear in this study as the sample was 472. Chi square is also affected by the size of the correlations in the model: the larger the correlations, the poorer the fit. For these reasons several additional goodness of fit indices have been introduced (Kenny, 2015; Kennedy, 2012).

According to Kenney (2015) there are three kinds of fit indices;

Incremental (relative) fit index (IFI)

IFI is analogous to R^2 and so a value of zero indicates having the worst possible model and a value of one indicates having the best possible. So the researcher's model was placed on a continuum of 0-1.

Absolute Fit Index (AFI)

AFI type of fit indices presume that the best fitting model has a fit of zero and measure the "badness" of the modes. Therefore the bigger the index, the worse the fit is.

Comparative Fit Index (CFI)

This index can be distinguished from absolute indices as it requires a comparison between two different models: Saturated and non-saturated models.

Model fit indices used in this study

Out of several fit indices, the following few were selected for this study based on their appropriateness and the recommendations of previous researchers.

a) **Root Mean Square of Approximation (RMSEA);** is an absolute measure of fit which is based on the non-centrality parameter. RMSEA is currently the most popular measure off fit and reported in almost all papers that use CFA or SEM (Kenney, 2015).
b) **Comparative Fit index (CFI);** is an incremental measure and directly based on the non-centrality measure. It is recommended to have a CFI value close to 0.95 (the higher the better).

c) **Tucker Lewis Index (TLI) or Non-normed Fit Index (NNFI)** is another incremental fit index. Hu and Bentler (1999) suggested .095 or closer value for a good fit of a model. Kenney (2015) suggests .090 would be reasonable enough to accept a model.
d) P of Close Fit (PCLOSE); Kenny (2015) indicated that this measure tests a null hypothesis that the RMSEA equals .05, what is called a close-fitting model. The alternative, one-sided hypothesis is that the RMSEA is greater than 0.05. So if the *p* is greater than .05 (i.e., not statistically significant), then it is concluded that the fit of the model is "close." If the p is less than .05, it is concluded that the model's fit is worse than close fitting (i.e., the RMSEA is greater than 0.05). Therefore a researcher should look for a *p* value which is greater than .05.

e) **Bayesian Information Criterion (BIC);** is "a comparative fit index and hence, it is meaningful only when two different models are estimated. Lower values indicate a better fit. Therefore the model with the lowest BIC is the best fitting model" (Kenney 2015).

f) **Hoelter Index;** is a recommended test to conduct when only the chi-square value is significant as it indicates how small a sample size would have to be for the result to be non-significant. The Hoelter test only makes sense to interpret if N > 200 and the chi square is statistically significant. This index was selected for the current analysis as the sample size was higher than 400. Kenny recommended a Hoelter value of at least 200.

In addition to the above-mentioned model fit indices, PCFI and PNFI were also considered as extra indicators which should exceed 0.05 threshold (Al-Hajla, 2013). GFI and AGFI were not considered as fit indices in this study, since recent papers do not recommend them as important indices (Kenney 2015). Table 3.17 summarises all the model fit indices and their cut offs.

Table 3.17

Summary of recommended cut off values for Fit Indices

Indices	Abbreviations/ Codes	Cut off values	References
Absolute/predictive fit	X^2/df	< 3 good,<5 (Sometimes permissible	Hu and Bentler,1999
X^2/df		< 5	Schreiber,et.al., 2006
Root Mean Square of Approximation	RMSEA	< 0.05	Kenney, 2015
		<0.10	Matsunaga, 2010
Comparative Fit index	CFI	>0.95	Kenney, 2015
		>.95 Great >.90 traditional	Hu and Bentler, 1999
Tucker Lewis Index or Non-normed Fit Index	TLI/NNFI	>0.95	Hu and Bentler,1999
		>0.90	Kenney, 2015, Kline, 2005
p of Close Fit	PCLOSE	>0.05	Kenney, 2015
Bayesian Information Criterion	BIC	Lowest	Kenney, 2015
Parsimony–adjusted NFI	PNFI	>0.05	Schreiber,et.al., 2006 Kline, 2005
Parsimony-adjusted CFI	PCFI	>0.05	Schreiber,et.al., 2006
Hoelter Index		>200	Kenney, 2015

3.2.3.2.2 Initial estimation of RIM Model fit Evaluation (Model A)

The main objective of running CFA is to confirm the factor structure of the RIM suggested by EFA. CFA confirms the conceptual soundness of the scale (Schreiber et al., 2006). A model diagram for the CFA was drawn using AMOS based on the EFA Pattern matrix output. All the latent variables were covaried as suggested by the EFA. The CFA initial estimate yielded the output diagram shown in the appendix 3.12 According to the model standard output, factor loadings (FL) for all observed variables except one item (e30/MTQ14) were above 0.50. However, from the chi-square score and some of the other fit indices, the model did not fit the data (x^2 = 2421.423, df = 1034, x^2/df = 2.342, GFI = 0.83, CFI = 0.86, RMR = 0.49, AGFI = 0.82, PGFI = 0.76, TLI =0.86, IFI = 0.86, PCFI = 82, PNFI = 0.75, RMSEA = 0.053, PCLOSE = 0.022. HOLELTER values were above 200 (216). It is worth noting that the *p* value for the chi-square was significant (*p* =.00) where ideally this should be non-significant (>0.05) if the model fits the data. However as explained in the 3.2.3.1 above, when the sample is large the chi-square tends to be significant. Although most of the main indices (DF/ CMIN/DF, RMSEA) were within an acceptable range according to the criterion presented in the above table (3.17) further analyses were carried out to find out the best fit model and to obtain the optimum chi-square value.

3.2.3.2.3 The Respecified model estimation (Model B)

As there were some issues related to a few fit indices and there was scope for improving the model, modification indices were taken into consideration. The covariance table suggested some covariates which had not been specified in the initial model. Only covariances with MI value more than 20 were considered for modification and only within the same factor. These covariances were e2 ↔1 value = 24.705, e38↔32 value = 21.509, e38↔e36 value = 21.455, e9↔e8 value 23.166, e16↔e12 value = 23.819, e15↔e12 value = 32.308, e18↔e12 value 23.57. A new CFA was run, allowing these suggested covariance. After running this respecified model, all the fit indices improved slightly (x^2 = 2179.08, df = 982, x^2/df = 2.22, GFI = 0.85, CFI = 0.88, RMR = 0.51, AGFI = 0.83, PGFI = 0.77, TLI =0.87, IFI = 0.88, PCFI = 84, PNFI = 0.76, RMSEA = 0.051, PCLOSE = 0.31. In this model RMSEA and PCLOSE improved to a satisfactory level. The lowest AIC value was achieved by the saturated model, lowest ECVI also was achieved by the saturated model, as expected. Finally, HOLELTER values also improved from 216 to 229. See appendix 3.13 for the respecified CFA output.

3.2.3.2.4 The final Estimation Model (Model C)

Byrne (2001) stated that when using AMOS, a researcher should not be aiming to produce an ideal fit but should try to produce the best possible and interpretable model fit. Even though the respecified model above produced a better result, still it was worthwhile to try alternative models. Therefore several alternative models were tested. These alternative models were based on different reasoning. Looking at the covariance among the latent factors, it was observed that MTQ1 and MTQ2 were correlated highly (0.80), MTQ2 and Hardi also correlated at 0.80 level. Therefore alternative models were run to see if there was any improvement in fit indices, but they did not bring out any improvement. As mentioned in the scale reliability testing section (3.2.2.2.2), the reliability of factor four (Hardiness) was not good (Cronbach alpha = 0.65) while the other three factors had good reliability scores. Having this in mind, another alternative model was tested, removing the fourth factor from the model. In this new model, all possible covariance suggested by the re-specified model was allowed, but MTQ14 was not removed.

The CFA output for the new alternative model (Model C) without Hardiness improved all comparative, absolute and incremental fit indices to a satisfactory level showing the best fit to the data compared to the other tested models. The results were as follows; x^2 = 1749.58, df = 813, x^2/df = 2.15, GFI = 0.85, CFI = 0.91, RMR = 0.52, AGFI = 0.84, PGFI = 0.77, TLI =0.90, IFI = 0.91, PCFI = 85, PNFI = 0.79, RMSEA = 0.049, PCLOSE = 0.71. In the model RMSEA and PCLOSE further improved to a highly satisfactory level. Lowest AIC value was achieved by the saturated model, Lowest BIC was achieved by the default model and lowest ECVI also was achieved by the saturated model. Finally, HOLELTER values also improved to 238. The model diagram with loadings for the final estimation is presented in figure 3.5.

The three CFA estimation models, Model A, Model B and Model C, CFA were compared to decide on the best fit model. These comparisons are shown in table 3.18.

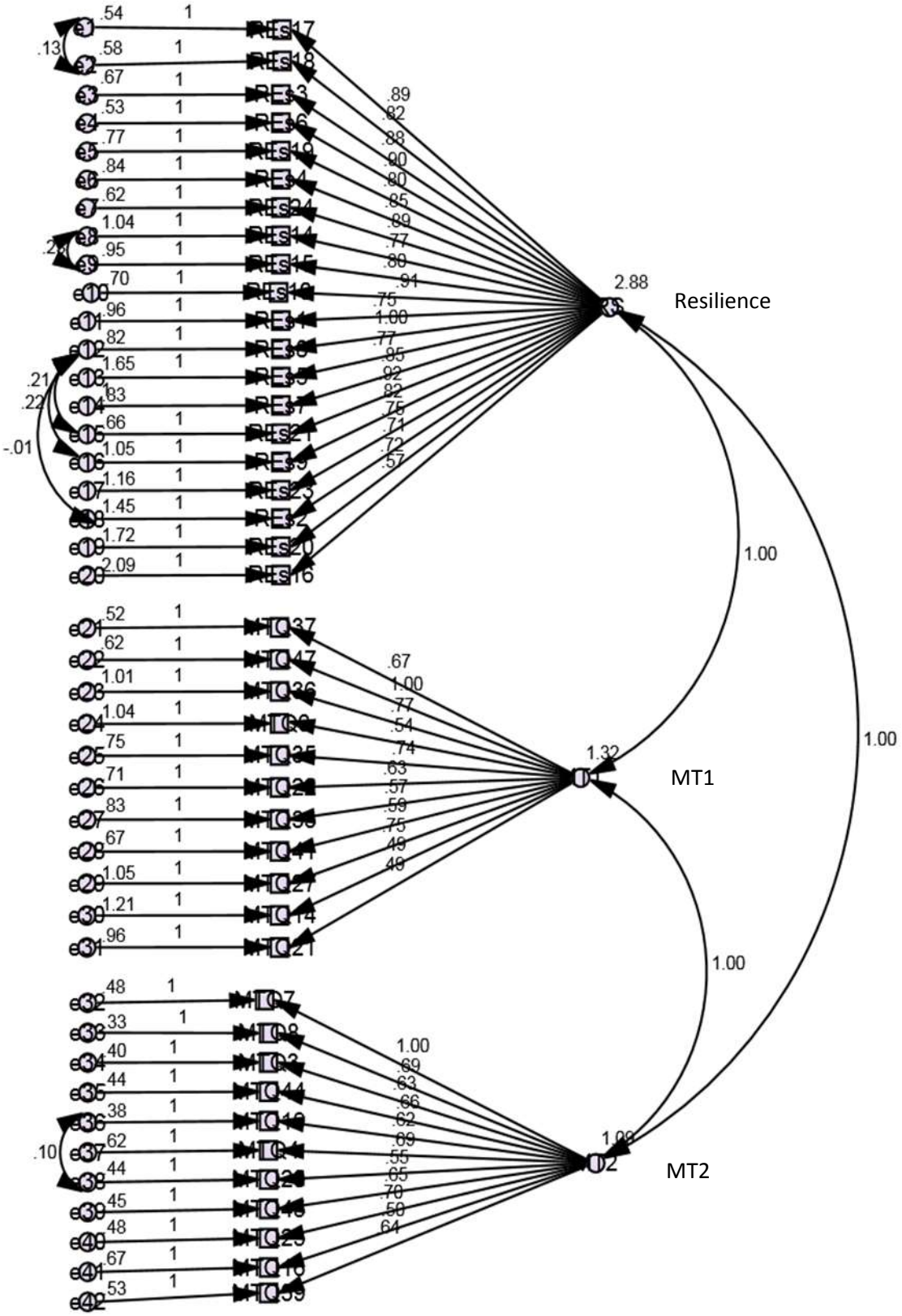
Table 3.18

Resilience Inventory for Military– Model fit indices for three alternative estimations

Indices	Code	Criteria	Obtained value Model A	Obtained value Model B	**Obtained value Model C**
Absolute/predictive fit X^2/df	**X^2/df**	< 5	2.34	2.22	**2.15**
Comparative Fit index	CFI	≥0.95	0.86	0.88	**0.90**
Normed Fit Index	NFI	≥0.90	0.78	0.80	**0.83**
Root Mean Square of Approximation	RMSEA	< 0.05	0.05	0.05	**0.05**
p of Close Fit	PCLOSE	>0.05	0.02	0.40	**0.61**
Tucker Lewis Index or Non-normed Fit Index	TLI	≥0.90	0.86	0.87	**0.90**
Bayesian Information Criterion	BIC	Lowest for the model	√	√	√
Parsimony–adjusted NFI	PNFI	>0.05	0.75	0.76	**0.79**
Parsimony-adjusted CFI	PCFI	>0.05	0.82	0.84	**0.85**
Hoelter Index (.05)	HOELTER	>200	216	229	**238**

Figure 3.5

Resilience Inventory for Military (RIM) Final CFA model without Hardiness (Model C)



According to the above illustration (Table 3.17) which allows comparison of all the alternative models and estimations, it is clear that the third estimation model (model C) has the best fit to the data. However, not surprisingly, even though absolute predictive fit meets the criteria it obtained a significant *p* value. *P* value for this should be non- significant to accept the model. Nevertheless, Brown stated that "Although $\mathbf{X^2}$ is steeped in the traditions of ML and SEM, it is rarely used in applied research as a sole index of model fit. There are salient drawbacks of this statistic including the fact that it is highly sensitive to sample size" (Brown, 2006 p. 17). Many other researchers have shared Brown's opinion about chi-square value (Kenny, 2015; Kennedy, 2012; Hu & Bentler, 1999; Newson, 2017; MacCallum, Byrne 2001). Since this has been identified as an issue, other model fit indices were considered to make a final decision. This model meets all the fit indices criteria except CFI and NFI where the criteria say the value should be 0.95 for CFI and ≥0.90 for NFI or any closer value. The value obtained by the Model C for CFI is 0.90, and for NFI is 0.83 which are borderline values. However, this does not prevent accepting this model, as eight out of ten model fit indices meet the required criteria.

Additionally, standardised regression weights of the final model estimate are illustrated in table 3.19. All the *P* values in the regression table strongly supported the 3 factor model of the Resilience Inventory for Military. With this, all the steps for CFA model fit were completed, and it was safe to decide that the 3-factor model was the best fit for the data at this stage.

Table 3.19

Regression Weights, Standardised Items FLs and SEs of the final estimation

			Estimate	S.E.	C.R.	P	Label
REs16	<---	Resilience	.559	.042	13.695	***	
REs20	<---	Resilience	.684	.040	18.166	***	
REs2	<---	Resilience	.706	.037	19.009	***	
REs23	<---	Resilience	.762	.034	21.669	***	
REs9	<---	Resilience	.807	.030	27.232	***	
REs21	<---	Resilience	.887	.027	34.691	***	
REs7	<---	Resilience	.844	.032	26.399	***	
REs5	<---	Resilience	.715	.040	19.493	***	
REs1	<---	Resilience	.790	.032	23.150	***	
REs10	<---	Resilience	.879	.031	28.934	***	
REs15	<---	Resilience	.814	.033	24.530	***	
REs14	<---	Resilience	.790	.033	23.161	***	
REs24	<---	Resilience	.887	.030	29.513	***	
REs4	<---	Resilience	.843	.032	26.332	***	
REs19	<---	Resilience	.839	.031	26.056	***	
REs6	<---	Resilience	.904	.029	30.912	***	
REs3	<---	Resilience	.878	.031	28.820	***	
REs18	<---	Resilience	.877	.029	28.746	***	
REs17	<---	Resilience	.900	.029	30.621	***	
MTQ14R	<---	MT1	.456	.048	10.170	***	
MTQ27R	<---	MT1	.645	.048	15.675	***	
MTQ41R	<---	MT1	.635	.038	15.320	***	
MTQ33R	<---	MT1	.583	.042	13.685	***	
MTQ22R	<---	MT1	.653	.040	15.935	***	

Continued table 3.19

			Estimate	S.E.	C.R.	P	Label
MTQ35R	<---	MT1	.699	.042	17.552	***	
MTQ36R	<---	MT1	.662	.048	16.241	***	
MTQ37R	<---	MT1	.727	.036	18.611	***	
MTQ39	<---	MT2	.677	.037	17.192	***	
MTQ16	<---	MT2	.541	.040	12.691	***	
MTQ23	<---	MT2	.724	.037	19.008	***	
MTQ45	<---	MT2	.712	.035	18.548	***	
MTQ20	<---	MT2	.655	.034	16.347	***	
MTQ4	<---	MT2	.678	.040	17.203	***	
MTQ19	<---	MT2	.723	.033	18.962	***	
MTQ44	<---	MT2	.717	.035	18.723	***	
MTQ3	<---	MT2	.718	.033	18.785	***	
MTQ8	<---	MT2	.781	.032	21.560	***	
MTQ6R	<---	MT1	.518	.045	11.818	***	
MTQ21R	<---	MT1	.496	.043	11.216	***	

Furthermore, Brown (2006) advised looking at the localized ill fit in the solution as an additional check on the model fit, since most of the main fit indices (e.g. SRMR, RMSEA and CFI) provide a global descriptive indication of the ability of the model to reproduce the observed relationships among the indicators in the input matrix. Standardised residuals are useful statistics which can help to overcome this doubt. As suggested by Brown (2006) a standardised residual at a value of 1.96 or higher would indicate that there exists significant additional covariance between a pair of indicators that was not reproduced by the model's parameter estimates. Therefore, the standardised residual table was examined for any values greater than 1.96 to determine localised strain. There were no localised strains for this model, as all the values were lower than the upper threshold of 1.96.

Check for Common Method Bias

Common method bias is common in behavioural research (Podsakoff et al., 2003). It refers to a bias in a data set due to something external to the measure that may have influenced the response given. This type of bias can occur in a self-administered questionnaire which collects data using a single (common) method, such as a survey. A study that has significant common method bias is one in which a majority of the variance can be explained by a single factor. Therefore it was worth checking whether any common factor which is beyond the latent variables influences the factors. To check this, Common Latent Factor (CFL) was tested (Podsakoff et al., 2003). CLF is a method which can capture common variance among all the observed variables in the model. In this method, the researcher should add a new latent variable to the model and connect it with all the observed variables and run the model estimation. The standardised regression weight table of this model with CLF should be compared with the standardised regression weight table of the original model without the CLF. If there are large differences (greater than 0.200), then it suggests the data set has a common method bias problem (Gaskin 2016). In the current study, this test was administered, and there were no value differences which met the 0.200 threshold (See Appendices 3.14 for the regression weight table of the model with the CLF). All the values just differed from the original model without CLF, there did not appear to be common method bias.

3.2.3.2.5 Internal Validity and the reliability of the RIM scale based on the CFA

The next step was to test the convergent validity, discriminant validity and the reliability of the finalised scale which contains three factors, 42 items. For these tests, a few measures which are widely used in SEM were used. Those were composite reliability also known as construct reliability (CR), Average Variance Extracted (AVE) and Maximum Shared Variance (MSV). Another way of measuring reliability is calculating Maximal Reliability (Max R /*H*) which introduced by Hancock and Mueller (2001). The threshold for the each is measure given below.

Reliability - CR> 0.7 (Hair et.al, 2010)

Max R (H)>0.8 (Hancock, & Mueller, 2001)

Convergent Validity - AVE > 0.5 (Hair et.al, 2010)

Discriminant Validity - MSV < AVE (Hair et.al, 2010)

These measures (CR, AVE, MSV and *H*) were calculated using an online calculator provided by the 'Statwiki' website (Gaskin, 2016). This calculator has been created using formulae, which have been developed by Raykov (1997); Hancock and Mueller (2001).

The calculation table for above measure is presented below (Table 3.20).

Table 3.20

Values of CR, AVE, and MSV for reliability and validity calculations

	CR	AVE	MSV	MaxR(H)	Resilience	MTN(MT1)	MTP(MT2)
Resilience	0.975	0.668	0.317	0.980	**0.817**		
MTN	0.879	**0.404**	**0.692**	0.983	0.512	**0.636**	
MTP	0.917	0.503	**0.692**	0.986	0.563	0.832	**0.709**

Please note that factors 2 and 3 have been renamed as MTN (MTQ1) and MTP (MTQ2) as this formula does not operate with variable names with numbers

The validity and the reliability for each of the factors of the new scale shown in the above table is reported below.

3.2.3.2.6 Convergent validity

One way of confirming convergent validity is to look at the factor loadings of the model estimation (Brown, 2006) which is represented by Average Variance Extracted AVE. For a scale to obtain convergent validity AVE should be greater than 0.5 for each scale. According to the Table 3.20 the resilience sub scale obtained 0.668 while the MTP obtained 0.501. So, both these sub scales/factor achieved convergent validity. However, there is a convergent validity issue with factor 2 which is MTN (MTQ1) as it did not meet the 0.5 criterion (AVE = 0.404). This issue could not be resolved by removing items, combining items or co-varying the error terms. It is worth noting that AVE is considered as a strict method of measuring convergent validity. Malhotra and Dash (2011, p 702) argued that "AVE is a more conservative measure than CR. On the basis of CR alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error." Furthermore, Garson (2012) said one rule of thumb for determining convergent validity is that factor loadings < .40 are weak and factor loadings ≥.60 are strong (Garson, 2012). All factor loading of EFA were greater than .5 and for CFA were greater than.48. Based on these recommendations the AVE for MTN, which is .404, can be considered as a borderline AVE value. Thus, it was decided to consider that MTQ1 (MTN) has convergent validity.

3.2.3.2.7 Discriminant validity

As detailed in Table 3.20 Maximum Shared Variance (MSV) for Resilience was within the acceptable level for discriminant validity as AVE (0.668) was greater than MSV (0.317). MTP (MTQ2) also met this criterion, as AVE (0.692) was greater than MSV (0.503). However, MTN (MTQ1) demonstrated a problematic situation in discriminant validity, which means variables in the factor correlate more with variables outside their parent factor than with the variables within their parent factor; i.e., the latent factor is better explained by some other variables (from a different factor), than by its own observed variables (Hair et.al 2010). It is also obvious that the correlation between MTN and MTP is very high (r = .83). It should be noted that both MTN and MTP factors were derived from MTQ48 scale and reverse worded items were loaded onto the same factor, despite re-coding them prior to factor analysis. This may be under the influence of reverse worded items (Zhang, 2016). The problem with RW items is reflected in the discriminant validity. This will be further discussed in the discussion section (3.3.3.2).

Resolving the discriminant validity issue

To resolve this issue another CFA tactic was used. This was to create a second order latent factor combining MTN and MTP. Figure 3.6 shows a new path diagram with the second order factor. A CFA model with this new second order latent variable combining MTN and MTP was run and resulted in significant improvement of all the fit indices, including X^2. The following table (3.21) outlines the values of each fit indicex.

Table 3.21

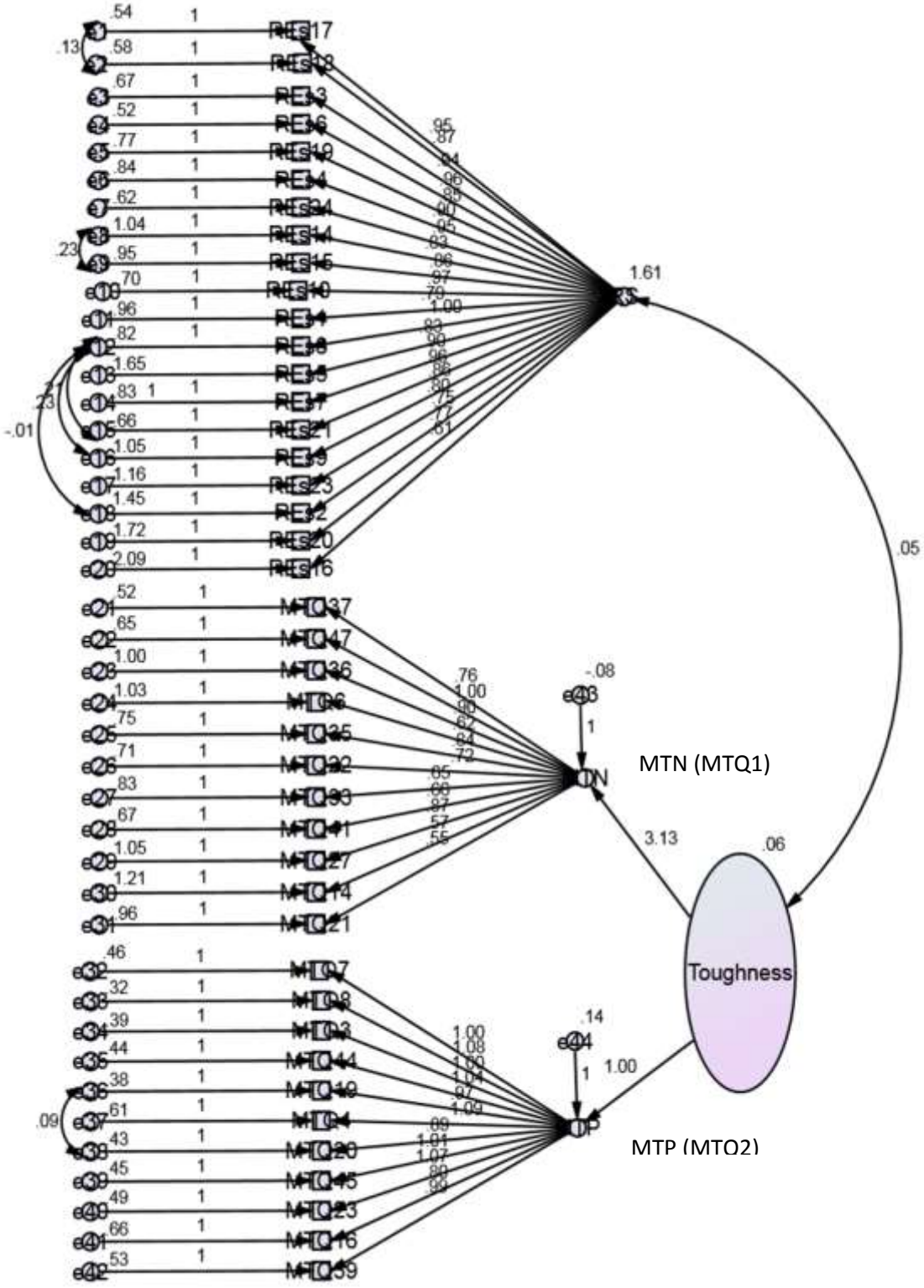
Values of fit indices of second order latent value model

Indices	Code	Criteria	Obtained value for Second order model
Absolute/predictive fit X^2/df	**X^2/df**	< 5	1.85
Normed Fit Index	**NFI**	>.90	0.86
Root Mean Square of Approximation	RMSEA	< 0.05	0.04
p of Close Fit	PCLOSE	>0.05	1.00
Comparative Fit index	CFI	≥0.95	0.93
Tucker Lewis Index or Non-normed Fit Index	TLI	≥0.90	0.92
Bayesian Information Criterion	BIC	Lowest for the model	√
Parsimony–adjusted NFI	PNFI	>0.05	0.82
Parsimony-adjusted CFI	PCFI	>0.05	0.87
Hoelter Index (.05)	HOELTER	>200	276

This resolves the discriminant validity issue regarding the MTN factor and gives a better solution for the model. Brown (2006) note that any correlation greater than 0.80 is considered as non-discriminant. The correlation between main two factors in the new second order model is 0.15 and this confirms the discriminant validity of the factor model. With this new improvement, the final scale would consist of two main sub scales, one for resilience and one for mental toughness.

Figure 3.6:

Second order latent value model (Combining both MTQ factors to 1 latent factor)



3.2.3.2.8 Reliability of RIM

The reliability of the finalised RIM model was tested using Composite Reliability (CR). Hair et al. (2010) noted that a CR value greater than 0.7 confirms the reliability of the measure. Both sub scales obtained Composite/Construct reliability values well above the lower threshold (Resilience 0.98, Toughness 0.89). This reconfirms the internal consistency of the new scale.

Figure 3.7 outlines the items selected for the RIM which will be used to measure pre-enlistment resilience level of the military candidates in Sri Lanka.

Figure 3.7

Items in the RIM final scale

Resilience sub scale
My belief in myself gets me through hard times
In an emergency, I am someone people generally can rely on
I am able to depend on myself more than anyone else
I feel proud that I have accomplished things in my life
I have enough energy to do what I want to do
I am friends with myself
Keeping interested in things is important to me
My life has meaning
I can usually look at a situation in a number of ways
I am determined
Usually I take things in stride
I keep interested in things
When I make plans I usually go through with them
I have self-discipline
I feel that I can handle many things at a time
When I am in a difficult situation, I can usually find my way out of it
I usually manage one way or other
I can be myself if I have to
Sometimes I make myself do things whether I want to or not
I can usually find something to laugh about

Continued figure 3.7

Mental Toughness Sub scale
When I am feeling tired I find it difficult to get going
When I face setbacks I am often unable to persist with my goal
When I make mistakes I usually let it worry me for days after
Unexpected changes to my schedule generally throw me
I usually find it difficult to make a mental effort when I am tired
I am easily distracted from tasks that I am involved with
Things just usually happen to me
I feel that what I do tends to make no difference
I tend to worry about things well before they actually happen
I often wish my life was more predictable
I generally find it hard to relax
I don't usually give up under pressure
I am generally confident in my own abilities
I generally feel that I am a worthwhile person
I usually enjoy a challenge
I can generally be relied upon to complete the tasks I am given
Challenges usually bring out the best in me
I usually take charge of a situation when I feel it is appropriate
I can usually control my nervousness
I generally cope well with any problems that occur
I generally look on the bright side of life
I can normally sustain high levels of mental effort for long periods

Composite scores were created for the two subscales and the total scale of RIM based on the mean of the items which had the primary loading on each factor. Skewness and the kurtosis for the scale were well within a tolerable range suggesting a normal distribution. Scores were negatively skewed, and that suggest military sample in this study scored higher in resilience and mental toughness than expected in a normal population. Correlation between the two sub scales was moderately significant (r = .086 n =935, p =0.01).

3.3. Discussion

The first study aimed to develop a screening tool to assess pre-enlistment psychological factors likely to impact on military well-being and performance. To meet this objective, a tool was developed combining both risk and protective factors. Then a cross sectional survey study was conducted to validate this tool with 960 junior military officers, representing all three forces in Sri Lanka. Data were analysed using appropriate statistical programmes. Both EFA and CFA were used in the validation processes. The following section discusses the results and findings of this study.

