

**An exploration of individual level of resilience and suicidality across  
three age groups in males and females living in the community**

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This dissertation is submitted in fulfilment of the requirements for the degree  
of Doctor of Philosophy (Ph.D in Medicine) in the Faculty of Health Sciences,  
School of Psychology, at the University of Adelaide

## **Declaration**

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## List of Publications

Publications are listed in order of appearance in this dissertation.

Liu, D. W. Y., Fairweather, A. K., Burns, R. A., & Roberts, M. R. (2015). The utility of non-specific measures of resilience across the lifespan: An investigation of structural invariance across gender and age cohorts. *Australian Journal of Psychology*, 37, 340-348. doi: 10.1111/ajpy.12091

Liu, D.W.Y., Fairweather-Schmidt, A. K. Burns, R., Roberts, R.M. (2014). The Connor-Davidson Resilience Scale: Establishing invariance between gender across the lifespan in a large community based study. *Journal of Psychopathology and Behavioural Assessment*, 1 – 9, DOI: 10.1007/s10862-014-9452-z

Liu, D.W.Y., Fairweather-Schmidt, A. K., Roberts, R.M., Burns, R. and Anstey, K.J. (2014). Does resilience predict suicidality? A lifespan analysis. *Archives of Suicide Research*, 18, 453-464, DOI:10.1080/13811118.2013.833881

## **Abstract**

Although suicide research has been prolific, studies have trended to focusing on risks that may increase the occurrence of suicidality by reducing individual mental and physical wellbeing. From this, understanding has been gained as to what may predict suicidality. Meanwhile, studies of resilience have typically comprised samples from unique populations, such as children/adolescents or well-adjusted adults, with experiences of childhood adversity. Though some longitudinal explorations of suicidality and resilience have been conducted, studies have typically consisted of a cross-sectional design. As such, investigation of the role of resilience on suicidality, within a longitudinal context with a community based sample, has been uncommon. Assessment of the relationship between gender, age, resilience and suicidality in a community based sample are fewer still. Studies presented in the current thesis attempted to address this paucity of research by exploring resilience and suicidality within such a community based sample. Analyses were stratified by age and gender in order to identify differences in regards to individual-level resilience and suicidality. Differences in the findings of existing literature can be attributed to variation in/lack of standardised approaches to the operationalisation and measurement of resilience, therefore the first two studies of the thesis assessed the measurement of resilience. The first study focused on the invariance of a resilience-specific measure across age and gender, with the next study comparing a standardised measure of resilience against proxy measures of resilience. Data used originated from the Personality and Total Health (PATH) Through Life Project. As an epidemiological based project, PATH participants were randomly selected from the electoral roll of individuals living in Canberra and Queanbeyan, Australia. Three cohorts aged 20 – 24, 40 – 44 and 60 – 64 years at

baseline allowed for specific and non-specific measures of resilience to be assessed across the lifespan and gender, in relation to their applicability in assessing resilience within a community based sample. Findings from these two studies determined that, not only was a resilience-specific measure better suited than a non-specific measure to assess resilience, but the resilience-specific measure was found to be invariant across age and gender. Subsequently, resilience in further studies was measured using a resilience-specific measure.

Cross-sectional analyses in the third study verified an association between low resilience and suicidality across the lifespan and gender. Though this effect became redundant when adjusting for risk factors for suicidality for the youngest and oldest cohorts, those in the midlife age group were found to have an increased vulnerability to suicidality. In the final study, longitudinal analyses of the youngest PATH cohort assessed whether resilience predicted suicidality over time, or contrastingly, whether suicidality predicted resilience. Extending upon the previous study's findings, results further demonstrated the association over time between resilience and suicidality, and in particular suicidality with low resilience. As before, effects were attenuated when covariates were added.

Limitations are present, however, in using a data source such as PATH. For instance, attrition has the capacity to bias samples towards being healthier. Additional related consequences involve fewer numbers available to assess resilience and suicidality between waves 3 and 4. Information of completed suicides was not available. Self-report questionnaires depend on memory recall, and may be subject to social desirability. Other considerations include that measures selected for the current thesis were limited to those available in the PATH dataset. Importantly, use of alternative measures may have led to different results.

Results from this dissertation carry important implications for understanding the role of resilience in relation to suicidality, within a general population sample across age and gender. Having undertaken nonclinically-based studies, current findings provide robust information pertaining to the relationship between resilience and suicidality relevant to the general community. Use of a constellation of scales to assess resilience across age and gender was not as effective as a resilience-specific scale (Connor-Davidson Resilience Scale; CD-RISC) for measuring resilience. Applicability of the CD-RISC within the general community was made evident by this thesis. The unitary underlying CD-RISC factor structure was also established as being consistent across lifespan and gender. Furthermore, individual manifested indicators of resilience were shown to differ between different groups, such that certain characteristics promoting resilience appear more prevalent for one age/gender group than another.

Resilience was associated with suicidality across the lifespan, though this effect attenuated in the younger and older cohorts, when other risk factors for suicidality were considered. Conversely, those at midlife continued to report increased likelihood of suicidality in models that adjusted for other risk factors. Longitudinal analyses identified the presence of suicidality as being a risk factor for subsequent poor and reduced levels of resilience. Moreover, it was established that use of current resilience or suicidality levels to predict future status is an unreliable method of ascertaining likelihood of individual wellbeing. This is due to the varying influence that psychological constructs (e.g., anxiety, mastery levels) may have on our resilience and/or suicidality status.

Recommended future research includes clarification into use of the CD-RISC as a 22- or 10- item measure. Further assessment of the CD-RISC's applicability as

a shortened 10- or full length 22- item measure in the PATH sample would provide additional support as to whether the CD-RISC be considered the “gold standard” resilience measure, regardless of its format. Using just one measure, such as the CD-RISC, would allow comparisons of community and clinical samples providing a better understanding of similarities and/or differences in resilience between these two populations. From this, programs aimed at improving resilience, and to reduce suicidality risk could be informed. Further exploration is recommended to establish whether non-specific measures are an unreliable assessment of resilience across samples, aside from those in the general community. This information would be beneficial to practitioners, researchers and policy makers, in formulating plans to improve resilience to adversity, thereby reducing suicidality risk likelihood.

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## Chapter One: Introduction and Overview

Although the domains of suicidality and resilience have both been explored extensively as independent areas of research (Conwell, Duberstein & Caine, 2002; Fairweather-Schmidt, Anstey, Salim & Rodgers, 2010; Fleming, T. M., Merry, Robinson, Denny & Watson, 2007; Werner, 2005; Werner & Smith, 1979), investigation into resilience in conjunction with suicidality consists of only a handful of studies (Heisel & Flett, 2008; Osman et al., 2004; Rutter, P. A., Freedenthal & Osman, 2008). Within these evaluations, adolescent/young adult, geriatric, clinical and university populations (Heisel & Flett, 2008; Johnson, Gooding, Wood & Tarrier, 2010; Osman et al., 2004; Roy, Sarchiapone & Carli, 2007; Rutter, P. A. et al., 2008) have been the main foci. Exploration across the lifespan, and certainly between gender across age in relation to the role of resilience, in a large adult community sample has yet to be explicated. As such, knowledge of the association of resilience and suicidality in the general population, and between gender and age, has yet to be fully expounded (Johnson, Wood, Gooding, Taylor & Tarrier, 2011).

### 1.1 Definitions

**Resilience.** Although the word resilience carries a degree of familiarity, the term resilience carries different meanings across different contexts. Several decades of research has brought many perspectives and voices, but despite this vast body of research, little agreement has been reached on a single definition of resilience.

Though seemingly simple, the definition of resilience is widely recognised as being complex (Windle, 2010). Originally operationalised as successful adaptation towards the environment in completing age relevant development tasks (Masten & Obradović, 2006), distinguishing resilience as a unitary construct has proved

problematic. Definitions are embedded in historical, cultural and developmental contexts, whether assumed or made explicit (Masten & Obradović, 2006). They have been dependent upon the aspect of resilience being researched, and have also reflected different theoretical approaches (Hjemdal, Friborg, Stiles, Martinussen & Rosenvinge, 2006; Jowkar, Friborg & Hjemdal, 2010; Vaishnavi, Connor & Davidson, 2007). Explored across multiple domains (e.g., stress resistance, coping), several theories in regards to the construct of resilience have been suggested (Jew, Green & Kroger, 1999). These include, but are not limited to, resilience being considered as a personality trait, a process/outcome, a pattern for life development, involving internal and external adaptive functioning (e.g., psychological wellbeing, getting along with peers) and being either uni- or multi-dimensional (Masten et al., 1999; Masten & Obradović, 2006). Hardiness, grit (Maddi & Khoshaba, 1994); seeking help from others (Davydov, Stewart, Ritchie & Chaudieu, 2010); self-reliance and support networks (Rutter, P. A. et al., 2008; Wells, 2009) are just some of the resources that have been suggested within the aforementioned constructs, that may enable the facilitation of resilience. Consequently, definitions of resilience have incorporated elements such as emotional health, facets of risk factors, and how the presence of threat may affect the ability to adapt (Masten & Obradović, 2006). This has resulted in vague and inexact meanings (Luthar, Cicchetti & Becker, 2000) of resilience. A consistent definition of resilience is crucial if reliable evidence is to be provided in ascertaining the role of resilience. This is even more important if the definition of resilience is to be applied across age groups (Miller, E. D., 2003). As such, there is a need to tread carefully in defining and operationalising resilience (Masten & Obradović, 2006).

In an attempt to address these discrepancies in defining resilience, two comprehensive reviews were conducted (Herrman et al., 2011; Windle, 2010). Acknowledged as incorporating several disciplines, these reviews endeavoured to formulate a single, all-round definition of resilience that could be used across domains. Windle (2010) used a three-prong approach, applying concept analysis, a systematic literature review and stakeholder consultation in quantifying resilience. Real-life cases of resilience were adopted as it was argued that hypothetical scenarios only provide a limited construct of resilience. Further, definitions of resilience were explored across several domains (e.g., dictionary; developmental psychology; context – the life course; environmental, biological and psychiatry; and personal characteristics). In contrast, Herman et al.'s (2011) review of resilience was not conducted as extensively in terms of its definitions and perceived related variables. Consideration was given to personal, biological and environmental-systemic factors, with interactions between these elements explored. General discussion as to varying definitions utilising quotes was provided, with clinical and public health implications considered. The origin of these quotes, however, was unclear.

Though differences are apparent between the two reviews, and limitations arise in both, it was agreed that an interactive dynamic process contributed to the occurrence of resilience. Adversity or risk was observed as needing to be present for resilience to be facilitated (Windle, 2010). Further, resilience was noted to be context and time specific, and may be absent across all domains of life (Herrman et al., 2011). While no definitive conclusion was provided by Herrman et al. (2011) as to what resilience is or how it could be defined, Windle (2010) developed a set of requisites in exploring resilience that included 1) significant adversity or risk was

necessary; 2) resources or assets had to be available to alter the influence of the adverse event; and 3) circumvention of negative outcomes or positive adjustment must ensue. Formulated through an extensive review of resilience literature, Windle (2010) definition of resilience is similar to previous definitions that perceive resilience as the flexible response to demands, whilst bouncing back from negative experiences (Lazarus, 1993). However, it differs from others by not being dependent upon a singular aspect of resilience being researched (Hjemdal, Friborg, Stiles, Martinussen, et al., 2006).

With resilience having been investigated in different domains, operationalising its definition has led to a loss of any independent meaning (Miller, E. D., 2003). Thus if resilience is to be understood and future research informed, the definition needs to be distinct (Windle, 2010) and able to stand alone from other concepts (Miller, E. D., 2003). Recognised as being flexible in nature, resilience enables an individual to return from adversity (Lazarus, 1993). As such, for the purpose of the current thesis, resilience is defined as *the process by which individuals utilise personal and environmental resources that enables them to adapt to, or manage, significant daily life-stress or trauma* (Windle, 2010), *thus allowing them to recover from adversity* (Lazarus, 1993).

**Suicidality.** “Suicidality” is an encompassing term comprising suicidal ideation (thinking about ending one’s life), attempts (nonfatal self-injurious behaviour, some intent to die), plans (formulating a strategy of how to end one’s life) and completed suicide (death by suicide) (Nock et al., 2008; Silverman, 2006; Silverman, Berman, Sanddal, O’Carroll & Joiner, 2007). Examination of the individual components that formulate the spectrum of suicidality (Johnson, Gooding, Wood & Tarrier, 2010) has shown that suicidal behaviour can be

considered as an act of intentional self-harm that is separated from other suicidal behaviours only by the outcome of that behaviour (Rossow, Romelsjo & Leifman, 1999).

The terms suicidality, suicidal ideation and suicidal behaviours will feature in the following chapters. Suicidality will be used to encompass a range of behaviours from suicidal ideation through to completed suicide. Suicidal ideation will refer to thoughts about ending one's life, while behaviours address attempts and plans.

## **1.2 Background**

Although both resilience and suicidality research explore factors that may reduce or increase individual wellbeing, studies have frequently been conducted independently within either domain. Only in recent times has resilience and suicidality been examined simultaneously, to address the issue of suicidality risk. Consequently, while factors such as family and social connectedness, spirituality, social activities and perception that life is meaningful and worth living have been identified as being associated with a reduced probability of suicidality (Borowsky, Resnick, Ireland & Blum, 1999; Eisenberg & Resnick, 2006; Heisel, 2006; McLean, Maxwell, Platt, Harris & Jepson, 2008), the role of resilience in lowering suicide risk is still being identified (Hobbs & McLaren, 2009; Johnson, Gooding, Wood & Tarrier, 2010). Indications from studies that have explored this area have shown an association between resilience, and the occurrence of suicidality. Stratifying the analysis by gender, in a sample of older adults, Hobbs and McLaren (2009) demonstrated that suicidality could be mitigated, should resilience (or protective factors that enable resilience) be present. In conjunction with lower levels of depression, high agency levels (e.g., competitiveness, feelings of superiority) were found to reduce suicidal ideation risk for men and women. It was also noted that

men with lower levels of agency had high levels of depression and consequently, greater suicidal ideation risk. Meanwhile, Johnson, Gooding, Wood and TARRIER (2010), determined that within a student population, high levels of positive self-appraisals were negatively associated with the occurrence of suicidality, even when stress was present. As such, though protective factors and resilience have a smaller body of evidence than that relating to suicidality, research conducted on the association of the role of resilience on suicidality, highlights its importance in considering suicidality risk.

**1.2.1 Suicidality research.** Research on suicide has typically focused on the construct of suicidality and the accompanying social, psychological, biological and existential variables involved in its process (Heisel, 2006). With suicide research having predominately explored risk, co-morbidity and socio-cultural factors (Johnson, Gooding, Wood & TARRIER, 2010; McLean et al., 2008), this has resulted in multiple factors associated with suicidality being identified. Childhood adversity, low socio-economic status, mental illness, maladaptive coping strategies, and impulsivity, are risk factors that have been extensively researched (Beautrais, Horwood & Fergusson, 2004; Denney, Rogers, Krueger & Wadsworth, 2009; Fairweather-Schmidt et al., 2010; Johnston, Pirkis & Burgess, 2009; Kutek, Turnbull & Fairweather-Schmidt, 2011; Lawrence, Almeida, Hulse, Jablensky & Holman, 2000; Masten, Best & Garmezy, 1990). Social disadvantage, biological and genetic risk, exposure to negative life events and psychopathology, personality and temperament characteristics also increase suicidality risk (Fleming, T. M. et al., 2007).

Though examination of age, gender and suicidality has been scarce (Zhang, McKeown, Hussey, Thompson & Woods, 2005), gender differences in suicidality

risk have been observed. Differences appear to originate from adolescence (Fairweather-Schmidt, Anstey, Rodgers, Jorm & Christensen, 2007) in the occurrence of suicidal thoughts and behaviours (Edwards & Holden, 2001; Hobbs & McLaren, 2009). Suicide attempts occur more frequently amongst adolescent girls (Borowsky et al., 1999; Fleming, T. M. et al., 2007; Rew, Thomas, Horner, Resnick & Beuhring, 2001), while adolescent boys have a higher prevalence for completing suicide (Borowsky et al., 1999; Fernquist, 1999). Importantly, these differentials persist as individuals age with suicide attempt remaining high amongst women (Borowsky et al., 1999; Fairweather, Anstey, Rodgers & Butterworth, 2006; Fleming, T. M. et al., 2007; Rew, Thomas, et al., 2001), with men still more likely to complete (Borowsky et al., 1999; Corna, Cairney & Streiner, 2010; Fernquist, 1999; Hobbs & McLaren, 2009). Low levels of education and being widowed, separated, divorced or never married have also shown a gender divide with risk of suicide heightening amongst men but not women (Denney et al., 2009). This demonstrates the prevalence of male and female differences in suicidal ideation, plans and attempts (Johnston et al., 2009).

Studies exploring age and suicidality have observed that whilst completion rates normally increase with age (Fairweather-Schmidt et al., 2007; Rew, Taylor-Seehafer, Thomas & Yockey, 2001), a greater proportion of suicidal ideation and attempts are observed among young adults, with rates conversely reducing with advancing age (Fairweather-Schmidt et al., 2007; Fairweather et al., 2006). Patterns of suicidal ideation, plans and attempts have been found to differ according to age and gender with 35 – 44 year old men, and women aged 16 – 24 being at increased vulnerability for suicidal ideation, plans and attempts (Johnston et al., 2009). Importantly, differences between age and gender are not systematic, but seem to

vary according to developmental and social factors. For example, unemployed men in their 40s exhibit increased levels of suicidality while women in their 20s and 60s are more vulnerable to suicidal ideation than men in the same age groups (Fairweather-Schmidt et al., 2010). However, though suicidality does vary across age and gender, within each of these variables the underlying construct of suicide remains unchanging (Fairweather-Schmidt, Anstey & Mackinnon, 2009). Thus, in conducting suicidality research, it is essential that these variables are considered and reflected upon (Fairweather-Schmidt et al., 2010).

Though research on variables that may increase risk of suicide and suicidal behaviours has been essential in determining how we may ameliorate suicidality, work on prevention and detection has been limited (Christiansen & Jensen, 2007). Furthermore, though resources such as the National Youth Suicide Prevention Strategy and Living is For Everyone (LIFE) Framework (Johnston et al., 2009) are available to the public, not all individuals are able or are willing to access them (Johnston et al., 2009; Wilson & Deane, 2010). This is partly due to the fact that these strategies are often focused (e.g., target a particular age or at risk group); or are overly broad and lacking specificity in that individuals of all ages are grouped together and are provided with the same treatment options (Fairweather, 2008; Johnston et al., 2009; Lawrence et al., 2000; Wilson & Deane, 2010). Simply targeting mental illness or other risk factors in attempting to detect and treat individuals with an increased chance of developing suicidality is not sufficiently sensitive (Lawrence et al., 2000). Factors (e.g., ethnic background, demographic groups and geographic locations; Garlow, Purselle & Heninger, 2005) influencing suicidality risk are frequently associated with individual development and life stages, and so may be variable (Conwell et al., 2002; Hirsch & Barton, 2011) across



the lifespan. Interactions with other variables may also influence the impact of a risk factor (Johnson, Gooding, Wood, Taylor, et al., 2010), thus formulation of an effective prevention, and indeed, a reliable and accurate screening instrument for suicide risk (Christiansen & Jensen, 2007) is incredibly challenging.

**1.2.2 Studies of resilience.** With low resilience levels having been associated with increased suicidality likelihood (Roy, Sarchiapone & Carli, 2006; Roy et al., 2007), incorporation of resilience measurement with risk assessments has the potential to overcome some of these difficulties. As resilience involves the ability to cope with adversity (Everall, Altrows & Paulson, 2006; McLean et al., 2008; Netuveli, Wiggins, Montgomery, Hildon & Blane, 2008) and is associated with satisfactory levels of physical and mental health (Wells, 2009), assessment of current resilience levels could provide an indicator of individual wellbeing that assessment of risk factors may overlook. Thus, an amalgamation of resilience and risk variables may be valuable in informing the likelihood of suicidality risk.

Viewed as being fundamental in enabling an individual to maintain or regain adequate mental wellbeing (Herrman et al., 2011), resilience has been deemed essential in facilitating constructive outcomes when adversity and/or risk are present (Everall et al., 2006; Netuveli et al., 2008; Rutter, M., 1981; Schoon, 2006). Possessed in varying degrees (Wagnild, 2003) across domains for each individual (e.g., ability to handle daily stress but unable to maintain an intimate relationship; Davydov et al., 2010; Tusaie & Dyer, 2004), and dependent upon significant life changes and development, resilience has been shown to not be stable (Afifi & Macmillan, 2011; Tusaie & Dyer, 2004).

Identified through observations of individuals who transitioned into well-adjusted adults despite experiencing childhood adversity, studies have linked the

presence of resilience with a reduction in impact of highly stressful events, whilst lowering suicidality risk (Johnson, Gooding, Wood & Tarrier, 2010). However, for resilience to occur, stress or adversity must be present (Jew et al., 1999; Schoon, 2006; Windle, 2010), as otherwise adjustment and adaptation cannot occur (Schoon, 2006; Windle, 2010). In being exposed to difficult situations, strategies utilised as a direct consequence may enable an individual to develop successfully despite adversity (Connor & Davidson, 2003; Windle, 2010). For instance, a good outcome may be facilitated through the processes that enable maintenance of positive self-concept, mental health and self-esteem (Everall et al., 2006; Hjemdal et al., 2011; Jew et al., 1999). Application and use of resources from the environment, life experiences and the individual themselves (Everall et al., 2006; Luthar & Cicchetti, 2000; Schoon, 2006; Windle, 2010; Windle, Bennett & Noyes, 2011) can enable this to be achieved. From this, retention of effective or positive functioning (or adaptation) during an adverse event (Masten et al., 1999; Sinclair & Wallston, 2004), and recovery from an illness, stressor or significant trauma (Lamond et al., 2008; Masten et al., 1999) may occur without significant maladjustment.

Consequently, resilience has been postulated as the capacity to bounce back from an unexpected event or pressure (Netuveli et al., 2008; Rew, Taylor-Seehafer, et al., 2001; Windle, 2010), through successful adaptation, cognitive, coping and negotiating processes (Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Sinclair & Wallston, 2004; Windle et al., 2011). Resources from within the individual, the environment and their life are additionally utilised to facilitate adjustment and return from adversity (Windle, 2010). This has led to resilience being considered as a multidimensional construct influenced by time, external support systems, family engagement, individual capabilities and cultural backgrounds (Connor & Davidson,

2003; Jew et al., 1999; Jowkar et al., 2010).

Few studies have investigated the aetiology of resilience. Of those that have, there are indications that resilience is dependent on reciprocal interactions between an individual and their environment (Everall et al., 2006; Luthar & Cicchetti, 2000). Life experiences, social engagement, family, present situation and intimate relationships (Wagnild, 2003) influence individual ability to develop and sustain resilience through providing (or in other cases, not) a sense of connectedness, self-worth and access to health promotion strategies.

Considered to be significant determinants of adjustment to long-term stress, the presence of family cohesion and support, and external support systems (e.g., positive peer relationships), have been associated positively with resilience (Friborg, Hjemdal, Rosenvinge & Martinussen, 2003; Jowkar et al., 2010; Von Soest, Mossige, Stefansen & Hjemdal, 2010). In having access to support mechanisms such as these, feelings of being understood and of belonging, enables better management of stress. Resources (e.g., advice, knowledge) can also be drawn from these quarters, thus enabling the development of effective coping strategies in times of stress. Positive individual/dispositional attributes, like self-worth for instance, facilitates resilience through helping to promote the return of supportive relationships, self-image and optimism for the future (Friborg et al., 2003; Jowkar et al., 2010; Von Soest et al., 2010)

Successful ageing (e.g., the enjoyment of health and energy of the body, mind and spirit), where an individual engages in activities such as physical exercise and involvement within the community, has also been associated with resilience (Lamond et al., 2008; Wagnild & Young, 1993). Good mental health (also linked to successful ageing), concomitant with the occurrence of good adaptive and coping

strategies, has also been linked to resilience (Lamond et al., 2008; Wagnild, 2003; Wells, 2009). Further, positive emotional wellbeing and optimism (Lamond et al., 2008; Wagnild, 2003; Wells, 2009) have also been identified as being linked to resilience. In regards to these aspects, the ability to adapt and cope with stressful events/adversity, whilst maintaining a positive outlook, increases an individual's likelihood of pursuing support and/or help as needed.

**1.2.3 The role of resilience on suicidality.** With evidence demonstrating that individuals can overcome previous suicidality experiences, through the development of tactics that protect them from future suicidality behaviours (Everall et al., 2006), the role of resilience appears central to the amelioration of suicidality. The presence of protective factors such as hopefulness, optimism and reasons for living, that have been established as reducing suicidality even among those experiencing stress/adversity and depression (Lamond et al., 2008; McLean et al., 2008), demonstrates that not all who are vulnerable, continue to encounter suicidal thoughts and behaviours. As such, resilience to stressful life events has been argued to be a better predictor of suicidality than the amount of life events experienced by an individual (McLean et al., 2008).

Though resilience research has demonstrated that certain variables may enhance or maintain ability to sustain or develop resilience, continuous experiences of stressors or adversity over a period of time may accumulate. Retention of resilience becomes increasingly difficult when hardships multiply (Netuveli et al., 2008). Consequently, over time, resilience levels can decline and vulnerability to suicidality increase (Netuveli et al., 2008). However, if individuals have fostered and sustained elements that can potentially facilitate the rebuilding or development of resilience (e.g., independence, confidence), this may reduce the impact that

continuous adversity may have on individual wellbeing (Hobbs & McLaren, 2009; Wells, 2009). As such, it has been suggested that as certain variables may facilitate, increase or sustain resilience levels (Hirsch & Barton, 2011; Masten et al., 1990), suicidality risk can subsequently be lowered, enabling an individual to successfully age (Hobbs & McLaren, 2009; Wells, 2009). Subsequently, there is a current need for the association between age and resilience to be explored further to understand the impact that the relationship between age and resilience has on an individual. With research into gender and resilience observing male and female differences (Friborg et al., 2003; Hjemdal et al., 2011; Jowkar et al., 2010; Masten et al., 1990), gender and age in resilience research needs to be more thoroughly examined. For example, social support has been connected with resilience more so in women than men (Netuveli et al., 2008), due to women being more inclined to seek and use social resources when needed (Hjemdal et al., 2011; Werner, 2005).

Presently, research is unable to accurately distinguish those at risk of suicidality in the general community, particularly amongst those who have either never demonstrated suicidal behaviour yet have died by suicide/completed suicide (Conwell et al., 2002), or who experience suicidal ideation but do not seek support (Corna et al., 2010; Johnston et al., 2009). Consequently, the need for resilience-focused research is crucial. If a prevention strategy is to be effective, identification of factors that promote or attenuate resilience is essential. From this, information and understanding of the role of resilience and its association with suicidality (Conwell et al., 2002; McLean et al., 2008) can be provided.

### **1.3 Research Gaps**

With suicide research having trended towards exploring risk variables affecting mental and physical wellbeing (Werner, 2005), high risk groups remain a

dominant focus for researchers (Masten, 2001). If improvement of mental wellbeing is to be achieved, research needs to work towards identifying factors that directly impact cognitive and emotional resources alongside those that are associated with them (Beddington et al., 2008). Focusing solely on factors that increase suicidal thoughts and behaviours has led to a greater body of knowledge concerning risk of suicidality, with few identifying factors ameliorating suicidality (Hobbs & McLaren, 2009; Johnson, Gooding, Wood & Tarrier, 2010; McLean et al., 2008). This is despite evidence demonstrating the role of protective factors in improving wellbeing, whilst reducing suicidality risk. Agency, for example (otherwise known as masculine qualities e.g., feelings of superiority), in high levels has been shown to have a protective role in reducing suicidality risk in depressed individuals (Hobbs & McLaren, 2009). Further exploration of protective factors and resilience, and the role that resilience has on the occurrence of suicidality is essential if suicide research is to progress in regards to working towards the amelioration of suicidality.

Advancement in suicide research has been further hampered by methodological issues such as the general use of clinical (Lawrence et al., 2000; Wilburn & Smith, 2005), and infrequent use of community (Fairweather-Schmidt et al., 2010) samples. Use of clinical samples (e.g., those who experience suicidality, those with a mental disorder), for instance, may provide a misrepresentation of suicidality across the general community (Lawrence et al., 2000). Accurate profiles of suicidality in the population is also restricted by the sporadic use of community based samples, despite the advantages that large data sets have in regards to data collection (e.g., avoid bias; the ability to evaluate change within an individual; Fairweather-Schmidt et al., 2010). Furthermore, dominant utilisation of clinical

samples has led to knowledge of the associations of suicidality processes in non-clinical populations being impeded (Wilburn & Smith, 2005).

Compared to suicide research, more longitudinal work has been conducted in resilience research (e.g., British Household Panel Survey, Kaui Longitudinal Study; McLean et al., 2008; Werner, 2005; Werner & Smith, 1979). There has also been a plethora of research involving specific age groups (e.g., young children, adolescents and to a lesser degree, older adults; Campbell-Sills, Cohan & Stein, 2006; Heisel, 2006; Lundman, Strandberg, Eisemann, Gustafson & Brulin, 2007; Netuveli et al., 2008; Stewart, 2011). However, few resilience studies have compared differences in resilience between gender (Werner, 1993, 2005) and/or across the lifespan (Campbell-Sills et al., 2006; Werner, 2005). Further, knowledge of resilience and its potential application (e.g., increasing wellbeing, reducing suicidality risk, measure of treatment response) in clinical settings is still relatively limited (Connor & Davidson, 2003). Investigation is still needed to resolve how risk, resources and protective factors may influence each other over time (Masten, 2001).