3.3.1 Pre-enlistment risk factors in military officers in Sri Lanka and their relationship

Pre-enlistment risk factors such as childhood adversities, antisocial behaviour patterns, suicidality, history of mental health problems, traumatic experiences were tested using a self-reporting method in the current study. Initial descriptive correlational analysis showed that there were significant correlations among the risk factors. Especially, childhood adversities and absence of parents were highly correlated with other risk factors such as diagnosed with mental health issues, suicidality, and anti-social behaviours. These findings are compatible with previous literature which suggest childhood adversities, pre-trauma experience, and pre-enlistment antisocial behaviours are linked with mental health issues in soldiers exposed to combat (Cabrera et al., 2007; Macmanus, 2012; Owens et al., 2009).

It was observed that responses to the risk factor scales had been influenced by social stigma. Especially, compared to adversity and anti-social assessments, history of mental health issues was highly under reported. The vast majority of the sample (93.8%) did not answer this question and another 23% said that they “don’t know” whether there was a history of mental health problems in their family.

Underreporting has been addressed as a major issue in military research. Social stigma about mental health, childhood adversities, and antisocial behaviour appears likely to have influenced on this underreporting. These questions were asked in a self-reported

questionnaire and presented as direct questions to which respondents were asked to say "yes/no". They must have easily opted to say "no" as they did not want to give any more details about the dark side of their lives. Sri Lanka has a culture in which everybody seeks social acceptance, and they are very concerned about what others think of them. When it comes to the military context, which is rather judgmental, nobody wants to reveal that they have had a problematic background, or have suffered or are suffering from a psychological disorder. As reported in previous studies, military personnel think that treatment-seeking is socially unacceptable or asking for help is a sign of weakness or an admission of failure (Wright, Cabrera et al. 2009). Cabrera et al. (2007) further described that under-reporting of abuse and adversities is more common in males than females. Given the fact that the current study sample was from the military and nearly 95% male, this issue could be more relevant to this sample. Previous studies also have proved that accuracy of adult recall about adverse childhood experiences (e.g. abuse) can suffer from false negative and can be underreported. Garb et al. (2013) reported the same issue with regard to mental health problems in their study with a military sample.

Even though each risk factor scale obtained an acceptable reliability level, considering under reporting and the diversity of the concepts measured by each of these risk scales, these scales did not merge with the protective factor scales, but they were analysed separately instead.

3.3.2 Validation of individual protective scales

A Resilience scale, a Hardiness scale and a Mental Toughness questionnaire were used in the study to develop a comprehensive tool to assess the pre-enlistment protective factors. The level of hardiness, resilience and mental toughness seemed high in this military sample and scores for all three scales were negatively skewed, suggesting most of the respondents scored above the mean. Correlations among these scales confirmed that these concepts are related to each other and the hardiness and resilience scales are more related ($r = .27$, $p<0.01$) than hardiness and MTQ ($r = .16$, $p<.01$). The relationship between resilience and MTQ was weaker but still it was positive and significant ($r = .08$, $p < .05$).

These three scales measure slightly distinct resilience related personality characteristics of the individuals. Therefore, before putting them together, each scale was validated separately using the main sample of 960 officers to see any of these individual scales could used to assess protective factors by itself. None of the scales could replicate the same factor structure as the original scales. Details of those validations are discussed below.

3.3.2.1 Validity and reliability of RS25 in Sri Lankan military context

Even though the items of the resilience scale loaded onto two factors, as in the original scale, the factor structure was different. The original RS25 had 17 items in the frist factor and eight items in the second factor (Wagnild & Young, 1993) whereas the current study got 22 in the frist factor and only three items in the second factor. However, out of these three items, two represented the second factor of the original study. Two items (13, 25) did not meet the .5 benchmark and loaded with only .42 and 35 respectively. The differences in the number of factors obtained and loadings may have been influenced by the cultural connotation of the items. For example, item 25 which states, "It is ok if there are people who don't like me" is not culturally appropriate for the Sri Lankan context, as individuals in Sri Lanka seek social acceptance for their behaviours and are very concerned about what others think of them.

Previous studies on validating resilience scales have reported different numbers of factors. In contarst to the factor loadings of the current Sri Lankan study, validation of resilience scales done by Munasinghe (2012) with Sri Lankan adolescents reported five factors. Munasinghe reported that two items were disqualified but did not mentioned which items. Oladipo and Idemudia (2015) reported a 3-factor structure for RS25 in the Nigerian context. The Finnish version of RS also has reported an ambiguous factor structure (Losoi et al., 2013). The Japenese and the Russian versions of RS 25 and 14 confirmed the inconsistency of the RS factor structure (Aroian et al., 1997; Nishi et al., 2010).

Despite the inconsistency of factor structure, the Resilience scale obtained excellent internal consistency as measured by Cronbach's alpha ($\alpha = .94$) and was significantly correlated with the Hardiness scale ($r = .27$) and MTQ48 ($r = .16$) suggesting the concurrent validity of the scale. Internal consistency for the sub scales was not calculated as the original factor structure could not be sustained.

3.3.2.2 Validity and reliability of DRS15 in Sri Lankan Military context

Although, DRS15 claims to have three factors in it (Bartone, 1995) namely; Control, Challenge and Commitment, the current study finalised with a 4-factor solution, as it provided meaningful factors with minimal cross-loadings over the 3-factor solution. This factor solution concurs with Hystad et al. (2011) findings with a Norwegian military sample. Thirteen out of fifteen items obtained loading above the benchmark of .5. The two items that loaded below the value were items number 3 and 11, with .33 and .46 respectively. DRS also

reportedly has an inconsistent factor structure, according to previous studies. The Chinese version of DRS preserved a 3-factor structure, but with different items loading onto each factor compared to the original version (Wong et al., 2014).

In the present study, the Cronbach's alphas for the total Hardiness scale was just on the acceptable level (Cronbach's $\alpha = 0.65$). Although somewhat low, these reliability estimates are still comparable to estimates found in the literature, which are usually in the range of .6 to .8 (e.g. Bartone et al., 2008; Britt et al., 2001; Hystad et al., 2011; Hystad et al., 2015; Wong et al., 2014).

3.3.2.3 Validity and reliability of MTQ48

MTQ48 concluded with a 6-factor solution as with the original scale (Clough et al. 2007), but items were not always loaded onto the target factor. A factorial validity study on MTQ48 conducted by Perry et al. (2013) confirmed a 6-factor solution as the best fit model for MTQ48. Perry et al. (2013) further informed that the Control sub scale had low loadings and low internal consistency. Conversely, the current study observed that items from the Control sub scale and the Confidence sub scale were loaded with strong eigenvalues compared to the other sub scales. One explanation for this difference could be the relevance of Control and Confidence for military personnel. The variance explained by the data was 38%, and this was the same as original validation of MTQ48 (Keith, 2007).

The overall reliability of the MTQ48 for the current sample was Cronbach's $\alpha = 0.89$. Internal consistency for the sub scales was not calculated at this stage as there was not enough evidence to use the same factor structure in the Sri Lankan military context.

In conclusion for the validation of the individual protective scales, it is important to note that none of these individual scales was ready to use in their original form with their original factor structures. Instead, they need to be modified and adapted to Sri Lankan military context if someone wishes to use them alone. According to the objectives of the current study, it was needed to develop a succinct and comprehensive scale to assess pre-enlistment protective factors. To meet this objective, these three scales were merged and the best items selected and validated with a Sri Lankan military sample. The next section discusses that validation process and the outcomes of that study.

3.3.3 Validation of the Resilience Inventory for Military (RIM)

The split sample cross-validation method was adopted as per the recommendation on validation (*i.e.* Costello & Osborne, 2005; DeVellis, 2012). As a result, both EFA and CFA could be conducted with reasonably large samples. EFA was performed with a sample of 476 and CFA with 484. Converting scale scores into standardised (Z) scores prior to EFA helped to minimise the problems related to different rating scales and maximise the validity of the analysis by producing factor scores that were highly correlated with a given factor and to obtain unbiased estimates of the true factor scores (DiStefano et al., 2009).

EFA process

PCA was preferred over Common Factor Analysis in this factor analysis. There is an ongoing argument among researchers whether to use Principal Component Analysis (PCA) or Common Factor Analysis (Costello & Osborne, 2005). Some argue in favour of common factor analysis (i.e. Bentler & Kano, 1990; MacCallum & Tucker, 1991) while others say that researchesr can use either PCA or true factor analysis (Schoenmann, 1990; Steiger, 1990; Velicer & Jackson, 1990). However, PCA was the choice of preference for a few reasons. PCA is known as a good data reduction method (Costello & Osborne, 2005) which was the main objective of the EFA process in this study. PCA yields one or more composite variables that capture much of the information originally contained in a larger set of items Several principal component analyses (PCA) were performed to identify the possible latent variables (DeVellis, 2012).

3.3.3.1 Outcome of EFA process

As mentioned in the results section, a rigorous screening was carried out to select the best items. Even though a five-factor solution resulted in meaningful factor loadings, considering high standard EFA practices and criteria, the fifth factor which contained three items from Hardiness was removed. After removing items loaded with eigenvalue lower than .5, the scale ended with 47 items and a final PCA was performed with the selected 47 items requesting four factors. As portrayed in table 3.16, the 4-factor solution accounted for 47.16% of the total variance. It is important to notice that out of this total variance, 36% was explained by the frist[t] factor, which consisted only of Resilience items. The remaining 11.16% was distributed among the other three factors. Factor 2 comprised 11 MTQ items, factor 3 comprised another 11 MTQ items and factor 4 loaded with five Hardiness items. It was obvious that Resilience was the dominant factor and Resilience items were loaded with high values (.63 - .88). Even though the other three factors also loaded with good values (.5<) the

average of the communalities could not meet the criterion for the sample size of 0.6 (Field, 2009). The average was 0.47, and this was accepted, as the sample size was large (476).

The first three factors obtained excellent and good reliability values (Resilience, α = .96, MTQ1, α = .79 and MTQ2, α = .82). However, the forth factor, which was Hardiness, obtained only Cronbach's α = .62. This problem emerged during individual scale validation, where DRS15 obtained a marginal reliability of α = .65. This issue was not addressed at this point, as the newly developed tool was subjected to further purification with CFA.

3.3.3.2 Problem with RW items in MTQ48

All the items in factor 2 consisted of reverse worded (RW) items of MTQ. MTQ48 is presented in a mixed-worded Likert format. Twenty-two items of the 48 were RW items. Issues related to RW have been discussed in the recent literature as measurement confound (Wong et al., 2003; Weijters et al., 2013; Zhang, 2016). RW items in a mixed item scale such as MTQ48 have a tendency to be loaded onto a common factor as they share common rating methods which are not resolved by re-coding the scores. This problem may occur be due to the lack of understanding of respondents on how they should respond to these items in the middle of positively worded (PW) items. According to Weijters, et al. (2013) there are three sources of reversed item bias: acquiescence, careless responding to reversed items, and confirmation bias. Acquiescence and careless responding are expected to increase response inconsistency between PW and RW items, both acquiescence and careless responding contribute to inconsistency bias. Furthermore, Wong et al. (2003) proposed another three possible causes for RW problem. They are; (1) translation errors, (2) cross-cultural response biases, or (3) substantive cultural differences. The current study has taken every possible step to avoid translational errors by following appropriate translation and back translations steps. Therefore cross-cultural response biases and substantive cultural differences might have played a role here. Respondents tend to agree (acquiescence) or disagree (disacquiescence) with items irrespective of content. This can produce a low degree of correlation between PW and RW items. Wong et al. (2003) emphasised that the RW item issue is more obvious in the cross-cultural validation of scales and further exploration has found that this problem is common to both Western and Asian research literature. One possible way to minimise these issues is to offer RW items, not as statements but framed as questions. However, there is an ongoing discussion among researchers whether RW should be included in scales at all.

3.3.4 The CFA process and steps are taken to increase the accuracy

The 47 item scale that resulted from EFA was named as the Resilience Inventory for Military and brought forward to Confirmatory Factor Analysis. All the cutoff criteria for fit indices were set according to the previous literature and the recommendations of experts (i.e. Hu & Bentler, 1999; Kenney, 2015; Kline, 2005).

Several models were tested until the data met the cut off of fit indices. As modification indices did not help to improve CFA model fit, it was decided to remove the forth factor with five hardiness items which obtained lower reliability at the EFA level. This removal helped to achive a considerable improvement of all fit indices, including X^2.

Validity issues for the sub scales

Although there were no issues with the reliability of subscales measured using construct reliability (CR), according to Brown (2006), the MTN subscale could not meet the criterion for convergent validity which was assessed using AVE (AVE >.5). All possible steps were taken to resolve this issue by removing items, combining factors or co-varying the error terms and none of these improved the AVE value for MTN(MTQ1). Malhotra and Dash (2011) argued that having a satisfactory value for CR is enough to determine the convergent validity of a scale. They further state that AVE is a more strict and conventional way of measuring convergent validity. Furthermore, Garson (2012) put forward the idea that to determine convergent validity researchers should look at the factor loadings of individual items. He recommended that factor loadings < .40 are weak and factor loadings ≥.60 are strong. According to this argument, all the items in MTN subscale loaded with factor loadings > .40 (0.49-1.00). Based on these arguments and recommendations AVE for MTQ1 (.404) was considered as borderline and it was concluded that MTQ1 met the convergent validity requirements.

There was an issue with discriminant validity measured with MSV for MTQ1 (MTP) which means the variables of MTQ1 correlate more with variables outside its parent factor. A careful review of the related literature and methodological issues of the current study helped to get some insight into this issue. Both MTQ1 and MTQ2 were derived from the MTQ48 questionnaire and items loaded onto two different factors based on whether the items were positively worded or reversely worded. As described in the EFA section (3.2.2.2) RW items can cause a problem in EFA and CFA as they tend to load onto the same factor (Zhang, 2016) based on the rating method. This methodological issue was correctly reflected in the discriminant validity. It was also noticed that these two factors are highly correlated (r =.83)

as they come from the same parent factor. Considering these facts, it was decided to combine MTQ1 and MTQ2 into one parent factor and rerun the CFA model. Surprisingly, this single step improved all the important fit indices and resolved the issues with convergent and discriminant validity. The final values for all the fit indices reported in table 3.21 provide a clear justification for this decision.

As Hu and Bentler (1999) specified, a combination of cut off criteria of 0.9 for TLF, CFI and 0.5 or o.6 for RMSEA could minimise both Type I and Type II errors in research and increase the robustness of the findings. The final model achieved these requirements. Given the fact that the sample of the current study is 484, the data met criteria for robustness. Common method bias was also ruled out by using the appropriate test (Podsakoff et al., 2003).

3.3.5 Justification of the final model for RIM

The second order latent factor CFA model suggested combining the two factors that represented the MTQ48 scale on to one parent factor to resolve discriminant validity issue in the new scale. Theoretically, this combination makes more sense as the newly developed scale measures two different positive aspects of the pre-enlistment personality of the military candidates. The Hardiness factor had to be removed to improve the model fit. Hardiness was unstable from the beginning of the EFA, and it did not reach the required level of reliability (Cronbach's alpha = 0.65). Both English and Sinhala items in the Hardiness factor were interpreted carefully to see whether there is any theoretical compromise of deleting those items and there appeared to be no special reason to keep them. Another reason for this decision was the rating scale of the Hardiness scale. There is an ongoing discussion in the current literature about odd and even number Likert scales. Some argue for scales with odd numbers, as some respondents wish to sit on the fence. Hardiness is rated on a 4 point Likert scale in DRS 15 with the aim of forcing respondents to declare a clear stance. Maxell and Jacoby (1972) said that the decision of the number of points depends on the researcher's objective in the study. However, in the RIM scale, both Resilience and MTQ have odd number rating scales of 7 points and 5 points respectively. If an even number scale is included alongside these two odd number scales, respondents may be confused about the consistency. Therefore, removing the Hardiness subscale made the RIM scale less complicated and more straightforward. Those two sub scales obtained very good internal consistency (Resilience = 0.98, Toughness = 0.89). Thus, the 42 item RIM scales was carried forward to the predictive validity study described in the next chapter.

3.4 Chapter Summary

Section 3.1 presented the methodology used for the frist study conducted to develop and validate a screening tool to assess pre enlistment psychological factors of military personnel. The study used 960 junior military officers as its sample. A cross sectional survey method was used to collect the data. After initial descriptive and individual factor analysis, the total sample was split into two to employ for cross validation of the scale. The frist sample was used to exploratory factor analysis for item redundancy, and the second sample was utilised for the confirmatory factor analysis.

Section 3.2 outlined the results of the validation process of the RIM. None of the individual scales could preserve their original factor structures in the current military sample. Thus it was decided to merge these three scales into one and identify items which mostly explain the variables of the sample. EFA was conducted with 476 participants and suggested a 4-factor structure (47 items) for the new scale, which was named the Resilience Inventory for Military (RIM). Then a CFA was run using AMOS version 24 to confirm the factor structure suggested by the EFA with the other half of the sample (n= 484). CFA suggested dropping the forth factor, which represented Hardiness, due to its low reliability. CFA also preferred the model when the two factors from MTQ were combined under one parent latent factor. The final model met all validity and reliability requirements. This includes the face validity of having two separate factors derived from two different questionnaires. The final 42 items were then used in the second study, which is presented in the next chapter.

Section 3.3 discussed the results of the validation study, focusing on the key findings and issues. Overall the newly developed RIM demonstrated good validity and reliability, and therefore this can be used confidently in the Sri Lankan military context. The next chapter presents the second study conducted to test the predictive validity of this tool.

CHAPTER FOUR: STUDY 2 - PREDICTIVE VALIDITY STUDY OF RIM

4.0 Introduction

The Resilience Inventory for Military (RIM), developed by the analyses described in the previous chapters, is the first ever screening tool developed for Sri Lanka military. RIM was designed to measure the level of pre-enlistment resilience of military candidates. It consisted 42 items representing two subscales, namely, resilience and mental toughness. The overall expectation of this scale is to select psychologically resilient candidates for military services. All aspects of internal validity of RIM (face and content validity, construct validity, discriminant and convergent validity) were established in the first study, and it demonstrated a very good level of reliability. However, the external validity (predictive, convergent, discriminant validity) of the tool was yet to be established. Predictive validity is crucial to convince the military authorities to use this tool in the recruitment process. For this reason a longitudinal predictive validity study was designed for this purpose.

There were a few predictions of RIM. It was predicted that those who scored high on RIM scale would complete the basic military training successfully. If they were resilient, they also should be able to adjust to the military organisational structure well. Another prediction of resilience is concerned the psychological well- being of the trainees. Therefore the individuals who score high in resilience should have lower psychological issues or should score low in mental health assessments. Prevention of attrition in the military was another objective of developing RIM scale which means it should be able to predict those who leave the service prematurely. A longitudinal study was designed to test all these predictions.

This chapter discusses the aims, methods, procedure and the results of the predictive validity study. Methods and the procedure will be presented in section 1, and the results will be reported in section 2.

4.1 Methods and procedures

4.1.1 Aims of the study

The aims of the study were:

- to determine the extent to which the Resilience Inventory for Military (RIM) predicts military training success and adjustment to the service
- to determine whether RIM can predict psychological well-being of the trainees

- to explore the relationship between pre- enlistment risk factors and training success and psychological well-being

4.1.2 The sample

Cadet trainees who were in training at that time of the study in all three forces were the target population for this study. The inclusion criteria for this sample were an officer cadet, with at least six months to go before the completion of the training, to allow six-month follow-up. One hundred and forty-seven trainees were tested using the RIM and other demographic and risk assessment questionnaires during October, November and December 2015. Of these 39.5% (n=58) were Army cadets, 58 39.5% (n=58) were Navy cadets while 21.1% (n=31) represented the Airforce. Only 2.7% (n=4) were female. These trainees were monitored for six months for their training performance, and the predictive criterion was tested at the end of the six months period (June- July 2016).

At the stage of the data collection for the predictive variables after 6-7 months, out of 147 total trainees surveyed in the first stage, only 118 questionnaires were returned. This may have been because of the unavailability of the trainees due to personal or training reasons. Out of those 118 who responded, 25 (21%) questionnaires were removed from the study as they were either incomplete or not from respondents who originally participated in the previous study. Hence, only 93 cadet trainees were included in the second stage of the study. Of these, 55.9% (n=52) were from the Navy, 23.7% (n=22) were from the Army and the other 20.4% (n=19) were from the Airforce. Therefore these 93 trainees were considered as the final sample for the predictive validity study. Academic performance and other archival information such as examination results were collected only from navy cadets, due to the practical difficulties of obtaining archival information from Army and Airforce training sections.

4.1.3 Measures

The predictor variables in this study were the RIM (standardised) scores and scales for vulnerability factors (ASB, childhood adversities, PCL and suicide intention). The dependent variables were: newcomer adjustment scale (NCA18); turnover intention scale (TIS6); training satisfaction questionnaire (TS8); and general health questionnaire (GHQ 12). These will be described next.

4.1.3.1 The criterion/ independent variables

The RIM (42 items) was considered as the main criterion variable of this study. A questionnaire for demographic data and the pre-enlistment risk factors, which was used in the previous study, was also administered to collect other criterion data. This includes sub -

tests for childhood adversities, antisocial behaviour patterns, history of psychological disorders of the trainee and or the family, suicidal thoughts and attempts of the trainee and or the family, the PTSD checklist (short version). These subscales are detailed above in chapter 3 (3.1.1.1)

4.1.3.2 Dependent variables

4.1.3.1.1 Newcomer Adjustment Scale

Newcomer Adjustment/ Learning was measured using the 18 items developed by Thomas and Anderson (2014). This scale has three main domains: role learning, social learning and organisational learning. This measure is considered as the most parsimonious and least occupationally specific newcomer learning scale (Thomas & Anderson, 2014). Items are rated on a 7 point Likert scale from 1 "strongly disagree" to 7 "strongly agree". Examples of items included in newcomer adjustment scale are; "I understand how to perform the tasks that make up my job?" and "Most of my co-workers have accepted me as a member of this company". As reported by Kenny at el. (2014) internal consistency for each domain of the newcomer learning measure fall between $\alpha = 0.77$ to .90. Here, this scale had a Cronbach's alpha coefficient of 0.91.

4.1.3.1.2 Turnover Intention Scale

Turnover intention (the intention to leave or stay) was assessed using a six-item Turnover Intention Scale (TIS-6) validated by Bothma and Roodt (2013). This is the short version of the original 15 item scale which was developed by Roodt (2004). Authors suggest that TIS-6 can be used as a reliable and valid scale to assess turnover intentions or to predict actual turnover (Bothma & Roodt, 2013). Items number 1, 3, 4 and 6 of the scale are rated on a five point Likert scale from 1 "never" to 5 "always". Item number 2 which is a reversed item, has a five point scale from 1 "to no extent" to 5 "to a very large extent". Item number 5 was assessed on another five point Likert scale, from 1 "highly unlikely" to 5 "highly likely".

Examples of items included in the TIS-6 are: 'How often have you considered leaving your job?' and 'How often do you look forward to another day at work?' TIS-6 seems to have good internal consistency; Bothma and Roodt (2013) reported a Cronbach alpha coefficient of 0.81 for the 6-item version of the TIS. Jacobs (2005) reported a Cronbach alpha coefficient of 0.91 for the 15-item version of the TI scale. Here, the Cronbach's alpha coefficient was 0.76.

4.1.3.1.3 General Health Questionnaire

GHQ 12 was used as the measure of psychological well-being of the cadet trainees. The General Health Questionnaire (GHQ) is a self-administered questionnaire widely used to

detect potential nonpsychotic psychiatric disorders. The original questionnaire consists of 60 items, but subsequently, 30, 28 and 12 item versions have been derived from it. These are used globally. GHQ 12 has been validated for many countries, and claims to have 2-3 factor solutions. GHQ 12 has been validated in the Sri Lankan population (Sinhala language) by Abeysena et al. (2009), where the internal consistency of GHQ-12 was 0.88. This Cronbach's alpha value was the same for the total sample for all subgroups in terms of sex, age and educational level in the original validation study of GHQ12 Sinhala version (Abeysena et al., 2009). Here, in this study the Cronbach's alpha was 0.78.

4.1.3.1.4 Academic performance during the training

One indicator of the success of training is how trainees have performed in their academic courses, which include both theory and practical examinations. Therefore average of academic performance at the exams was collected for further analysis. However, the full record was obtained only for the 28 trainees of the 54th Cadet Batch of the Navy, who had completed the three years training. Only frist year examination results were available for the 56th batch**.**

4.1.3.1.5 Subjective training satisfaction and attitudes toward training staff

Training satisfaction and attitude toward training and staff could be crucial factors for a military recruit as they may play an important role in adjustment to the military. A questionnaire was developed to assess the satisfaction level of the trainees and their attitudes towards the training staff and environment considering the military training context. This variable included eight items, and the first item was a global measure of overall job satisfaction. According to previous research, this is a single item scale which measures global rating of overall job satisfaction (Thomas & Anderson 2002; Sackett & Larson, 1990; Scarpello & Campbell, 1983). The single item "How satisfied are you with the decision you made to join with military/" was rated on a 1-5 scale from "not satisfied at all" to " fully satisfied".

To compensate the limitations of single item scales (Wanous, Reichers & Hudy, 1997), seven more items were included in the satisfaction scale. Those were on trainees' satisfaction with overall training quality, knowledge and practical skills, perceived quality of the relationship with the training staff and the peers, health condition during the training and the facilities provided during the training (sleep, food, accommodation, and equipment). To be consistent with the single item rating, the other seven items in this scale were also rated on a 5 point Likert scale from "not satisfied at all" to "fully satisfied". Examples of the items in this scale "how satisfied are you with the quality of the relationship you had with your

training staff and other rankers?" and "how satisfied are you with the knowledge you gained through the training?"

The GHQ-12 already exists in Sinhala. NCA-18 and TIS-6 were translated into Sinhala then back into English, following the procedure already described for the resilience questionnaires. The satisfaction scale was developed in English and translated into Sinhala and examination scores were obtained from the training officers' records.

4.1.4 Procedures

4.1.4.1 Data collection

At the frist stage, data were collected using the full scales (then scores for RIM 42 items were derived from that), demographic data, pre-enlistment vulnerability sub scales (ASB, PCL, childhood adversities, psychological disorder, suicidal attempts and thoughts). The cadet trainees were given an information sheet at the initial data collection point, which stated that their performance would be monitored and they needed to participate in the second study after six months. All the participants explicitly expressed their informed consent for the study and the follow-up. Therefore they were asked to put their official number on the top of the questionnaire as identification. If they felt uncomfortable with being monitored and participating in the second study, they could decide not to participate without any negative consequences. They were asked to complete the survey at one time while the researcher was available for any clarification. When they completed the questionnaire, it was sealed in an envelope and handed over to the researcher. Data collection was completed during October-December 2015.

Behavioural outcomes should be measured within a reasonable timeframe after accepting a position within an organisation. Based on Muliawan et al., (2009), this study used a 6-7 month period.

The second stage of the data collection was done remotely with the help of the training staff and counselling officers of the each military service; the researcher could not attend this stage due to practical issues. Training officers were asked to distribute the questionnaire among the trainees for them to complete in their own time and return it to the training staff in a sealed envelope. In this way, respondents were given freedom to take their own time and minimise the influence of the presence of training staff. Data collection was done during June-July 2016.

4.1.4.2 Procedures - Statistical analysis

Data cleaning and tabulation were carried out same as with the frist study. Descriptive data analysis and simple correlation methods were employed to get an idea of relationships within outcome variables and between outcome and predictive variables.

Hierarchical multiple regression (MLR) analysis was carried out to see the contribution of predictive factors to the outcome variables. Risk factors (childhood adversities, PTSD symptoms, anti-social behaviour patterns, and history of psychological disorder) and protective factors (the resilience and mental toughness measured by the newly developed tool) were considered as the independent variables, whereas the NCA, TIS, training satisfaction and GHQ were considered as the dependent variables in this study. RIM was entered in the frist block of the MRL, and all the other predictive variables entered in the second block. Reasons for this decision are explained in the results section (4.3.6.1).

Approval for the study was obtained from the Ministry of Defence and each military service. The informed consent form was signed by the each participant before the survey.

4.2 Results of the predictive validity study

4.2.0 Introduction

Hierarchical multiple regression analysis was carried out to see the contribution of predictive factors to the outcome variables. Risk factors (childhood adversities, PTSD symptoms, anti-social behaviour patterns, and history of psychological disorder) and protective factors (the resilience and mental toughness measured by the newly developed tool) were considered as the independent variables whereas the NCA, TIS, training satisfaction and GHQ were considered as the dependent variables in this study. The following sections describe the descriptive statistics, regression analyses and their outcomes.

4.2.1 Characteristics of the respondents

One hundred and forty-seven trainees were entered into this study after testing using RIM and other demographic and risk assessment questionnaire during October November and December 2015. However, after six months, only 93 Cadet Trainees completed the outcome measures. Of these, 55.9% (n=52) were Navy cadets representing two training cohorts (54th and 56th), another 23.7% (n=22) were Army cadets representing two training cohorts (83rd and 84th) and 20.4% (n=19) represented the Airforce (58th cohort). There were only two female respondents. Respondents' mean age was 21.5 years (SD = 1.58). As all of them were cadet trainees their minimum level of education was GCSE Advanced Level. Five respondents had achieved diploma level qualifications. All the participants were unmarried.

4.2.2 Scores for the predictive measures

The main predictive measure of this study was the RIM score of the cadet trainees which was tested six months before the second study. As the first study used the full scales before validating scores for the selected items, after validation the two validated subscales were extracted from the main data file from study 1, for each cadet trainee. The mean score for the resilience factor of cadet trainees was 109.62 (SD = 23.66) while the mean score for the mental toughness factor was 75.95 (SD = 8.72). These scores were standardised before entered into the second study, to minimise the influence of two different point scales.

Another predictive variable/ measure for this study was the anti-social behaviour patterns of the trainees prior to the recruitment. Anti-social behaviour was assessed with eight true/false items. The mean number of yeses for this sample was 1.48 (SD = 1.67). However, it is worth noting that 38.7% (n = 36) scored 2 or more points on the ASB scale. Raw scores were converted into two categories, ASB positive and ASB negative, based on Felitti et al. (1998). By this criterion 20.4% (n=19) were ASB positive.

Pre- enlistment trauma was measured using the PCL short version, and in this sample the mean score was 9.5 with a standard deviation of 3.75. According to the scale authors, an individual can be screened positive if the sum of these items is 14 or greater. The sample was categorised into two categories based on this criterion as PTSD positive and PTSD negative. There were 11.8% (n = 11) respondents who fell into the PTSD positive category.

The next predictive variable was suicidal thoughts and attempts. Ninety-two respondents completed this. Raw data were categorized into two categories: no suicidality, and one or more events. Forty-one per cent of respondents had some suicidality, of whom 9.7% (n=9) reported more than two events.
Only 8.6% (n=8) reported a history of psychological disorders, so this variable was not going to be a useful predictor.