As is the nature of research, methodological issues have been encountered in the area of resilience study. Single geographic locations (Rew, Taylor-Seehafer, et al., 2001), unbalanced and cross-sectional designs (Cowen et al., 1997; Cowen, Wyman, Work & Parker, 1990; Lamond et al., 2008; Lundman et al., 2007; Masten et al., 1990) have prevented the generalisation of results across samples. Use of single gender cohorts (Lundman et al., 2007), and one age group (Kissane & McLaren, 2006; McLaren, Gomez, Bailey & Van Der Horst, 2007), has hindered exploration into gender and age/lifespan differences, in relation to the role of resilience.

Longitudinal examination of community samples on resilience and its association with suicidal thoughts and behaviours is still scarce (Chan, Draper & Banerjee, 2007; Marty, Segal & Coolidge, 2010). This is needed not only to confirm and expand existing small, cross-sectional studies that have investigated either resilience, or suicidality (Chan et al., 2007; Lamond et al., 2008), but also to explore the relationship between resilience and suicidality risk over time. Resilience and whether it is negatively associated with risk in the general population is yet to be understood (Johnson et al., 2011). Research into these areas is essential to promote positive mental health, which is vital for both healthy and clinical populations (The Government Office for Science, 2008).

If resilience and suicide research is to progress, there is a necessity for these research areas to amalgamate and focus on larger community-based samples. Policies working towards improving mental wellbeing across the whole population, in addition to clinical subsets, should be considered. Moreover, information derived from longitudinal studies across a range of ages would be invaluable in identifying the effects that predictors have on individual wellbeing, as what may influence an individual who is 60 years old now, compared to someone who will become 60 in 2034, may differ (The Government Office for Science, 2008). As such, examination of those who demonstrate resilience, whether they be considered to be at risk or not, needs to be reflected upon (Davydov et al., 2010), if research is to progress in understanding resilience and its processes. This thesis aims to fill some of these knowledge gaps, by exploring the concept of resilience and its relationship with suicidal thoughts and behaviours across gender and age.

#### **1.4 Research Objectives**

As alluded to previously, much research into resilience and suicidality has



been methodologically limited or population specific. Subsequently, the current thesis sought to provide insight into the role of resilience and its impact on suicidal thoughts and behaviours within a community based sample, across three cohorts.

Due to a lack of clarity in relation to the measurement of resilience, the first objective of this thesis is to explore the validity of a measurement of resilience from data derived from a community sample. Variables such as age, gender and other factors potentially contributing to the construct of resilience are investigated concurrently. Findings from this investigation will inform how resilience is to be measured in the subsequent studies of the current thesis, which focus on characterising the role and influence of resilience on risk of suicidality.

The second aim of this thesis is to investigate the effect of age and gender on resilience and in turn, suicidality risk. This thesis will also explore the influence that different levels of resilience (i.e. low, high or stable) may have on the amelioration of suicidal thoughts and behaviours. Furthermore, longitudinal investigation of resilience and suicidal thoughts and behaviours will also be conducted to ascertain whether the effect of resilience on suicidality (and vice versa) is stable over time.

## **Chapter Two: Resilience**

Related to stress, coping and risk paradigms, resilience has been associated with the presence of protective factors or processes that diminish the impact of adversity (Smith, C. & Carlson, 1997). This is achieved through the facilitation of coping mechanisms, management techniques and support from others.

Consequently, the current thesis, as defined in the previous chapter, conceptualises resilience as the ability to employ resources (e.g., environmental, personal) that enables adaptation to, or management of stressful/adverse situations. From this, bounce back or return from a negative experience/s can occur (Lazarus, 1993).

Resilience research comprises studies of resilience from a community level (Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum, 2008; Ungar, 2011), down to intra individual factors (Ungar, 2012). Considered to be a form of protection from adversity, resilience research has facilitated current understanding of the concept of resilience, and how adversity/trauma can affect individual development (Luthar & Cicchetti, 2000; Roy, Carli & Sarchiapone, 2011; Shen & Zeng, 2010; Sroufe & Rutter, 1984). Possession of certain strengths, resources and assets that help in the management of adversity may reduce the impact of stressful events (Richardson, 2002). Consequently, experiences of adversity, disadvantage and stress may not predetermine a negative outcome for individuals if resilience is present (Schoon, 2006). However, current and subsequent responses to adversity are dependent on existing risk factor/s and stressors encountered, in addition to the environment in which the stressor occurs (Everall et al., 2006; Luthar & Cicchetti, 2000; Schoon, 2006; Vanderbilt-Adriance & Shaw, 2008). As such, the facilitation of resilience is dependent on an individual's response and available resources that can be drawn upon, at that moment in time.

Studies have predominantly explored the role of resilience on individual wellbeing, health, quality of life and management of ageing (Huppert & So, 2013; Windle et al., 2011). Thus, research has concentrated on identifying factors/characteristics enabling individuals to adapt, recover positively or to thrive despite adversity (Luthar & Cicchetti, 2000; Masten, 2007; Masten & Obradović, 2006; Tusaie & Dyer, 2004). Further, in trying to understand resilience, various models, frameworks, paradigms and theories have been conceptualised (Fleming, J. & Ledogar, 2008; Johnson et al., 2011; Richardson, 2002). Determining factors and mechanisms that may facilitate the prevention of mental health disorder development irrespective of exposure to adverse events, has also been an area of interest (Hjemdal, Aune, Reinfjell, Stiles & Friborg, 2007; Masten & Obradović, 2006).

## **2.1 Resilience in the Literature**

The study of resilience has progressed across several major waves, and has characterised and highlighted the processes considered to underpin positive outcome (and subsequently resilience), whilst also helping to shape an emerging field of resilience framework for research and practice (Campbell-Sills et al., 2006; Cowen et al., 1990; Masten, 2001; Tusaie & Dyer, 2004). Researched within select disciplines prior to broadening across domains, the study of resilience brought reflection on how adversity/trauma, may or may not affect individual development (Luthar & Cicchetti, 2000; Sroufe & Rutter, 1984).

Originally focusing on the elucidation of factors that enabled individuals to thrive when faced with adversity or risk (Richardson, 2002), basic concepts and methodologies of resilience arose that focused on the individual (Wright & Masten, 2005). Stressors/adversities span problems that could be considered as something

that disrupts daily life (e.g., arguments with loved ones), to experiencing major life events such as parental separation or divorce, or even a natural disaster (Smith, C. & Carlson, 1997). Those who transcended such adversities were labelled as “hardy,” or “invulnerable” (Werner & Smith, 1982). Subsequent investigations then orientated towards understanding the processes underlying facilitation of positive outcomes and how resilience could be acquired (Cowen et al., 1997; Luthar et al., 2000; Margalit, 2003). This was a more dynamic accounting of resilience (Wright & Masten, 2005), where resilience was recognised as a process. As such, resilience can grow, or diminish over time, depending on interactions occurring between an individual and their environment, and between risk and protective factors which may feature in an individual’s lifetime (Werner, 1992).

Research then departed from investigation of psychological issues to exploring how wellness could be developed and promoted. Interest in wellbeing from governments and policy makers led to a focus on approaches to prevention, intervention and policies directed towards safeguarding children experiencing adversity (Cowen et al., 1990; Masten & Obradović, 2006). Intervention efforts, stimulated by prevention efforts, worked towards promoting aptitude, so as to ameliorate or prevent emotional and/or behavioural problems (Masten & Obradović, 2006). Neurobiological processes underpinning adaptation, brain development and behaviours at multiple levels, as well as genetic contributions, have also since been examined (Carli et al., 2011; Vaishnavi et al., 2007; Wright & Masten, 2005). Findings from this area of study includes that an individual’s genetic makeup may proffer protection from adversity; equally, there are those with a background of genetic risk (Carli et al., 2011; Cicchetti, 2010). High measures of dehydroepiandrosterone (DHEA), neuropeptide Y, galanin, and testosterone, as well

as increased 5-HT1A receptor and benzodiazepine receptor function, have been suggested to be potential markers for resilience (Charney, 2004). It has also been suggested that improved understanding of neurobiological processes that lead to an increase in maladaptive development may provide novel targets for preventive intervention (Cicchetti, 2010).

Resilience research has since continued on a broad base, encompassing resilience from a community level down to intra individual factors (Norris et al., 2008; Ungar, 2011). Identifying what enables resilience in individuals has provided a foundation for what factors may assist people in overcoming adversity, and what may be needed to allow a person to flourish. With flourishing (i.e., experience of life going well) highlighted as being more than the absence of disorder, and requiring investigation in its own right (Huppert & So, 2013), resilience, similarly, deserves the same attention. From this, policy/interventions/programs can be implemented that may increase the number of resilient individuals within the population.

## **2.2 Theory and Concepts of Resilience Processes**

As mentioned earlier, the construct of resilience has been researched across several domains (Luthar & Cicchetti, 2000; Sroufe & Rutter, 1984). Whilst there is commonality in regards to ideas and concepts from areas such as coping, hardiness, risk research, positive psychology and salutogenesis, crucial differences are evident between research areas (Jowkar et al., 2010). For instance, though an individual with good coping skills may be considered resilient, those who live in a protective environment may not have effective coping strategies due to a lack of skill in this area (Mandleco & Peery, 2000). Moreover, though the terms resilience and coping have been used interchangeably, it has been suggested that resilience has been

observed to influence how an event is appraised, whilst coping refers to mechanisms used following a difficult situation (Fletcher & Sarkar, 2013). Thus resilience and coping have been identified as two distinct constructs (Campbell-Sills et al., 2006), where the presence of one does not automatically necessitate the occurrence of the other. Within positive psychology, the presence of stressors, losses or trauma are grounds for the study of resilience. Only variables that have a negative influence on health appear to be of interest in risk research, despite both risk and protective factors being of interest in resilience research (Luthar, 2006). Developed from risk research on stress-exposed individuals, the hardiness construct is defined by certain personality dispositions (Kobasa, Maddi & Kahn, 1982). These characteristics facilitate the adaptation process when encountering stressful life events. However, in focusing on these factors, the worth of interpersonal and external protective factors for positive adaptation, and how they can contribute towards hardiness is often overlooked (Jowkar et al., 2010). Similarly for salutogenesis (i.e., sense of coherence; Antonovsky, 1979), attention centres on the significance of intrapersonal capacities.

Despite these differences, a direct consequence of resilience exploration across domains has led to the generation of theories and development of frameworks related to resilience, whilst empirical evidence has led to the manifestation of models and instruments that operationalise its concept (Ahern, Kiehl, Sole & Byers, 2006). The commonality underpinning these theories is the notion that resilience is a dynamic process that changes over time, that involves the interaction of a wide range of factors which determines an individual's resilience (Fletcher & Sarkar, 2013).

Throughout the resilience literature, several models of resilience have been

developed (Fleming, J. & Ledogar, 2008). These models explain how protective factors influence the impacts of adversity and the resultant aftereffects (Windle, 2010). Resilience models have included, but are not limited to, three main categories; “compensatory,” “protective” and “challenge” models (Fleming, J. & Ledogar, 2008). The former (e.g., the cumulative/compensatory model) proposes that a resilience variable may offset, or act in the opposite direction to a risk factor (Fleming, J. & Ledogar, 2008; Masten et al., 1990). Consequently, this model relies on an accumulation of several protective factors (i.e. high levels of self-esteem) that can be used to balance out experiences of adversity (Schoon, 2006). Meanwhile, for the protective/interaction effect model, protective factors operate in several ways to influence outcomes of an adverse event (McLaren et al., 2007; Schoon, 2006). With regards to the challenge/inoculation model, the theory here is that as the number of protective factors increases, the relationship between the risk factor and maladjusted behaviours diminishes accordingly (McLaren & Challis, 2009; McLaren et al., 2007). This model, however, is only relevant in low/moderate risk situations; it does not provide explanation for how resilience functions in high risk encounters (Schoon, 2006).

Suggested to be dormant, or irrelevant, resilience becomes “activated” when triggered by adversity (Johnson et al., 2011). As such, experiences of stressful situations are vital for the catalysis of resilience, whereby skills are subsequently adopted and available to respond to future adverse events (Connor & Davidson, 2003; Jew et al., 1999). However, management is dependent on the balance between a person’s psychological resources and environmental demands (Lazarus, 2006).

The necessity of risk/stress to be present and of sufficient strength to trigger

resilience, has led to resilience being considered as intertwined with risk (Jew et al., 1999; McLaren et al., 2007; Schoon, 2006; Stouthamer-Loeber et al., 1993; Windle, 2010). From the perspective of the current thesis, resilience will be considered from the stress and coping perspective, where management of adversity is determined by the resources that are available to an individual that may ameliorate the impact of adversity on individual wellbeing (Smith, C. & Carlson, 1997). Through previous experiences of adversity, individuals develop qualities and skills that enable them in the future to be less disrupted by adverse events; as such, past experiences may influence the manner in which individuals respond to future adversity (Richardson, 2002). However, the presence (or lack) of factors such as family connectedness and social support may modify an individual's subsequent approach/strategies in dealing with a current stressor/adverse event (Jowkar et al., 2010; McLaren, 2011; Richardson, 2002; Shanahan, 2000; Sroufe & Rutter, 1984). This can explain why some are able to maintain wellbeing (and subsequently resilience), even when current circumstances are difficult (The Government Office for Science, 2008). However, in experiencing adversity, irrespective of the degree of unpleasantness experienced, each event can have differing impacts. For instance, a build-up of daily stress and/or events (which an individual may be able to endure), compared to a solitary distressing incident, may have a greater negative impact on an individual's wellbeing (Everall et al., 2006; Netuveli et al., 2008). Indeed, dependent on the availability of protective factors that enables resilience, an individual's "choice" of coping behaviours can be impacted upon (Schoon, 2006). Further, while protective factors may be available, it is only through the applied use of these (e.g., personal strengths and support mechanisms), that the effect of adversity on an individual may be ameliorated (Smith, C. & Carlson, 1997).



### **2.2.1 Identifying processes that influence the action of resilience.**

Research into resilience and its development, processes and operation, has unveiled interesting and consistent findings (Masten, 2001). Low resilience, for instance, has been associated with hopelessness, suicidality, loneliness, subsequent mental health diagnoses and an increased likelihood of psychiatric symptoms (Campbell-Sills & Stein, 2007; Hjemdal, Friborg, Stiles, Rosenvinge & Martinussen, 2006; Rew, Taylor-Seehafer, et al., 2001; Roy et al., 2007). Among less resilient individuals, experiences of depression, poorer self-rated wellbeing and fewer health promoting behaviours, reduces the chances for successful ageing compared to those who are more resilient (Wagnild, 2003).

Resilience comprises character traits and behaviours that are reflected by habitual behavioural and cognitive actions (Burns & Anstey, 2010). Catalysed by life events, resilience can be influenced positively or negatively by factors such as family, life experiences, social engagement, present situation and intimate relationships (Connor & Davidson, 2003; Wagnild, 2003; Windle, 2010).