Childhood adversity was measured using an 8 item scale. Only 11.8% (n = 11) had been away from their mother more than six months, and 15.2% (n = 14) had been away from their fathers for more than six months. Only two respondents (1.4%) reported living with a mentally ill person, while 10 (6.8%) reported living with a problem drinker. Twenty-three respondents (25%) had experienced one or more abuses as a child. Three people did not answer this question. Scale responses were categorised into, no adversity reported and at

least one adversity reported. Twenty-five respondents (26.9%) have had at least one of the adversity experience as a child.

4.2.3 Results of the Outcome variables

The results of all outcome variables; Newcomer Adjustment, Turnover intention, Subjective training satisfaction, General health questionnaire and examination performance are presented in table 4.1.

Skewness and kurtosis values confirmed the normal distribution of the data. Academic performance of the trainees was obtained only from navy cadet sample due to problem of access to army and airforce records. The subjective training satisfaction scale which included a single item overall job satisfaction scale, was analysed separately to see participants' general satisfaction with the job so far, and the mean score was 3.73 (SD = 1.10, n = 92). Scores ranged from 1 to 5. Raw GHQ scores were converted to standard GHQ scoring format (0, 0, 1, 2), then totalled for each respondent. The reliability of each scale was also measured using Cronbach's alpha and obtained good-to excellent reliability, ensuring the safe use of these scales in the Sri Lankan military context.

Table 4.1

Results of the Outcome variables

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis		Reliability Cronbach's alpha
							Statistic	Std. Error	Statistic	Std. Error	
TotalNCA	93	47	77	124	103.74	8.876	-0.201	0.25	-0.172	0.495	0.91
TotalTIS	92	19	6	25	14.39	4.065	0.556	0.251	-0.243	0.498	0.76
TotalTSAT	92	40	13	53	38.17	7.875	-0.191	0.251	0.01	0.498	0.91
TotalGHQ	92	9	0	9	2.93	2.301	0.275	0.251	-0.715	0.498	0.78
ExamscoreAve average Exam scores	53	18.79	54.23	73.02	63.7166	4.4218	0.114	0.327	-0.276	0.644	

Differences between the three military services

To check whether there were any statistical differences between means of these outcome variables in terms of military services a one way ANOVA was conducted. As shown in table 4.2, mean GHQ is significantly different for at least one military group (F=4.51, p< 0.05). Means of none of the other scales were different for military groups. Comparison of the mean for examination score could not be obtained as the army and air force data were missing.

Table 4.2

Mean differences among military services

			Sumof Squares	df	Mean Square	F	Sig.
TotalNCA * MService Military Service	Between Groups	(Combined)	434.541	2	217.270	2.870	.062
	Within Groups		6813.265	90	75.703		
	Total		7247.806	92			
TotalTIS * MService Military Service	Between Groups	(Combined)	24.528	2	12.264	.738	.481
	Within Groups		1479.385	89	16.622		
	Total		1503.913	91			
TotalTSAT * MService Military Service	Between Groups	(Combined)	338.643	2	169.322	2.841	.064
	Within Groups		5304.574	89	59.602		
	Total		5643.217	91			
TotalGHQ * MService Military Service	Between Groups	(Combined)	44.275	2	22.137	4.505	.014
	Within Groups		437.334	89	4.914		
	Total		481.609	91			

a. Fewer than two groups - statistics for ExamscoreAve average Exam scores * MService Military Service cannot be computed.

4.2.4 Correlation between predictive variables and outcome variables

Before multivariate analysis, first order correlations were calculated between all predictor and outcome variables. RIM was correlated with most outcome variables, as shown in Table 4.3, NCA (r=0.38), turnover intention (r=-0.43), training satisfaction (r=0.42) and GHQ (r=-0.40), but not with academic score (r=0.20).

Childhood adversity was one of the main risk factors looked at in this screening tool. Categorized adversity data were positively correlated with GHQ12 scores (r = .24, $p < .05$, n = 89 non parametric). Individuals who had experienced childhood adversities scored high on GHQ 12, indicating a threat to their psychological well-being. However none of the other outcome measures correlated with childhood adversities in this cadet sample.

Suicidal acts and thoughts was another risk factor included in the screening tool. However none of the outcome measures were correlated with suicide acts and thoughts.

PTSD was correlated with total GHQ (r = .22, p < 05, n = 92). Antisocial behaviour patterns were not correlated with any outcome measures.

4.2.5 Correlation among outcome measures

There were some strong correlations among outcome measures. Total newcomer adjustment scores were strongly negatively correlated with turnover intention (r = -.62, $p < 001$, n = 92). Cadets who had adjusted well into the service had no intention to leave the service and vice versa. NCA was positively correlated with subjective training satisfaction (r = .50, $p < 001$, n = 92). Those who were satisfied with the aspects of training also had adjusted to the service culture or vice versa. Correlation between NCA and GHQ also was significant (r = -.49, $p <$ 001, n = 92). Turnover intention was negatively correlated with training satisfaction (r = -.58, $p < 001$, n = 92) while turnover intention scores were positively correlated with GHQ scores (r = .48, $p < 001$, n = 92).

Table 4.3
Correlations among predictive and outcome variables

		NCA	TIS	TSAT	GHQ	Average Exam scores	PTSD positive	Suicide cat	Childhood adversity	ASB cat	RIM composite
NCA	Pearson Correlation	1	**-.62****	**.50****	**-.49****	.08	-.023	.03	-.03	**.21***	**.38****
	Sig. (2-tailed)		.000	.000	.000	.580	.825	.794	.797	.045	.000
	N	93	92	92	92	50	93	92	90	93	91
TIS	Pearson Correlation	**-.62****	1	**-.58****	**.48****	-.15	.05	.03	.08	-.12	**-.43****
	Sig. (2-tailed)	.000		.000	.000	.297	.655	.747	.449	.300	.000
	N	92	92	92	92	50	92	91	89	92	90
TSAT	Pearson Correlation	**.50****	**-.58****	1	**-.52****	.28	-.06	.11	.03	.23*	**.42****
	Sig. (2-tailed)	.000	.000		.000	.050	.573	.308	.787	.028	.000
	N	92	92	92	92	50	92	91	89	92	90
GHQ	Pearson Correlation	**-.49****	**.48****	**-.52****	1	-.05	**.22***	-.20	**.22***	**-.30****	**-.40****
	Sig. (2-tailed)	.000	.000	.000		.756	.039	.057	.043	.003	.000
	N	92	92	92	92	50	92	91	89	92	90
Average Exam	Pearson Correlation	.08	-.15	.28	-.05	1	-.02	.19	-.00	.^{c}	.13
scores	Sig. (2-tailed)	.580	.297	.050	.756		.910	.169	.985	.000	.360
	N	50	50	50	50	53	53	52	51	53	53

Continued table 4.3

ptsdpositive	Pearson Correlation	-.02	.05	-.06	**.22***	-.02	1	.04	.11	**.19***	.16
	Sig. (2-tailed)	.825	.655	.573	.039	.910		.658	.189	.024	.058
	N	93	92	92	92	53	147	146	143	147	142
suicidecat	Pearson Correlation	.03	.03	.11	-.20	.19	.04	1	-.14	**.40****	.11
	Sig. (2-tailed)	.794	.747	.308	.057	.169	.658		.103	.000	.195
	N	92	91	91	91	52	146	146	142	146	141
Childhood	Pearson Correlation	-.03	.08	.03	**.22***	-.00	.11	-.14	1	-.00	.00
adversity	Sig. (2-tailed)	.797	.449	.787	.043	.985	.189	.103		.992	.984
	N	90	89	89	89	51	143	142	143	143	138
asbcat	Pearson Correlation	**.21***	-.11	.23*	**-.30****	.[c]	.19*	**.40****	-.00	1	.08
	Sig. (2-tailed)	.045	.300	.028	.003	.000	.024	.000	.992		.346
	N	93	92	92	92	53	147	146	143	147	142
RIM	Pearson Correlation	**.38****	**-.49****	**.42****	**-.40****	.13	.16	.11	.00	.08	1
ZComposite	Sig. (2-tailed)	.000	.000	.000	.000	.360	.058	.195	.984	.346	
	N	91	90	90	90	53	142	141	138	142	142

Correlation is significant at the 0.01 level (2-tailed)**

Correlation is significant at the 0.05 level (2-tailed).*

Cannot be computed because at least one of the variables is constant.c

4.2.6 Can RIM and other pre-enlistment risk factors predict military well-being and successfulness in training?

The main objective of the predictive validity study was to determine whether the pre-enlistment factors assessed by RIM and the other risk scales can predict military well-being and training successfulness measured using five outcome measures (NCA, TIS6, TSAT, examination scores and GHQ12). These outcome measures were considered as the dependent variables, and the criterion/predictive variables were considered as the independent variables in this analysis. A series of multiple linear regression (MLR) was conducted to help determine whether the predictor variables could be used to predict military well-being and training success and to find out which predictive variable is the best predictor of the outcome measures. Separate MLRs were conducted to test each outcome measure/ dependent variable. A preliminary linear regression was employed before MLR to determine the contribution of demographic variables to models. None of the demographic variables had a significant influence on the models. This may be due to the homogeneity of the sample, as all cadet trainees shared common demographic features. All of them were aged between 18 and 25 years, and their education level was A-Levels. It was impossible to consider gender as a moderating factor as this sample had only four female respondents. Therefore none of the demographic variables was included into the hierarchical models conducted afterwards. However, the absence of the effect of demographic variables strengthened the effect of the regression models.

Determinants of the regression model

Before deciding the order of entry in the hierarchical MLR model, a simple linear regression was performed entering risk factors together to see the contribution of risk factors to each outcome variable model and it was found that none of them had any significant influence on any of the models. With that insight and because this research aimed to produce a usable predictive questionnaire, rather than to understand what pre-enlistment risk factors predict military performance, for all the regression analyses conducted in this study, RIM was entered in t first block, then the other predictor variables in block two. This ensured that variance explicable by RIM would not be attributed to other predictor variables. Another reason for this approach was that there are issues with the veracity of self-reported risk factors, which may be reduced with a standard 'personality' questionnaire. It was important to see the contribution of RIM as it was newly developed through the frist study while other predictive variables were already available. Therefore it was important to determine the contribution of the RIM in this study. Also, as reported in section 4.3.8 RIM scores were

strongly correlated with all the outcome measures compared to the other predictive variables. Due to these reasons, RIM was entered first and other variables entered in the second block, but without any specific order. There was a possibility that entering RIM first may leave little to be predicted by the other variables. Still, this order was used due to the reasons explained above.

4.2.6.1 Can RIM, and other pre-enlistment risk factors predict Newcomer adjustment?

Newcomer adjustment of military trainees is one indicator of successful training completion and subsequent performance. A hierarchical multiple regression method was employed to see whether the criterion variables can predict newcomer adjustment. NCA score was entered as the dependent variable, and RIM score was entered as the first independent variable in the model, followed by the other variables in the second block, without a specific order.

Before regression analysis, all relevant assumptions for multiple regression recommended by Field (2009) were tested using appropriate tests and the data met all required assumptions. Std. Residual Minimum and Std. Residual Maximum were within recommended levels. Tolerance and VIF statistics showed none of the variables exceeded the VIF value 10 and Tolerance level less than 0.1 (See appendix 4.3).

Regression model for Newcomer Adjustment

Table 4.4 displays the model summary table of the regression model for NCA as the outcome measure. R2 for Model one was 14.8%, which means RIM alone accounted for 14.8% of the total variance. R2 for Model two was 20.6%, and this represents the total contribution of the model to the variation. This means Childhood adversities, PTSD positivity. Suicide act and thoughts, and ASB scores added an additional 6% to the total variance of NCA

Adjusted R square values (appendix 4.4) give an idea how well this model generalises to the population. Ideally, R^2 and adjusted R value should be the same or very close, which means the difference between the sample and the true population is zero or very little. Difference between R^2 and adjusted R for both models confirmed that model could be generalised to the normal population. Values of R square change in the table for the Model 1 is 0 to .148, and this change in the amount of explained variance gives rise to an *F*- ratio of 14.8, which is significant at 0.001 probability level. However, the R square change of Model 2 is not significant (p = 218). This suggests that adding other predictors did not make a considerable contribution to the model.

The ANOVA table of regression analysis showed that the suggested regression model was significantly better at predicting the outcome than using the mean as 'best guess'. Both models were significant, Model 1 was significant at the 0.001 level and Model 2 at the 0.01 level. The overall model fit was F (5, 81) = 4.204, p < 0.01. Table 4.4 presents a summary of the multiple regression model for NCA.

Table 4.4

Multiple regression model summary for NCA

	B	SE B	Beta
Step 1			
Constant	103.96	0.89	
RIM Score	0 .17	0.05	.39**
Step 2			
Constant	104.18	1.35	
RIM score	0 .18	0.47	.41***
ASB	-5.14	2.27	.24*
Suicide	-1.60	1.34	-.13
Adversity	0-37	1.97	-.02
PTSD	-2.6	2.80	-.10

Note R^2 = .15 for step 1, R^2 = .21 for step 2 ***p < .001, **p < .01

As shown in table 4.4, RIM positively contributed to Newcomer adjustment while ASB, childhood adversities, Suicide thoughts, PTSD positivity negatively contributds to NCA. These trends will be further discussed in the discussion section.

4.2.6.2 Can RIM, and other pre-enlistment risk factors predict Turnover Intention?

The turnover intention of military trainees is another main indicator of successful training completion and military attrition. A hierarchical multiple regression method was employed to see whether the criterion variables including RIM can predict turnover intention. TIS6 score was entered as the dependent variable, and RIM score was entered as the first independent variable as RIM is the main criterion variable and as it was strongly correlated with TIS.

Data were tested for all the assumptions before the MLR and it was observed that data contained no outliers. The Durbin-Watson value confirmed that the data in this study met the assumption of independent errors (Durbin-Watson value = 2.14). Histogram and normal probability test and scatter plot were considered to confirm that this data set met the

assumptions of Random normal distribution, Homoscedasticity and Linearity (see appendix 4.5).

Regression model for Turnover Intention

According to the model summary, R^2 value indicates that all predictors accounted for 24.2% of the total variance of Turnover intention, whereas the Model 1 alone accounted for 18.2%. This means Childhood adversities, PTSD positivity, Suicide act and thoughts, and ASB scores have added only an additional 6% to the total variance of turnover intention.

Adjusted R square values (Appendix 4.6) tell that this model can be generalised to the population. In the Model 1, the defference between R^2 and adjusted R is 0.010 (0.182-0.172), and this means that if the model were derived from the general population rather than a sample, RIM would account for approximately 1% less variance of turnover intention. In Model 2, this difference is 0.048 (0.242 -.194) which is about 4.8%. This means if the model was derived from the population, the contribution to the variance of Turnover intention would be 4.8% less than in the sample. F value for Model 1 was significant at the .001 level. However, the R square change of model 2 is not significant (p = .188). Adding other predictors other than RIM should be reconsidered.

Overall model fit was significant F (5, 85) = 5.20, p < 0.001. Table 4.5 presents a summary for the multiple regression model of turnover intention.

Table 4.5:

Multiple regression model summary for Turnover Intention

	B	SE B	Beta
Step 1			
Constant	14.33	0.40	
RIM Score	-.088	0.02	.43***
Step 2			
Constant	13.58	0.60	
RIM score	-0 .20	0.02	.48***
ASB	1.39	1.00	.14
Suicide	1.80	0.59	.21
Adversity	0.74	0.88	.08
PTSD	1.54	1.23	.12

Note R^2 = .18 for step 1, R^2 = .24 for step 2 ***p < .001

The contribution of RIM (P< 0.001) to the model was significant, and the contribution of other variables was not significant. The table also summarises that RIM score which is a protective factor had a negative impact on turnover intention and other risk factors had a positive impact on turnover intention of the military trainees.

4.2.6.3 Can RIM, and other pre-enlistment risk factors predict Training satisfaction of military trainees?

Training satisfaction of military trainees during training lays a strong foundations for military life. This is like the first impression of novices about the organisation. Subjective training satisfaction and RIM were positively correlated, according to the correlational analysis. A hierarchical multiple regression was conducted to check the predictive ability of these criterion variables in relation to training satisfaction. Subjective training satisfaction score was entered as the dependent variable; RIM score was entered as the first independent variable, and all the other criterion variables were entered into the second block. Data were tested for all assumptions of MLR and no concerns were raised for violation of any of these (see appendix 4.7).

Regression model for subjective training satisfaction

R^2 values in the model summary (Appendix 4.8) indicated that all predictors accounted for 25.2% of the total variance of training satisfaction while in Model 1 alone accounted for 18.7%. All the other criterion variables added only an additional 6.5% to the total variance in training satisfaction.

Model 1 can be generalised to the normal population as the probability of difference between R and R^2 was significant at the .001 level (p < 000), but Model 2 has a generalizability issue as its probability level is not significant (p = 15). The overall model fit was significant F (5, 85) = 5.40, p < 0.001. Table 4.6 presents a summary of the multiple regression models for training satisfaction.

Table 4.6:

Multiple regression model summary for training satisfaction

	B	SE B	Beta
Step 1			
Constant	38.41	0.79	
RIM Score	0.18	0.04	.43***
Step 2			
Constant	37.77	1.19	
RIM score	0 .18	0.04	.43***
ASB	-4.93	2.01	-.25*
Suicide	-0.47	1.18	-.04
Adversity	0.68	1.76	.04
PTSD	-2.94	2.47	-.12

Note R^2 = .19 for step 1, R^2 = .25 for step 2 ***p < .001, *p <.05

The contribution of RIM (P< 0.001) to the training satisfaction model was significant and positive. The contribution of ASB was also significant (p < .05) while the individual contributions of other variables were not significant.

4.2.6.4 Can RIM, and other pre-enlistment risk factors predict GHQ of military trainees?

A low score on GHQ is a good indicator of psychological well-being. To see whether the criterion variable in this study can predict GHQ of military trainees, a hierarchical multiple regression was conducted. GHQ 12 score was entered as the dependent variable, and RIM score was entered as the first independent variable, and all the other criterion variables were entered into the second block. None of the multiple regression assumptions raised concerns (Please see appendix 4.9).

Regression model for GHQ

R^2 values in the model summary (Appendix 4.10) indicated that all predictors accounted for 41.4% of the total variance of GHQ, whereas the Model 1 alone accounted for 19.7%. All the other criterion variables added an additional 21.7% to the total variance of GHQ.

Both models 1 and 2 can be generalised to the normal population as the probability of difference between R and R^2 was significant at the 0.001 level (p < 000). The overall model fit was significant F (5, 85) = 11.30, p < 0.001. Table 4.7 presents a summary of the multiple regression models for GHQ.

Table 4.7:

Multiple regression model summary for GHQ

	B	SE B	Beta
Step 1			
Constant	2.81	0.23	
RIM Score	-0.05	0.01	-.44***
Step 2			
Constant	2.77	.305	
RIM score	-0 .05	0.01	-.43***
ASB	2.19	0.51	-.39*
Suicide	0.01	0.30	.00
Adversity	1.06	0.45	.21*
PTSD	1.76	0.63	.24**

Note R^2 = .20 for step 1, R^2 = .41 for step 2 ***p < .001, **p <.01, *p < .05

The contribution of RIM to the GHQ model was significant (p< 0.001) and it was negative. The contributions of ASB, childhood adversities and PTSD positivity were also significant (p < .01, and p < .05) while suicide thought was not significant in this model.

4.2.6.5 Can RIM and other pre-enlistment risk factors predict training performance?

The simplest way to assess training performance is to look at the average examination scores of trainees as all theory and practical examination scores were averaged together. Therefore average examination score was considered as another outcome variable in this study. Examination scores were available only for two intakes of the Navy. As noticed in the correlational analysis in 4.2.5 above, there is no any strong relationship between any of the criterion variable and examination score. To further explore any linear relationship, another hierarchical multiple regression was carried out. However, none of the models were significant, which leads to the conclusion that none of the criterion variables in this study cannot predict examination performance (see appendix 4.11 for the model summary). This will be discussed further in the discussions in the next section.

4.3 Discussion

To answer the second research question, a longitudinal predictive validity study was carried out. The RIM scale developed through the frist study and other risk factor variables were used as the independent (criterion/ predictive) variables and newcomer adjustment, turnover intention, training satisfaction, examination performance and GHQ12 were taken as outcome variables. A sample of 93 Cadet Trainees participated in this study. They were assessed using the RIM and risk factor variables initially, and they were assessed with the outcome variables after six months.

Even though the initial plan was to follow up all 147 trainees who participated in the frist session, only 93 responded to the outcome variables at the end of the six month period for various reasons. This will be further discussed as a limitation of the study in the next chapter (5.3.1).

Demographic information of the sample suggests that the sample was homogeneous as they shared common characteristics such as age, education level, and marital status. Due to this reason, subsequent regression analysis did not use them as moderating factors. The initial descriptive statistics also suggested that the three forces do not significantly differ from each other when it comes to predictive and outcome variables. Only GHQ mean scores were significantly different ($p < 05$) for the three forces. This different was not further explore as it was not the objective of current study.

4.3.1 Predictive ability of risk factors on military well-being and performance

The predictive validity study looked into the contributions of these factors to the identified outcome variables. Before deciding the order of entry in the hierarchical MLR model, a simple linear regression was performed entering risk factors together to see the contribution of risk factors to each outcome variable models and it was found none of them had any significant influence on any of the models. Therefore RIM was entered as the first independent variable in the hierarchical MLR model. The second study assumed that those who scored high in risk factor scales should have problems related to well-being and performance. These expectations were not observed clearly in the current study. None of the risk factors were significant in the turnover intention predictive model when RIM was removed. The relationship of ASB to predictive variables was unexpected, as ASB was negatively related to GHQ while the relationship to newcomer adjustment was positive. ASB also positively contributed to the training satisfaction model. The only possible explanations for these unexpected directions of relationship is that participants may have answered unfaithfully because of their anti-social traits or trying to respond to outcome measures according to social desirability.

However, both childhood adversity and PTSD positivity could predict GHQ, the well-being of the trainee as expected (Cabrera et al., 2007; Macmanus, 2012; Owens et al., 2009). This finding further confirms the notion that childhood adversity and child trauma may continue to have strong influences on mental health issues in adult life. Suicidal thoughts did not make any significant contribution to any predictive model. However, these assessments measured very sensitive aspects of respondents' pre-enlistment life as articulated in the above section and therefore, either underreporting or social desirability may have influenced these unexpected results. The absence of evidence of sufficient relationship between of pre-enlistment risk factors and well-being and performance models does not indicate that they do not exist. It means the risk assessment measures need to be modified.

4.3.2 Predictive ability of RIM on well-being and performance of military trainees

The justification for entering RIM as the frist block was provided in the results section (4.2.6). A series of Multiple Linear Regressions (MLR) performed for each outcome variable found that RIM could predict 4 out of 5 outcome variables. As expected, RIM contributed to the Newcomer Adjustment model, with positive significant effect. The contribution of RIM in the Turnover Intention model was also significant, and this was a negative contribution. The predictive ability of RIM on training satisfaction was proved to be positive and significant as expected. RIM negatively contributed to the GHQ model, which measured the

psychological well-being of the trainees. These contributions were strong, and all of them were in the expected direction. However, RIM failed to demonstrate any significant contribution to the academic performance of the trainees. Academic performance was measured by the average examination score of the trainees. As discussed above there was a problem of lack of data for this variable as data from the army and airforce could not be obtained only for this variable. Only 53 navy participants were entered into the average examination score variable, and of these, final marks were available only for 28 trainees, and the balance was from the end of frist year scores. Due to these data collection limitations, the absence of a relationship between RIM and academic performance cannot be concluded until confirmed with a good set of data. On the other hand, average examination score is not a good measure of military personality, and it will not predict military performance and/or well-being. Thus, indicators that can measure the performance of the military trainees effectively should be identified.

As RIM is a new tool, it is difficult to compare these findings with previous studies, but as the items were drawn from existing resilience and mental toughness scales, it is possible to look at some of the mental toughness and resilience related literature. However, these studies are not necessarily related to the military context.

Mental toughness, which represents nearly 50% of the RIM scale, has been found to be correlated negatively with perceived stress and level of depression in adolescents (Gerber, 2012). The findings of the current study are in line with the findings of Godlewski and Kline (2012) who reported that mental toughness predicts military voluntary turnover. Crust and Keegan (2010) observed that the challenge subscale of mental toughness could predict the attitudes towards the physical risk taking and these confidence subscale can predict psychological risk taking of athletes. Mental toughness was found to be correlated significantly with eight coping subscales and optimism in a study done with athletes (Nicholls, Polman, Levy, & Backhouse, 2008). A study on the role of mental toughness in education has reported that the control of life aspect of mental toughness significantly associates with academic attainments and attendance (St Clair-Thompsona et al., 2015). The Military Training Mental Toughness Inventory (MTMTI), developed and validated by Hardy et al. (2015) is reported to predict individual course performance of military trainees. The relationship of mental toughness and GHQ has also been validated by Nicholls et al. (2008). They observed that mental toughness is positively correlated with optimism and coping among athletes.

Even though mental toughness is claimed to play a role as a protective factor for psychological well-being, a recent study especially on emotional toughness found a contradictory outcome. Jakupcak, Blais, Grossbard, Garcia, & Okiishi, (2014) reported that veterans who had been deployed in Iraq and Afghanistan also and who scored high on the emotional toughness sub scale, were shown more likely to screen positive for PTSD symptoms and depression. These authors modified and used 3 item Toughness Subscale of the Male Role Norms Scale (MRNS) (Thompson & Pleck, 1986) to assess emotional toughness. The items in this subscale are quite different from the items in MTQ used in the current study. The three items used in the above controversial study were (1) "When soldiers feel stress, they should not show it very much"; (2) "Nobody respects a soldier who frequently talks about worries, fears, and problems"; and (3) "Soldiers must always stand on their two feet and never depend on other people to help" (Jakupcak et al., 2014). These statements reflect stereotypical characteristics of a strong man and they ask wheter people show these feeling, not what feeling they actually have. It can be argued that inability/unwillingness to show emotions and seek help would weaken resilience, it just hiding problems. The emotional control subscale of MTQ48 is comparatively less stereotypical (please refer to the appendix 3.4 for MTQ48 questionnaire). The RIM's new scale included only four items from the emotional control subscale of the original MTQ48. Therefore it is difficult to make any comparison between the current study and Jakupcak et al. (2014) without a further investigation on these items.

There is a lack of empirical evidence for the resilience concept coupled with newcomer adjustment, turnover intention, or training satisfaction. However, there is abundant research that has looked at resilience as a predictor of mental health. The military is one of the contexts which have utilised the term "resilience" extensively. One big project is Comprehensive Soldier Fitness (Cornum et al., 2011). This project has started in 2009 and was supposed to finish by 2015. Under this project, compulsory resilience training was recommended, and small unit leaders were trained to help their subordinates. There are some vital criticisms against this project (Eidelson & Soldzs, 2012). Critiques have mainly criticised the methodological flaws of the project. However, these criticisms have not been able to disprove that resilience is important in the military. A similar kind of resilience training programme has been adopted by the Australian military to train their soldiers in resilience. This training is called "BattleSMART" (Self -Management and Resilience Training). The main objective of this resilience training is to create awareness of

psychological and physiological reactions to adverse and stressful events and teach trainees how to minimise maladaptive behaviours in reaction to stress (Cohn, et al., 2010).

Another project in which the resilience concept is used is the Technical Cooperation Program (Sudom & Lee, 2016). According to this report, some studies have considered resilience as the absence of psychological symptoms such as PTSD and depression. This finding is in linewith the finding of the current study, which confirmed that the RIM could predict GHQ, which is the well-being of the military trainees.

In addition to military literature, resilience seems to predict the coping of young people. Task-oriented coping has been positively correlated with the resilience of young adults, and emotional oriented coping was negatively correlated with resilience (Campbell-Sillsa, Cohana & Steina, 2005).

Acknowledging the fact that the RIM developed through this study has merged two personality aspects into one scale, it was difficult to find sufficient previous literature to compare the findings. However, there is enough evidence that resilience and mental toughness, as two different concepts, have been tested and validated to predict military performance and particularly well-being.

4.4 Summary of the chapter

This chapter was devoted to reporting and discussing the method and results of the longitudinal predictive validity study conducted with 92 cadet trainees. This study explored the relationship between predictive and outcome variables. Correlations confirmed the relationship between them. Further, MLR demonstrated a strong contribution of RIM to each outcome variable except examination performance. Examination scores did not correlate with any predictive variable which needed further exploration. Risk factors were correlated and predicted GHQ but not the other outcome variables. The contributions of these risk factors might have been masked by the MLR procedure employed in the current analysis giving priority to the RIM. Overall, the current study met its objectives set at the beginning to a great extent, as the RIM demonstrated robust statistical contributions to the military outcomes measured in the current study.

The next chapter summarises the findings and discusses the implications of these findings, the limitations of study, recommendation for implementation of the findings and directions for future research.

CHAPTER FIVE: CONCLUSION

5.0 Introduction

The previous two chapters presented the two main empirical studies conducted to answer the research questions of the current study;

1. What are the pre-enlistment psychological factors likely to impact on well-being and performance of military personnel?

2. Do such factors predict military performance and well-being?

This chapter aims to collate and discuss the findings of this study presented in the previous chapters, comparing them with existing knowledge and practices. Also, it discusses how this new tool will contribute to the military assessment process in Sri Lanka.

The current study was not a theory laden study, but it was a demand-driven reaserch in the Sri Lankan military context. The purpose of this chapter is to conclude the findings and highlight the theoretical and methodological contributions of the study. The first section of this chapter provides a summary of the findings of the two studies to answer the two research questions specified at the beginning. This chapter also discusses the limitations of the methodology employed by the current study. As the final step, reccommendation for the users of the tool and future research directions are presented.

5.1 Summary of the studies and key findings

Overall, the current study had two main objectives; 1) to develop and validate a comprehensive tool to assess pre-enlistment psychological factors likely to contribute to military well-being and performance and 2) to establish the predictive validity of such a scale. Two studies were conducted in the current research could to meet these objectives.

At the end of the frist study, a tool which consists of 42 items was developed and validated through EFA and CFA statistical processes. The study sample for the frist study was 960 junior military officers from the three military forces in Sri Lanka. The question pool for this scale was drawn from three different existing well-established scales which claim to measure different types of resilience in a different context. Those were the Resilience scale (RS25) developed by Wagnild and Young (1993), the Hardiness scale (DRS15) by Bartone (1995) and the Mental Toughness scale (MTQ48) by Clough et al. (2002). In addition to these protective factor scales, the questionnaire contained several other short scales to assess pre-enlistment risk factors. The items on the protective factor scale went through a rigorous filtering process to select the best items from a pool of 88 items. Various solutions with different numbers of factors were tried out, and a four-factor solution was finalised from

EFA. Forty-seven items were retained in the final scale after EFA and carried forward to CFA analysis. At the end of the CFA process, the forth factor with Hardiness items was removed to improve the validity and the model fit of the tool. The final tool ended up with 42 items; 20 from Resilience and 22 from Mental Toughness. This tool was named the "Resilience Inventory for Military" (RIM). Both the Resilience and Mental Toughness subscales obtained good reliability values. Also, the scale met appropriate levels of different validity measures (construct, face, translational, convergent, and divergent validity).