Interactions with and impacts by social, physical and environmental factors, may alter the influence of protective factors (e.g., family/peer support, feelings of self-worth) that enable resilience (Windle, 2010). If stressors increase in number, are accumulative and continuous, the capacity to maintain resilience is likely to diminish (Friborg et al., 2003; Netuveli et al., 2008; Vanderbilt-Adriance & Shaw, 2008). Moreover, with stressors potentially emerging from within the individual, and from their environment, as well as varying in intensity and duration, vulnerability can ensue (Smith, C. & Carlson, 1997). Indeed, as an individual's life circumstance evolves and changes, these can create new strengths, but also vulnerabilities (Masten et al., 1990; Werner, 1993, 2005). Thus, the presence of

resilience does not guarantee that experiences with adversity or stress will be effectively managed or overcome (Friborg et al., 2003).

Nevertheless, while encounters with adversity, trauma or disadvantage are challenging, sometimes beyond current coping resources, these experiences offer opportunities for building resilience, thus increasing the opportunity for better management of subsequent challenges (Masten, 2007). Resolution of stressful situations with a positive outcome, for instance, can increase a person's coping skillset (Levine, 2009; Rutter, M., 1985). The ability to generate positive meaning from difficult situations, such as single mothers parenting children with disabilities, can be strengthening (Levine, 2009). Thus, an individual's level of resilience appears dependent upon internal and external influencing factors (Connor & Davidson, 2003; Wagnild, 2003; Windle, 2010).

**2.2.2 Characterising the construct of resilience.** As discussed in Chapter one, resilience has been explored across multiple domains (e.g., coping, in/vulnerability), leading to several different characterisations of the construct being suggested (Jew et al., 1999). Theories consider resilience as a trait, a process or an outcome; a pattern for life development, multi or uni-dimensional, narrow or broad, occurring in the short or long term and; involving internal and external adaptive functioning (e.g., psychological wellbeing, getting along with peers) and resources (Masten et al., 1999; Masten & Obradović, 2006). Consequently, there is still little clarity about what constitutes the construct of resilience (Jew et al., 1999; Lamond et al., 2008; Masten, 2001; Masten & Obradović, 2006; Miller, E. D., 2003; Netuveli et al., 2008). The following sections present current concepts derived from resilience literature in order to illustrate different notions of the construct of resilience.

**2.2.2.1 Resilience as a personality trait.** Originally considered to be a personality trait, factors such as grit, hardiness and “ego-resilience” were observed to facilitate resilience when an individual was under duress (Lundman et al., 2007; Maddi & Khoshaba, 1994; Maddi, Matthews, Kelly, Villarreal & White, 2012; Schoon, 2006; Wells, 2009). Positively related to a sense of meaning, hardiness enhances performance and health (Maddi, 2014). Comprising three components (e.g., commitment, challenge and control), hardiness also facilitates the means to manage stressful life events (Kobasa et al., 1982). The first factor, commitment, allows an individual to generate a sense of purpose that enables them to identify with, whilst also providing meaning to experiences, things and others in their lives. Consequently, investment occurs, both internally and externally for the individual. Challenge, secondly, embraces change in life as a chance to grow. As such, adverse events are seen as stimulating, with individuals fostering openness and flexibility. The third component of hardiness, control, leads to behaviours that prevent a situation from becoming overwhelming, by reducing it down to something that can be managed (Kobasa et al., 1982). Together (i.e., control, challenge, commitment), they facilitate positivity and resilience to daily life (Maddi & Khoshaba, 1994). Similarly, grit facilitates factors like motivation, which enables management of stressful circumstances (Maddi et al., 2012 930). Grit has also been associated with a relentless pursuit of goals, regardless of adversity (Maddi et al., 2012 930). “Ego resilience,” meanwhile, refers to a set of traits representing strength of character, flexibility in functioning and general resourcefulness (Fletcher & Sarkar, 2013). Attributes of “ego resilience” include high levels of energy, curiosity, a sense of optimism, and the ability to disconnect and conceptualise issues (Block & Block, 1980).

Issues arose, however, when using these traits as indicators of a resilience construct. Hardiness for example, is considered to be a stable personality trait; meanwhile resilience has been shown to be variable in nature (Windle, 2010). Further, as resilience is considered a dynamic process where individuals display positive adaptation despite experiencing significant adversity or trauma (Luthar & Cicchetti, 2000), it cannot be considered to be a personality trait or a temperamental attribute (Luthar et al., 2000; Masten et al., 1999). Thus, resilience is argued to be precluded from being considered a personality characteristic (Luthar & Cicchetti, 2000; Schoon, 2006).

**2.2.2.2 Resilience as a facet of healthy development.** As resilience research evolved, resilience came to be regarded as a normal facet of healthy development rather than a trait a person may or may not possess (Everall et al., 2006). Further, it was observed to be dependent on reciprocal interactions between an individual and their environment (Everall et al., 2006; Luthar & Cicchetti, 2000; Schoon, 2006). Thus, resilience came to be considered by some as being an innate characteristic present in varying degrees (Wagnild, 2003), with the capacity to be enhanced or diminished in response to adversity/life events (Everall et al., 2006; McLean et al., 2008; Wagnild, 2003).

**2.2.2.3 Resilience: Internal and external factors.** Here, resilience was suggested as involving both an internal (e.g., self-reliance) and external protective factor (e.g., support networks) in order to successfully cope with stressors (Rutter, P. A. et al., 2008; Wells, 2009). Individuals must have the capability to utilise resources external to themselves (e.g., by seeking help from others), in order to protect their mental wellbeing (Davydov et al., 2010). However, meaning construed by an individual from interactions with their environment (Lazarus 1998, 1999),

could influence wellbeing. Thus, when conceptualising resilience, consideration of the interaction between individuals and their environment has been suggested to be important (Waller, 2001). However, there is still little clarity of how this process occurs and at what point individuals can build resilience (Wagnild, 2003).

**2.2.2.4 Resilience: Multidimensional construct.** More recently, resilience has been conceptualised as a multidimensional construct (Campbell-Sills et al., 2006). The ability to cope with adverse events has been demonstrated to be a learnable skill (Campbell-Sills et al., 2006). Changeable dependent on the possession of relevant abilities (e.g., positive coping strategies) by an individual, resilience may be contextually and temporally influenced by the presence, growth, or lack of protective factors available, at the time of adversity (Campbell-Sills et al., 2006; Fletcher & Sarkar, 2013). Consequently, the resilience construct was believed to pertain to a dynamic process evolving over time, conveying the capacity to be adaptive when encountering high levels of adversity (Everall et al., 2006; Luthar et al., 2000; Roy et al., 2007; Schoon, 2006; Vanderbilt-Adriance & Shaw, 2008). This highlights that resilience is not necessarily intrinsic to the individual.

**2.2.2.5 Summary.** Despite numerous suggestions, consensus have not been reached identifying discrete aspects establishing the theoretical construct of resilience (Charney, 2004; Davydov et al., 2010; McLaren et al., 2007; Richardson, 2002; Schoon, 2006; Windle, 2010). However, criteria constituting resilience has been established. A resilient individual achieves a positive outcome when placed in high risk situations; effectively maintains skills optimal for managing situations of threat; and recovers from an adverse event or trauma (Gucciardi, Jackson, Coulter & Mallett, 2011; Masten, 2001, 2007; Masten et al., 1990; Masten & Obradović, 2006; Rigsby, 1994).

### **2.3 The Role of Protective Factors in Resilience**

Resilience comprises various factors which stimulate an individual's ability to manage stress (Fletcher & Sarkar, 2013). Investigation into the processes leading to or underpinning resilience has revealed an abundance of information on the type of factors that may enable it to manifest (Hjemdal et al., 2011). These factors can originate internally (e.g., gender, general health, cognitive ability, psychological characteristics) and externally (e.g., relationships with family, peers or community resources), with each playing an important role in acquiring resilience (Mandleco & Peery, 2000).

Multiple factors and mechanisms that precede and facilitate functional coping and successful adjustment, have been shown to influence resilience (Ahmed, 2007; Friborg, Hjemdal, Martinussen & Rosenvinge, 2009). Arising from experience or constituting an aspect of the individual themselves, protective factors can modify, ameliorate or change individual responses to adversity (Johnson, Gooding, Wood & Tarrier, 2010; Masten et al., 1990; Rutter, M., 1985; Schoon, 2006). Occurring as a consequence of interactions over time, protective factors act in direct and indirect ways to promote resilience among individuals (Rutter, M., 1985). Skills can augment behaviours and life patterns, which in turn enable a person to capably manage future adversity (Jowkar et al., 2010; Richardson, 2002; Schoon, 2006). Encounters with stressors support the development of skills/beliefs (e.g., mastery); from this, self-confidence can develop, orientating individuals to seeing future stressful events as positive opportunities or challenges to be overcome (Richardson, 2002).

The capacity of individuals to draw on their resilience is influenced by characteristics of their current situation, the number of resources (e.g., social

support) available; further, whether the individual is overwhelmed by the adversity faced (Masten et al., 1990; Masten & Obradović, 2006; Vanderbilt-Adriance & Shaw, 2008; Wagnild, 2003). The degree to which a protective factor is effective, however, is dependent on when they are available to an individual. Social support for instance, has to be present prior to and during an adverse event, rather than after, for it to be wholly effective (Netuveli et al., 2008). Moreover, while factors may be constructive in one situation, they may not be valid or appropriate in another (Jew et al., 1999). For example, being able to consider the future positively may help a person to manage a difficult situation, whilst simultaneously in another circumstance, prevent them from being proactive in the present. Influences from environmental factors may also affect resilience (Jew et al., 1999). As such, an individual may be able to adapt to certain experiences more easily than others (Wright & Masten, 2005). This suggests that the effectiveness of protective factors cannot be reliably depended upon to sustain or improve resilience (Masten et al., 1990; Masten & Obradović, 2006; Vanderbilt-Adriance & Shaw, 2008).

**2.3.1 Identified protective factors.** Derived from a variety of sources, continuing resilience is dependent on the presence of resources from family members, peers, community and within each individual. These foundations are vital in the development and maintenance of effective coping strategies, whilst supporting mental and physical health (Friborg et al., 2003; Jowkar et al., 2010; Levine, 2009; Von Soest et al., 2010). Positive influences such as empathy and social behaviours (e.g., engaging with others), can lead to an increased likelihood of supportive associations occurring (Friborg et al., 2003; Masten et al., 1990).

Social support, whether provided by family, friends, or the community, is an important protective factor that facilitates the development and maintenance of

resilience (Everall et al., 2006; Herrman et al., 2011; Lamond et al., 2008; Netuveli et al., 2008; Purcell et al., 2011; Vanderhorst & McLaren, 2005; Wagnild, 2003). Putatively, the presence of a stable, positive family, and/or having peer relations, enables access to encouraging role models and confidantes, whilst enabling constructive adaptive development (Borowsky et al., 1999; Everall et al., 2006; Fenaughty & Harré, 2003; Masten & Obradović, 2006; Schoon, 2006; Werner, 1993, 2005; Werner & Smith, 1979). Other individuals (e.g., teachers, community, extended family members), in the absence of parental emotional support, can enable resilience to be built through the provision of a sense of belonging, connection, and importance (Fenaughty & Harré, 2003; Werner, 1993, 2005). Furthermore, no single source of support has been found to be more efficacious than another (Everall et al., 2006), with the quality of some relationships observed to contribute more to resilience than quantity, such as a large social network (Heisel & Flett, 2008). As such, social support could be argued to be a form of familial/community resilience, which boosts individual resilience.

Experiences of success could fuel a cycle that includes social inclusion, opportunity and social cohesion (The Government Office for Science, 2008). Further, the accomplishment of tasks or skills valued by the individual, their family and/or their peers, can increase/help to develop mastery (Everall et al., 2006), which in turn, alongside self-efficacy, boosts positive self-concept and self-worth (Burns, Anstey & Windsor, 2011; Everall et al., 2006; Jew et al., 1999; Mak, Ng & Wong, 2011; Rutter, M., 1985; Schoon, 2006). This in turn, can motivate the use of helpful behaviours in facilitating management of difficult situations (Jew et al., 1999; Masten et al., 1990).

Self-confidence in one's abilities can facilitate effective coping, and has also



been deemed to be an essential component of resilience (Werner, 1993). Optimism, self-esteem, emotional stability, personal strength, and hope about the future have also been linked with greater levels of resilience (Everall et al., 2006; Friborg, Barlaug, Martinussen, Rosenvinge & Hjemdal, 2005), and subsequently, better wellbeing. Resilience has also been positively associated with the occurrence of a sense of belonging, positive environments (e.g., school, home), academic success, no family history of suicidal behaviour, low novelty seeking and neurotic behaviours, no interaction with deviant peers and the absence of childhood sexual abuse (Borowsky et al., 1999; Everall et al., 2006; Fenaughty & Harré, 2003; Fergusson, Beautrais & Horwood, 2003; Nettles, Mucherah & Jones, 2000). In essence, resilience can be enabled by the interaction of a comprehensive range of factors that has a positive, protective impact on an individual.

#### **2.4 Age Effects in Resilience**

Age effects in resilience have more commonly been conceptualised in terms of their implications among children and adolescents at risk, with less focus on older adults (Campbell-Sills et al., 2006; Heisel, 2006; Lundman et al., 2007; Miller, E. D., 2003; Netuveli et al., 2008; Stewart, 2011). This has led to an unsatisfactory representation of resilience across the lifespan, and across adult age groups, specifically among adults aged 25 - 50 years (Lundman et al., 2007; Werner, 2005).

Resilience appears to increase with age (Lamond et al., 2008; Lundman et al., 2007; Netuveli et al., 2008; Wagnild, 2003; Wells, 2009). This is likely to be due to individual development or quality and quantity of experiences (and skill development in managing challenges) over the lifespan (Afifi & Macmillan, 2011; Everall et al., 2006; Lundman et al., 2007; McLean et al., 2008; Windle, 2010).

However, regardless of age-related developments, there are certain adverse experiences (e.g., bereavement) in which individuals' wellbeing can decrease dramatically (Charles, 2010). Consideration of factors involved in facilitating resilience in adulthood is crucial, particularly as situational, environmental and individual trajectories are dynamic and influence resilience resources over the lifespan (Ahmed, 2007; Stewart, 2011). Consequently, examination of age effects on resilience is essential (Everall et al., 2006; Herrman et al., 2011; McLean et al., 2008). Further, longitudinal analysis needs to be conducted that spans the life course and considers wellbeing to inform long-term strategies/policies (Beddington et al., 2008; The Government Office for Science, 2008).

**2.4.1 Resilience in childhood and adolescence.** The first ten years of life are viewed as crucial in determining the outcome of an individual in adulthood (Werner, 1993). Early learning, for instance, may enable children to increase their resilience to stress; this can help to engender wellbeing in adulthood and old age (Beddington et al., 2008). Seminal studies such as the Kauai Longitudinal Study (Werner, 1993, 2005; Werner & Smith, 1979) and the Rochester Child Resilience Project (Cowen et al., 1997; Cowen et al., 1990), have been vital in demonstrating the role of resilience in childhood and adolescence. Protective factors (e.g., presence of a family unit), were found to significantly reduce the negative outcomes among individuals who experience childhood adversity (Werner, 1993). With approximately two thirds of the population experiencing some degree of childhood adversity (Burke, Hellman, Scott, Weems & Carrion, 2011; Felitti, 2002), knowledge as to how protective factors, and consequently, resilience can be facilitated is essential if ongoing individual wellbeing is to be attained and

maintained. Resilience, specifically in relation to childhood and adolescence, will be addressed in the following sections.

#### ***2.4.1.1 Longitudinal studies on resilience in childhood and adolescence.***

School based samples aged between 14 – 25 years (psychiatrically hospitalised and non-hospitalised); a low-income sample of delinquent men (followed from 10 – 70 years of age); a 9 – 12 year old sample from two schools; and individuals followed from either birth until 21 years, or from 2 years of age until their 40s, illustrate the characteristics of cohorts studied specifically in relation to resilience (Collishaw et al., 2007; Cowen et al., 1990; Fergusson & Horwood, 2003; Glueck & Glueck, 1950; Sampson & Laub, 2003; Vaillant & Davis, 2000).

Key observations from these studies highlight that not all individuals who experience adversity develop risk behaviours; that good quality relationships are important in enabling adult wellbeing; and, that the impact of adversity can mitigate or exacerbate risk (Allen, Hauser & Borman-Spurrell, 1996; Collishaw et al., 2007; Cowen et al., 1990; Fergusson & Horwood, 2003; Masten et al., 1999; Vaillant & Davis, 2000). The presence of resilience has been linked to possessing greater empathy; effective problem solving and coping skills; a strong sense of self-esteem and competence; having psychosocial resources that enable capability to handle stressful or adverse events that will facilitate good outcomes; and possessing a good understanding of how problems may be controlled by the individual (Cowen et al., 1990; Masten et al., 1999). Good cognitive skills and supportive parents were also essential in facilitating the management of adverse events (Masten et al., 1999). Parental care, in particular, has lifetime effects on mental wellbeing (i.e., those who experience warmth and responsiveness have greater future mental wellbeing; The Government Office for Science, 2008)

*2.4.1.1.1 The Kauai longitudinal study.* Starting in 1955, the Kauai Longitudinal Study was a seminal study that routinely assessed a cohort of 700 individuals from prenatally (via maternal reports) until midlife (Werner, 1993; Werner & Smith, 1979). Selected from several ethnic backgrounds in Hawaii, participants constituted a high risk sample who demonstrated adaptive and maladaptive outcomes (Masten, 2001). Family structures, individual characteristics and the external environment were investigated in an effort to identify factors enabling participants to successfully adjust to adversity and flourish (Jew et al., 1999).

Supported by subsequent studies, the Kauai study effectively pioneered resilience research and identified the role of resilience in high risk individuals (Borowsky et al., 1999; Everall et al., 2006; Jew et al., 1999; Nettles et al., 2000). Individuals identified as possessing resilience had supportive families, and had not been exposed to stressful events prior to, during or after their birth (Werner, 1993, 2005; Werner & Smith, 1979). Effective parenting appeared to have a crucial role in moderating the association between major life events and adaptive behaviour in children (Masten, 2001). Individuals with greater resilience were more independent, assertive, inquisitive and communicative than those who were less resilient. Resilient individuals also demonstrated a positive individual self-concept, internal locus of control, were adaptive and developed positively despite living in poverty (Werner, 1993).

Those with greater resilience had fewer mental health, behavioural and learning problems (Werner, 1993). Accomplishments were found to be equal to those of low risk individuals who were raised in more stable, secure and affluent areas. As children, those that excelled in critical areas were observed later to

demonstrate positive adaptability in adulthood (Cowen et al., 1997; Werner, 2005). Thus, whilst risk factors (e.g., lack of stability) have potential to reduce adaptation in childhood, there is still significant variability in outcomes (Afifi & Macmillan, 2011; Masten, 2001; Shanahan, 2000).

**2.4.2 The role of resilience in adulthood.** Follow-ups of the Kauai Longitudinal Study participants provided a snapshot, in midlife, of individuals who earlier experienced childhood adversity (Werner, 1993; Werner & Smith, 1979). Positive interactions enabled development of help-seeking skills and/or orientation towards seeking rewarding environments. Continued education, starting work, joining the armed forces, participating in volunteer work, marriage or recovery from a life-threatening illness, were found to have a positive influence on individuals who initially struggled at a younger age (Werner, 1993, 2005). Opportunities such as these can increase self-worth, belongingness and confidence, thus increasing/sustaining resilience.

The Kauai Longitudinal Study (Werner, 1993; Werner & Smith, 1979) has been invaluable in providing follow-up information as the cohort matured into adulthood. Findings have shown the concept of resilience to be relevant across all ages, as it accounts for the ability to view life and health positively and satisfactorily despite adversity, disease and disability (Lamond et al., 2008). Seizing opportunities and utilising internal and external resources in a positive manner, can make an adverse situation more manageable for an individual (Everall et al., 2006). Growing older and experiencing changes in life (e.g., becoming a single parent due to marital breakdown/bereavement, raising a child with a disability, loss of parental figures) may affect resilience at any point in time (Afifi & Macmillan, 2011; Jew et al., 1999; Levine, 2009). This is due to the duress it

places on an individual's ability to react, alongside whether resources are available that enable management of adversity. Thus, there is value in conducting resilience research at different time points in life (Luthar et al., 2000). From this, information can be disseminated, enabling policy/program developers to formulate strategies to support individuals to adopt lifestyle changes, that could protect them as they age (The Government Office for Science, 2008). Examples include social activities for the elderly and mentorship groups for young adults/adolescents.

**2.4.3 Resilience among older adults.** Though resilience among older adults has not been comprehensively explored, several potential factors associated with the occurrence of resilience have been observed (Fenaughty & Harré, 2003; Heisel, 2006; Netuveli et al., 2008; Windle, 2010). Good mental and physical health, for instance, has been linked positively with resilience in older adults (Shen & Zeng, 2010; Smith, B. W., Tooley, Christopher & Kay, 2010; Wagnild, 2003; Wells, 2009). Equanimity, self-reliance, perseverance and meaningfulness of life have also been suggested as being more common among those who demonstrate resilience (Wagnild, 2003; Wells, 2009). These factors provide an individual with a sense of belonging, control and motivation that may aid in dealing with adversity.

Persisting into old age, social support is thought to play a vital role in enabling resilience by facilitating the ability to preserve wellbeing through the maintenance of self-control and independence; it also lowers feelings of isolation while increasing/sustaining reasons for living (Wagnild, 2003; Wells, 2009). Feelings of superiority can also be a protective factor against suicidal ideation for older male adults with high levels of depression, by compensating for the impact of depression on suicidality (Hobbs & McLaren, 2009). Indeed, the role of traits such as agency, competitiveness and independence has been consistently shown to reduce suicidal

ideation (Hobbs & McLaren, 2009; Sanfilipo, 1994). Women aged 50 years or more, with pre-existing high levels of social support prior to exposure to an adverse event, have shown a greater level of resilience when compared to their male counterparts (Netuveli et al., 2008). In having social supports available prior to an event, resources are consequently readily available when adversity occurs, thus potentially reducing the impact of a negative event. Age also acts as a protective factor in managing daily stress (Diehl & Hay, 2010), due in part to skills learnt from previous experiences, and through the life course as one ages. Thus, resilience is crucial in dictating whether an individual succumbs to adversity/stressors, as they age.

## **2.5 Gender and Resilience**

Though not explicitly investigated, the association between gender and resilience have noted differences between studies (Afifi & Macmillan, 2011; Friberg et al., 2003; Hjemdal, Friberg, Stiles, Martinussen, et al., 2006; Lundman et al., 2007; Rigsby, 1994; Vanderbilt-Adriance & Shaw, 2008; Werner, 1993). Originating in childhood, gender differences endure in most but not all samples (e.g., elderly, community, healthcare personnel, patients with/without medical conditions; c.f., homeless adolescents) (Lundman et al., 2007; Rew, Taylor-Seehafer, et al., 2001; Werner, 1993, 2005). Differences in developmental changes linked to emotion, cognition, cultural and social environment have been proposed to explain why these gender-based variations occur (Masten et al., 1990). Variation in methodology (e.g., examination of one gender group or oversampling of one gender in a sample) have also been offered as explanations of observed differences (Lundman et al., 2007). Further investigation is needed, particularly as to whether protective factors, and consequently resilience, are dependent on gender (Afifi &

Macmillan, 2011; Stewart, 2011).

### **2.5.1 Gender differences in protective factors that facilitate resilience.**

With protective factors being identified across the resilience literature, it is unsurprising that their impact has been found to vary by gender. Such distinctions include the inclination to seek and utilise social resources, which occurs more frequently among women than men (Friborg et al., 2003; Hjemdal et al., 2011; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Jowkar et al., 2010; Werner, 2005). Being able to discuss issues can provide a sense of control of a situation, as well as gaining perspectives different from their own, that might be more positive/realistic response to the circumstances in question.

Other factors that have been observed to increase resilience among women include the presence of role models and partaking in structured activities (Werner, 1993). These factors provide purpose to an individual, a person/s whom they can talk to, a sense of belonging, as well as providing a social element. Family also plays an important role, with women who are raised in homes where they assist with the raising of siblings, have a working mother or an absent father, found to develop a stronger sense of responsibility and independence (Werner, 1993). With discourse shown to be important among women in developing/sustaining wellbeing, unavailability of good family relationships, confidantes and sound emotional health, perhaps unsurprisingly, has a greater detrimental effect on adolescent girls than boys (Borowsky et al., 1999).

Women are more effective in coping with experiences of child and adult adversity than men, and have a greater likelihood than men to implement positive changes by midlife, after experiencing behavioural problems during their teenage years (Werner, 1993, 2005). Furthermore, a stable marriage, development of



personal resources, improvements in competence and motivation have been found to promote positive coping responses in women, even when experiencing stressors in adolescence (e.g., teenage pregnancy) (Werner, 1993). Each of these factors provides support and/or agency, from which a sense of control can be enabled aiding management of adversity.

The presence of structure, routine and rules that are built into daily life, have been observed amongst men who demonstrate resilience (Werner, 1993). Being first born (and so having a sense of responsibility and control), having an emotionally supportive family as well as positive associations with adults external to the family when aged between 2 and 10 years, enables men to adjust to adversity (Werner, 1993). Though both men and women are influenced by competitiveness, self-assertion and self-control, which have been suggested as potential protective factors due to their association with the occurrence of lower levels of suicidal ideation, the effect is stronger for men than women (Hobbs & McLaren, 2009). This is often seen on factors that reflect agency/masculine attributes (e.g., self-control), with men generally scoring more highly than women (Sanfilippo, 1994).

With gender differences demonstrated throughout the resilience literature, its role on resilience needs to be considered. Reflection is required in regards to how resilience may influence men and women independently. From this, policies and strategies can be formulated that encompass all individuals, regardless or accommodating of gender (or indeed, age), to enable all to flourish and improve wellbeing, in a manner that is best suited for that individual's needs.

## **2.6 Difficulties Faced in Resilience Research**

Though resilience research has expanded over the years, much criticism (e.g., in relation to measures, methods) has been directed towards it (Luthar et al., 2000;

Masten, 2007; Masten & Obradović, 2006). This has been in relation to the theoretical conceptualisation of resilience, and specifically, debate over its definition (Luthar et al., 2000; Stouthamer-Loeber et al., 1993). Other critiques have focused on areas such as heterogeneity in risks experienced, use of terminology, and competencies considered to be attained by those deemed resilient (Luthar et al., 2000). These issues will be explored in further detail in the following section.

**2.6.1 Problems with the definition of resilience.** As discussed in depth in the first chapter, debate about how resilience should be defined has pervaded resilience literature (Fleming, T. M. et al., 2007; Masten et al., 1990; Stouthamer-Loeber et al., 1993; Vanderbilt-Adriance & Shaw, 2008; Windle, 2010; Windle et al., 2011). Varying with each successive research wave (Luthar et al., 2000), definitions have often been attributed to and influenced by the researcher, the domain of study (e.g., developmental, positive psychology fields), adaptation criteria and how outcomes are established (Masten, 2001; Vanderbilt-Adriance & Shaw, 2008). Within the coping literature, for instance, resilience is considered as influencing one's appraisal prior to coping and emotional responses; also by its positive and protective impact. Coping, alternatively, is a response to a stressful encounter, with the outcome being dependent on its effectiveness (Fletcher & Sarkar, 2013). With resilience commonly perceived to be the ability to bounce back through successful adaptation, coping and cognitive processes (Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Rew, Taylor-Seehafer, et al., 2001), this definition in itself incorporates two arguably compatible, but distinct aspects of an individual. Thus, differentiating between resilience and other factors that may be considered a

part of or contributor to resilience, or whether resilience stands alone, has been problematic.

The type of sample used (e.g., clinical, children) and cultural norms of a sample group has also influenced definition development (Masten, 2001). Consequently, these differences have impacted upon the criteria by which resilience is operationalised and measured (Johnson, Gooding, Wood, Taylor, et al., 2010; Masten, 2007; Stouthamer-Loeber et al., 1993). Moreover, though several definitions exist, these are not transferable across age or samples, as the majority of definitions and implications have been conceptualised in relation to at risk children and adolescents (Miller, E. D., 2003). What may be resilience for a child or adolescent may not hold true for resilience in an adult or older adult. Further, dependent on location, geographically and culturally resilience may differ. Consequently, little consensus has been achieved in establishing a stable definition (Luthar et al., 2000). Subsequently, this has led to resilience being described as being a poorly characterised construct (Miller, E. D., 2003).

Despite these difficulties surrounding the definition of resilience, ongoing exploration has not been curtailed (Smith, B. W. et al., 2010). Criticisms, however, have not just been directed towards definition. The processes underlying resilience and its usefulness have also been targeted. The next section will discuss this in more detail.

**2.6.2 Criticisms of resilience research: Process and usefulness of resilience.** The ability to consistently identify variables facilitating resilience, as well as determining the processes involved in promoting resilience, has faced criticism (Hjemdal, Friborg, Stiles, Martinussen, et al., 2006). Conducting research, for instance, into naturally occurring resilience presents difficulties in trying to

identify and delineate a capacity that has not yet transpired (Masten, 2001). Furthermore, the ability to apply a high-risk environment equally amongst participants, so that all are exposed to the same level of adversity without interacting covariates affecting outcomes, is impractical and unethical (Masten, 2007; Vanderbilt-Adriance & Shaw, 2008). This has led to questions of whether moderate levels of stress are sufficient enough to make resilience meaningful; also, whether the theory of resilience is relevant to the general population, and not just for those who have experienced trauma or adversity.

Further considerations pertaining to the notion of resilience includes whether it acts as a predictor and/or is simply an outcome of positive adaptation during, and after an adverse event (Burns & Anstey, 2010). Considered by some to be a trait, despite being shown to be dynamic and progressive (Wagnild, 2003), differences are still prevalent in how resilience is construed. Moreover, if resilience is multifaceted in nature, variables that may confer resilience may be specific and directed at particular risk factors only (Johnson et al., 2011). Thus, application of protective factors cannot be generalised without further investigation as to their purpose.