In the second study, the RIM tool developed through the frist study and the other risk assessment tools were considered as independent (predictive) variables and several outcome variables (newcomer adjustment, turnover intention, training satisfaction, GHQ12) were considered as dependent variables. This study used a sample of 93 cadet trainees from the three forces. Demographic data were removed from further analysis after a preliminary analysis which showed demographic data did not contribute the model. Age (18-25), gender (only three female), education (A/L), background, and marital status (unmarried) of this sample were mostly homogeneous, as all the participants were cadet trainees and their recruitment requirements were almost the same for three forces.

A series of MLR was conducted to see whether RIM and other risk factors can predict the performance and well- being of the cadet trainees. RIM, the main predictive variabl, was shown to have a significant contribution to the regression models for Newcomer adjustment, Turnover intention, Training satisfaction and GHQ. RIM could not predict examination performance of the cadet trainees. Pre-enlistment risk factors had a marginal contribution to some of the outcome variables, but those were not strong enough to conclude their contribution.

The key findings of this study is summarised below.

Key findings

The key findings of these two empirical studies are summarised below:

1. A tool which includes both risk and protective factors was developed with a large military sample representing all three military services in Sri Lanka, and the protective factor scales was named the Resilience Inventory for Military.
2. EFA and CFA processes showed that these three scales overlap and the best items for the final tool, were selected.

3. RIM demonstrated face, construct, discriminated, and convergent validity and reliability in the Sri Lankan military context.
4. Risk factors correlated with measures of military well-being and performance Anti-social behaviour, PTSD positivity and childhood adversity could predict GHQ but not newcomer adjustment or turnover intention. However, their contributions were marginal compared to RIM. This may be due to the sensitive nature of the measures and under reporting.
5. RIM correlated with four outcome measures and significantly contributed to models of military outcome measures except for the academic performance of the trainees.
6. Therefore RIM can be accepted as a strong measure of military resilience which can help to predict military well-being and performance but risk factor scales needed to be modified. Overall, both studies achived the objectives set at the beginning, with small deviations.

As this was a novel kind of research which combined several risks and protective factors in a new research context, the findings showed some unique features. Overall, these two studies suggest that resilience, as measured by RIM, and pre-enlistment factors, notably prior antisocial behaviour, can predict adjustment to the military. Further research would be needed to assess whether these enlistment variables also predict subsequent military performance.

5.2 Contributions of the study

5.2.1 Theoretical contribution of the study

There are a few theoretical contributions of the current study. As articulated in the introductory chapters, there is ample research which suggests that risk factors and protective factors contribute to the well-being and performance of military personnel. However, hardly any tool had combined these two factors in one scale to assess pre-enlistment psychological factors of the military officer candidates. The current research has created a comprehensive tool by combining these two aspects. This newly validated scale will make it possible to see the gap between risk and protective factors, which indicates the true resilience level of the individual. As Doty (2010) pointed out, protective and risk factors of resilience are not necessarily opposites. "A protective factor is something mediates the effect of a risk to benefit the individual in some way or predict a desirable outcome" (p 142). Thus, even if an individual scores high in risk assessments (has undergone adverse childhood experinces and experienced mental health issues) the risk will be mediated by higher scores in protective factors. It would be unethical to disqualify an individual from any profession by only looking

at the risk factors. As resilience is believed to develop in adverse situations in most individuals it is always good to look at the current resilience level of the individual.

Another contribution of the current study is the merging of three existing resilience related scales into one concise scale. It is clear that the origin of all these three scales was the resilience concept originated by Kobasa (1979). A careful analysis shows that that the meanings of some of the items in these three scales overlap even in the original English versions. Do these three scales not just measure the same latent factors using different names? This study provides a partial answer to this question. First, none of these individual scales could be validated with their original factor structures in the Sri Lankan military context. Previous literature also supports the idea that these scales do not preserve their factor structures across different data sets. However, through a strong filtering process of the EFA and CFA in the current study, hardiness items were disqualified, and the resilience and MTQ scales proved to measure somewhat different variables. Hardiness does not work in the Sri Lankan context. Some of the items of Hardiness were dropped at the EFA stage, and the remainder were disqualified during the CFA process. As both MTQ48 and DRS 15 have three subscales with the same themes (Commitment, Challenge and Control), MTQ can represent DRS items. The resultent 42 RIM scale consisted of 20 resilience items which explained 31% of total variance, and 22 items of MTQ, which explained 16% of total variance. These remaining items represent all the sub scales and the facets of resilience and toughness concepts. Thus, this RIM is theoretically and practically appropriate. Validation of the individual scales also showed that Hardiness is not appropriate to the military sample used in this study, as DRS failed to obtain an acceptable level of reliability. However, the concepts measured by RS25 and MTQ48 seem to work in the Sri Lankan military context, and they might be used as stand-alone scales.

Theoretical contribution to the military psychology literature

Military psychology literature in the South Asian context, particularly in Sri Lanka, is underdeveloped. Therefore this study adds some valuable inputs to the military literature in the South Asian context. Most of the tools used in South Asian military organisations have been adopted from the Western world, and there is some cultural and contextual mismatch. The current study also adopted tools developed in Western contexts but managed to put three scales together and select most suitable items for the Sri Lankan military context in a local language. Then these items were coupled with risk factors to get a realistic account of the resilience level of the military personnel. Unlike most other studies, the current study has used a large sample representing all three military services, ensuring generalisability of the

findings to all three services. This particular tool was developed to use with officer candidates and can be adapted to other rankers with some alteration.

The resilience, hardiness and mental toughness levels of Sri Lankan military personnel were assessed separately and revealed higher scores, which were negatively skewed in the normal distribution curve. This trend gives a hint that military personnel who are already in the service are high in resilience traits. However, there are no comparable civilian data.

The robust findings of the predictive validity study suggest that resilience and mental toughness can predict both positive and negative outcomes of military personnel at least during their basic training period. It was observed that those who scored high in RIM had higher scores in newcomer adjustment and training satisfaction and lower scores of turnover intention and GHQ. This is the first evidence in Sri Lankan and most probably in the South Asian context of the relationship between resilience and the military outcomes mentioned above. Also, this could be the first time that resilience has been identified as a predictor of newcomer adjustment and training satisfaction of military personnel, irrespective of the context.

Even though the resilience concept has been adopted and used in Western military contexts to a large extent through projects like the Comprehensive Soldier Fitness programme in the USA, this would be the first time that this concept has been explored and utilised in the Sri Lankan military context. Since the findings suggest that resilience and mental toughness can predict positive and negative outcomes, these two aspects can be included in military training curriculums, not only for basic training but also in advanced training for both officers and other rankers.

5.2.2 Methodological contribution

Unlike most other scale developments initiatives, where there are prior theoretical frameworks to confirm and factor structures to preserve, this study provided the freedom to select only very strong items with good factor loadings as no predetermined factor structure was assumed. Hence, a robust factor analysis method was used, and none of the items were forced to remain which helped to finalise a tool with the best items. The robustness of the regression analyses confirmed that RIM fits well into the Sri Lankan military sector, particularly for predicting turnover intention, adjustment to the service and well-being during the training period.

The current study adopted sthe plit-sample cross-validation method for EFA and CFA since the main sample was large enough to do so. The large sample size presumably contributed to the robustness of the findings. However, due to the large size of the sample, probability values for the X^2 remained an issue; this problem is well established in methodological papers on CFA.

The findings of the validation study also confirmed suggestions of Weijters, et al. (2013) and Wong et al. (2003) the inclution reverse worded items in scales is problematic, as most of the reverse worded items loaded onto the same factor, irrespective of their parent factors. This also led to a problematic discriminant validity for the new scale and it was necessary to combine the two MTQ factors under one parent factor, which ultimately resolved this problem.

5.2.3 Practical Implications for the Sri Lankan military sector

The most significant outcome of this study is its implication for the Sri Lankan military context. This study could make a huge change to the Sri Lankan military, as hoped at the outset of the study. The RIM would be the first ever psychological screening tool to be used in the officer recruitment process to assess the risk and protective factors of the individual candidates. The tool confirmed its ability to predict several military outcomes which are among the main concerns of any military organisation, such as attrition and mental health issues. Identifying the candidates with high risk and low resilience in the first place will help the military organisation to take preventive measures, such as specific resilience training and referring such individuals to a mental health professional to get help. The RIM gives an indication of the future job attitudes of the cadet trainees too. Using this tool also will help to provide some baseline information about each military intake and provide facilities for follow up of the recruits' performance and health related issues. Surveying 960 triforces junior officers and travelling to each military base island wide was not an easy task. All these efforts were made to ensure a genuine research with a true sample representing the true population. The ultimate aim of this study was to fulfil the requirement of a usable, concise and culturally appropriate tool for the Sri Lankan military services.

Most importantly, the findings and the data collected through this study could be used as a database for a historical longitudinal study in the Sri Lankan military. The cadet sample used for the predictive study was not anonymous, and they gave their consent for follow-up studies. This would make it possible to see their professional and personal development in the military service in subsequent years and strengthen the findings of the current study.

However, only 93 cadet trainees participated in the sample for the second study. This will limit the ability to follow up.

Since the RIM which consists of elements of both resilience and mental toughness, could predict several military outcomes, these aspects can be included in future basic and advanced training as a compulsory part of the training.

In addition to the short term direct implications of these findings, there are a few long term indirect implications too. It is expected that these findings could help to reduce the costs borne by the Sri Lankan military for military training, provided the tool is strictly used for screening and or categorisation of the recruits. Another long term implication would be to improve the public image of military personnel locally and internationally. However, the findings of this study do not promise these outcomes.

5.3 Limitations of the study

5.3.1 Sampling issues

Despite the large sample size employed in this study, a few issues which may have influenced the robustness of findings were identified. Using purposive sampling, which is a non-random sampling method, may have limited the generalizability of the results. However, purposive sampling was used to make sure all three forces, all the branches and areas were represented. The total sample (N=960) was a good representation of each military service and other differences within the service. Also, the sample was proportionate to the real populations. However, the navy sample dominated in the second study, and this may restrict generalizability to a certain extent.

Ideally, RIM should be validated using a sample of military officer candidates who are undergoing the recruiting process. Due to practical issues such as the principal researcher's timeframe, unavailability of any recruitment during the research period, and issues of access to candidates for all three services at the same time, junior officers were used as the sample for scale development instead. For the predictive validity study, cadet trainees who were already in basic training were utilised.

Female representation for the first study was less than 10%, and for the second study, it was 3.2%. Therefore, comparisons between male and female candidates could not be made. Also, in the longitudinal study, naval cadets were over-represented for a variety of reasons, and the findings are probably more representative of the navy than the other services.

5.3.2 Issues related to measuring methods

"A major concern about noncognitive measures, whether they are classified as temperament, biodata, personality, or interest, is that of faking. Because these measures are self-reported, there is always the danger that the individual may take the opportunity to present himself or herself in the most positive light possible, rather than in terms that would reflect the individual's characteristics most accurately" (Rumsey, 2012, pp. 135–136).

All the measures used in the study were self-report methods and suffered from the validity issues common to such measures. As highlighted by Cabrera et al. (2007) the validity of these measures cannot be assured. This matter and its reflection on risk factor measures were discussed in detail in the discussion sections in both studies (3.4, 4.3). Ideally, the initial measuring tool of the frist study would have included items to assess faking, which were not included in the current study. To minimise this limitation, common method bias was tested during the CFA process. Common method bias test would tell if any factor/s other than latent factors measured in the tool (confound variables) or social desirability trends influenced the responses. The result of this test proved there is no common method bias involved in this study.

5.3.3 Other issues

Another problem pointed out in the section 3.1.1 was missing data for sensitive measures such as childhood adversities, suicidality, and mental health issues. Although the initial plan was to combine and validate both risk and protective factors into one scale, later it was decided to keep them separate as risk factor assessments were sensitive and a large minority of respondents opted not to answer those questions. Due to the same reasons, a significant relationship could not be established between risk factors and the outcome measures except GHQ. It is not justifiable to conclude that risk factors do not predict military outcomes but there is a requirement to identify less sensitive and more objective measures to assess risk factors. For example, to assess these sensitive variables either generic measures of PTSD and depression or any psychological disorder can be used. Another option is using medical records and other archived information. Otherwise, a combination of both of these methods would be preferable to using self-report questionnaires.

Dropout and non-availability of some data were identified as another limitation of the second study. Dropping out of the respondents is a common suffering of longitudinal studies and most of the time these issues are beyond the control of the researcher (Crane et al., 2012). According to Crane et al., drop-out and recruitment rates, particularly in military studies

addressing potentially sensitive issues can be varied, but those are generally below 50%. It is important to note that the military training environment is a restricted context and authorities exert maximum effort to maintain its standard. Therefore any research carried out with military trainees has to tackle dropout issue very delicately.

Although the initial plan of the predictive study was to collect data about any attrition during the training, physical and mental health issues complained by the trainees and any physical injuries during training, this was not feasible due to practical issues of access to this kind of data related to military trainees. Not having these data can be considered as a weakness. Another problem is that, out of 147 cadet trainees who participated in the first phase of the predictive study, only 93 have completed the second phase. It would have been preferred if the reasons for this absence could be identified. According to the military rules in SL, it is illegal for trainees to leave training and if they do so, they have to pay back the training cost. There are limited occasions when trainees are discharged from the training due to unsuitability such as injuries, physical or mental health issues. These instances are rare. There are some explanations for the other absentees. Those may be due to temporary health issues or deployment for a specific training such as sea training, where access is difficult. Some trainees may have taken personal leave due to unavoidable family circumstances such as a wedding or a funeral. It could have been very useful if such data had been available, as they could be correlated with the predictive variables.

The newly developed RIM is only validated in the Sinhala language, and the original English version is also available if necessary. However, it is a limitation that the tool is not available in the Tamil language which is the second language in Sri Lanka. As presented in table 3.2 only a very small percentage (0.6%) of military personnel are Tamil speaking, and they are fluent in either or both Sinhala and English. Sri Lanka uses both Sinhala and Tamil as official languages. Ideally RIM should be translated into Tamil and validated.

5.4 Generalizability

The study included all three forces in Sri Lanka. Although the tool was developed for officer recruits, this does not prevent generalising it to other rankers as they share common features in terms of duty except that some additional responsibilities are expected from the officers. Officers are more accountable to the top of the hierarchy than other rankers. However, these findings would not be generalisable to civil organisations without proper validation, as the military population has quite distinct characteristics and the organisational structures compared to a civil organisation. These findings can be adapted and applicable to other services such as police and firefighters. This tool also can be adapted to at least other Asian

countries (India, Pakistan, Bangladesh, Nepal, and Bhutan) with translation and some alteration as these countries share common military culture to a great extent.

5.5 Recommendations for military services which intend to use the tool

Following are some recommendations for military services that would like to use the RIM tool.

To use a scale as a screening tool, it should have a cutoff mark to screen out or in. There is no cut off mark set for the RIM yet. In general, people are not screened and or rejected based on a single psychometric tool, due to ethical concerns. This tool has a lot to be improved through more empirical studies. Thus, it is recommended that this tool should not be used to screen out enlistees as its current form but should be used to identify individuals at-risk who have a high pre-enlistment risk and are low in resilience. Also, those who score in low in risk factors and high in resilience can be selected for special operations and foreign missions with more confidence.

Cardona and Ritchie (2006) recommend using screening tools to identify the relevant psychological information about recruits at risk of impaired ability to adjust and attrition. The basic training then should includ specific skills which can increase the resilience of the trainees. Military services should not compromise their standards by recruiting risky enlistees. Instead, they can apply primary and secondary preventive mechanisms through screening and timely psychological intervention.

Administration of this tool should be done by a qualified recruiting team, preferably with the involvement of a charted psychologist or a counsellor working for the relevant military service.

As there is no cut off mark set yet, it is recommended to look at the difference between risk scores and protective scores. Recruits can be categorised into four groups based on their score on the RIM and risk factor tools. This categorisation would be made easy by naming the highest 10% of the candidates with highest resilience score measures with RIM, as the “high resilient” quartile and the lowest 10% as the “low resilience” quartile. The Same procedure can be used with risk factors also. The highest 10% name as the “high risk” quartile and the lowest 10% name as the “low-risk quartile”. The scores of these two tools go in opposite direction. After this categorisation, further assessment and follow up need to be done with the “high risk” category especially if they have fallen into the “low resilient” category too. This category should be followed up for mental health or behavioural issues

during the training and subsequent years of service. It is also advisable to assess their mental health status time to time particularly before and after deploying them in special operations and tasks. Irrespective of the category they belong to, adding a resilience component to the basic training would be an added advantage.

Detecting faking in human responses is a challenge. For this reason, it is recommended to add some items to assess socially desirable responding. For that purpose, it is recommended to use the 13-item (MC–SDS) Marlowe-Crowne Social Desirability Scale (Reynold, 1986). The scores for these items should be analysed separately to have an idea of the level of influence of social desirability on individuals' responses. Those who scores high on these social desirability items tend to lie on other items too. However, this would not detect any fake responses, especially in a complicated military context. It would only minimise the problem related to the self-report method. As proposed in the limitations section (section 5.3) to assess some aspects of pre-enlistment behaviour and mental health issues, in addition to this scale, some other reliable measures can be used (e.g. generic measures, medical recodes, police recodes, peer or supervisor evaluations and other archival information)

5.6 Directions for future research

The results of the current study showed that military personnel scored high on all three protective scales, especially on the resilience and mental toughness scales and the distribution was negatively skewed. However, it was difficult to compare these scores with civil populations due to the lack of data available in the Sri Lankan context. Therefore further exploration is needed to find out if military personnel are more resilient than civil personnel.

The findings also demonstrated that the contribution of RIM to the models of outcome variables was very strong at the training level. However, the military training period is a very specific and strenuous period. Thus, individual responses to newcomer adjustment, turnover intention and job satisfaction may change over time after the training. Therefore further follow up studies are needed to check these trends. All these studies should adopt longitudinal methods to establish a causal relationship. Furthermore, individuals who score high in risk factors should be followed up for mental health issues at different levels of a military career, to see any behavioural changes over time.

Risk factor assessments are to be modified and validated with military and then these factors can be incorporated into a model with protective factors and test using SEM statistics.

The current study used a sample of cadet trainees who were already in the system for the predictive validity study. Future research could use a fresh sample of applicants at the first contact point and assess their resilience and risk level using the developed tool to see if there are any differences between selected and non-selected candidates.

Despite the high predictability of military performance by mental toughness, Jakupcak, et al., (2014) found contradictory findings. They found that emotional toughness increases the likelihood for screening positive for mental health conditions in returning male veterans from Iraq and Afghanistan (Jakupcak et al., 2014). This needs to be explored in the Sri Lankan military context too.

At the initial stage of the data collection, the principal researcher observed that even though military personnel gave their informed consent with no reluctance, their responses to the questionnaire did not reflect such willingness to participate in the research. Some of the questionnaires were half completed, and some were completely blank. All these questionnaires were removed from further analysis, as data were not usable. This is a waste of money and time for both researchers and participants. There are emerging issues about the ethical practices, validity and the accuracy of informed consent in military research (Ryberg, 2003; McManus et al., 2005). Is consent genuinely free and informed, or do military personnel perceive it as a part of their duty and feel compelled to participate due to the special nature of the superior–subordinate relationship in the military? Therefore further qualitative studies are needed to explore this dilemma.

The RIM needs to be translated and validated in the Tamil language before using it with Muslim or Tamil military candidates.

5.8 Conclusions

The study tried to fill a vacuum in the military literature by developing a comprehensive tool to assess pre-enlistment psychological factors likely to impact on military well-being and performance. A 42-item protective scale and several risk factor assessments were put together to create this tool. Two empirical studies were conducted to develop and validate the tool. The findings demonstrated the validity and reliability of the scale through thorough statistical procedures. The predictive study evidenced the predictive ability of the newly developed tool in relation to several military outcome variables. The data set collected and tabled in this study will be used as base line data for a longitudinal military psychology project in Sri Lanka. The findings have important implications for the Sri Lankan military as well as military and resilience literature.

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APPENDICES

Appendix 3.1 English and Sinhala questionnaire

The following is the questionnaire for the study conducted to develop a psychological screening to assess pre-enlistment psychological factors likely to impact the well-being and performance of Sri Lankan military personnel.

Please read the instruction for all the questions before answering

Index No	

Personal and demographical data (Please tick in relevant box)

1. **Rank:**

2. **Category of service**

1	Regular	
2	Volunteer	

3. **Years of service**

1	0-5 years	
2	6-10 years	
3	11-15 years	
4	More than 15 years	

4. **Age:**

1	21-25	
2	26-30	
3	31-35	
4	36 - 40	
5	41 and above	

5. **Sex**

1	Male	
2	Female	

6. **Marital status**

1	Married	
2	Un married	
3	Divorced/Separated	

7. **Level of Education:**

1	Grade 1-8	
2	Up to O/L	
3	Up to A/L	
4	Technical training certificate	
5	Diploma	
6	Graduate	
7	Post graduate	

8. **Ethnicity:**

1	Sinhala	
2	Tamil	
3	Sri Lankan moor	
4	Malay	
5	Burger	
6	Other	

9. **Religion:**

1	Buddhist	
2	Christian	
3	Catholic	
4	Islam	
5	Hindu	
6	Other	

10. **Hobbies and Extracurricular activities: (Tick whatever relevant)**

1	Sports	
2	Movies/TV	
3	Listening to Music	
4	Playing music	
5	Reading	
6	Writing	
7	Social media	
8	Drawing	
9	**Other (specify)**	

11. **Assumed socioeconomic status:**

1	Low	
2	Lower Middle	
3	Middle Class	
4	Upper Middle	
5	Upper class	

12. **Father's highest education:**

1	Never been to school	
2	Grade 1-5	
3	Grade 5-10	
4	GCE O/L	
5	GCE A/L	
6	Diploma	
7	Graduate	
8	Post Graduate	

13. **Mother's highest education**

1	Never been to school	
2	Grade 1-5	
3	Grade 5-10	
4	GCE O/L	
5	GCE A/L	
6	Diploma	
7	Graduate	
8	Post Graduate	

14. **Do you have any family members who worked/working for any military services?**

1	Yes	
2	No	

Childhood and Psychological background

15. **When you were brought up (before age 18) had you lived away from your mother period of more than six months**

1	Yes	
2	No	

(if the answer for the above question is 'No' pleases go to question number 17)

16. **If the answer for the above question is 'Yes' Please find appropriate reason from following**

1	Death	
2	Divorce	
3	Separation	
4	Worked away from home for more than six months continuously	
5	Worked abroad	
6	Mother was hospitalized for more than 6 months	
7	Mother was in prison	
8	I was brought up in a residential care home	
9	Other (specify)	

17. **When you were brought up (before age 18) had you lived away from your father**

1	Yes	
2	No	

(if the answer for the above question is 'No' pleases go to question number 19)

18. **If the answer for the above question is 'Yes' Please find appropriate reason from following**

1	Death	
2	Mother was not married	
3	Divorce	
4	Separation	
5	Worked away from home for more than six months continuously	
6	Worked abroad	
7	Father was in prison	
8	I was brought up in a residential care home	
9	Other (specify)	

19. **"While I was growing up during first 18 years of life"**

	Experience	**Yes**	**No**
1	I have lived with a problem drinker or alcoholic at home		
2	I have lived with a mentally ill person at home		

20. **"While I growing up during your first 18 years of life" Never = 1, Very often = 5**

		1	**2**	**3**	**4**	**5**
1	I have been abused physically					
2	I have been abused sexually					
3	I have been abused psychology					
4	I have witnessed violence against my mother					

21. When I was growing up:

(Please state true or false for the following statements)

No	Behaviour	True 1	False 2
1	I used to get into physical fights at school		
2	I often used to play truant at school		
3	I was suspended or expelled from school due my misbehaviour		
4	I did things that should have got me (or did get me) into trouble with the police		
5	I tended to lie and deceive others.		
6	I often acted or reacted impulsively.		
7	I often didn't care about the safety of myself or others		
8	I was under the care of probation or certified school		

22. Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, put an "X" in the box to indicate how much you have been bothered by that problem in the past month.

No	Response	Not at all (1)	A little bit (2)	Moderate (3)	Quite a bit (4)	Extremely (5)
1	Repeated, disturbing memories, thoughts, or images of a stressful experience from the past?					
2	Feeling very upset when something reminded you of a stressful experience from the past?					
3	Avoid activities or situations because they remind you of a stressful experience from the past?					
4	Feeling distant or cut off from other people?					
5	Feeling irritable or having angry outbursts?					
6	Having difficulty concentrating?					

23. Have you ever been treated by a psychiatrist, a psychologist or a psychological counsellor before?

1	Yes	
2	No	

24. If you answer for the above question was 'yes' please specify the diagnose, or nature of the problem

1	Depression		2	Phobia	
3	Anxiety		4	OCD	
5	Personality disorder		6	bi-polar depression	
7	Family		8	Stress and adjustment problem	
9	Addiction		10	Education	
11	Career		12	Psychosis	
13	Relationship issue		14	Sexual problem	
15	Other		16	Not wish to mention	
17	Cannot remember		18	Do not know	

If you find it difficult to categorize your problem to any of the above category please give a brief description of symptomology of your problem

25. Have you ever felt that you would benefit from the services of a psychiatrist/ psychologist/ counsellor and (but) you did not do it?

1	Yes	
2	No	

26. If 'yes' please try to think of a reason for you not to do so

1	Felt ashamed thinking that others will think "I am mad or weak"	
2	Did not have time	
3	Did not have money	
4	Did not know whom to meet	
5	Services were not available	
6	Problem was not serious enough to seek any professional help	
7	Cannot remember	
8	Other (specify)	

27. Are you aware of anyone in your family who has suffered is suffering from any **psychological disorder**

1	Yes	
2	No	
3	Don't know	

If yes who was that and what was the problem?

28. Do you feel hopeless about the present or future?

1	Yes	
2	No	

29. Have you ever thought of taking your life :

1	Yes	
2	No	

30. Have you ever put that thought into action?

1	Yes	
2	No	

31. If your answer is 'yes' to the above question pls. specify how many times it happened

1 time	
2-3 times	
3< times	

32. Has anyone in your family (parents/siblings/maternal and paternal relations) ended his/her life as a result of suicide or tried doing so?

1	Yes		
2	No		
3	Don't know		

(If yes Please specify who was that)

33. How important are these aspects of your job for you?

0 = not important at all 1 = not that important 2 = Important 3 very Important 4 = extremely Important

	Reason					**Rating**
1	Salary and benefit	**0**	**1**	**2**	**3**	**4**
2	Job satisfaction	**0**	**1**	**2**	**3**	**4**
3	Prestige	**0**	**1**	**2**	**3**	**4**
4	Power and control	**0**	**1**	**2**	**3**	**4**
5	Fun	**0**	**1**	**2**	**3**	**4**
6	New experience	**0**	**1**	**2**	**3**	**4**
7	Opportunity to growth	**0**	**1**	**2**	**3**	**4**
8	Helping others	**0**	**1**	**2**	**3**	**4**

34. How would you rate following characters in relation to a military officer

0 = not important at all 1 = not that important 2 = Important 3 = very Important 4 = extremely Important

	Characteristics					**Your Rating**
1	Physical fitness	**0**	**1**	**2**	**3**	**4**
2	Psychological fitness	**0**	**1**	**2**	**3**	**4**
3	Leadership	**0**	**1**	**2**	**3**	**4**
4	Motivation	**0**	**1**	**2**	**3**	**4**
5	Team work	**0**	**1**	**2**	**3**	**4**
6	Patience	**0**	**1**	**2**	**3**	**4**
7	Decision making	**0**	**1**	**2**	**3**	**4**
8	Ability to understand others feeling	**0**	**1**	**2**	**3**	**4**

Below are statements about life that people often feel differently about. Please show how much you think each one is true about you. Give your own honest opinions. There are no right or wrong answers.