**2.6.3 Methodological issues within resilience research.** As with definitions of resilience, methods used to explore resilience have been diverse, resulting in inconsistent findings (Luthar et al., 2000). If outcomes were too few, assessment occurs at only one time point, or only one data source is relied upon, it is possible that results may simply be artefacts of the method used (Vanderbilt-Adriance & Shaw, 2008; Windle, 2010). Consequently, differences in methodology have made establishing a normative rate (e.g., what can be determined as a

“normal” level of resilience, that is neither high or low) of resilience difficult (Vanderbilt-Adriance & Shaw, 2008).

Differences in statistical analyses and criteria can also lead to discrepant results (Jowkar et al., 2010; Rigsby, 1994; Yu, Lau, Mak, Zhang & Lui, 2011). Use of small samples, or focus on one gender and/or age group, reduces the ability to generalise results (Kissane & McLaren, 2006; Masten, 2001; McLaren et al., 2007), as findings may be specific to these groups only. Additionally, application of a variable or person-focused approach can lead to information being overlooked, not captured or even obscure knowledge of the underlying relationships in regards to the processes of resilience (Masten, 2001). Results may be further confounded by differences (e.g., societal, individual and cultural) in sample collection and/or cohort effects (Lamond et al., 2008). So for instance, what may affect an individual’s resilience when they are 20 may differ from that of someone who reaches the age of 20, fifteen years later.

Use of cross-sectional designs is limited as they only provide a snapshot of a specific group at one time point (Cowen et al., 1997; Cowen et al., 1990; Lamond et al., 2008; Masten et al., 1990). How and where participants are recruited (e.g., university, clinically) and later grouped (e.g., resilient versus non-resilient; low-risk versus high-risk) also affects outcomes in exploring resilience (Hjemdal et al., 2007; Vanderbilt-Adriance & Shaw, 2008). Consequently, examination of the prevalence of resilience, group differences, and fluctuations in outcome and changes in status cannot be easily achieved, through comparison of resilience studies. With some measures of resilience also being culturally insensitive or invalid, dependent on the population (Jowkar et al., 2010; Yu et al., 2011), appropriate measurement of resilience is another area that have been examined. Further detail is provided in the

following section.

**2.6.4 Issues in measuring the construct of resilience.** Prior to the development of resilience-specific scales, indirect measures were used to evaluate resilience (Ahern et al., 2006; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006). Examples include life events, self-esteem and social support scales (Nettles et al., 2000; Stouthamer-Loeber et al., 1993). This has contributed to variation in the criteria and definitions of resilience (Windle, 2010). It has also led to inconsistent findings, which has made comparisons across studies difficult (Friborg et al., 2005; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Stouthamer-Loeber et al., 1993; Windle et al., 2011).

Chapters 5, 6 and 8 respond to some of the aforementioned issues, and so the current thesis has contributed to clarifying some of these problems. However, a review of available resilience-specific measures is useful in order to appreciate the decision to adopt the measure selected for the current group of studies. The following sections provide further detail of available resilience measures.

## **2.7 Progression in the Measurement of Resilience**

One of the earliest measures of resilience was devised by Wagnild and Young (1993). Known as the Resilience Scale (RS; Wagnild & Young, 1993), five domains are assessed: equanimity, self-reliance, perseverance, meaningfulness and existential aloneness. Developed from a sample of older women, the RS has been subjected to several validations of test score interpretations across different age and ethnic groups (Ahern et al., 2006). Reliability of test scores and stability over time, of the RS however, still requires further attention (Lundman et al., 2007).

Questions have been levelled at the structure of the RS. Items appear to load on more than one facet of resilience, and there are disagreements about the number

of RS domains (two or five) (Burns & Anstey, 2010; Lundman et al., 2007). These differences have been attributed to the RS having been developed to be inter-related, so that it is representative of the multidimensional nature of resilience (Wagnild & Young, 1993). It has also been suggested that the RS assesses a spectrum of characteristics and resources related to resilience, rather than being representative of resilience *per se* (Smith, B. W. et al., 2010). Reasons underpinning the failure of RS to capture external sources of support systems (e.g., peers and family), and over-reliance on internal resources and independent management of difficult situations however, has not been resolved sufficiently (Lundman et al., 2007).

Jew, Green and Kroger (1999) developed a scale identifying skills and abilities in children and adolescents at risk. Here, resilience was conceptualised as a trait that emerged from specific beliefs interacting with environmental stressors. High school students from an adolescent psychiatric treatment facility (aged over 15 years) and seventh to twelfth grade students from a rural school comprised samples used to develop the Resiliency Scale. Three subscales comprise the 35-item measure (Optimism, Future Orientation and Belief in Others), with attributes reflecting those identified in the Kauai Longitudinal Studies (Werner & Smith, 1979).

Both Wagnild and Young's (1993) and Jew et al.'s (1999) scales are problematic as they are population and age specific, and are not broadly applied in resilience research (Connor & Davidson, 2003; Friborg et al., 2003). Further, neither scale measures social factors, which has been suggested as being important in the maintenance of resilience during adversity (Friborg et al., 2003).

**2.7.1 The Resilience Scale for Adults and the Resilience Scale for Adolescents.** Friborg et al. (2003) and Hjermadal, Friborg, Stiles, Martinussen, et al.

(2006) attempted to capture the multidimensional construct of resilience, while addressing age-related differences. The Resilience Scale for Adults (RSA; Friborg et al., 2003) initially developed in 2001 (Hjemdal, Friborg, Martinussen & Rosenvinge, 2001), and later refined in 2003, incorporates three fundamental aspects considered to facilitate resilience, that is, positive individual variables, family support and an external supportive environment (Friborg et al., 2003; Von Soest et al., 2010). Based on the same theoretical content as the RSA, the Resilience Scale for Adolescents (READ; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006) attempts to encapsulate factors that act as protective variables specific to adolescence (Hjemdal et al., 2011).

The RSA was created to assess the role of resilience in adapting to high and low stress conditions (Friborg et al., 2006). Consisting of 33 items, each question assesses the interpersonal and intrapersonal protective resources that may enable an individual to adapt and gain tolerance to stress and negative life events (Friborg et al., 2005; Friborg et al., 2003). Initially using a Likert-type measure, this was later altered to a five point semantic differential-type response (e.g., where each item has a positive and negative attribute at each end of the scale continuum) in order to lower the issue of acquiescence bias (Friborg et al., 2005).

Five components have been identified in the RSA (personal strength, social competence, structured style, family cohesion and social resources), with two sub-factors in the personal strength factor (positive perception of self and positive perception of the future) (Friborg et al., 2009; Friborg et al., 2006). These five components fall within the three resilience categories identified by Friborg et al., (2005); personal competence, degree of family cohesion and how individuals perceive their own social resources. Further, the RSA detects variability in levels of



protective factors and respective impact on risk and stress variables, at an intrapersonal (personal/social competence) and interpersonal (family/social resources) level (Friborg et al., 2005). Research into people experiencing pain and stress has demonstrated that the usefulness of the RSA in predicting differences in resilience (Friborg et al., 2006). It has also been used to measure protective factors that have a buffering effect, and as a predictor of the development of psychiatric symptoms (Hjemdal, Friborg, Stiles, Rosenvinge, et al., 2006).

Validation of test score interpretations of the RSA with personality factors has shown moderate to strong associations. Adequate reliability of test scores, internal consistency coefficient of results of the test and test-retest correlations of test scores (over a 4-month period) have been reported by the authors (Friborg et al., 2005; Friborg et al., 2003). Confirmatory factor analysis has further demonstrated good fit, with convergent and discriminative validity of test scores interpretations evident (Friborg et al., 2005; Friborg et al., 2006).

Issues arising from this instrument are similar to that of the Resilience Scale (Wagnild & Young, 1993). Domains measured (personal strength, social competence, structured style, family cohesion and social resources) by the scale, are argued to be characteristics of resilience, rather than a specific conception of it (Smith, B. W. et al., 2010). Further, when broken down into subscales, low internal consistency prevents exploration of the RSA's individual domains. Consequently, the overall score of the RSA must be examined in order to maintain reliability (Friborg et al., 2006).

Interpretations of test scores have been validated cross culturally (Hjemdal et al., 2011; Jowkar et al., 2010), with the RSA generalising better to non-Western cultures than other resilience measures (Jowkar et al., 2010). However, validity of

test scores interpretations has been conducted primarily by its authors in the general population in Norway, and in specific clinical and university samples (Friborg et al., 2009; Friborg et al., 2003; Friborg et al., 2006; Hjemdal et al., 2011; Jowkar et al., 2010). Little research, other than from Friborg's group, has been undertaken with this scale.

Comprising the same five domains of the RSA, the READ was developed to assess adolescent resilience (Friborg et al., 2005; Hjemdal et al., 2007; Hjemdal et al., 2011). Examination of the psychometric properties of the RSA has revealed that if resilience occurs in one area of an individuals' life, it increases the likelihood of resilience being available in other domains (Von Soest et al., 2010). Adequate psychometric properties and predictive validity of test scores interpretations has been demonstrated by its authors separate clinical samples (Friborg et al., 2006; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006). Further, the READ has been advocated as being suitable in tracking resilience levels longitudinally, from adolescence, through to adulthood, as both the RSA and the READ have the same factor structure (Friborg et al., 2003; Hjemdal et al., 2007; Hjemdal et al., 2001).

By design, the READ is specific to adolescent, rather than general populations (Hjemdal et al., 2011; Von Soest et al., 2010). Furthermore, efficacy in predicting depressive and social anxiety symptoms in adolescents is limited by the majority of studies being based on a Norwegian sample (Hjemdal et al., 2007; Von Soest et al., 2010). Cross-cultural performance of the measure remains untested.

**2.7.2 The Brief Resilient Coping Scale.** The Brief Resilient Coping Scale (BRCS; Sinclair & Wallston, 2004) was developed on a sample of individuals with rheumatoid arthritis. Consisting of four items, the BRCS has demonstrated good validity of test scores interpretation and reliability of test scores (Ahern et al.,

2006; Vaishnavi et al., 2007). It has also been suggested to be sufficiently sensitive to function as an outcome measure for cognitive psychological interventions (Sinclair & Wallston, 2004).

Drawbacks of the measure, however, include that the BRCS is limited by a focus on current stressors and coping strategies in adult populations (Sinclair & Wallston, 2004). Developed on a specific sample, its generalisability to other populations and internal consistency has yet to be fully tested; as such, application to other samples may be problematic (Sinclair & Wallston, 2004). Further, unlike the RSA and READ, the BRCS does not examine family support or positive individual factors (Friborg et al., 2003; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Jowkar et al., 2010; Sinclair & Wallston, 2004; Von Soest et al., 2010; Windle et al., 2011).

**2.7.3 The Brief Resilience Scale.** The Brief Resilience Scale (BRS; Smith, B. W. et al., 2008) was devised to assess the ability of an adult to return to normal functional levels after experiencing a stressful event. Consisting of a unitary construct, reliability of test scores and validity of test score interpretations has been established (Smith, B. W. et al., 2008). Used to assess recovery time in individuals who are already unwell (however, an explanation as to how this is calculated is not reported), the BRS can also be used to predict health outcomes (Smith, B. W. et al., 2008; Windle et al., 2011).

**2.7.4 The Suicide Resilience Inventory-25.** The Suicide Resilience Inventory-25 (SRI-25; Osman et al., 2004) was created to assess suicide and resilience concurrently in adolescents and young adults. Validity of test score interpretations, and reliability of test scores have been established for the SRI-25. Consisting of three factors (Internal Protective, Emotional Stability and External

Protective), the SRI-25 has been suggested to be valuable in its assessment of suicide resilience, in relation to these three constructs.

Though there are benefits in evaluating suicide and resilience simultaneously (e.g., time efficiency), the independent complexities of suicide and resilience are agreed to be better characterised by separate measures, providing a more in-depth and accurate portrayal of each aspect (Connor & Davidson, 2003; Friborg et al., 2003; Heisel, 2006; Jew et al., 1999; Jowkar et al., 2010; Windle et al., 2011). Combining these two elements risks specific information as to either resilience or suicidality being missed, particularly as here resilience is measured in the context of suicide. Further, factors that may increase an individual's resilience in regards to general wellbeing may not necessarily be the same as those that may prevent suicidality (dependent also on age and gender).

**2.7.5 The Connor-Davidson Resilience Scale.** Aiming to quantify resilience in both clinical and community populations, the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) was conceived to address the paucity of suitable resilience measures at that time. Identifying self-efficacy, optimism, sense of humour, patience and faith in coping with stress or adversity, this scale allowed for resilience to be explored in adults in greater detail than had been achieved previously, particularly in relation to individual temperaments and response to interventions (Campbell-Sills et al., 2006; Von Soest et al., 2010). Moreover, it has been successfully used to assess resilience interventions, identifying characteristics of resilience, and exploring coping strategies (adaptive or maladaptive) in stressful situations (Connor & Davidson, 2003). A detailed description of the factors underlying the CD-RISC, its psychometric, factorial

properties and its application in the assessment of resilience can be found in Chapter six (Study 2).

The CD-RISC has been progressive in its approach to assessing resilience, compared to other resilience measures; it has also provided the foundations for the development of other resilience-specific scales (Shen & Zeng, 2010). Nevertheless, the CD-RISC still suffers from limited application to specific populations and cultures, as well as being argued to be uni-dimensional rather than multidimensional in its construct (Burns & Anstey, 2010; Campbell-Sills & Stein, 2007; Jowkar et al., 2010). Differences in statistical analyses, population type, criteria and cultural meaning (of resilience) have been identified as underpinning variations found between studies (Jowkar et al., 2010; Rigsby, 1994; Yu et al., 2011). Other limitations include that the CD-RISC does not measure resilience in a way that would allow for its role as either an outcome or predictor to be assessed (Burns & Anstey, 2010). As such it does not contribute information to the processes involved in resilience or its theory (Connor & Davidson, 2003).

Investigation into the CD-RISC has raised suggestions that it is better utilised as a 10-item rather than a 25-item measure, as it is more efficient and stable, whilst still capturing the core features of resilience (Campbell-Sills & Stein, 2007; Gucciardi et al., 2011). This shortened version provides a more succinct method of measuring resilience, and has demonstrated excellent psychometric properties (Campbell-Sills & Stein, 2007). Furthermore, though research supports the presentation of the CD-RISC as a unidimensional measure of resilience (Gucciardi et al., 2011), limitations have been observed (e.g., homogenous sample, lack of research into clinical or high trauma samples) (Campbell-Sills & Stein, 2007; Gucciardi et al., 2011).

Previous analyses on the CD-RISC, conducted using the PATH sample, demonstrated that this measure performed better in a 22-item, rather than 25-item format (Burns & Anstey, 2010). Furthermore, comparison of Burns and Anstey's (2010) 22-item to Campbell-Sills and Stein (2007) 10-item version on the PATH sample revealed that whilst alternative items were found to be stronger than those demonstrated by Campbell-Sills and Stein (2007), the two 10-item measures were analogous, with the 22-item shown to perform similarly (Burns & Anstey, 2010). Thus, though researchers have supported Campbell-Sills and Stein (2007) 10-item measure (Gucciardi et al. (2011) over the original 25- and 22-item versions (Burns & Anstey, 2010; Connor & Davidson, 2003), each version carries its own strengths.