Please indicate your response to the following items by circling one of the numbers, which have the following meaning;

0= Not at all true

1= A little true

2= Quite true

3= Completely true

	Not at all true	A little true	Quite true	Completely true
1. Most of my life gets spent doing things that are meaningful	0	1	2	3
2. By working hard you can nearly always achieve your goals	0	1	2	3
3. I don't like to make changes in my regular activities	0	1	2	3
4. I feel that my life is somewhat empty of meaning	0	1	2	3
5. Changes in routine are interesting to me	0	1	2	3
6. How things go in my life depends on my own actions	0	1	2	3
7. I really look forward to my work activities	0	1	2	3
8. I don't think there is much I can do to influence my own future	0	1	2	3
9. I enjoy the challenge when I have to do more than one thing at a time	0	1	2	3
10. Most days, life is really interesting and exciting for me	0	1	2	3
11. It bothers me when my daily routine gets interrupted	0	1	2	3
12. It is up to me to decide how the rest of my life will be	0	1	2	3
13. Life in general is boring for me	0	1	2	3
14. I like having a daily schedule that doesn't change very much	0	1	2	3
15. My choices make a real difference in how things turn out in the end	0	1	2	3

Please indicate your response to the following items by **circling one** of the numbers, which have the following meaning;

1 = strongly disagree; **2** = disagree; **3** = neither agree nor disagree; **4** = agree; **5** = strongly agree

Please answer these items carefully, **thinking about how you are generally**. Do not spend too much time on any one item

MTQ	**Disagree**				**Agree**
1. I usually find something to motivate me	1	2	3	4	5
2. I generally feel in control	1	2	3	4	5
3. I generally feel that I am a worthwhile person	1	2	3	4	5
4. Challenges usually bring out the best in me	1	2	3	4	5
5. When working with other people I am usually quite influential	1	2	3	4	5
6. Unexpected changes to my schedule generally throw me	1	2	3	4	5
7. I don't usually give up under pressure	1	2	3	4	5
8. I am generally confident in my own abilities	1	2	3	4	5
9. I usually find myself just going through the motions	1	2	3	4	5
10. At times I expect things to go wrong	1	2	3	4	5
11. "I just don't know where to begin" is a feeling I usually have when presented with several things to do at once	1	2	3	4	5
12. I generally feel that I am in control of what happens in my life	1	2	3	4	5
13. However bad things are, I usually feel they will work out positively in the end	1	2	3	4	5
14. I often wish my life was more predictable	1	2	3	4	5
15. Whenever I try to plan something, unforeseen factors usually seem to wreck it	1	2	3	4	5
16. I generally look on the bright side of life	1	2	3	4	5
17. I usually speak my mind when I have something to say	1	2	3	4	5
18. At times I feel completely useless	1	2	3	4	5
19. I can generally be relied upon to complete the tasks I am given	1	2	3	4	5
20. I usually take charge of a situation when I feel it is appropriate	1	2	3	4	5
21. I generally find it hard to relax	1	2	3	4	5
22. I am easily distracted from tasks that I am involved with	1	2	3	4	5
23. I generally cope well with any problems that occur	1	2	3	4	5
24. I do not usually criticise myself even when things go wrong	1	2	3	4	5
25. I generally try to give 100%	1	2	3	4	5
26. When I am upset or annoyed I usually let others know	1	2	3	4	5
27. I tend to worry about things well before they actually happen	1	2	3	4	5
28. I often feel intimidated in social gatherings	1	2	3	4	5
29. When faced with difficulties I usually give up	1	2	3	4	5
30. I am generally able to react quickly when something unexpected happens	1	2	3	4	5
31. Even when under considerable pressure I usually remain calm	1	2	3	4	5
32. If something can go wrong, it usually will	1	2	3	4	5
33. Things just usually happen to me	1	2	3	4	5
34. I generally hide my emotion from others	1	2	3	4	5
35. I usually find it difficult to make a mental effort when I am tired	1	2	3	4	5
36. When I make mistakes I usually let it worry me for days after	1	2	3	4	5
37. When I am feeling tired I find it difficult to get going	1	2	3	4	5
38. I am comfortable telling people what to do	1	2	3	4	5
39. I can normally sustain high levels of mental effort for long periods	1	2	3	4	5
40. I usually look forward to changes in my routine	1	2	3	4	5
41. I feel that what I do tends to make no difference	1	2	3	4	5
42. I usually find it hard to summon enthusiasm for the tasks I have to do	1	2	3	4	5

43. If I feel somebody is wrong, I am not afraid to argue with them	1	2	3	4	5
44. I usually enjoy a challenge	1	2	3	4	5
45. I can usually control my nervousness	1	2	3	4	5
46. In discussions, I tend to back-down even when I feel strongly about something	1	2	3	4	5
47. When I face setbacks I am often unable to persist with my goal	1	2	3	4	5
48. I can usually adapt myself to challenges that come my way	1	2	3	4	5

Resilience Scale

Please indicate your response to the following items by circling one of the numbers

Resilience	**Disagree**						**Agree**
1. When I make plans I usually go through with them	1	2	3	4	5	6	7
2. I usually manage one way or other							
3. I am able to depend on myself more than anyone else							
4. Keeping interested in things is important to me							
5. I can be myself if I have to							
6. I feel proud that I have accomplished things in my life							
7. Usually I take things in stride							
8. I am friends with myself							
9. I feel that I can handle many things at a time							
10. I am determined							
11. I seldom wonder what the point of it all is							
12. I take things one day at a time							
13. I can get through difficult times because I 've experienced difficult before							
14. I have self-discipline							
15. I keep interested in things							
16. I can usually find something to laugh about							
17. My belief in myself gets me through hard times							
18. In an emergency, I am someone people generally can rely on							
19. I can usually look at a situation in a number of ways							
20. Sometimes I make myself do things whether I want to or not							
21. My life has meaning							
22. I do not dwell on things that I can't do anything about							
23. When I am in a difficult situation, I can usually find my way out of it							
24. I have enough energy to do what I want to do							
25. It is ok if there are people who don't like me							

Sinhala version

ශ්‍රී ලාංකික ආරක්ෂක සේවාවන්ට බඳවා ගන්නා නිළධාරීන් ගේ බඳවා ගැනීමට පෙර පවතින ඔරොත්තු දීමේ හා හැඩ ගැසීමේ හැකියාව මැන බලන මනෝවිද්‍යාත්මක මෙවලමක් ගොඩනැගීම හා වලංගු කිරීම **සඳහා පවත්වනු ලබන අධ්‍යයනය**

පුද්ගලික හා ජ්‍රජා විද්‍යාත්මක තොරතුරු අනු අංකය

(කරුණාකර අදාල කොටුව තුල √ ලකුණ යොදන්න)

1. නිලය:

2. සේවයේ ස්වභාවය

1	නිත්ය	
2	ස්වේච්ඡා	

3. සේවා කාලය

1	අවුරුදු 0-4 දක්වා	
2	අවුරුදු 5-10දක්වා	
3	අවුරුදු 10-14දක්වා	
4	අවුරුදු 15 හෝ ඊට වැඩි	

4. වයස:

1	21-25	
2	26-30	
3	31-35	
4	36 -40	
5	41 හෝ වැඩි	

5. ස්ත්‍රී/ පුරුෂ භාවය:

1	ස්ත්‍රී	
2	පුරුෂ	

6. විවාහක අවිවාහක බව

1	විවාහක	
2	අවිවාහක	
3	දික්කසාද හෝ වෙන්වී	

7. අධ්‍යාපන මට්ටම:

1	1-8 වසර දක්වා	
2	සා/පෙළ දක්වා	
3	උ/පෙළ දක්වා	
4	කාර්මික පුහුණු සහති ක පත්	
5	ඩිප්ලෝමා	
6	උපාධිධාරී	
7	පශ්චාත් උපාධිධාරී	

8. ජන වර්ගය:

1	සිංහල	
2	දමිළ	
3	මුස්ලිම්	
4	බර්ග්ර්	
5	මැලේ	
6	වෙනත්	

9. ආගම:

1	බෞද්ධ	
2	ක්‍රිස්තියානි	
3	කතෝලි ක	
4	ඉස්ලාම්	
5	හිංදු	
6	වෙනත්	

10. පාසැල් කාළයේ හා ඉන් පසුව නියැලුනු බාහිර ක්‍රියාකාරකම් විනෝදාංශ:(එකක් හෝ කිහිපයක් සඳහන් කල හැක)

1	ක්‍රීඩා	
2	රූපවාහිනී/ චිත්‍ර පටි නැරඹීම	
3	සංගීතය ට සවන් දීම	
4	සංගීතය වාදනය	
5	කියවීම	
6	ලිවීම	
7	චිත්‍ර ඇඳීම	
8	සමාජ වෙබ් අඩවි ඇසුර	
9	වෙනත් (කරුණාකර සඳහන් කරන්න)	

පවුල් පසුබිම

11. ඔබ සිතන ලෙස ඔබගේ පවුල අයත් වන සමාජ ආර්ථික මට්ටම:

1	අඩු ආදායම්	
2	පහළ මධ්‍යම පාන්තික	
3	මධ්‍යම පාන්තික	
4	ඉහළ මධ්‍යම පාන්තික	
5	ඉහළ පාන්තික	

12. පියාගේ අධ්‍යාපන මට්ටම:

1	පාසැල් අධ්‍යාපනය ලබා නැත	
2	1-5 වසර දක්වා	
3	6 වසර - 10 වසර දක්වා	
4	සා/පෙළ දක්වා	
5	කාර්මික පුහුණු සහතික පත්‍ර	
6	උ/පෙළ දක්වා	
7	ඩිප්ලෝමා	
8	උපාධිධාරී	
10	පශ්චාත් උපාධිධාරී	

13. මවගේ අධ්‍යාපන මට්ටම:

1	පාසැල් අධ්‍යාපනය ලබා නැත	
2	1-5 වසර දක්වා	
3	6 වසර - 10 වසර දක්වා	
4	සා/පෙළ දක්වා	
5	කාර්මික පුහුණු සහතික පත්‍ර	
6	උ/පෙළ දක්වා	
7	ඩිප්ලෝමා	
8	උපාධිධාරී	
10	පශ්චාත් උපාධිධාරී	

14. ඔබගේ පවුලේ කිසිවෙකු (මව, පියා, සහෝදර, හෝ ලහම ඥාති) ත්‍රිවිධ හමුදාවක සේවය කර හෝ කරමින් සිටීද?

1	ඔව්	
2	නැත	

සමාජ මනෝ විද්‍යාත්මක පසුබිම

15. ඔබ හැදී වැඩෙන කාළය (අවුරුදු 18ට) පෙර ඔබ එකදිගට **මාස 6 ක් හෝ ඊට වැඩි කාලයක් මවගෙන්** බැහැරව ජීවත්ව සිටියේද?

1	ඔව්	
2	නැත	

(පිලිතුර 'නැත' නම් ප්‍රශ්න අංක 17 ට යන්න)

16. ඉහත ප්‍රශ්නයට පිලිතුර ඔව් නම් ඊට හේතුව කුමක්ද?

1	මව මිය ගියා	
2	දික්කසාද වී සිටියා	
3	වෙන්ව ජීවත් වූවා	
4	රැකියාවක් සඳහා පවුලෙන් බැහැරව ජීවත් වුනා	
5	විදේශගතව සේවය කලා	
6	ඔබ හැදී වැඩුනේ ළමා නිවාසයක	
7	මාස 6ට වැඩි කාලයක් මව රෝහල් ගතව සිටියා	
8	මව සිරගතව සිටියා	
9	වෙනත්	

17. ඔබ හැදී වැඩෙන කාළය (අවුරුදු 18ට) පෙර ඔබ එකදිගට **මාස 6 ක් හෝ ඊට වැඩි කාලයක් පියාගෙන්** බැහැරව ජීවත්ව සිටියේද?

1	ඔව්	
2	නැත	

(පිලිතුර 'නැත' නම් ප්‍රශ්න අංක 19 ට යන්න)

18. ඉහත ප්‍රශ්නයට පිලිතුර ඔව් නම් ඊට හේතුව කුමක්ද?

1	පියා මිය ගියා	
2	මව විවාහ වී සිටියේ නෑ	
3	දික්කසාද වී සිටියා	
4	වෙන්ව ජීවත් වූවා	
5	රැකියාවක් සඳහා පියා පවුලෙන් බැහැරව ජීවත් වුනා	
6	විදේශගතව සිටියා	
7	මාස 6ට වැඩි කාලයක් පියා රෝහල් ගතව සිටියා	
8	පියා සිරගතව සිටියා	
9	ඔබ හැදී වැඩුනේ ළමා නිවාසයක	
10	වෙනත්	

19. ඔබගේ ළමා කාළය තුළ (අවු: 18ට පෙර) පහත සඳහන් කුමන හෝ අත්දැකීමකට ඔබ මුහුණ දී තිබේද? (අදාල කරුණු සියල්ල ලකුණු කරන්න)

	අත්දැකීම	**ඔව් 1**	**නැත 2**
1	මානසික රෝගියෙකු සමග නිවසේ ජීවත් උනා		
2	මත් පැන් හෝ මත් ද්‍රව්‍ය වලට ඇබ්බැහි වූ කෙනෙකු සමග නිවසේ ජීවත් උනා		

20. ඔබගේ ළමා කාළය තුළ (අවු: 18ට පෙර) පහත සඳහන් කුමන හෝ අත්දැකීමකට ඔබ මුහුණ දී තිබේද? (අදාල කරුණු සියල්ල ලකුණු කරන්න)
කිසිදා නැත = 1, එක් වරක් පමණක් සිදුවුණි = 2, දෙතුන් වතාවක් සිදුවුණි =3
කිහිප වතාවක් සිදු වුණි = 4, නිතර නිතර සිදුවුණි = 5

		1	2	3	4	5
1	කායිකව අපයෝජනයට හෝ හිංසනයට පත් උනා					
2	මානසික අපයෝජනයට හෝ හිංසනයට පත් උනා					
3	ලිංගික අපයෝජනයට හෝ හිංසනයට පත් උනා					
4	මවට එරෙහි කරන ලද හිංසනයන් මගේ සියැසින් දුටුවා					

21. ඔබගේ ළමා කාලය ගැන සිතා බලද්දී අවු: (16ට පෙර) පහත සඳහන් ප්‍රකාශවල අසත්යතාවය සඳහන් කරන්න

No	**Behaviour**	සත්ය **1**	අසත්ය 2
1	මම අනෙක් ළමුන් සමග කායික ගැටුම් (ගහ ගැනීම්) වලට නිතර පැටලුනා		
2	පාසැලෙන් කට්ටි පැන්නා		
3	මගේ විනය විරෝධී හැසිරීම් නිසා මාව පාසැලෙන් නෙරපුවා/පන්ති තහනම් කලා		
4	පොලිසිය සමග ගැටුම් ඇති විය හැකි ආකාරයේ හෝ ගැටුම් ඇති වූ ක්‍රියාවල නියැලුනා		
5	අනෙක් අය රැවටීමේ හෝ බොරු කීමේ ප්‍රවනතාවක් මා තුල තිබුනා		
6	මම බොහෝ අවස්ථාවල ආවේගශීලීව හැසිරී හෝ ප්‍රතිචාර දක්වා තියෙනවා		
7	මම බොහෝ විට මගේ හෝ අන් අයගේ ආරක්ෂාව ගැන නොසලකා වැඩ කළා		
8	පරිවාස භාරයේ හෝ සහතික කළ පාසැලක සිටියා		

22. පහත සඳහන් වන්නේ පීඩාකාරී ජීවිත අත්දැකීම් වලට මුහුණ දීමෙන් පසුව පුද්ගලයින් දක්වන ප්‍රතිචාර කීපයකි. එම එක් එක් ප්‍රකාශ හොඳින් කියවා බලා පහත සඳහන් තත්වයන් ගෙන් ඔබ කෙතරම් දුරට පීඩා විඳින්නේද යන්න අදාල කොටුව තුල x ලකුණ යෙදීමෙන් සඳහන් කරන්න (කරුණාකර මෙහිදී පසුගිය **මසක** කාලය තුල ඔබගේ කායික මානසික තත්වය සැලකිල්ලට ගන්න)

	ප්‍රතිචාරය	කොහෙත් ම නැත(1)	ඉතා සුලු වශයෙන් 2	මධ්‍යස්ථ වශයෙන් 3	ටිකක් වැඩි වශයෙන් 4	ඉතා වැඩි වශයෙන් 5
1	අතීතයේ සිදු වූ අසහනකාරී සිදුවීමක් සම්බන්ධයෙන් නිතර නිතර මතුවන පීඩාකාරී මතකයන්, සිතුවිලි හෝ මානසික චිත්‍ර					
2	අතීතයේ සිදු වූ අසහනකාරී සිදුවීමක් නැවත සිහිගැන්වෙන යමක් සිදුවුවහොත් හෝ දුටුවහොත් දැඩිලෙස අපහසුවක් දැනීම					
3	අතීතයේ සිදු වූ අසහනකාරී සිදුවීමක් නැවත සිහිගැන්වෙනැයි බියෙන් සමහර ක්‍රියාකාරකම් හා අවස්ථා මග හැරීම					
4	අන් අයගෙන් දුරස් වූ හුදකලා ස්වභාවයක් දැනීම					
5	නොරිස්සුම් සහගත බවක් හෝ දැඩිලෙස කේන්ති යාම					
6	අවධානය රඳවා සිටීමේ අපහසුව					

23. ඔබ කිසියම් හෝ දිනක මානසික වෛද්‍යවරයෙකුගෙන්, මනෝ විද්‍යාඥයෙකුගෙන් හෝ මනෝ උපදේශකයෙකුගෙන් ප්‍රතිකාර ගෙන තිබේද?

1	ඔව්	
2	නැත	

24. ඉහත ප්‍රශ්නයටපිළිතුර ඔව් නම් ඔබ වෙත ලබා දෙන ලද රෝග විනිශ්චය හෝ ගැටලුවේ ස්වභාවය කුමක්ද?

1	විෂාදය		2	භීතිකාව		3	කාංසාව	
4	ග්‍රස්ථී අක්‍රමතාවය		5	පෞරුෂත්ව අක්‍රමතාවය		6	ද්විද්‍රැව විෂාදය	
7	පවුල් අර්බුධයක්		8	මානසික ආතතිය හා හැඩගැසීමේ ගැටලු		9	ඇබ්බැහිවීමක්	
10	අධ්‍යාපන ගැටලුවක්		11	රැකියාවේ ගැටලුවක්		12	හින්නෝන්මදය	
13	සබඳතා ගැටලුවක්		14	ලිංගික ගැටලුවක්		15	වෙනත්	
16	සඳහන් කිරීමට අකමැතියි		17	මතක නැත		18	නොදනී	

ඉහත කිසිදු වර්ගීකරණයකට ඔබගේ ගැටලුව අයත් නොවේනම් කරුණාකර ඔබගේ ගැටලුවේ ස්වභාවය සඳහන් කරන්න

25. ඔබට කිසියම් දිනක මනෝ වෛද්‍යවරයෙකුගේ හෝ මනෝ චිකිත්සකයෙකුගේ සේවාවක් ලබා ගැනීමට අවශ්‍යතාවය තිබී එහෙත් මොනයම් හෝ හේතුවක් මත එසේ නොකර සිට ඇත්ද?

1	ඔව්	
2	නැත	

26. ඉහත ප්‍රශ්නයට පිළිතුර 'ඔව්' නම් ඊට හේතුව කුමක්ද?

1	අනෙක් අය මාව ‘පිස්සෙකු’ හෝ දුර්වලයෙකු යැයි සිතාවී කියා ලැජ්ජා සිතුණි	
2	වේලාවක් නොතිබුණි	
3	මුදල් නොතිබුණි	
4	උපකාරයක් ගත හැක්කේ කාගෙන් දැයි නොදැන සිටියෙමි	
5	එවන් උපකාර ගතහැකි සේවාවක් නොතිබුණි	
6	ප්‍රතීකාර ගැනීමට තරම් ගැටලුව සංකීර්ණ යැයි නොසිතුණි	
7	මතක නැත	
8	වෙනත්	

27. ඔබ දන්නා පරිදි ඔබේ පවුලේ දෙමාපියන්, සහෝදර සහෝදරියන්, මවු පාර්ශ්වයේ ඥාතීන්, පිය පාර්ශවයේ ඥාතීන් කිසිවෙකු හෝ මානසික රෝගයකින් පෙළෙන්නේද/පෙළී ඇත්ද?

1	ඔව්	
2	නැත	
3	නොදනී	

කරුණාකර ඒ කුමක්දැයි සඳහන් කරන්න

28. වර්ථමානය හෝ අනාගතය ගැන ඔබට දැඩි බියක් ඇතිවී තිබේද?

1	ඔව්	
2	නැත	

29. ඔබට කිසියම් හෝ දිනක ජීවිතය නැති කරගැමනීට සිතී ඇත්ද?

1	ඔව්	
2	නැත	

30. එම අදහස කිසියම් හෝ දිනක ක්‍රියාවට නංවා තිබේද?

1	ඔව්	
2	නැත	

31. ඉහත ප්‍රශ්නයට පිලිතුර ඔව් නම් එසේ කළ වාර ගනන

1	එක් වතාවක් පමණි	
2	2-3 වතාවක්	
3	3ට වැඩි වාර ගනනක්	

32. ඔබ දන්නා පරිදි ඔබේ පවුලේ දෙමාපියන්, සහෝදර සහෝදරියන්, මවු පාර්ශ්වයේ ඥාතීන්, පිය පාර්ශවයේ ඥාතීන් කිසිවෙකු හෝ සියදිවි නසාගෙන හෝ එසේ කිරීමට තැත් කර තිබේද?

1	ඔව්	
2	නැත	
3	නොදනී	

කරුණාකර ඒ කවුදැයි සඳහන් කරන්න

33. මෙම රැකියාව සම්බන්ධ පහත එක් එක් කරුණු ඔබ අගයන්නේ කෙසේදැයි අදාල ලකුණුරවුම් කිරීමෙන් සඳහන් කරන්න

0 = කිසිසේත් වැදගත් නැත 1= එතරම් වැදගත්නැත

2= වැදගත් 3 = ඉතා වැදගත්

4= අතිශයින්ම වැදගත්

	කරුණ					**ඔබදෙන අගය**
1	වැටුප හා වරප්රසාද	**0**	**1**	**2**	**3**	**4**
2	කීර්තිය හා ගරුත්වය	**0**	**1**	**2**	**3**	**4**
3	බලය හා පාලනය	**0**	**1**	**2**	**3**	**4**
4	**විනෝදය**	**0**	**1**	**2**	**3**	**4**
5	නව අත්දැකීමක් ලැබීම	**0**	**1**	**2**	**3**	**4**
6	දියුණුවට ඇති අවස්ථාව	**0**	**1**	**2**	**3**	**4**
7	අන් අයට උදවු කිරීම	**0**	**1**	**2**	**3**	**4**
8	මවු බිමට සේවය කිරීම	**0**	**1**	**2**	**3**	**4**

34. හමුදා නිළධාරියෙකු සම්බන්ධව පහත ගතිලක්ෂණ ඔබ අගයන්නේ කෙසේද?

0 = කිසිසේත් වැදගත් නැත 1= එතරම් වැදගත්නැත

2= වැදගත් 3 = ඉතා වැදගත්

4= අතිශයින්ම වැදගත්

	ගතිලක්ෂණ					**ඔබදෙන අගය**
1	කායික ශක්තිය	**0**	**1**	**2**	**3**	**4**
2	මානසික ශක්තිය	**0**	**1**	**2**	**3**	**4**
3	නායකත්වය	**0**	**1**	**2**	**3**	**4**
4	අභිප්රේරණය	**0**	**1**	**2**	**3**	**4**
5	කණ්ඩායම් හැඟීම	**0**	**1**	**2**	**3**	**4**
6	ඉවසීම	**0**	**1**	**2**	**3**	**4**
7	තීරණ ගැනීමේ හැකියාව	**0**	**1**	**2**	**3**	**4**
8	අන් අයගේ හැඟීම් තේරුම් ගැනීම	**0**	**1**	**2**	**3**	**4**

Hardiness Scale පහත සඳහන් වන්නේ එක් එක් පුද්ගලයින් සිය ජීවිතය ගැන සිතන විවිධ ආකරයන් දැක්වෙන ප්‍රකාශයන් ය. එම එක් එක් ප්‍රකාශයන් ඔබ සම්බන්ධව කොතරම් දුරට සත්‍යදැයි ඉදිරියෙන් ඇති කොටුතුල X ලකුණ යෙදීමෙන් දක්වන්න . මෙම ප්‍රකාශ සඳහා හරි හෝ වැරදි පිළිතුරු නොමැත. එබැවින් ඔබගේ අවංක පිළිතුර ලබා දීමට කාරුණික වන්න.

ප්‍රකාශ සමග ඔබ කෙතරම් සත්‍යදැයි ඇඟවීමට පහත සඳහන් තේරුම් භාවිතා කරන්න.
කිසිසේත්ම සත්‍ය නොවේ
ඉතා සුලු වශයෙන් සත්‍ය වේ
බොහෝදුරට සත්‍ය වේ
සම්පූර්ණයෙන්ම සත්‍ය වේ

	කිසිසේත්ම සත්‍ය නොවේ	ඉතා සුලු වශයෙන් සත්‍ය වේ	සම්පූර්ණයෙන්ම සත්‍ය වේ	බොහෝදුරට සත්‍ය වේ
1. මගේ ජීවිතය වැඩි වශයෙන් ගතවන්නේ අර්ථවත් යමක් කිරීම සඳහායි				
2. මහන්සි වෙලා වැඩ කලොත් හැම විටම වගේ මට මගේ ඉලක්ක ජය ගන්න පුලුවන්				
3. මගේ එදිනෙදා එදිනෙදා වැඩ කටයුතු වලට වෙනසක් එකතු කරන්න මම කැමති නැහැ				
4. මට හිතෙනවා මගේ ජීවිතේ තරමක් දුරට තේරුම් රහිතයි කියලා				
5. සාමාන්ය දින චරියාවට වෙනසක් එකතු වෙනවට මම කැමතියි				
6. ජීවිතයේ සිදුවන දෑ මගේ ක්‍රියාකාරිත්වය මත රදා පවතී				
7. මගේ දෛනික කටයුතු පිළිබඳ මම ආශාවෙන් බලාපොරොත්තුව හිඳිමි				
8. මම හිතන්නේ නෑ මගේ අනාගතයවෙනුවෙන් ඒ හැටියමක් මට කල හැකියි කියලා				
9. එකවර වැඩ කීපයක් කරන්න වෙන අභියෝගවලට මම කැමතියි				
10. බොහොමයක් දිනවල මගේ ජීවිතය රසවත් හා උද්යෝගීමත්				
11. මගේ දිනචරියාවට බාධා වෙනකොට මට හරිම අපහසුයි				
12. මගේ ජීවිතයේ ඉතුරු කාලය කොහොමවෙයිද කියන එක තීරණය කලයුත්තේ මම විසින්මයි				
13. සාමාන්ය විදිහට ගත්තොත් මගේ ජීවිතය හරිම ඒකාකාරියි				
14. නිතර නිතර වෙනස් නොවන දින චරියාවකට මම කැමතියි				
15. අවසානයේදී දේවල් කොහොම සිද්ධවෙනවද කියලා තීරණය වෙන්නේ මම අද ගන්න තීරණ අනුව				

MTQ Scale

කරුණාකර පහත සඳහන් ප්‍රකාශ සමග ඔබ කෙතෙක් දුරට එකඟ වනාවාදැයි අදාල අංකය රවුම් කිරීමෙන් දක්වන්න. ඒ සඳහා පහත යතුර භවිතා කරන්න.

1 = දැඩි ලෙස එකඟ නොවෙමි
2 = එකඟ නොවෙමි
3 = එකඟ වන්නේ හෝ නොවන්නේ නොවෙමි
4 = එකඟ වෙමි
5 = දැඩි ලෙස එකඟ වෙමි
කරුණාකර පිළිතුරු සැපයීමේදී ප්‍රකාශය හොඳින් කියවා ඔබගේ සාමාන්‍ය හැසිරීම ගැන සිතා පිළිතුරු දෙන්න. එක් ප්‍රශ්නයකට වැඩි වෙලාවක් ගත නොකරන්න

Agree ⏩	⏪ Disagree				
1. මම සාමාන්‍යයෙන් මාව පෙළඹවිය හැකි දෙයක් හොයා ගන්නවා	1	2	3	4	5
2. මම සාමාන්‍යයෙන් පාලනයකින් යුක්ත කෙනෙක් බව හැඟෙනවා	1	2	3	4	5
3. මම වටිනා කෙනෙක් කියල මට හිතෙනවා	1	2	3	4	5
4. අභියෝග තියෙනවිට තමයි මම හොඳටම වැඩ කරන්නේ	1	2	3	4	5
5. අනෙක් අයත් එක්ක වැඩ කරන කොට මම සාමාන්‍යයෙන් බලපෑම් කරන සුලුයි	1	2	3	4	5
6. මගේ කාල සටහනේ අනපේක්ෂිත වෙනස්කම් මාව වියවුලට පත් කරනවා	1	2	3	4	5
7. මම සාමාන්‍යයෙන් පීඩනකාරී තත්වයකදී උනත් යමක් අත අරින්නේ නෑ	1	2	3	4	5
8. මට මගේ හැකියාවන් ගැන සාමාන්‍යයෙන් හොඳ විශ්වාසයක් තියෙනවා	1	2	3	4	5
9. මට දැනෙන්නේ මම ඔහේ එන එන දේකට මූණ දෙනවා මිසක් වැඩි යමක් කරන්නේ නෑ කියලා	1	2	3	4	5
10. ඇතැම් දේවල් බලාපොරොත්තු වෙන විදිහටම සිද්ධ නොවෙන බව මම දන්නවා	1	2	3	4	5
11. එකවර කළයුතු දේවල් ගොඩක් තියෙන අවස්ථාවලදී කොහෙන් පටන් ගන්නද කිලයා මට හිතා ගන්න බෑ	1	2	3	4	5
12. මගේ ජීවිතයේ සිද්ධවෙන දේවල් ගැන පාලනයක් මට තියෙනවා කිලයා සාමාන්‍යයෙන් මට හැඟෙනවා	1	2	3	4	5
13. දේවල් කොච්චර නරක විදිහට සිද්ධ උනත් අවසානයේදී ඒ හැම එකක්ම හොඳින් විසඳෙන බව මට හිතෙනවා	1	2	3	4	5
14. මම හැම තිස්සෙම හිතන්නේ මගේ ජීවිතේ සිද්ධවෙන දේවලි කලින් දැනගන්න පුලුවන් නම් කොච්චර හොඳද කියලා	1	2	3	4	5
15. මම දෙයක් සැලසුම් කලොත් මොනවාහරි හේතුවකින් ඒක කඩා කප්පල් වෙනවා	1	2	3	4	5
16. මම සාමාන්‍යයෙන් ජීවිතයේ එළිය පැත්ත ගැන දකින කෙනෙක්	1	2	3	4	5
17. සාමාන්‍යයෙන් මට යමක් කියන්න තියෙනවානම් හිතේ තියෙන දේ කෙලින්ම කියනවා	1	2	3	4	5
18. සමහර වෙලාවට මට හිතෙනවා මම කිසිම වැඩකට නැති පුද්ගලයෙක් කියලා	1	2	3	4	5
19. මට පවරන කෘයයක් නිම කරන බවට මං කෙරෙහි විශ්වාසය තියන්න පුලුවන්	1	2	3	4	5
20. සුදුසුයැයි හැඟෙන අවස්ථාවල මම සාමාන්‍යයෙන් මූලිකත්වය ගන්නවා	1	2	3	4	5

21. මට සාමාන්‍යයෙන් සැහැල්ලු වෙන්න අමාරුයි	**1**	**2**	**3**	**4**	**5**
22. මම නියැලිලා ඉන්න වැඩ කෙරෙහි ඇති අවධානය ලේසියෙන්ම බිඳෙනවා	1	2	3	4	5
23. මම සාමාන්‍යයෙන් එන ඕනම ප්‍රශ්නයක් හොඳින් දරා ගන්නවා	1	2	3	4	5
24. යමක් වරදුනා කියලා සාමාන්‍යයෙන් මම මට දොස් පවරගන්නේ නෑ	1	2	3	4	5
25. මම සාමාන්‍යයෙන් **100%** දෙන්න උත්සාහ කරන කෙනෙක්	1	2	3	4	5
26. මට දුක හිතුන හෝ තරහා ගිය වෙලාවට මම ඒක අනෙක් අයට දැනෙන්න අරිනවා	1	2	3	4	5
27. මම යමක් වෙන්න කලින්ම ඒ ගැන තැවෙනවා	1	2	3	4	5
28. සෙනග ගැවසෙන තැන්වලදි මට සාමාන්‍යයෙන් බියක් දැනෙනවා	1	2	3	4	5
29. ආමාරු අවස්ථාවලදී මම දේවල් අත අරිනවා	1	2	3	4	5
30. අනපේක්ෂිත යමක් උනොත් සාමාන්‍යයෙන් මට ඉක්මනින් ප්‍රතිචාර දක්වන්න පුලුවන්	1	2	3	4	5
31. සැළකියුතු පීඩනකාරී තත්වයකදී උනත් මට සංසුන්ව ඉන්න පුලුවන්	1	2	3	4	5
32. යමක් වරදින්න තියෙනවානම් ඒක වෙනවාම තමයි	1	2	3	4	5
33. සාමාන්‍යයෙන් මට යම් යම් දේවල් මගේ බලපෑමකින් තොරව ඔහේ සිද්ධ වෙනවා	1	2	3	4	5
34. මම සාමාන්‍යයෙන් මගේ චිත්තවේග අනෙක් අයගෙන් සඟවා ගන්නවා	1	2	3	4	5
35. වෙහෙස වූ වෙලාවට මට මානසික වශයෙන් ශක්තිය යොදවන්න අමාරුයි	1	2	3	4	5
36. මගේ අතින් යම් වැරැද්දක් උනොත් එයින් පස්සේ දවස් ගානක් යනකනුත් මම ඒ ගැන හිත හිතා දුක් වෙනවා	1	2	3	4	5
37. මට මහන්සි දැනුනොත් එයින් පස්සේ වෙන මොකුත් කරන්න බෑ	1	2	3	4	5
38. අනෙක් අයගෙන් අපේක්ෂා කරන කාර්යයන් කිසිදු අපහසු තාවයකින් තොරව ඒ අයට කියන්න මට පුලුවන්	1	2	3	4	5
39. මට දිගු වේලාවක් යමක් වෙත ඉහළ මට්ටමින් මානසික ශක්තිය යොදවාගෙන ඉන්න පුලුවන්	1	2	3	4	5
40. මගේ දින චරියාවේ වෙනසක් වෙනතුරු මම ආසාවෙන් බලාගෙන ඉන්නවා	1	2	3	4	5
41. මට හිතෙනවා මම මොනවා කලත් එයින් කිසිම දෙයක් වෙනස් වෙන්නේ නෑ කියලා	1	2	3	4	5
42. මට කරන්න නියමිතව තියෙන කාර්යයට ලොකු උනන්දුවක් ඇතිකර ගන්න මට සාමාන්‍යයෙන් අමාරුයි	1	2	3	4	5
43. මත හැහෙනවා නම් යෙමෙක් වැරදියි කියලා ඒ අය එක්ක වාද කරන්න මම පැකිලෙන්නේ නෑ	1	2	3	4	5
44. මම සාමාන්‍යයෙන් අභියෝගවලින් තෘප්තියක් ලබනවා	1	2	3	4	5
45. මම සාමාන්‍යයෙන් මානසික නොසන්සුන්තාවයන් හොඳින් පාලනය කර ගන්නවා	1	2	3	4	5
46. සාකච්ඡාවලදී මගේ මතය හොඳටම නිවැරදියි කියලා දැනුනත් මම පහු බහිනවා	1	2	3	4	5
47. බිඳවැටීම ඇති උනාම මට ඉලක්කවලට යන්න අමාරුයි	1	2	3	4	5
48. මට මුහුණ දෙන්න වෙන අභියෝග අනුව මාව හැඩගස්සවා ගන්න මට සාමාන්‍යයෙන් පුලුවන්	1	2	3	4	5

Resilience Scale

පහත සඳහන් වාක්යවලට ඔබ කෙතරම් දුරට එකඟ වනවාද එකඟ නොවෙනවාද යන්න සිතා ඊට ගැලපෙන අංකය රවුම් කරන්න

	එකඟ නොවෙනවා						එකඟ වෙනවා
1. මම සැලසුම් කරන දේ ක්රියාත්මක කරන්න උත්සාහ කරනවා	1	2	3	4	5	6	7
2. සාමාන්යයෙන් මම කුමන ආකාරයකින් හෝ මාගේ අරමුණු ඉටු කර ගන්නවා							
3. අන් අයට වඩා මට මා ගැන විශ්වාසයක් තිබේ							
4. දේවල් ගැන උනන්දුවෙන් සිටීම මට වැදගත් ය							
5. අවශ්ය වූ විට මට තනිව සිටිය හැක							
6. මාගේ අරමුණු සාර්ථකව ඉටු කරගැනීම ගැන මම සාඩම්බරයි							
7. මම සාමාන්යයෙන් නොසැලී කටයුතු වල යෙදෙමි							
8. මම ගැන මම සෑහීමකට පත් වෙමි							
9. වැඩ කීපයක් එකවර කරගැනීමට පුලුවන් යැයි මට හැඟෙනවා							
10. මම අධිෂ්ඨානශීලියි							
11. ජීවිතයේ තේරුම පිළිබඳ මම කලාතුරකින්වත් නොසිතමි							
12. මම එදිනෙදා කටයුතු සඳහා පමණක් යෙදෙන්නෙමි							
13. මට දුෂ්කරතාවන්ට මුහුණදිය හැක්කේ මට ඒ පිළිබඳ ලත් පෙර අත්දැකීම් නිසා							
14. මට හොඳ විනයක් තිබේ							
15. මම සෑම දෙයක් ගැනම උනන්දුවෙන් සිටිනවා							
16. මට සාමාන්යයෙන් සිනාසීමට හේතුවක් සොයා ගත හැක							
17. මගේ ආත්ම විශ්වාසය මට දුෂ්කර අවස්ථාවන් වලදී රුකුලක් ය							
18. සාමාන්යයෙන් හදිසියකදී කෙනෙකුට මා කෙරෙහි විශ්වාසය තැබිය හැක							
19. යම් අවස්ථාවක් ගැන විවිධ කෝණ වලින් බලන්න මට පුලුවන්							
20. අකමැත්තෙන් වුවත්, අවශ්ය දේ කිරීමට මට හැකිය							
21. මාගේ ජීවිතය අර්ථවත් ය							
22. මට වෙනස් කිරීමට නොහැකි දේවල්ගැන මම ඒ හැටි කල්පනා නොකරමි							
23. සාමාන්යයෙන් අසීරු අවස්ථාවකින් ගැලවීමට මට මගක් සොයා ගත හැකිය							
24. මට කරන්න දෙවල් වලට මට නිසි ශක්තිය ඇත							
25. මට අකමැති අය සිටියට මට කමක් නැහැ							

Appendix 3.2 Debrief Form

DEBRIEF FORM

Debriefing information (Let participant take this with them)

Title: DEVELOPING A PSYCHOMETRIC TOOL TO ASSESS PRE-ENLISTMENT PSYCHOLOGICAL RESILIENCE OF SECURITY FORCES PERSONNEL

Name of Principal Investigator and Researcher: H.G.Kanthilatha Prof. Richard Hammersley

Background and Research Question:

High prevalence of psychological problems, attrition, suicides and suicidal attempts are common in armed forces. There are several contributing factors to this. While nature of the war and the structure of the military system being the main contributing factors researchers have confirmed that some pre-enlistment personality characteristics also increase the vulnerability of developing psychological issues in military persons. When such people are recruited in to military services consequently, they can find it difficult to adjust to the high demands of a military setting and combat experience. As a result, the number of psychological diagnoses, actual and attempt suicides, work related and family related issues and substances abuse among military personnel increase. Not only this creates a bad image about military services on general public and military personnel themselves it also leads to sever social and financial issues.

Screening officers and soldiers for psychological resilience before recruitment has been suggested by recent researches as a way of minimizing such negative consequences. Most of the military services in Western and other parts of the world use various psychological screening tools at the recruitment level and gain positive outcome. It has been observed that both military service and the servicemen are benefited by utilizing such screening tools.

Now it is the right time for all armed forces in Sri Lanka to raise their bar for recruitment in order to recruit most suitable persons in to their services as there is no urgency of recruitment unlike in the war period.

Thus the current study is aiming to develop a comprehensive psychometric screening tool to be used in the process of officer recruitments for Sri Lanka armed forces considering several other tools used by other military services in the world and in accordance with latest research findings. The first step would be to develop and validate a psychological screening tool for Sri Lanka military services and then the second study will test the predictive validity of this screening tool with newly recruited cadet officers in tri forces.

Research question

What are the pre-enlistment psychosocial factors contributing to the performance and wellbeing of a military officer?

Anticipated findings: The findings will confirm whether this newly developed tool is suitable to be used in the recruitment process of the armed forces in Sri Lanka. Potentially, this would be then used as part of the recruitment process to help to disqualify the people who are unfit to armed forces.

Further information:

If you have any complaints, concerns, or questions about this research, please feel free to contact,

Prof. Richard Hammersley

Appendix 3.3 Information sheet for study 1 English and Sinhala versions

I

Information sheet

Title: Developing a psychological screening tool to assess pre-enlistment psychological resilience of security forces personnel

Researcher name: Lieutenant Commander H.G. Kanthilatha (Clinical Psychologist Sri Lanka Navy)

Purpose of Study
The purpose of this study is to develop a comprehensive psychometric test to be used in the process of officer recruitments for Sri Lanka armed forces. It aims to select most suitable persons for armed services in order to minimize developing psychological issues, substance abuse and suicides rates among military personnel. This could lead to more professional military services in line with International Humanitarian Laws. Reputation of the armed forces in Sri Lanka will be positively affected with implementation of the tool. In other way implementing this tool will help individuals to identify themselves whether they are suitable for a military services or not and with that understanding they can make the decision prior to the enrolment.

Procedures
The participants of this study will require to fill up a series questionnaire which measure participants' hardiness, mental toughness and resilience including demographic and childhood experiences. This information will be used to validate a psychological screening tool which will be used for new recruitment only.
It can be assured that none of the participant of this study will be affected negatively by participating or not participating in this study. All these information will be gathered by the counselling officers or designated research officers in service and completed questionnaires will be handled confidently only by the research team.

How much of your time will participation involve?
The questionnaire should take approximately 30 minutes to answer

Will your participation in the project remain confidential?
If you agree to take part, your name will not be recorded on the questionnaires and the information will not be disclosed to other parties. Your responses to the questions will be used for the purpose of this project only. You can be assured that if you take part in the project you will remain anonymous. Completed questionnaire should be returned in a sealed envelope provided by the research team.

Will you able to withdraw from the study?

You may withdraw from the study at any point (before, during and after) of the study process without any negative consequences. We will remove all your data from the study as you withdraw.

Payment
Participants will not get any financial benefit by participation in this study.

Potential Risks and Ethical Consideration
There is no particular risk of participating in this study as military officer. However there is a possibility of feeling discomfort while answering the questionnaire as some negative childhood memories will associate with some of the personal questions. No other risks are known to the investigator at this time. Your score in this study will not do any influence on your career in the

service. Though the your information in this study are not going to share with the system if you find any psychological discomfort while completing these questionnaires you are welcome to contact the main researcher or and counselling officers in your service to discuss this.

Benefits
Your contribution will be highly valued for future enhancement of the military services and enhancement of scientific knowledge in Sri Lanka.

What happens now?
If you are interested in taking part in the study you are asked to complete and sign the consent form. Then you will be given more specific instructions. Do not sign if you do not wish to take part. Please feel free to ask any questions that you may have.

Contact for Further Information
If you need any further information about the study you may contact me

තොරතුරු පත්‍රිකාව - පළමු අධ්‍යනය

අධ්‍යන මාතෘකාව: ශ්‍රී ලාංකික ආරක්ෂක සේවාවන්ට බඳවා ගන්නා නිළධාරීන් ගේ බඳවා ගැනීමට පෙර පවතින ඔරොත්තු දීමේ හා හැඩ ගැසීමේ හැකියාව මැන බලන මනෝවිද්‍යාත්මක මෙවලමක් ගොඩනැගීම හා වලංගු කිරීම

පරීක්ෂණය මෙහෙයවන්නා: ලුතිනන් කොමාන්ඩර් එච්.ජී. කාන්තිලතා, සායනික මනෝවිද්‍යාඥ ශ්‍රී ලංකා නාවික හමුදාව

පරීක්ෂණ අධීක්ෂණය: මහාචාර්ය ජොර්ජ් රිච්චර්, මනෝවිද්‍යා අධ්‍යන අංශය, හල් විශ්ව විද්‍යාලය, එක්සත් රාජධානිය.

අධ්‍යනයේ අරමුණු:

මෙම අධ්‍යනයේ මූලික පරමාර්ථය වන්නේ ශ්‍රී ලංකා ආරක්ෂක අංශවලට බඳවා ගැනීමේ දී භාවිතා කළ හැකි මනෝවිද්‍යාත්මක මෙවලමක් ගොඩනැගීමයි. මෙමගින් ආරක්ෂක අංශයන් සඳහා වඩාත් ගැලපෙන නිළධාරීන් තෝරා ගැනෙන අතර ආරක්ෂක නිළධාරීන් අතර ඇති මානසික රෝගී තත්වයන්, සියදිවි නසා ගැනීම් හා තැත් කිරීම්, මත්ද්‍රව්‍ය අනිසි ලෙස භාවිතය යනාදී ගැටළු අවම කිරීමට හේතුවන අතර එමගින් ශ්‍රී ලාංකික හමුදාවන් කෙරෙහි යහපත් ප්‍රතිරූපයක් ගොඩනැගීමට හැකි වනු ඇත. ව්‍යාත්තීය හමුදා සේවයකට මෙය මහත් රුකුලක් වනු ඇත.

මෙම මනෝවිද්‍යාත්මක මෙවලම භාවිතා කිරීමෙන් අයදුම්කරුවන්හටද තමා හමුදා සේවයට සුදුසුද නැද්ද යනවග කලින්ම තීරණය කලහැකි වීමෙන් අනිවිය හැකි ගැටළුකාරී තත්වයන් අවම කරගත හැක.

අධ්‍යන ක්‍රම වේදය.

මෙම අධ්‍යනය අධ්‍යයර දෙකකින් යුතු අතර මේ ඉන් පළමු වැන්නයි. මීට සහභාගීවන්නන් හට සම්පූර්ණ කිරීම සඳහා ප්‍රශ්නාවලියක් ඉදිරිපත් කෙරෙනු ඇත. මෙම ප්‍රශ්නාවලිය මගින් සහභාගීවන්නන් ගේ ප්‍රජා තොරතුරු, පවුල් පසු බිම, මනෝ සමාජීය පසුබිම මෙන්ම ඔවුන් ගේ මානසික දෘඩතාවය, මානසික හැඩ ගැසීමේ හැකියාව, මනසික දැඩිබව මැන බලීමට ප්‍රශ්නාවලි කීපයක් ද මීට ඇතුලත් කෙරෙනු ඇත.

මෙම පරීක්ෂණයට සහභාගී වීමේ හෝ නොවීමේ තීරණය සම්පූර්ණයෙන්ම ඔබ සතු වන අතර සහභාගී වීමෙන් හෝ නොවීමෙන් කිසිදු ආකරයේ ව්‍යාත්තීය හෝ පෞද්ගලික අහිතකර ප්‍රතිඵලයක් අත් නොවන බව තහවුරු කල හැක. ජීයේෂණයට අදාල සියළු තොරතුරු රැස් කිරීම ඔබ සේවයේ නියුක්ත උපදේශන නිලධාරීන් විසින් හෝ වෙනත් නම් කරන ලද නිලධාරියෙකු විසින් සිදු කරනු ලබන් අතර සම්පූර්ණ කරන ලද ප්‍රශ්නාවලි පරීක්ෂණ කන්ඩායම විසින් පමනක් මෙහෙයවනු ඇත. සම්පූර්ණ කරන ලද ප්‍රශ්නාවලිය මුද්‍රා තබන ලද කවරයක බහා බාර දෙන්න.

ජීයේෂණය සඳහා ගතවන කාලය:

මෙම ප්‍රශ්නාවලිය සම්පූර්ණ කිරීම සඳහා ආසන්න වශයෙන් මිනිත්තු 30ක කාලයක් ගතවනු ඇත.

තොරතුරුවල රහස්ය භාවය

ඔබ මෙම අධ්යනයට සහභාගී වීමට එකඟ වන්නේ නම් ඔබ සපයන සියළු තොරතුරු නිර්නාමිකව හා රහස්යභාවයෙන් යුතුව භාවිතා කිරීමට ඒයේෂණ කණ්ඩායම බැඳී සිටී. මෙම තොරතුරු අධ්යන පරමාර්ථය සඳහා පමණක් භාවිතා වන අතර ඉන්පසුව විනාශ කෙරෙනු ඇත. අධ්යන කණ්ඩායම හැර කිසිදු පුද්ගයෙකුට මෙම තොරතුරු නිරාවරණය නොවනු ඇත.

ගෙවීම්

මෙම අධ්යනයට සහභාගීවීම වෙනුවෙන් ඔබට කිසිදු මූල්ය ප්රතිලාභයක් අත් නොවනු ඇත.

සිදුවිය හැකි අවධානම් තත්වයන් සහ ආචාර ධර්ම ගැටළු

මෙම අධ්යනයට සහභාගීවීමෙන් සිදුවියහැකි විශේෂ අවධානම් තත්වයක් හඳුනාගෙන නොමැත. එහෙත් මෙම ප්රශ්නාවලියේ අසන ඇතම් පෞද්ගලික ප්රශ්නවලට පිළිතුරු දීමේදී සහභාගීවන්නාගේ ලමා කාළයේ අමිහිරි මතකයන් අවධිවීමෙන් යම් මානසික අපහසුතාවයක් ඇතිවිය හැක. ඒ හැරුණු කොට ඔබ මෙම ප්රශ්නාවලීන්ට ලබාගන්නා ලකුණු කිසිදු ආකාරයකින් ඔබගේ වෘත්තියට බලපෑමක් නොකරනු ඇත. ඔබ අප වෙත ලබදෙන තොරතුරු වෙන කිසිවෙකුටත් ලබා නොදුන්නද අධ්යනයට සහභාගී වීමෙන් යම් කිසි මානසික අපහසුතාවයක් ඇති වුවහොත් ඒ පිළිබඳව උපදේශන නිළධාරීනි හමුවී සාකච්ඡා කිරීමට ඔබට අවස්ථාව ඇත.

මෙම අධ්යනයට සහභාගීවීමේ වාසි

ඔබ මෙම අධ්යනයට සහභාගීවීමෙන් ශ්රී ලංකාවේ ආරක්ෂක අංශවල ගුණාත්මකභාවය වැඩිදියුණු කිරීමට මෙන්ම විද්යාත්මක දැනුම් ලෝකය පුළුල් කිරීමටද ඔබට දායක විය හැක.

මෙම අධ්යනය පිළිබඳ ඕනෑම ගැටළුවක් අතොත් අධ්යනයට පෙර, අතර්තුරදී හෝ අධ්යනය අවසානයේදී අසා දැනගන්න.

වැඩි විස්තර දැනගැනිම සඳහා ලියන්න: ලු.කොං. එච්.ජී. කාන්තිලතා, සායනික මනෝවිද්යාඥ, ශ්රී ලංකා නාවික හමුදාව, නාවික රෝහල, වැලිසර.

kanthihettigoda@gmail.com

Appendix 3.4 Consent form English and Sinhala versions

CONSENT FORM

TITLE OF PROJECT: **DEVELOPING A PSYCHOLOGICAL SCREENING TOOL TO ASSESS PRE-ENLISTMENT PSYCHOLOGICAL RESILIENCE OF SECURITY FORCES PERSONNEL**

Investigators: H.G. Kanthilatha , Prof. Richard Hammersley

Department of Psychology, University of Hull

The participant should complete the whole of this sheet himself/herself. Please cross out as necessary

- Have you read and understood the participant information sheet

  YES/NO
- Have you had the opportunity to ask questions and discuss the study

  YES/NO
- Have all the questions been answered satisfactorily

  YES/NO
- Have you received enough information about the study

  YES/NO
- Do you understand that you are free to withdraw from the study:

  at any time without having to give a reason

  YES/NO
- Do you agree to take part in the study

  YES/NO

This study has been explained to me to my satisfaction, and I agree to take part. I understand that I am free to withdraw at any time.

Signature of the Participant. . . . . .

Date. . . . . .

Name (in block capitals) . . . . . .

I have explained the study to the above participant and he/she has agreed to take part.

Signature of researcher . . . . . .

Date. . . . . .

අධ්‍යයනයට සහභාගී වීමට කැමැත්ත පල කිරීමේ පෝරමය

අධ්‍යයන මාතෘකාව: ශ්‍රී ලාංකික ආරක්ෂක සේවාවන්ට බඳවා ගන්නා නිළධාරීන් ගේ බඳවා ගැනීමට පෙර පවතින ඔරොත්තු දීමේ හා හැඩ ගැසීමේ හැකියාව මැන බලන මනෝවිද්‍යාත්මක මෙවලමක් ගොඩනැගීම හා වලංගු කිරීම

පරීක්ෂණය මෙහෙයවන්නා: ලුතිනන් කොමාන්ඩර් එච්.ජී. කාන්තිලතා, සායනික මනෝවිද්‍යාඥ ශ්‍රී ලංකා නාවික හමුදාව

පරීක්ෂණ අධීක්ෂණය: මහාචාර්ය ජොර්ජ් රිච්ටර්, මනෝවිද්‍යා අධ්‍යයන අංශය, හල් විශ්ව විද්‍යාලය, එක්සත් රාජධානිය.

සහභාගී වන්නන් විසින් මෙම පෝරමය සම්පූර්ණ කලයුතු අතර අනවශ්‍ය වචන කපා හරින්න

ඔබ විසින් සහභාගීවන්නන් දැනුවත් කිරීමේ පත්‍රිකාව හොඳින් කියවා බැලුවේද? ඔව් / නැත

ඔබට ඒ පිළිබඳ යම් ගැටලුවක් වී නම් එය විමසා බැලීමට අවස්ථාවක් ලැබුනේද? ඔව් / නැත

එම ප්‍රශ්න සියල්ලටම ඔබට සෑහීමකට පත්විය හැකි පිළිතුරු ලැබුනේද? ඔව් / නැත

මෙම අධ්‍යයනය පිළිබඳ ප්‍රමානවත් තරම් තොරතුරු ඔබට ලැබුනේද? ඔව් / නැත

හේතු දැක්වීමකින් තොරව ඕනෑම අවස්ථාවකදී මෙම අධ්‍යනයෙන් ඉවත් වීමට ඔබට තීරණය කලහැකි බව ඔබ තේරුම් ගත්තේද? ඔව් / නැත

ඔබ මෙම අධ්‍යනයට සහභාගී වීමට එකඟ වන්නේද? ඔව් / නැත

මෙම අධ්‍යනය පිළිබඳ මාහට සෑහීමකට පත් විය හැකි තරම් පැහැදිලි කරදීමක් කර දී ඇත. අවශ්‍ය නම් ඕනෑම අවස්ථාවකදී අධ්‍යනයෙන් ඉවත් වීමට හැකි බව මම දනිමි.

සහභාගීවන්නාගේ අත්සන:

දිනය:

නම:

ඉහත සහභාගීවන්නාහට අධ්‍යනය පිළිබඳ තොරතුරු මවිසින් සපයන ලද අතර ඔහු/ඇය අධ්‍යනය සඳහා සහභාගී වීමට කැමැත්ත පළ ලකරන ලදි.

පරීක්ෂකගේ අත්සන:

දිනය:

Appendix 3.5 Ethics approval from department of psychology, University of Hull

Dear **Prof R Hammersley**,

Ethics Application Approved

The following ethics application has been approved

Reference	480612-1442315891
Title	DEVELOPING A PSYCHOLOGICAL SCREENING TOOL TO ASSESS PRE-ENLI
Classification	Exceptional
Researcher	K Hettigoda Gamage (h.g.kanthilatha@2014.hull.ac.uk)
Principal (PI)	Prof R Hammersley (r.hammersley@hull.ac.uk)

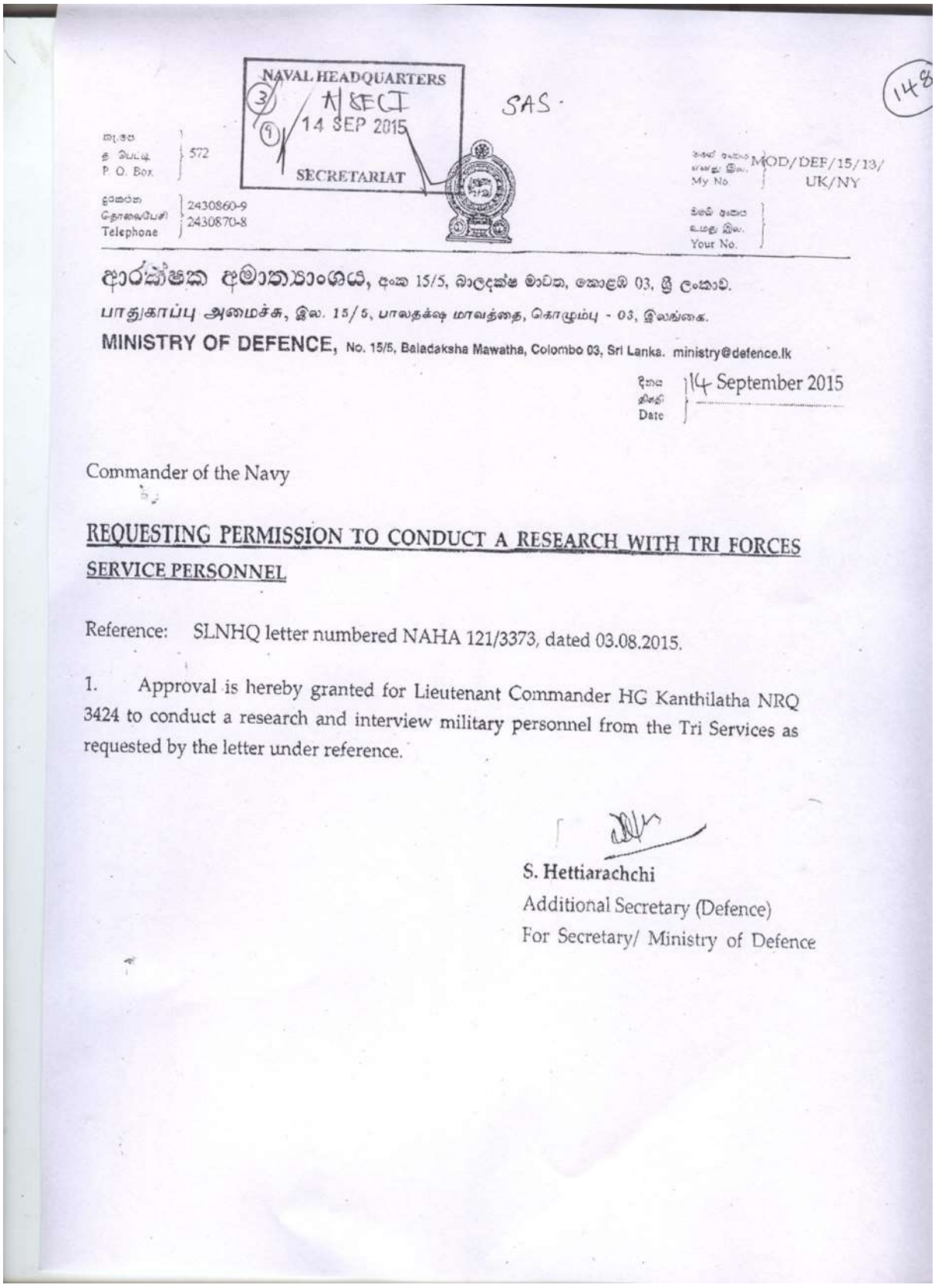
Use the reference *480612-1442315891* in any correspondence about this application.

http://psy.hull.ac.uk/Committees/Ethics/Apply/

Best Regards,

Ethics Applications
Department of Psychology
University of Hull.

Appendix 3.6 Approval letter from Ministry of Defence Sri Lanka



NAVAL HEADQUARTERS
3 A/SEC I
9 14 SEP 2015
SECRETARIAT

SAS.

148

P. O. Box 572
Telephone 2430860-9, 2430870-8

My No. MOD/DEF/15/13/ UK/NY
Your No.

ආරක්ෂක අමාත්‍යාංශය, අංක 15/5, බාලදක්ෂ මාවත, කොළඹ 03, ශ්‍රී ලංකාව.
பாதுகாப்பு அமைச்சு, இல. 15/5, பாலதக்ஷ மாவத்தை, கொழும்பு - 03, இலங்கை.
MINISTRY OF DEFENCE, No. 15/5, Baladaksha Mawatha, Colombo 03, Sri Lanka. ministry@defence.lk

Date 14 September 2015

Commander of the Navy

REQUESTING PERMISSION TO CONDUCT A RESEARCH WITH TRI FORCES SERVICE PERSONNEL

Reference: SLNHQ letter numbered NAHA 121/3373, dated 03.08.2015.

1. Approval is hereby granted for Lieutenant Commander HG Kanthilatha NRQ 3424 to conduct a research and interview military personnel from the Tri Services as requested by the letter under reference.