Though the 25-item measure has been demonstrated to be able to distinguish different levels of resilience in individuals, additional study is required (Connor & Davidson, 2003). Investigation is needed to further streamline the measure's factor structure, whilst also re-examining the definition of resilience that the scale is attempting to encapsulate (Campbell-Sills et al., 2006). Validity of test score interpretations for the CD-RISC in individuals of different socioeconomic backgrounds, gender, age, ethnicity and education and against an objective measure, or a biological measure of resilience also needs to be explored (Connor & Davidson, 2003; Lamond et al., 2008).

## **2.8 Summary**

Research has demonstrated the importance of resilience in ameliorating the impact of adversity. Protective variables potentiating resilience across different populations have been identified. Family support and cohesion, individual positive/dispositional attributes (e.g., self-worth) and effective external support systems (e.g., positive peer relationships), in particular, have been argued to be

fundamental aspects that facilitate positive outcomes (Everall et al., 2006; Friberg et al., 2003; Friberg et al., 2006; Jowkar et al., 2010; Von Soest et al., 2010).

However, the impact of these variables differs as a function of age and gender.

Changing family structures, increased care responsibilities, an ever evolving mix of cultures and patterns in migration can also contribute to these differences due to the demands that they place on individuals (i.e., loss of connection with cultural groups) (Beddington et al., 2008; The Government Office for Science, 2008).

The role of resilience has been shown to be important in reducing the impact of risk on an individual in reducing risk behaviours, such as suicidality (Johnson et al., 2011). Research has already highlighted the importance of policy makers seizing opportunities to provide environments that encourage individual wellbeing (Beddington et al., 2008; The Government Office for Science, 2008). From this, individual wellbeing and resilience can be improved. This in turn carries implications with regard to the impact that resilience may have on the occurrence of suicidality. Community-based opportunities, for instance, that provides an individual access to both environmental and personal resources could be optimised in aiding the development of resilience in a meaningful way (Fletcher & Sarkar, 2013). The following chapter will discuss further the role of resilience on suicidality.

## **Chapter Three: Resilience and Suicidality**

In the Australian adult population alone, 350,000 individuals reported experiencing suicidal ideation with 100,000 making suicide plans and 65,000 attempting suicide over a 12 month period (Johnston et al., 2009). Due to how information is ascertained and recorded, these aforementioned numbers may be an underestimation (Graham et al., 2000; Johnston et al., 2009).

Though knowledge is prevalent throughout the suicidality literature in regards to risk factors and increased suicidality likelihood, risk factors cannot accurately predict suicidality (Christiansen & Jensen, 2007; Rutter, P. A. et al., 2008). Consequently, a different approach is needed to assess the likelihood of suicidality. More attention needs to be directed towards factors that render individuals vulnerable to suicidality; resilience-linked strengths with potential to lower suicidality likelihood also needs to be explored (Fergusson et al., 2003; Rutter, P. A. et al., 2008). In employing a balanced approach that examined both those who are and are not at risk, knowledge of factors that both increase and decrease vulnerability to suicidality can be improved upon (Fergusson et al., 2003; Stouthamer-Loeber et al., 1993). The following chapter will consider the role of resilience in ameliorating risk of suicidality. The influence of age and gender on resilience and links to suicidality will also be discussed.

### **3.1 The Definition of Resilience in the Resilience and Suicidality Literature**

Variation in definitions of resilience has led to differences in how resilience has been investigated in the suicidality literature (Johnson et al., 2011). Examples include resilience being regarded as an internal factor that reduces the probability of an individual becoming suicidal (Rutter, P. A. et al., 2008); that it is a way to manage suicidal ideation through aptitude, ability or access to resources (Osman et



al., 2004); and further, resilience has also been considered to involve the use of positive self-appraisals that mitigate the impact of stress or adversity (Johnson, Gooding, Wood & Tarrier, 2010). Resilience has also been thought to attenuate the strength of the relationship between risk factors and suicidality (Johnson et al., 2011).

### **3.2 Resilience and its Association with Suicidality**

Though associations between resilience and suicidality have been observed, the role of resilience and whether it alters suicidality risk has not been fully elucidated (Johnson, Gooding, Wood, Taylor, et al., 2010; Johnson et al., 2011; Luthar et al., 2000; Roy et al., 2007). Studies that have examined the relationship between resilience and suicidal thoughts and behaviours have often taken a negative perspective, with focus centred on risk factors and suicidality (Johnson, Gooding, Wood & Tarrier, 2010; McLaren, 2011). Furthermore, investigation into how individuals overcome suicidality, or despite adversity do not engage in suicidality is lacking (Everall et al., 2006; Johnson, Gooding, Wood & Tarrier, 2010; Johnson et al., 2011; McLaren, 2011). With studies demonstrating vulnerability/resilience to suicidality dependent on factor impact (e.g., personality and peer influence), research into the role of resilience and its protective factors on suicidality may be more insightful than the study of risk and vulnerability. Moreover, both risk and resilience domains needs to be considered equally if suicidality research is to progress in working towards the reduction of suicidality (Fergusson et al., 2003). Determining how risk and resilience interact during times of adversity would also be invaluable in working towards reducing suicidal outcomes (Fenaughty & Harré, 2003). Exploration of the influence of gender, as well as impacts across the lifespan and how resilience may facilitate positive wellbeing as one ages is also

needed (Friborg et al., 2003; Heisel, 2006; Lundman et al., 2007; Netuveli et al., 2008; Rigsby, 1994; Vanderbilt-Adriance & Shaw, 2008; Werner, 2005; Windle, 2010).

**3.2.1 How Resilience May Ameliorate Suicidality.** Factors that facilitate resilience by increasing the likelihood of a positive outcome have been suggested as playing an essential role in ameliorating suicidality risk (Hjemdal et al., 2011; Schoon, 2006). Even a small alteration in an individual's wellbeing, that enables resilience to increase, may reduce the likelihood of mental health declining (The Government Office for Science, 2008). Subsequently, it has been suggested that if an individual is to flourish (i.e., life going well), resilience and factors such as, optimism, positive relationships and life satisfaction (features of wellbeing), are necessary (Huppert & So, 2013). If these resources are not available or are lacking, wellbeing may diminish. Consequently, the role of resilience on suicidality is an important one to consider, if work is to be achieved in lowering suicidality risk.

Though not extensive, research examining the influence of resilience on suicidality has shown that an effect does exist (Fergusson et al., 2003). Low resilience, for instance, has been suggested to be a potential predictor for suicide risk (Roy et al., 2006, 2007). This is due to an association found between low resilience and poor mental and/or physical health status, with low resilience also linked to self-harm (Connor & Davidson, 2003; Roy et al., 2011; Roy et al., 2006, 2007). However, not all depressed individuals (whether adolescents or older adults), experience suicidal thoughts and behaviours (Fairweather-Schmidt et al., 2009; Fergusson et al., 2003; Hobbs & McLaren, 2009; McLaren et al., 2007; Useda, Duberstein, Conner & Conwell, 2004; Vanderhorst & McLaren, 2005). Persons who experience depression in their youth but have high resilience to

suicidal ideation have been observed to have a reduced likelihood for developing suicidal ideation in adulthood (Fergusson et al., 2003). This may be due to the presence of factors within the individual's environment (e.g., support mechanisms) that may influence suicidality risk (McLaren et al., 2007).

As discussed in Chapter two, three key elements have been consistently identified as facilitating resilience in dealing with adversity (Werner, 2005). First, being able to draw protective factors from within oneself (e.g., being affectionate, friendly) that enables easy interaction with others. This is in reference to factors that individuals may have or learn, that enable them to maintain or build resilience. This, in turn, may reduce suicidality likelihood. So, for instance, the presence of elevated levels of self-esteem, feelings of superiority, competitiveness, self-assertion, self-control and independence, have been associated with lower levels of suicidal ideation (Fenaughty & Harré, 2003; Hobbs & McLaren, 2009; Purcell et al., 2011). Instigation of these agency-type (e.g., active, decisive) traits enables greater success, that in turn can stimulate an increase in these qualities that may help to negate suicidality occurrence. In a similar vein, motivation for success, and encounters with, and overcoming of adversity successfully, can also facilitate resilience in an individual (Galligan, Barnett, Brennan & Israel, 2010; Kerr, Owen & Capaldi, 2008). The ability to prevail and to transcend through experiences, by eliciting internal resources that enable external sources to become available, can strengthen an individual. From this, the risk of suicidality may be reduced, with resilience increased in turn. The second key factor is the presence of protective factors in the family (e.g., grandparents, sibling) that encourages structure, expression of emotions, support, meaning of life and stability within an individual's life (Werner, 2005). With support being highlighted as crucial in enabling

individuals to overcome adversity, having a positive family environment and being a part of a larger family can offer greater protection to individuals against suicidality. Indeed, being included within a supportive environment increases an individual's connectedness with others, thereby increasing resilience levels (Denney et al., 2009; Masten et al., 1990; Schoon, 2006).

The third element is the presence of external support systems (Werner, 2005). Assistance, in any form (e.g., financial or emotional) (Fenaughty & Harré, 2003), has been consistently shown to provide a broader form of support to an individual when experiencing adversity (Afifi & Macmillan, 2011; Borowsky et al., 1999; Everall et al., 2006; Fleming, T. M. et al., 2007; Friberg et al., 2003; Friberg et al., 2006; Jowkar et al., 2010; Von Soest et al., 2010). As with family support, the ability to discuss issues or attaining a sense of belonging, can result in a positive influence on reducing attempts at suicide (Borowsky et al., 1999; Levine, 2009; McLaren et al., 2007; Schoon, 2006; Werner, 1993, 2005; Werner & Smith, 1979). Subsequently, support, whether it is encouragement from a therapist or a financial advisor helping an individual to get back on their feet and in control of their finances, can be fortifying for a vulnerable individual. Furthermore, actions such as these may bolster other aspects of the person, such as self-esteem and confidence that in turn can increase engagement in positive activities.

In strengthening an individual against adversity, protective factors are argued to be important in enabling individuals to strengthen themselves against suicidal thoughts and behaviours (Rutter, P. A. et al., 2008). From this, individual abilities/strategies/beliefs can be reinforced positively, thus increasing resilience against suicidality occurrence. Thus, the effectiveness that resilience may have on ameliorating suicidality, is dependent upon an individual begin able to draw on

available resources internally and externally from themselves, so that resilience may be maintained. The next section will now discuss suicidality risk among individuals.

### **3.3 Research Literature on Suicidality Risk**

Considered to be a multifaceted process, the occurrence of suicidality has frequently been associated with several psychological, social, biological and existential factors (Heisel, 2006). Furthermore, it has been shown to be variable across age, gender, location and culture, with suicidality mortality linked to the presence of risk factors (e.g., psychiatric disorder) and suicidal behaviours (Miller, M., Azrael & Barber, 2012).

As highlighted in Chapter one, factors such as marital status, age and gender have been related to susceptibility to suicidality (Bellivier et al., 2011; Miller, J. S., Segal & Coolidge, 2001; Pritchard & Hansen, 2005; Zhang et al., 2005). Strong associations with increased suicidality risk has also been observed among individuals who experienced or encounter childhood adversity, hopelessness and mental health problems (e.g., high levels of depression and/or anxiety; Bruffaerts et al., 2010; Corna et al., 2010; Denney et al., 2009; Enns et al., 2006; Fairweather-Schmidt et al., 2010; Klomek et al., 2011; Smith, J. M., Alloy & Abramson, 2006; Vanderhorst & McLaren, 2005; Wahlström, Michélsen, Schulman & Backheden, 2010). These risk factors may diminish an individual's wellbeing, should protective factors be diminished or lost, and as such, poses a threat to a person's resilience, whilst increasing suicidality risk. Furthermore, these variables (and others; e.g., chronic disease duration), can continue to pose a threat for suicidality among adult individuals, even when suicidal symptoms are not present (Fairweather-Schmidt et al., 2010).

It should be noted that the path of suicidality is not necessarily straightforward. Individuals who complete suicide do not always demonstrate risk behaviours prior to the event (Conwell et al., 2002; Wenzel & Beck, 2008). Those who attempt suicide do not always attempt again or complete at a future date (Rutter, P. A. et al., 2008). Furthermore, persons who are at high risk for suicidality are not persistently at threat from it (Johnson, Gooding, Wood & Tarrier, 2010; Rutter, P. A. et al., 2008; Schoon, 2006). Thus, though suicidal ideation may occur, this does not inevitably lead to suicide or suicide attempt (Bruffaerts et al., 2010; Corna et al., 2010). Moreover, though vulnerable and/or high risk individuals are generally considered to be at risk, they have been shown to be able to adapt and adjust successfully to adversity (Werner, 1993). Protective factors that arise from encounters with adversity could be how suicidality risk may be modified, ameliorated or can alter individual responses to adversity (Johnson, Gooding, Wood & Tarrier, 2010; Masten, 2007; Masten et al., 1990; Rutter, M., 1985; Schoon, 2006). As such, suicidality risk can be altered, but is dependent on the impact of the situation and the strength of protective factors present (Johnson, Gooding, Wood & Tarrier, 2010; Rutter, P. A. et al., 2008; Schoon, 2006). A closer review of the different aspects of suicidality (e.g., ideation, attempts) follows, with a focus on the differences and similarities on the effect of risk factors on the likelihood of suicidal thoughts and behaviours.

### **3.4 Suicidal Ideation and its Impact on the Individual**

With past ideation associated with the occurrence of future ideation, the presence of suicidal thoughts and behaviours play a significant role in the continuation and elevation of suicide risk as we age (Kerr et al., 2008). Common amongst young individuals, and when suicidal ideation is high, their intention to

seek help is often low (Wilson & Deane, 2010). Suicidal ideation in younger adults is associated with a variety of factors. These include but are not exclusive to the presence of psychological symptoms (e.g., depression, anxiety) and disorders, and emotional distress (Corna et al., 2010). Though not considered to be as physically harmful or dangerous as suicide attempts, mild levels of ideation can lead to the escalation and severity of risky behaviours (e.g., delinquency) (Kerr et al., 2008). A robust predictor for more serious suicidality risk, suicidal ideation is known to be a common precursor to attempted and completed suicide (Cohen et al., 2010; Conwell et al., 2002; Cukrowicz, Ekblad, Cheavens, Rosenthal & Lynch, 2008; Wilson & Deane, 2010).

With psychological, social and biological factors influencing individuals on a daily basis, the level of risk experienced by vulnerable individuals is in a constant state of flux (Conwell et al., 2002). This is due to several reasons. For instance, dependent on the context surrounding the occurrence of a risk factor, obstacles may appear manageable or unsurmountable to an individual (Schoon, 2006). Difficulty in connecting with others may impair the capacity to manage hardships (Vanderhorst & McLaren, 2005). Though variables such as a sense of responsibility may reduce suicide likelihood through provision of a reason for living, a lack of reciprocity, mutual exchange, respect, involvement or giving back to the community can diminish the sensation of belonging, resulting in feelings of being out of sync, isolated and detached from others (Kissane & McLaren, 2006). Furthermore, having a sense of belonging can become a risk factor, in that it can create overwhelming feelings of incompetency due to the beliefs of the individual (Denney et al., 2009; Kissane & McLaren, 2006). From this, thoughts of ending one's life to avoid the distress may potentially consume an individual (Britton et al., 2008).