S. Hettiarachchi
Additional Secretary (Defence)
For Secretary/ Ministry of Defence

Appendix 3.7 Comparison of means of scales by military services

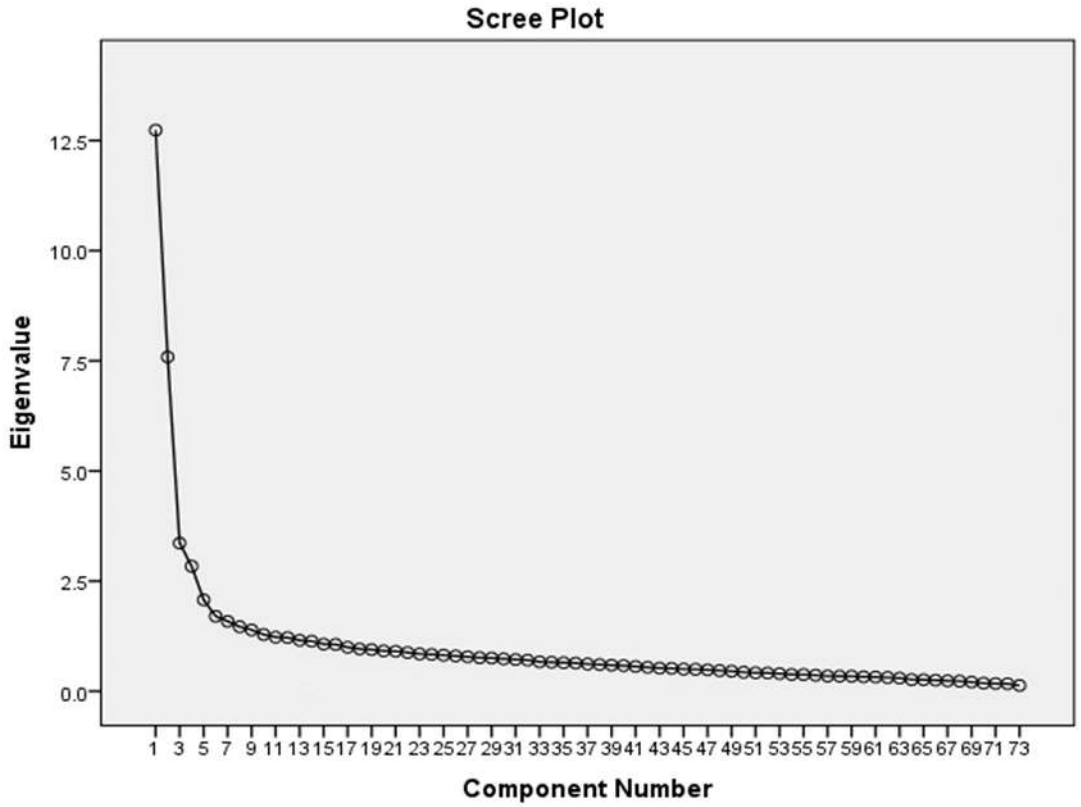
			Sum of Squares	df	Mean Square	F	Sig.
DRSTotal * MService Military Service	Between Groups	(Combined)	150.993	2	75.497	3.194	.041
	Within Groups		22620.218	957	23.637		
	Total		22771.212	959			
MTQTotal * MService Military Service	Between Groups	(Combined)	704.674	2	352.337	1.008	.365
	Within Groups		334568.637	957	349.602		
	Total		335273.311	959			
REsTotal * MService Military Service	Between Groups	(Combined)	8443.810	2	4221.905	6.776	.001
	Within Groups		596299.021	957	623.092		
	Total		604742.831	959			

APPENDIX 3.8

Descriptive statistics for scales

			Statistic	*Std. Error*
MTQTotal MTQ Total	*Mean*		170.62	.620
	95% Confidence Interval for Mean	*Lower Bound*	169.40	
		Upper Bound	171.84	
	5% Trimmed Mean		170.71	
	Median		171.00	
	Variance		358.402	
	Std. Deviation		18.931	
	Minimum		82	
	Maximum		235	
	Range		153	
	Interquartile Range		24	
	Skewness		-.157	.080
	Kurtosis		.686	.160
Resiliencetotal Resilience Total	*Mean*		131.83	.827
	95% Confidence Interval for Mean	*Lower Bound*	130.21	
		Upper Bound	133.45	
	5% Trimmed Mean		133.97	
	Median		137.00	
	Variance		636.244	
	Std. Deviation		25.224	
	Minimum		25	
	Maximum		175	
	Range		150	
	Interquartile Range		25	
	Skewness		-1.496	.080
	Kurtosis		3.002	.160
TotalHardiness Hardiness Total	*Mean*		31.24	.166
	95% Confidence Interval for Mean	*Lower Bound*	30.91	
		Upper Bound	31.57	
	5% Trimmed Mean		31.26	
	Median		32.00	
	Variance		25.632	
	Std. Deviation		5.063	
	Minimum		13	
	Maximum		45	
	Range		32	
	Interquartile Range		7	
	Skewness		-.116	.080
	Kurtosis		-.017	.160

Appendix 3.9 Scree plot for the PCA with 476 data



Appendix 3.10

Factor loadings and communalities based on Principal component analysis with oblimin rotation for 88 items from MTQ, RS and DRS scales (N=476) for 5 Factors

	Component					Commun
Item	1	2	3	4	5	alities
REs17 My belief in myself gets me through hard times	.880					.774
REs18 In an emergency, I am someone people generally can rely on	.875					.746
REs3 I am able to depend on myself more than anyone else	.852					.730
REs6 I feel proud that I have accomplished things in my life	.823					.659
REs19 I can usually look at a situation in a number of ways	.816					.661
REs4 Keeping interested in things is important to me	.810					.667
REs24 I have enough energy to do what I want to do	.793					.666
REs14 I have self-discipline	.780					.593
REs15 I keep interested in things	.777					.651
REs10 I am determined	.772					.611
REs1 When I make plans I usually go through with them	.754					.598
REs8 I am friends with myself	.752					.652
REs5 I can be myself if I have to	.743					.521
REs7 Usually I take things in stride	.737					.600
REs21 My life has meaning	.729					.636
REs9 I feel that I can handle many things at a time	.725					.588
REs23 When I am in a difficult situation, I can usually find my way out of it	.724					.552
REs2 I usually manage one way or other	.702					.503
REs20 Sometimes I make myself do things whether I want to or not	.664					.461
REs16 I can usually find something to laugh about	.631					.407
MTQ37 When I am feeling tired I find it difficult to get going		.613				.403
MTQ47 When I face setbacks I am often unable to persist with my goal		.610				.382
MTQ36 When I make mistakes I usually let it worry me for days after		.596				.342
MTQ6 Unexpected changes to my schedule generally throw me		.583				.320
MTQ35 I usually find it difficult to make a mental effort when I am tired		.583				.346

Continued appendix 3.10

MTQ22 I am easily distracted from tasks that I am involved with	.560				.378
MTQ33 Things just usually happen to me	.551				.340
MTQ41 I feel that what I do tends to make no difference	.524				.363
MTQ27 I tend to worry about things well before they actually happen	.515				.287
MTQ14 I often wish my life was more predictable	.511				.278
MTQ21 I generally find it hard to relax	.499				.241
MTQ7 I don't usually give up under pressure		.674			.435
MTQ8 I am generally confident in my own abilities		.612			.393
MTQ3 I generally feel that I am a worthwhile person		.610			.443
MTQ44 I usually enjoy a challenge		.608			.363
MTQ19 I can generally be relied upon to complete the tasks I am given		.607			.406
MTQ4 Challenges usually bring out the best in me		.577			.324
MTQ20 I usually take charge of a situation when I feel it is appropriate		.552			.317
MTQ45 I can usually control my nervousness		.551			.315
MTQ23 I generally cope well with any problems that occur		.535			.344
MTQ16 I generally look on the bright side of life		.520			.254
MTQ39 I can normally sustain high levels of mental effort for long periods		.515			.360
Hardi15My choices make a real difference in how things turn out in the end			.640		.422
Hardi7 I really look forward to my work activities			.580		.387
Hardi1 Most of my life gets spent doing things that are meaningful			.577		.412
Hardi6 How things go in my life depends on my own actions			.568		.352
Hardi2 By working hard you can nearly always achieve your goals			.559		.349
Hardi13 Life in general is boring for me				-.667	**.459**
Hardi4 I feel that my life is somewhat empty of meaning				-.525	**.390**
Hardi8 I don't think there is much I can do to influence my own future				-.511	**.295**
Eigenvalues	12.74	7.59	3.36	2.83	**2.07**
% of Variance	17.45	10.39	4.61	3.89	**2.84**
Cronbach's α	.96	.79	.81	. 62	**.5**3

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

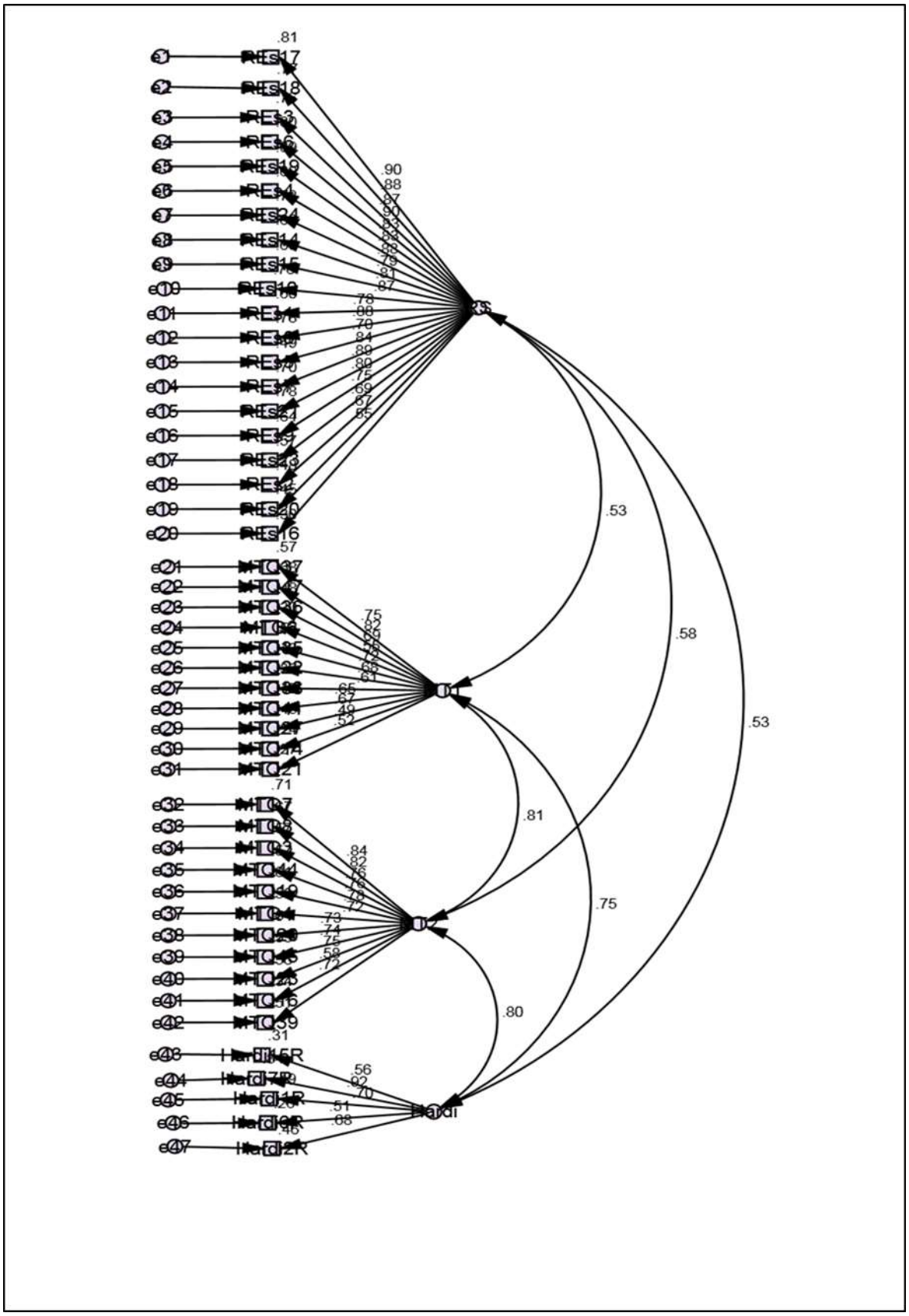
Appendix 3.11

Component Correlation Matrix

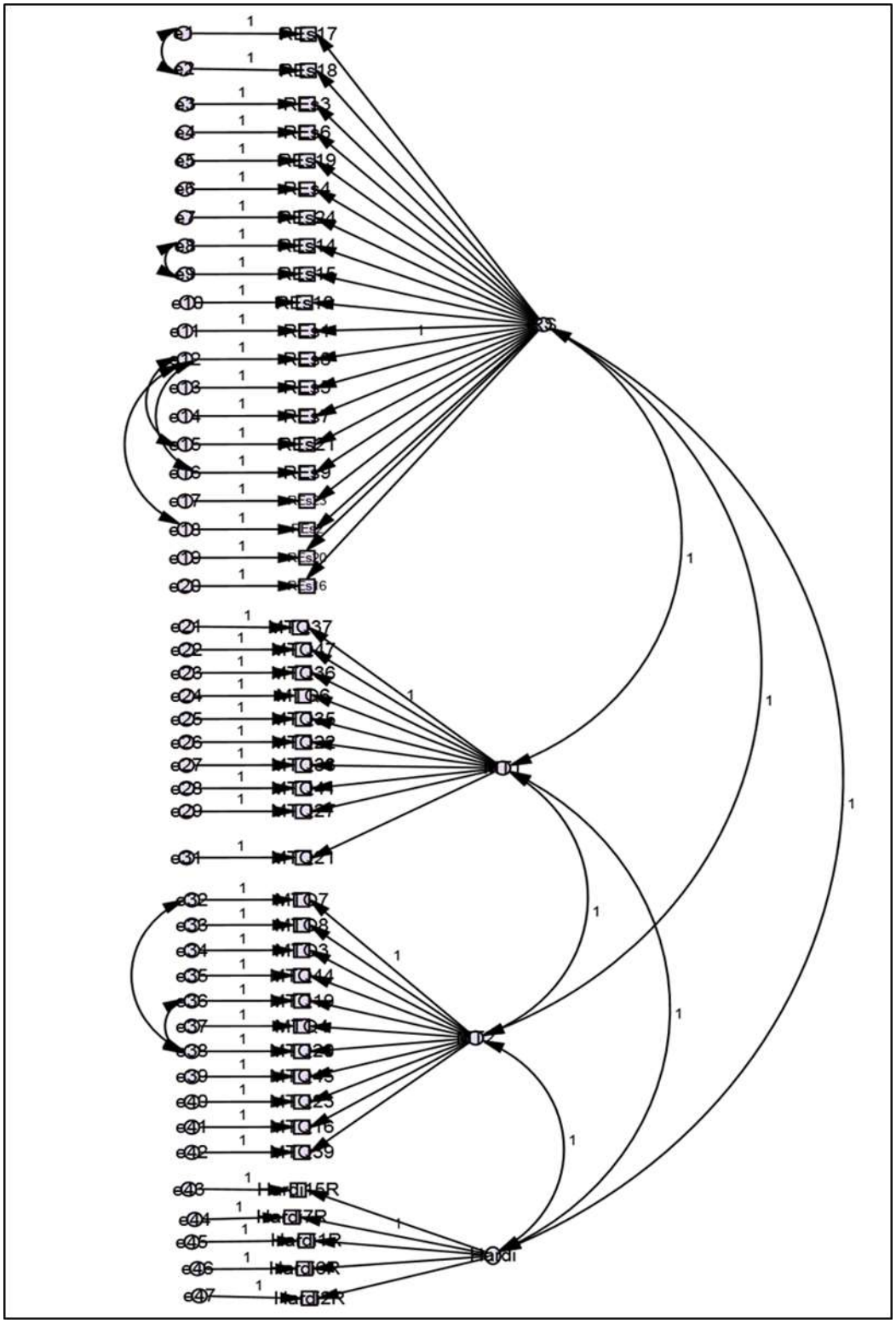
Component	1	2	3	4	5
1	1.000	.037	.048	.225	-.119
2	.037	1.000	.256	.006	-.052
3	.048	.256	1.000	.031	-.072
4	.225	.006	.031	1.000	-.076
5	-.119	-.052	-.072	-.076	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Appendix 3.12 Military Resilience Inventory (MRI) CFA initial model with 47 items (Model A)



Appendix 3.13 Re- specified model without 14 and suggested covariance (Model B)



Appendices 3.14 Standardized Regression Weights for the model with CLF for common method bias test

			Estimate
REs16	<---	Resilience	.557
REs20	<---	Resilience	.685
REs2	<---	Resilience	.714
REs23	<---	Resilience	.759
REs9	<---	Resilience	.812
REs21	<---	Resilience	.886
REs7	<---	Resilience	.843
REs5	<---	Resilience	.706
REs8	<---	Resilience	.880
REs1	<---	Resilience	.791
REs10	<---	Resilience	.878
REs15	<---	Resilience	.818
REs14	<---	Resilience	.780
REs24	<---	Resilience	.885
REs4	<---	Resilience	.846
REs19	<---	Resilience	.837
REs6	<---	Resilience	.901
REs3	<---	Resilience	.881
REs18	<---	Resilience	.874
REs17	<---	Resilience	.899
MTQ14R	<---	MT1	.456
MTQ27R	<---	MT1	.648
MTQ41R	<---	MT1	.632
MTQ33R	<---	MT1	.573
MTQ22R	<---	MT1	.650
MTQ35R	<---	MT1	.695
MTQ36R	<---	MT1	.661
MTQ47R	<---	MT1	.821
MTQ37R	<---	MT1	.723
MTQ39	<---	MT2	.662
MTQ16	<---	MT2	.455
MTQ23	<---	MT2	.730
MTQ45	<---	MT2	.726
MTQ20	<---	MT2	.466
MTQ4	<---	MT2	.561
MTQ19	<---	MT2	.675
MTQ44	<---	MT2	.621
MTQ3	<---	MT2	.612
MTQ8	<---	MT2	.689
MTQ7	<---	MT2	.837
MTQ6R	<---	MT1	.512
MTQ21R	<---	MT1	.494
REs17	<---	Commommethod	-.058
REs18	<---	Commommethod	-.089
REs3	<---	Commommethod	.007
REs6	<---	Commommethod	-.073
REs19	<---	Commommethod	-.055

			Estimate
REs4	<---	Commommethod	.004
REs24	<---	Commommethod	-.056
REs14	<---	Commommethod	-.199
REs15	<---	Commommethod	.023
REs10	<---	Commommethod	-.060
REs1	<---	Commommethod	-.017
REs8	<---	Commommethod	-.074
REs5	<---	Commommethod	-.186
REs7	<---	Commommethod	-.043
REs21	<---	Commommethod	-.047
REs9	<---	Commommethod	.038
REs23	<---	Commommethod	-.067
REs2	<---	Commommethod	.071
REs20	<---	Commommethod	-.013
REs16	<---	Commommethod	-.055
MTQ37R	<---	Commommethod	-.031
MTQ47R	<---	Commommethod	-.039
MTQ36R	<---	Commommethod	-.169
MTQ6R	<---	Commommethod	-.049
MTQ35R	<---	Commommethod	.001
MTQ22R	<---	Commommethod	.076
MTQ33R	<---	Commommethod	.019
MTQ41R	<---	Commommethod	.070
MTQ27R	<---	Commommethod	-.089
MTQ14R	<---	Commommethod	-.216
MTQ21R	<---	Commommethod	-.011
MTQ7	<---	Commommethod	.015
MTQ8	<---	Commommethod	.333
MTQ3	<---	Commommethod	.345
MTQ44	<---	Commommethod	.301
MTQ19	<---	Commommethod	.184
MTQ4	<---	Commommethod	.336
MTQ20	<---	Commommethod	.534
MTQ45	<---	Commommethod	.038
MTQ23	<---	Commommethod	.057
MTQ16	<---	Commommethod	.233
MTQ39	<---	Commommethod	.094

Appendix 4.1 Questionnaire for outcome variables: study 2

Official Number _____ **Serial Number** _____

New comer Learning measures (express to what extent you are agree with the statement by putting X below the correct number)

		Strongly disagree 1	**Disagree 2**	**Slightly disagree 3**	**Neither agree nor disagree 4**	**Slightly agree 5**	**Agree 6**	**Strongly Agree 7**
	ROLE LEARNING							
1	I understand how to perform the tasks that make up my job.							
2	I understand which job tasks and responsibilities have priority.							
3	I understand what my personal responsibilities are.							
4	I know what my supervisor considers as good performance.							
5	I know what it takes to do well.							
6	I understand what all the duties of my job entail.							
	SOCIAL LEARNING							
7	Other workers have helped me on the job in various ways.							
8	My co-workers are usually willing to offer their assistance or advice.							
9	Most of my co-workers have accepted me as a member of this company.							
10	My relationships with other workers in this company are very good.							
11	I am usually included in informal networks or gatherings of people within this organisation.							
12	I believe most of my co-workers like me.							

	ORGANISATION LEARNING							
13	I am familiar with the history of this organisation.							
14	I know the internal structure of this organisation.							
15	I have learned how things really work at this organisation.							
16	I am familiar with the unwritten rules of how things are done at this organisation.							
17	I understand this organisation's objectives and goals.							
18	I know who the most influential people are in my organisation.							

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TURNOVER INTENTION SCALE (TIS)

The following section aims to ascertain the extent to which you intend to stay at the organisation.

Please read each question and indicate your response using the scale provided for each question:

DURING THE PAST 9 MONTHS…..

1	How often have you considered leaving your job?	**Never**	1-------2-------3-------4-------5	**Always**
2R	To what extent is your current job satisfying your personal needs?	**To no extent**	1-------2-------3-------4-------5	**To a very large extent**
3	How often are you frustrated when not given the opportunity at work to achieve your personal work-related goals?	**Never**	1-------2-------3-------4-------5	**Always**
4	How often do dream about getting another job that will better suit your personal needs?	**Never**	1-------2-------3-------4-------5	**Always**
5	How likely you to accept another job at the same compensation are level should it be offered to you?	**Highly unlikely**	1-------2-------3-------4-------5	**Highly likely**
6	How often do you look forward to another day at work?	**Never**	1-------2-------3-------4-------5	**Always**

Please circle the most appropriate number for the following questions about your satisfaction about the training

1	How satisfied are you with the decision you made to join with military	**Not satisfied at all**	1-------2-------3-------4-------5	**Fully satisfied**
2.	How satisfied are you about the basic training in general	**Not satisfied at all**	1-------2-------3-------4-------5	**Fully satisfied**
3	How satisfied are you about the knowledge you gain during this training	**Not satisfied at all**	1-------2-------3-------4-------5	**Fully satisfied**
4	How satisfied are you about the skills you gain during this training	**Not satisfied at all**	1-------2-------3-------4-------5	**Fully satisfied**
5	How satisfied are you with the quality of the relationship you had with your training staff and other rankers	**Not satisfied at all**	1-------2-------3-------4-------5	**Fully satisfied**
6	How satisfied are you with the quality of the relationship you had with your training colleagues	**Not satisfied at all**	1-------2-------3-------4-------5	**Fully satisfied**
7	How satisfied are you with your health condition during the training period.	**Not satisfied at all**	1-------2-------3-------4-------5	**Fully satisfied**
8	**How satisfied are you with following facilities provided to you during training period**			
	Sleeping hors	**Not satisfied at all**	1-------2-------3-------4-------5	
	Food and nutrition	**Not satisfied at all**	1-------2-------3-------4-------5	
	Medical facilities	**Not satisfied at all**	1-------2-------3-------4-------5	
	Training instructions and equipment	**Not satisfied at all**		

General Health Questionnaires 12

Please read this carefully:

We should like to know if you have had any medical complaints, and how your health has been in general, over the past few weeks. Please answer ALL the questions simply by underline the answer which you think most nearly applies to you. Remember that we want to know about present and resent complaints, not those you had in the past. It is important that you try to answer ALL the questions.

Thank you very much for your co-operation.

1	Been able to concentrate on whatever you are doing?	Better than usual		Same as usual		Less than usual		Much less than usual
2	Lost much sleep over worry?	Not at all		No more than usual		Rather more than usual		Much more than usual
3	Felt that you are playing a useful part in things?	More than usual		Same as usual		Less useful than usual		Much less usual
4	Felt capable of making decisions about things?	More than usual		Same as usual		Less useful than usual		Much less usual
5	Felt constantly under strain?	Not at all		No more than usual		Rather more than usual		Much more than usual
6	Felt you could not overcome your difficulties?	Not at all		No more than usual		Rather more than usual		Much more than usual
7	Been able to enjoy your day to day activities?	More than usual		Same as usual		Less useful than usual		Much less usual
8	Been able to face up to your problems?	More than usual		Same as usual		Less useful than usual		Much less usual
9	Been feeling unhappy and depressed?	Not at all		No more than usual		Rather more than usual		Much more than usual

10	Been loosing confidence in yourself?	Not at all		No more than usual		Rather more than usual		Much more than usual
11	Been thinking of you as a worthless person?	Not at all		No more than usual		Rather more than usual		Much more than usual
12	Been feeling reasonably happy, all things considered?	More than usual		Same as usual		Less useful than usual		Much less usual

Sinhala translation and validation by Dr. Chrishantha Abeysena, Dr. Pushpa Jayawardana, Dr. Upali Peiris

Sinhala version

අනු අංකය

නිල අංකය

New comer Adjustment නවක සේවකයිගේ අනුගතවීම (ඔබ මෙම ප්‍රකාශයට කෙතරම් එකඟ දැයි අදාල අංකයට යටින් **X** යෙදීමෙන් පවසන්න**)**

		1. කිසිසේත් එකඟ නොවෙමි	**2.** එකඟ නොවෙමි	**3.** තරමක් දුරට එකඟ නොවෙමි	**4.** එකඟ වන්නේ හෝ නොවන්නේ නොවේ	**5.** තරමක් දුරට එකඟ වෙමි	**6.** එකඟ වෙමි	**7.**දැඩි ලෙස එකඟ වෙමි
	ROLE LEARNING **භූමිකා ඉගෙනුම**							
1	මගේ රාජකාරිය සම්පූර්ණ කිරීමට අවශ්‍ය කෘයයන් කරන්නේ කෙසේදැයි මට අවබෝධයක් තිබේ							
2	ප්‍රමුඛත්වය දිය යුත්තේ කුමණ රාජකාරි හා වගකීම් වලටදැයි මට අවබෝධයක් තිබේ							
3	මාගේ පෞද්ගලික වගකීම් මොනවාදැයි මට අවබෝධයක් තිබේ							
4	මාගේ අධීක්ෂකයා නිවැරදි කෘය සාධනය ලෙස අර්ථ දක්වන්නේ කුමක්දැයි මම දනිමි							
5	හොඳින් රාජකාරී කිරීමට නම් දැනසිටිය යුත්තේ මොනදවා දැයි මම දනිමි							
6	මාගේ රාජකාරියට අයත් සියළු කෘයයන් පිළිබඳ මට අවබෝධයක් තිබේ							
	SOCIAL LEARNING **සමාජ ඉගෙනුම**							
7	කෘය මණ්ඩල සාමාජිකයින් මට රැකියාවේදී නොයෙක් අයුරින් සහාය දී තිබේ							
8	මා සමග පුහුණු වන අනෙක් පුහුණු ලාභීන් ඔවුන් ගේ සහාය හා උපදෙස් ලබා දීමට සැමවිටම සූදානම් ය							
9	මාගේ සගයින් බොහෝ දෙනෙකු මාද ඔවුන් ගේ කෙනෙකු ලෙස පිලිගෙන තිබේ							

10	ආයතයේ අනෙකුත් සාමාජිකයින් සමග මගේ සම්බන්ධතාවය ඉතා හොඳ එකකි							
11	මෙම ආයතනය තුල පවතින විධිමත් නොවන සම්බන්ධතා ජාලවලට හා සුහද හමුවීම්වලට මාද ඇතුලත් කරගෙන ඇත							
12	මම හිතනවා මාගේ සගයින් බොහෝ දෙනෙකු මට කැමතියි කියා							
	ORGANISATION LEARNING ආයතනික ඉගෙනුම	**1. කිසිසේත් එකඟ නොවෙමි**	**2. එකඟ නොවෙමි**	**3. තරමක් දුරට එකඟ නොවෙමි**	**4. එකඟ වන්නේ හෝ නොවන්නේ නොවේ**	**5. තරමක් දුරට එකඟ වෙමි**	**6. එකඟ වෙමි**	**7.දැඩි ලෙස එකඟ වෙමි**
13	මෙම ආයතනයේ ඉතිහාසය පිළිබඳ මට අවබෝධයක් තිබේ							
14	මෙම ආයතනයේ අභ්යන්තර ව්යුහය මම දනිමි							
15	මෙම ආයතනයේ හරියටම වැඩ සිද්ධ වෙන්නේ කුමණ ආකාරයටදැයි මම ඉගෙන ගෙන තිබේ							
16	මෙම ආයතනයේ වැඩ කරන ආකාරය පිළිබඳ නොලියැවුනු රීතීන් පිළිබඳ මට අවබෝධයක් තිබේ							
17	මෙම ආයතනයේ අරමුණු හා ඉලක්ක ගැන මට අවබෝධයක් තිබේ							
18	මෙම ආයතනය තුල වැඩිම බලපෑමක් කිරීමේ හැකියාවක් ඇති පුද්ගලයින් කවුදැයි මම දනිමි							

Cooper-Thomas et al.

Turn over Intention Scale සේවය හැරයාමේ අරමුණු මැනීමේ පරිමාණය (පහත සඳහන් ප්‍රකාශ වලට වඩාත් ගැලපෙන අංකය රවුම් කරන්න)

1	ඔබ කොපමණ වාරයක් මෙම රැකියාව හැර යාමට සිතුවේද?	කිසිදා නැත	1------2------3------4------5	හැම විටම
2	මෙම රැකියාව කෙතරම් දුරට ඔබගේ පෞද්ගලික අවශ්‍යතා තෘප්තිමත් කරන්නේද?	කිසිදා නැත	1------2------3------4-----5	හැම විටම
3	රැකියාව කරන අතරතුර රැකියාව සම්බන්ධ පෞද්ගලික ඉලක්ක ලඟා කරගැනීමට ඉඩ නොදීම පිළිබඳව ඔබ කෙතරම් වාරයක් බලාපොරොත්තු කඩවීම වලට මුහුණ පා ඇත්ද?	කිසිදා නැත	1------2------3------4------5	හැම විටම
4	ඔබගේ පෞද්ගලික උවමනාකම් වලට වඩාත් හොඳින් ගැලපෙන රැකියාවක් ගැන ඔබ කෙතරම් සිහින මවන්නේද?	කිසිදා නැත	1------2------3------4-----5	හැම විටම
5	ඔබ දැනට කරන රැකියාවේ වරප්‍රසාදම ඇති වෙනත් රැකියාවක් ඔබට පිරිනමණු ගැබුවහොත් එය පිළි ගැනීමට ඔබ කොතෙක් කැමති වේද?	කිසිදා නැත	1------2------3------4-----5	හැම විටම
6	රැකියාවේ ඊලඟ දිනය උදාවනතුරු ඔබ කෙතරම් ආසාවෙන් සිටින්නේද?	කිසිදා නැත	1------2-----3------4------5	හැම විටම

පුහුණුව පිළිබඳ ඔබගේ තෘප්තිමත් බව සොයා බලන පහත සඳහන් ප්‍රකාශ වලට වඩාත් ගැලපෙන අංකය රවුම් කරන්න

1	සමස්ථයක් ලෙස ගත් කල හමුදා සේවයට බැඳීමට ගත් තීරණය ගැන ඔබ කෙතරම් තෘප්තිමත්ද?	කොහෙත්ම තෘප්තිමත් නැත	1------2------3-------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
2	සාමන්‍ය ලෙස ගත් කල ඔබගේ මූලික පුහුණුව පිලිබඳ ඔබ කෙතරම් තෘප්තිමත්ද?	කොහෙත්ම තෘප්තිමත් නැත	1------2------3-------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
3	පුහුණු කාලය තුල ඔබ අත් කරගත් දැණුම පිලිබඳ ඔබ කෙතරම් තෘප්තිමත්ද?	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4-------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
4	පුහුණු කාලය තුල ඔබ අත් කරගත් කුසලතා පිලිබඳ ඔබ කෙතරම් තෘප්තිමත්ද?	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්

5	ඔබ ඔබගේ පුහුණු නිළධාරීන් හා සෙසු නිළයන් කණ්ඩායම සමග පවතින සබඳතාවයේ ගුණාත්මක භාවය ගැන කෙතරම් තෘප්තිමත්ද?	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
6	ඔබ ඔබගේ පුහුණු කණ්ඩායමේ සගයින් සමග පවතින සබඳතාවයේ ගුණාත්මක භාවය ගැන කෙතරම් තෘප්තිමත්ද?	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්**s**
7	පුහුණු කාලය තුල සමස්ථයක් ලෙස ගත් කල ඔබගේ සෞඛය තත්වය පිළිබඳ ඔබ කෙතරම් තෘප්තිමත්ද?	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
8	පුහුණු කායල තුල ඔබට ලැබුණු පහත සඳහන් පහසුකම් පිළිබඳ ඔබ කෙතරම් තෘප්තිමත්ද?			
	නිදා ගැනීමට ලැබුණු කාලය	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
	ආහාර හා පෝෂණය	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
	වෛද්ය පහසුකම්	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්
	පුහුණු උපකරණ හා උපදෙස්	කොහෙත්ම තෘප්තිමත් නැත	1------2------3------4------5	සම්පූර්ණයෙන්ම තෘප්තිමත්

සාමාන්‍ය සෞඛ්‍ය පිළිබඳ ප්‍රශ්න මාලාව 12

පසුගිය සති කීපය තුල ඔබගේ සෞඛ්‍ය ප්‍රශ්ණ/ගැටලු ඇතිවූවා නම' ඒ ගැන දැන ගැනීමට කැමැත්තෙමු
සෑම ප්‍රශ්නයක් ඉදිරියේ ඇති පිලිතුරු හතරෙන් ඔබට හරියැයි හැගෙ'න පිලිතුර යටින් ඉරක් අඳින්න අපට දැන ගැනීමට අවශ්‍යව ඇත්තේ පසුගිය සති කීපය තුල හා අද ඔබට ඇති ගැටළු' පිලිබඳව පමණ

(බොහෝ කලකට පෙර ඇති වූ ගැටළු' පිලිබඳව දැන ගැනීමට අවශ්‍ය නැත)

සෑම ප්‍රශ්නයකටම පිලිතුරු සැපයීම වැදගත්ය

ඔබගේ සහයෝගයට ස්තුතියි

1	ඔබ කල කටයුතු පිලිබඳව සිත යොමු කිරීමට හැකිවුනාද?	වෙනදාට වඩා හොඳින්		වෙනදා මෙන්		වෙනදාට වඩා අඩුවෙන්		වෙනදාට වඩා බොහෝ අඩුවෙන්	
2	සිතේ ඇති වූ කරදර නිසා නින්ද අඩු වුනාද?	කිසිසේත් නැත		වෙනදාට වඩා අඩුවක් නැත		වෙනදාට වඩා අඩුය		වෙනදාට වඩා බොහෝ අඩුය	
3	ඔබ ඒදිනෙදා කටයුතුවලදී ප්‍රයෝජනවත් මෙහෙයක් / කාර්යයක් ඉටු කරන කෙනෙක් යයි සිතුවාද?	වෙනදාට වඩා වැඩියෙන්		වෙනදා මෙන්		වෙනදාට වඩා අඩුවෙන්		වෙනදාට වඩා බොහෝ අඩුවෙන්	
4	ඔබට ඒදිනෙදා කටයුතු වලදී තීරණ ගැනීමට හැකිවුනාද?	වෙනදාට වඩා හොඳින්		වෙනදා මෙන්		වෙනදාට වඩා අඩුවෙන්		වෙනදාට වඩා බොහෝ අඩුවෙන්	
5	ඔබ සෑම විටම හිතෙහි අසහනකාරී පීඩාකාරී තත්වයකින් සිටියාද?	කිසිසේත් නැත		වෙනදාට වඩා අඩු හෝ වැඩි නැත		වෙනදාට වඩා වැඩියෙන්		වෙනදාට වඩා බොහෝ වැඩියෙන්	
6	ඔබට මතුවී ඇති දුෂ්කරතා වලින් ගොඩ ඒමට නොහැකි යයි සිතුවාද?	කිසිසේත් නැත		වෙනදාට වඩා අඩු හෝ වැඩි නැත		වෙනදාට වඩා වැඩියෙන්		වෙනදාට වඩා බොහෝ වැඩියෙන්	
7	ඔබ ඒදිනෙදා කරන කටයුතු වලින් සෑහීමකට/සතුටකට පත් වුනාද?	වෙනදාට වඩා වැඩියෙන්		වෙනදා මෙන්		වෙනදාට වඩා අඩුවෙන්		වෙනදාට වඩා බොහෝ අඩුවෙන්	

8	ඔබගේ ප්‍රශ්ණ ගැටළු'වලට මුහුණාදීමට හැකිවුනාද?	වෙනදාට වඩා හොඳින්		වෙනදා මෙන්		වෙනදාට වඩා අඩුවෙන්		වෙනදාට වඩා බොහෝ අඩුවෙන්	
9	ඔබ අසතුටින් හෝ කනස්සල්ලෙන් පසුවුනාද?	කිසිසේත් නැත		වෙනදා මෙන්		වෙනදාට වඩා වැඩියෙන්		වෙනදාට වඩා බොහෝ වැඩියෙන්	
10	ඔබේ ආත්ම විශ්වාසය අඩුවන බවක් දැනුනාද?	කිසිසේත් නැත		වෙනදාට වඩා අඩු හෝ වැඩි නැත		වෙනදාට වඩා වැඩියෙන් දැනුනා		වෙනදාට වඩා බොහෝ වැඩියෙන් දැනුනා	
11	ඔබ වැඩකට නැති කෙනෙක් යයි සිතුනාද?	කිසිසේත් නැත		වෙනදාට වඩා අඩු හෝ වැඩි නැත		වෙනදාට වඩා වැඩියෙන්		වෙනදාට වඩා බොහෝ වැඩියෙන්	
12	ඔබ සාමාන්‍ය පරිදි සතුටින් සිටියාද?	වෙනදාට වඩා වැඩියෙන්		වෙනදා මෙන්		වෙනදාට වඩා අඩුවෙන්		වෙනදාට වඩා බොහෝ අඩුවෙන්	

Sinhala translation and validation by Dr. Chrishantha Abeysena, Dr. Pushpa Jayawardana, Dr. Upali Peiris

Appendix 4.2 Information sheet for study 2 English and Sinhala versions

Information sheet

Title: Measuring relationship among pre enlistment resilience level and training performance of Sri Lankan cadet trainees

Researcher name: Lieutenant Commander H.G. Kanthilatha (Clinical Psychologist Sri Lanka Navy)

Purpose of Study

The purpose of this study is to measure the relationship between pre-enlistment resilience level and training performance of Sri Lankan cadet trainees.

Procedures

This study has two phases. You have participated on the first study either in November or December 2015. This is the second half if that study which will look at how your score on the scales on the first study relate with your training performance and satisfaction. This information will be used to predict how these score relate with successful completion of military training period as well as subsequent military services of newly recruited officers.

In this study your general health condition during the training, your adjustment to the organization, your satisfaction about the quality of the training and your intention to quit the organization will be assessed. Simultaneously, your official records such as your exam performance, successes, leave, sick leave also will be monitored during this period.

How much of your time will participation involve?
The questionnaire should take approximately 20 minutes to answer

Will your participation in the project remain confidential?
If you agree to take part, your information will not be disclosed to any other parties. Your responses to the questions will be used for the purpose of this project only. You can be assured that if you take part in the project you will remain anonymous. Completed questionnaire should be returned in a sealed envelope provided by the research team.

Will you able to withdraw from the study?

You may withdraw from the study at any point (before, during and after) of the study process without any negative consequences. We will remove all your data from the study as you withdraw.

Payment

Participants will not get any financial benefit by participation in this study.

Potential Risks and Ethical Consideration

There is no particular risk of participating in this study as military officer. Your score in this study will not do any influence on your career in the service. Though the your information in this study are not going to share with the system if you find any psychological discomfort while completing these questionnaires you are welcome to contact the main researcher or and counselling officers in your service to discuss this.

Benefits

Your contribution will be highly valued for future enhancement of the military services and enhancement of scientific knowledge in Sri Lanka.

What happens now?

If you are interested in taking part in the study you are asked to complete and sign the consent form. Then you will be given more specific instructions. Do not sign if you do not wish to take part. Please feel free to ask any questions that you may have.

Contact for Further Information

If you need any further information about the study you may contact me over kanthihettigoda@gmail.com

Sinhala version of Information sheet

තොරතුරු පත්‍රිකාව - දෙවන අධ්‍යනය

අධ්‍යන මාතෘකාව: ශ්‍රී ලාංකික ආරක්ෂක සේවාවන්ට බඳවා ගන්නා නිළධාරීන් ගේ බඳවා ගැනීමට පෙර පවතින ඔරොත්තු දීමේ හා හැඩ ගැසීමේ හැකියාව මැන බලන මනෝවිද්‍යාත්මක මෙවලමක් ගොඩනැගීම හා වලංගු කිරීම.

පරීක්ෂණය මෙහෙයවන්නා: ලුතිනන් කොමාන්ඩර් එච්.ජී. කාන්තිලතා, සායනික මනෝවිද්‍යාඥ ශ්‍රී ලංකා නාවික හමුදාව

පරීක්ෂණ අධීක්ෂණය: මහාචාර්ය රිචාර්ඩ් හැමර්ස්ලි, මනෝවිද්‍යා අධ්‍යන අංශය, හල් විශ්ව විද්‍යාලය, එක්සත් රාජධානිය.

අධ්‍යනයේ අරමුණු:

මෙම අධ්‍යනයේ මූලික පරමාර්ථය වන්නේ ශ්‍රී ලංකා ආරක්ෂක අංශවලට බඳවා ගැනීමේ දී භාවිතා කළ හැකි මනෝවිද්‍යාත්මක මෙවලමක් ගොඩනැගීමයි. මෙමගින් ආරක්ෂක අංශයන් සඳහා වඩාත් ගැලපෙන නිළධාරීන් තෝරා ගැනෙන අතර ආරක්ෂක නිළධාරීන් අතර ඇති මානසික රෝගී තත්වයන්, සියදිවි නසා ගැනීම් හා තැත් කිරීම්, මත්ද්‍රව්‍ය අනිසි ලෙස භාවිතය අවම කිරීමට හේතුවන අතර එමගින් ශ්‍රී ලාංකික හමුදාවන් කෙරෙහි යහපත් ප්‍රතිරූපයක් ගොඩනැගීමට හැකි වනු ඇත. ව්‍යක්තීය හමුදා සේවයකට මෙය මහත් රුකුලක් වනු ඇත.

මෙම මනෝවිද්‍යාත්මක මෙවලම භාවිතා කිරීමෙන් අයදුම්කරුවන්හටද තමා හමුදා සේවයට සුදුසුද නැද්ද යනවග කලින්ම තීරණය කලහැකි වීමෙන් අතිවිය හැකි ගැටළුකාරී තත්වයන් අවම කරගත හැක.

අධ්‍යන ක්‍රම වේදය.

මෙම අධ්‍යනය අධියර දෙකකින් යුතු අතර මේ ඉන් පළමු වැන්නයි. මෙම අධියරට සහභාගීවන්නන් අවස්ථා දෙකකදී අධ්‍යනයට සහභාගී වීමට නියමිතය. පළමු අධ්‍යනයෙන් මාස හයකට පසුව දෙවන අධ්‍යනය සිදුකෙරෙනු ඇත. පළමු අවස්ථාවේදී සහභාගීවන්නන් හට සම්පූර්ණ කිරීම සඳහා ප්‍රශ්නාවලියක් ඉදිරිපත් කෙරෙනු ඇත. මෙම ප්‍රශ්නාවලිය මගින් සහභාගීවන්නන් ගේ ප්‍රජා තොරතුරු, පවුල් පසු බිම, මනෝ සමාජීය පසුබිම මෙන්ම ඔවුන් ගේ සාමාන්‍ය මානසික සෞඛ්‍ය තත්වය, මානසික දෘඩතාවය, මානසික හැඩ ගැසීමේ හැකියාව, මනසික දැඩිබව මැන බලීමට ප්‍රශ්නාවලි කීපයක් ද මීට ඇතුලත් කෙරෙනු ඇත. මෙසේ රැස් කරන තොරතුරු හා ප්‍රශ්නාවලි වලට ලබාගන්නා ලකුණු පිළිබඳ වාර්ථාවක් ඊයේෂකයා විසින් තබා ගනු ඇත. මීට අමතරව සහභාගීවන්නන්ගේ පුහුණු කාලය පිළිබඳ තොරතුරු, විභාග ලකුණු, ජයග්‍රහණ, පැසසුම් හා වෙනත් රාජකාරී වාර්තා ද ලබා ගනු ඇත. පළමු අධ්‍යනයෙන් මාස හයකට පසුව සහභාගීවන්නන්හට තවත් ප්‍රශ්නාවලි කීපයක්ලබාදෙනු ඇත. එසේ ලබාගන්නා තොරතුරු පළමු අධ්‍යනයෙන් ලබාගන්නා තොරතුරු සමග සන්සන්දනාත්මක අධ්‍යනයක් කෙරෙනු ඇත.

මෙම පරීක්ෂණයට සහභාගී වීමේ හෝ නොවීමේ තීරණය සම්පූර්ණයෙන්ම ඔබ සතු වන අතර සහභාගී වීමෙන් හෝ නොවීමෙන් කිසිදු ආකරයේ ව්‍යක්තීය හෝ පෞද්ගලික අහිතකර ප්‍රතිඵලයක් අත් නොවන බව තහවුරු කල හැක. ඊයේෂණයට අදාල සියළු තොරතුරු රැස් කිරීම ඔබ සේවයේ නියුක්ත පරීක්ෂණ කන්ඩායම විසින් හෝ වෙනත් නම් කරන ලද නිලධාරියෙකු විසින් සිදු කරනු ලබන් අතර සම්පූර්ණ කරන ලද ප්‍රශ්නාවලි පරීක්ෂණ කන්ඩායම විසින් පමනක් මෙහෙයවනු ඇත.

ඡීයේෂණය සඳහා ගතවන කාලය:

මෙම ප්‍රශ්නාවලිය සම්පූර්ණ කිරීම සඳහා ආසන්න වශයෙන් මිනිත්තු 30ක කාලයක් ගතවනු ඇත.

තොරතුරුවල රහස්‍ය භාවය

ඔබ මෙම අධ්‍යනයට සහභාගී වීමට එකඟ වන්නේ නම් ඔබ සපයන සියළු තොරතුරු නිර්නාමිකව හා රහස්‍යභාවයෙන් යුතුව භාවිතා කිරීමට ඡීයේෂණ කණ්ඩායම බැඳී සිටී. මෙම තොරතුරු අධ්‍යන පරමාර්ථය සඳහා පමණක් භාවිතා වන අතර ඉන්පසුව විනාශ කෙරෙනු ඇත. අධ්‍යන කණ්ඩායම හැර කිසිදු පුද්ගලයෙකුට මෙම තොරතුරු නිරාවරණය නොවනු ඇත.

ගෙවීම්

මෙම අධ්‍යනයට සහභාගීවීම වෙනුවෙන් ඔබට කිසිදු මූල්‍ය ප්‍රතිලාභයක් අත් නොවනු ඇත.

සිදුවිය හැකි අවධානම් තත්වයන් සහ ආචාර ධර්ම ගැටළු

මෙම අධ්‍යනයට සහභාගීවීමෙන් සිදුවියහැකි විශේෂ අවධානම් තත්වයක් හඳුනාගෙන නොමැත. එහෙත් මෙම ප්‍රශ්නාවලියේ අසන ඇතම් පෞද්ගලික ප්‍රශ්නවලට පිළිතුරු දීමේදී සහභාගීවන්නාගේ ලමා කාළයේ අමිහිරි මතකයන් අවධිවීමෙන් යම් මානසික අපහසුතාවයක් ඇතිවිය හැක. ඒ හැරුණු කොට ඔබ මෙම ප්‍රශ්නාවලීන්ට ලබාගන්නා ලකුණු කිසිදු ආකාරයකින් ඔබගේ වෘත්තියට බලපෑමක් නොකරනු ඇත. ඔබ අප වෙත ලබාදෙන තොරතුරු වෙන කිසිවෙකුටත් ලබා නොදුන්නද අධ්‍යනයට සහභාගී වීමෙන් යම් කිසි මානසික අපහසුතාවයක් ඇති වුවහොත් ඒ පිළිබඳව උපදේශන නිළධාරීන් හමුවී සාකච්ඡා කිරීමට ඔබට අවස්ථාව ඇත.

මෙම අධ්‍යනයට සහභාගීවීමේ වාසි

ඔබ මෙම අධ්‍යනයට සහභාගීවීමෙන් ශ්‍රී ලංකාවේ ආරක්ෂක අංශවල ගුණාත්මකභාවය වැඩිදියුණු කිරීමට මෙන්ම විද්‍යාත්මක් දැනුම් ලෝකය පුළුල් කිරීමටද ඔබට දායක විය හැක.

මෙම අධ්‍යනය පිළිබඳ ඕනෑම ගැටළුවක් අතොත් අධ්‍යනයට පෙර, අතර්තුරදී හෝ අධ්‍යනය අවසානයේදී අසා දැනගන්න.

වැඩි විස්තර දැනගැනීම ලියන්න: ලු.කොං. එච්.ජී. කාන්තිලතා, සායනික මනෝවිද්‍යාඥ, ශ්‍රී ලංකා නාවික හමුදාව, නාවික රෝහල, වැලිසර.

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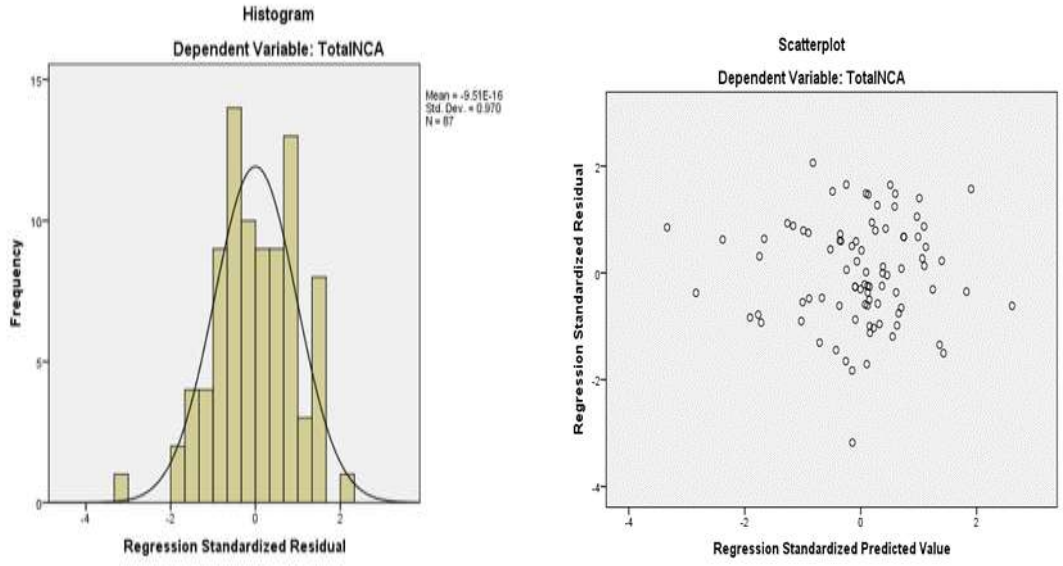
Appendix 4.3 Checking assumption for Multiple Regression for NCA

There are several assumptions for multiple regression (Field, 2009 and these assumptions were tested using appropriate tests in regression analysis statistics in SPSS. An analysis of standard residuals was carried out to check for outliers in the data set which showed that the data contained no outliers (Std. Residual Min = -3.18, Std. Residual Max = 2.06). The reference criteria to decide whether there are any outliers within the data set is, the minimum value is equal or below -3.29, or the maximum value is equal or above 3.29. So this data set has no outliers and therefore all the respondents were included for further analysis. Collinearity was tested to see if the data meets the assumption of multicollinearity. Collinearity table provided tolerance and VIF statistics and none of the variables exceeded the VIF value 10 and Tolerance level less than 0.1 (Zcomposite score, Tolerance = .92, VIF = 1.09; ASBcat, Tolerance = .90, VIF = 1.11; Suicidecat score, Tolerance = .84, VIF = 1.19; Childhoodadversity, Tolerance = .96, VIF = 1.04; and PTSDpositivity, Tolerance = .96 VIF = 1.04).

To determine that the data have met the assumption of independent errors Durbin-Watson value should be close to 2. Model summary table suggested that the data in this study have met the assumption of independent errors (Durbin-Watson value = 1.91). Histogram and normal probability test and scatterplot were considered to confirmed that this data set meet the assumptions of Random normal distribution, Homoscedasticity and Linearity. Figure 4.6 presents these graphs.

A **Random Normally Distributed Errors & Homoscedasticity & Linearity**



The histogram of standardised residuals indicated that the data contained approximately normally distributed errors, as did the normal P-P plot of standardised residuals, which showed points that were not completely on the line, but close. The scatterplot of standardised predicted values showed that the data met the assumptions of homogeneity of variance and linearity. All the variables had variances which are not equal to zero, thus this data meets the non-zero variance assumption too.

Appendices 4.4 NCA regression model summary

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.385[a]	.148	.138	8.246	.148	14.798	1	85	.000	
2	.454[b]	.206	.157	8.156	.058	1.473	4	81	.218	1.906

a. Predictors: (Constant), ZComposite

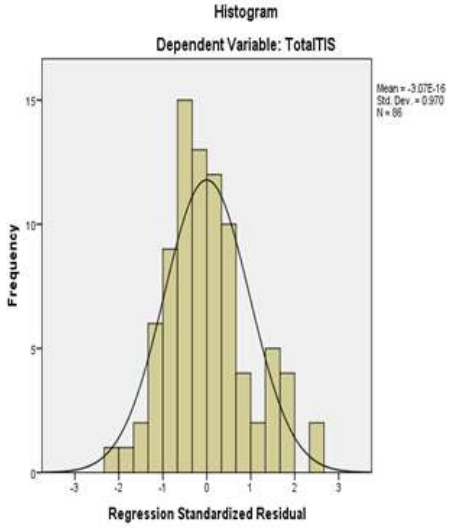
b. Predictors: (Constant), ZComposite, chidhoodadversitycat, asbcat, ptsdpositive, suicidecat

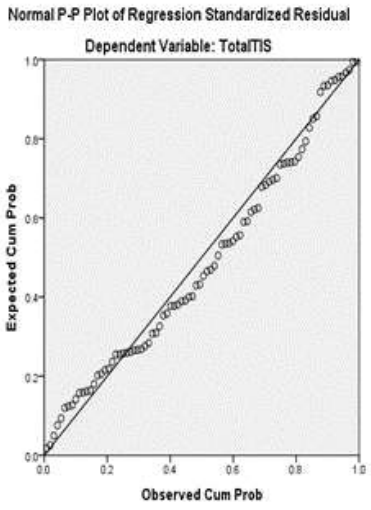
c. Dependent Variable: TotalNCA

Appendix 4.5 Checking assumption for TIS MLR

Data was tested for all the assumption prior to the MLR and observed that data contained no outliers (Std. Residual Min = -2.12, Std. Residual Max = 2.62). Tolerance and VIF statistics showed none of the variable exceeded the VIF value 10 and Tolerance level less than 0.1 (Zcomposite score, Tolerance = .92, VIF = 1.08; ASBcat, Tolerance = .90, VIF = 1.11; Suicidecat score, Tolerance = .85, VIF = 1.18; Childhood adversity, Tolerance = .96, VIF = 1.04; and PTSDpositivity, Tolerance = .96 VIF = 1.04). Durbin-Watson value confirmed that the data in this study have met the assumption of independent errors (Durbin-Watson value = 2.14). Histogram and normal probability test and scatterplot were considered to confirmed that this data set meet the assumptions of Random normal distribution, Homoscedasticity and Linearity. Figure 4.8 presents these graphs.

Random Normally Distributed Errors & Homoscedasticity & Linearity for TIS





Appendices 4.6 Turnover regression model summary

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.426[a]	.182	.172	3.642	.182	18.663	1	84	.000	
2	.492[b]	.242	.194	3.593	.060	1.577	4	80	.188	2.140

a. Predictors: (Constant), ZComposite

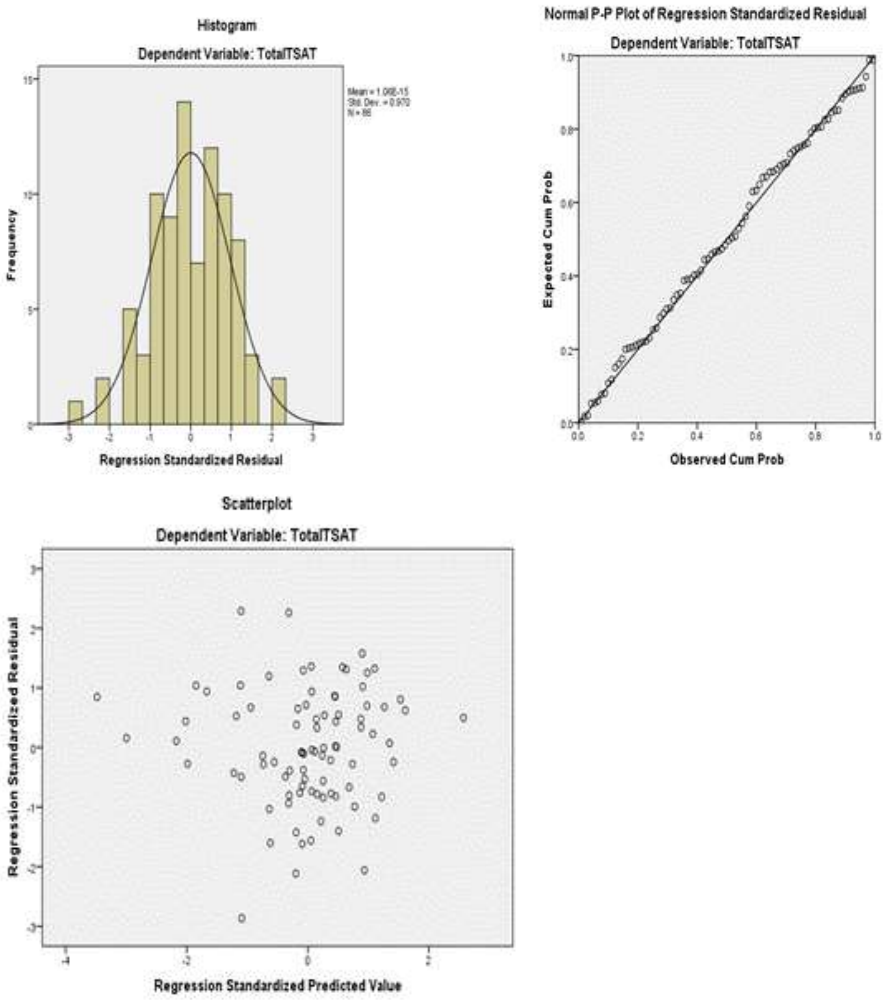
b. Predictors: (Constant), ZComposite, chidhoodadversitycat, asbcat, ptsdpositive, suicidecat

c. Dependent Variable: TotalTIS

Appendix 4.7 Testing assumption for training Satisfaction

Std. residual maximum and minimum, VIF, Tolerance and random normal distribution and met all the assumptions (please see appendix (Std. Residual, Min = -2.90, Std. Residual Max = 2.29; Zcomposite score, Tolerance = .92, VIF = 1.08; ASBcat, Tolerance = .90, VIF = 1.11; Suicidecat score, Tolerance = .85, VIF = 1.18; Childhood adversity, Tolerance = .96, VIF = 1.04; and PTSDpositivity, Tolerance = .96 VIF = 1.04; Durbin-Watson value confirmed that the data in this study have met the assumption of independent errors (Durbin-Watson value = 2.07). Histogram and normal probability test and scatterplot were considered to confirmed that this data set meet the assumptions of Random normal distribution, Homoscedasticity and Linearity. Figure 4.9 presents these graphs.

Random Normally Distributed Errors & Homoscedasticity & Linearity STSAT



Appendix 4.8 regression table for Training satisfaction

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.432[a]	.187	.177	7.310	.187	19.317	1	84	.000	
2	.502[b]	.252	.206	7.183	.065	1.748	4	80	.148	2.077

a. Predictors: (Constant), ZComposite

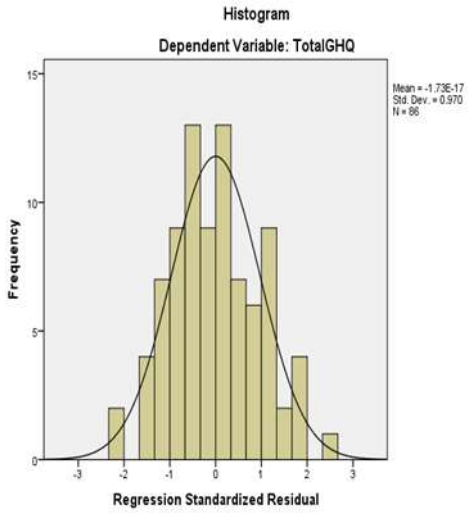
b. Predictors: (Constant), ZComposite, chidhoodadversitycat, asbcat, ptsdpositive, suicidecat

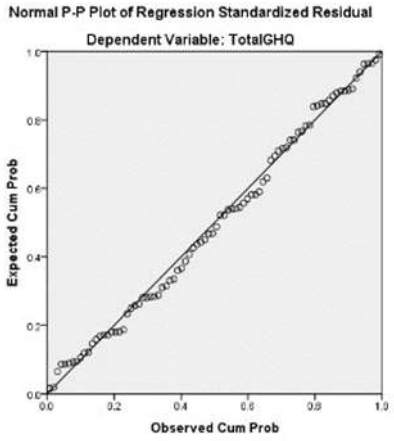
c. Dependent Variable: TotalTSAT

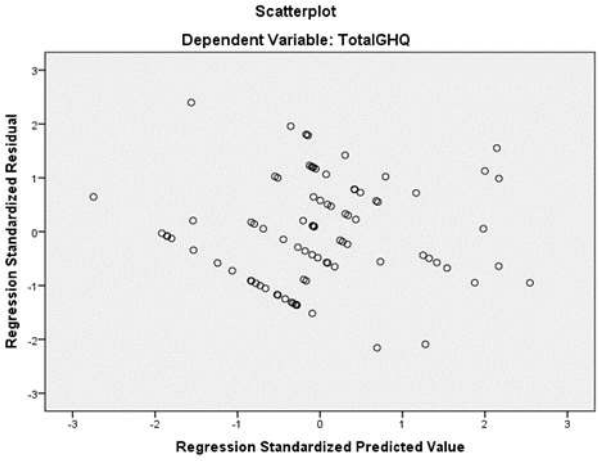
Appendix 4.9 Testing Assumption MLR for GHQ

Std. Residual, Min = -2.16, Std. Residual Max = 2.40; Zcomposite score, Tolerance = .92, VIF = 1.08; ASBcat, Tolerance = .90, VIF = 1.11; Suicidecat score, Tolerance = .85, VIF = 1.18; Childhood adversity, Tolerance = .96, VIF = 1.04; and PTSDpositivity, Tolerance = .96 VIF = 1.04; Durbin-Watson value confirmed that the data in this study have met the assumption of independent errors (Durbin-Watson value = 1.84). Histogram and normal probability test and scatterplot were considered to confirmed that this data set meet the assumptions of Random normal distribution, Homoscedasticity and Linearity. Figure 4.10 presents these graphs.

Random Normally Distributed Errors & Homoscedasticity & Linearity for GHQ







Appendix 4.10: Regression for GHQ

Model Summary for GHQ

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.444[a]	.197	.188	2.100	.197	20.617	1	84	.000	
2	.643[b]	.414	.377	1.839	.217	7.400	4	80	.000	1.837

a. Predictors: (Constant), ZComposite

b. Predictors: (Constant), ZComposite, chidhoodadversitycat, asbcat, ptsdpositive, suicidecat

c. Dependent Variable: TotalGHQ

Appendix 4.11 Model Summary for exam scores

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.118[a]	.014	-.008	4.40922	.014	.635	1	45	.430	
2	.230[b]	.053	-.037	4.47261	.039	.578	3	42	.633	1.953

a. Predictors: (Constant), ZComposite

b. Predictors: (Constant), ZComposite, chidhoodadversitycat, ptsdpositive, suicidecat

c. Dependent Variable: ExamscoreAve average Exam scores