Further discussion of factors that increase the likelihood of suicidal ideation occurrence now follows.

**3.4.1 Factors that influence vulnerability to suicidal ideation.** As already discussed in Chapter one, and to some extent, earlier in the present chapter, suicide research has uncovered many factors that influence the occurrence of suicidality. Specific to suicidal ideation, the presence of depression, panic disorder, social phobia, comorbid anxiety, alcohol and drug dependence, gambling, and stressful life events, have been linked to an elevated risk for suicidal ideation (Batterham & Christensen, 2012; Cohen et al., 2010; Corna et al., 2010; Heisel & Flett, 2008; Meltzer et al., 2011). A range of other mental health issues have also been associated with suicidal ideation, including neuroticism, cognitive vulnerability (e.g., dysfunctional attitudes and a negative inferential style), and rumination symptoms (Batterham & Christensen, 2012; Fairweather-Schmidt et al., 2007; Smith, J. M. et al., 2006). Reasons for these associations may be attributed to poor mental health care, and a lack of access or unwillingness to access appropriate support, to name a few. However, it should be noted that though each of these factors carries a strong connection, their occurrence is insufficient on their own for suicidal ideation to occur (Batterham & Christensen, 2012).

Factors that threaten an individual's sense of security and wellbeing such as when an individual has several debts (e.g., housing and shopping debts), can also lead to suicidal ideation occurring. (Meltzer et al., 2011). Having little or no possession of agency traits such as competitiveness (which can aid an individual's desire to succeed), and perceived burdensomeness, has also been shown to increase suicidal ideation likelihood (Christensen, Batterham, Soubelet & Mackinnon, 2013; Hobbs & McLaren, 2009). In addition, exposure to an acquaintance who has



completed suicide, dependent on the individual's wellbeing at the time, can determine the occurrence of suicidal ideation (De Leo, Cerin, Spathonis & Burgis, 2005). The following subsections will detail other variables that may increase the prospect of suicidal ideation.

**3.4.1.1 Demographic factors and employment.** Considered to be a potent risk factor for the development of suicidal ideation, demographic factors (e.g., age, marital status) play a key role in influencing risk over the lifespan (Schoon, 2006). However, though the influence on risk of these variables can be enduring, this is dependent on circumstances and age (Conwell et al., 2002; Everall et al., 2006; Luthar & Cicchetti, 2000; Schoon, 2006). For example, though living in a rural community may provide a close knit environment, residing in such circumstances presents greater risk for men in regards to the impact of stress on their wellbeing (Kutek et al., 2011). Further, living in areas of low income poses a higher risk for suicidal ideation compared to middle and high income locations (Beautrais, Wells, McGee & Oakley Browne, 2006; Cohen et al., 2010; Corna et al., 2010). Both of the aforementioned factors can be attributed in part to a lack of access, or inability to access, appropriate services, support, or understanding, all of which may enable an individual to reduce suicidality risk.

Other demographic factors that have been extensively examined in relation to suicidality include education, employment and marital status (Cohen et al., 2010; Denney et al., 2009; Fairweather-Schmidt et al., 2010; Johnston et al., 2009; Kutek et al., 2011; Möller-Leimkühler, 2003; Schoon, 2006; Shanahan, 2000). Though education is not a direct predictor, low educational attainment in conjunction with other factors (e.g., younger age) may increase vulnerability to suicidal ideation (Cohen et al., 2010; Rancāns, Lapiņš, Salander & Jacobsson, 2003). Individuals

with a diploma or tertiary degree have a lower likelihood of reporting lifetime suicidal ideation comparative to those with high school qualifications only (Denney et al., 2009; Johnston et al., 2009; Skala et al., 2012). This is suggested to relate to higher education levels being associated with a greater sense of self-control, engagement with others, and a sense of belonging (Denney et al., 2009; Johnston et al., 2009). Those with lower levels of education may not have as many responsibilities or connections, so increasing risk for suicidality (Denney et al., 2009).

Employment also has variable effects. Labour force status (e.g., being unemployed or economically inactive) can have a negative impact on an individual's wellbeing, which may lead to risk for suicidal ideation increasing (Denney et al., 2009; Johnston et al., 2009; Meltzer et al., 2011). This could be due to feelings of being unable to contribute to society and/or the family home, having no work role or responsibilities, and a lack of connection with others (Denney et al., 2009; Johnston et al., 2009). Unemployment in particular, may have a stronger impact on men than women, due to cultural expectations, and how the individual may define their role within the family setting (Möller-Leimkühler, 2003). These influences persist, with longitudinal exploration observing a connection between potential job loss or change, and a decline in health status (i.e., physical health among men and psychological health in women) (Ferrie, Shipley, Marmot, Stansfeld & Smith, 1995). Though the presence of positive feedback, having input into office and job strategies, and an encouraging social and physical environment can allow individuals to flourish (The Government Office for Science, 2008), a lack of these may reduce wellbeing. However, whether ill health is a consequence or cause of negative experiences with employment can be unclear (Ferrie et al., 1995).

Though marriage may ameliorate the probability of suicidality through providing support and a sense of belonging, losing a loved one can lead to vulnerability towards experiences of psychological stress, economic and social pressures (Kissane & McLaren, 2006). Individuals who are separated, divorced, widowed or never married generally report higher suicidal ideation than those who are married/co-habiting with a partner (Cohen et al., 2010; Denney et al., 2009; Johnston et al., 2009; Lawrence et al., 2000; Vanderhorst & McLaren, 2005). Here, loss of friendship groups, support structures, and a reduced sense of belonging can arise, leading to reduced wellbeing and increased likelihood of suicidality occurring. Men in particular are at an increased risk for ideation when experiencing relationship separation (Kolves, Ide & De Leo, 2010). Furthermore, marital status (i.e., being divorced, separated, widowed, or never married) has been observed to persist as a risk factor for the development of suicidal ideation, even when suicidal symptoms are not present (Fairweather-Schmidt et al., 2010). This may be attributed to losing a sense of belonging, social support or connectedness with others.

**3.4.1.2 Social support.** As has been highlighted consistently throughout the current thesis, the role of social connectedness appears to be of particular importance for vulnerable individuals (Denney et al., 2009). Feeling needed and loved by others as well as knowing that one would be missed if suicide was completed, provides individuals with a sense of purpose and motivation to positively alter aspects of their lives (Everall et al., 2006). The presence of a caring friendship, family and a sense of belongingness can subsequently reduce the likelihood of suicidal ideation by increasing an individual's sense of connectivity (Fleming, T. M. et al., 2007; McLaren et al., 2007; Schoon, 2006; Werner, 1993, 2005; Werner &

Smith, 1979). Additionally, positive self-appraisal, facilitated by having family and social support, can moderate the association between stressful life events and suicidality, as well as hopelessness and suicidal ideation (Johnson, Gooding, Wood & Tarrier, 2010; Johnson, Gooding, Wood, Taylor, et al., 2010). Alternatively, however, perceiving oneself as having the inability to have a meaningful role within the family unit can produce a negative impact on an individual (Möller-Leimkühler, 2003). This influence, nevertheless, varies dependent on an individual's existing relationships.

Further, engagement with others has frequently been reported to be an important predictor of subjective wellbeing (Kuttek et al., 2011). It has even been recommended that in addition to addressing any underlying social risk factors, appropriate support should ideally be available, when treating individuals with mental health issues or other difficulties (e.g., depression and alcohol) (Beddington et al., 2008). This is due to the potential it affords for connection through the formation of friendships, routines, responsibilities, fulfilment of life and belonging; all of which aids in reducing suicide risk (Denney et al., 2009; Kissane & McLaren, 2006; Werner, 1993, 2005; Werner & Smith, 1979). This has been evidenced in suicidality and resilience research, where high levels of social support has been linked to low levels of suicidal ideation, and greater levels of resilience (Masten et al., 1990; McLaren & Challis, 2009; Netuveli et al., 2008; Schoon, 2006). As such, being provided a reason to live (e.g. knowing you would be missed; wanting to be there for someone), can reduce suicidal ideation likelihood (Denney et al., 2009; Kissane & McLaren, 2006; Kuttek et al., 2011; McLaren, 2011; Werner, 1993, 2005; Werner & Smith, 1979).

**3.4.1.3 Mental health.** As discussed earlier in the current chapter, research

has consistently demonstrated that the presence of a psychiatric disorder heightens the risk for ideation and completed suicide (Christensen et al., 2013; Johnson, Gooding, Wood, Taylor, et al., 2010; Lawrence et al., 2000). Further, there is evidence that risk factors such as social phobia, panic, mood, eating and substance use disorders, play a role in increasing likelihood for suicidal ideation, plans and attempts (Beautrais et al., 2006; Corna et al., 2010; Spiwak et al., 2011). In addition, the presence of two or three mental disorders has been implicated as being linked with higher prevalence of suicidal ideation and plans, with manifestation of three or more disorders associated with even greater risk (Johnston et al., 2009). Moreover, having a family history of mental disorder also increases suicidal ideation risk (Hawton, Casanas, Comabella, Haw & Saunders, 2013). It is therefore evident that experiencing mental illness close hand, can have a negative impact on an individual's wellbeing. Thus, if effective prevention and reduction of suicidality is to occur, the management and treatment of disorders (e.g., mood, substance use), for those diagnosed, needs to be considered.

While family can confer protection from adversity (Denney et al., 2009; Masten et al., 1990; Schoon, 2006), amongst individuals with a mood disorder, it has been suggested that a sense of responsibility to family increases the degree to which hopelessness and suicidal ideation are experienced (Britton et al., 2008). This is due to the fear of failing in one's responsibilities, because of real or perceived individual inadequacies (Britton et al., 2008). If an individual feels that they are a burden to their family, experience a negative family environment, or feel ineffective in their abilities, risk for suicidality can elevate (Borowsky et al., 1999; Britton et al., 2008; Lizardi et al., 2009).

Suicidality and symptoms of depression have also been shown to commonly

co-occur (Corna et al., 2010; Fairweather-Schmidt et al., 2009; Malone et al., 2000; Vanderhorst & McLaren, 2005). Indeed, elevated levels of depression have been linked to increased rates of suicidal ideation and attempts, with rates rising for suicide risk in men aged 60 years and over (Hobbs & McLaren, 2009; Lawrence et al., 2000; McLaren & Challis, 2009; Useda et al., 2004; Vanderhorst & McLaren, 2005; Zhang et al., 2005). Evidence also suggests that depressed individuals with a family history of suicidality have a greater likelihood of engaging in suicidal ideation compared to individuals with depression, who have not been exposed to familial suicidality (Lizardi et al., 2009).

Compared to the presence of substance use issues or other mental health illnesses, having an affective disorder has been shown to be a stronger predictor for suicidal ideation risk (Alberdi-Sudupe et al., 2011; Conwell et al., 2002; Johnston et al., 2009). Links have also been observed between individuals with psychosis and hopelessness, with those who report high levels of positive self-appraisals but experience increased levels of hopelessness, less likely to experience suicidality (Johnson, Gooding, Wood, Taylor, et al., 2010). Thus, in considering mental health and suicidality, a range of disorders can contribute towards reducing wellbeing, and thus increasing suicidality risk.

**3.4.1.4 Life events.** Life events are major experiences that change an individual's status or circumstances (e.g., job loss, bereavement); as such, they are highly likely to be threatening to an individual's wellbeing (Brugha & Cragg, 1990; Gearing & Lizardi, 2009). Dependent on timing and the origins of an adverse situation, life events can have a variable impact (Schoon, 2006; Wahlström et al., 2010). Bereavement, for instance, though difficult for most, poses more of a suicide risk among older adults (Waern, Rubenowitz & Wilhelmson, 2003), as loss of

family and friends occur more frequently for this age group (Kissane & McLaren, 2006; Shen & Zeng, 2010; Waern et al., 2003; Wells, 2009). Further, factors such as age, family cohesion and access to resources can interact and influence the impact of life events (e.g., childhood adversity or a natural disaster) (Wahlström et al., 2010).

Though distress due to a life event may appear to be initially low, the impact on psychological health has the potential to be severe and enduring (Schoon, 2006; Wahlström et al., 2010). For example, car accidents are more likely to be “one-off” whereas childhood abuse is more likely to occur in a larger framework of adversity (Wahlström et al., 2010). Pregnancy on the other hand, depending on circumstance, may be perceived as an adverse event or not. Further, dependent on an individual’s level of resources, experiences such as perceiving one’s life to be at risk, witnessing an individual being severely harmed or killed, and strong initial emotional reactions to an event, can have an immediate/enduring negative impact on an individual (Ahmed, 2007). Responses to life events can also be influenced by gender, family and social support (Wahlström et al., 2010). Here, the presence of a supportive network, being able to seek help and having individuals close to you, can help to reduce the impact of life events, and so diminish the likelihood of suicidality occurrence.

### **3.5 Vulnerability to Attempted and Completed Suicide**

Suicidality comprises ideation, attempts and completed suicide. The current thesis will not include attempted or completed suicide as a focus due to insufficient data available from the PATH Project. However, to be thorough, a brief overview will be provided.

**3.5.1 Factors associated with suicide attempts.** Compared to completed suicide, suicide attempts are more common. Frequently occurring during adolescence, prevalence of suicide attempt increases throughout the teenage years (Conwell et al., 2002; Fleming, T. M. et al., 2007; Silverman et al., 2007; Wichstrom, 2000; Wilson & Deane, 2010). This may be due, in part, to the fact that at this stage of life, certain skills may not have been developed or learnt, and as such, the ability to cope with adversity may prove overwhelming as internal and external resources are scarce. Though this prevalence declines as an individual ages (and skills are subsequently learnt), suicide attempts continue for some (Alberdi-Sudupe et al., 2011; Fairweather-Schmidt et al., 2010; Fleming, T. M. et al., 2007).

A precursor to the occurrence of suicide attempt (Cohen et al., 2010; Conwell et al., 2002; Cukrowicz et al., 2008; Wilson & Deane, 2010), factors that influence suicidal ideation also affect suicide attempt. Socio-demographic disadvantage, the presence of a mental and/or physical disorder, and drug and alcohol abuse are just a few that are analogous between ideation and attempt (Beautrais, Joyce & Mulder, 1997; Harwood, Hawton, Hope & Jacoby, 2006). Differences, however, have also been found. Interpersonal difficulties, legal issues, suicidal ideation, previous suicide attempts, poor self-worth and gender have been found to influence current and future suicide attempts (Cohen et al., 2010; Cukrowicz et al., 2008; Fidan, Ceyhun & Kirpinar, 2011; Fleming, T. M. et al., 2007; Gonzalez, 2012; Rew, Thomas, et al., 2001; Runeson, Tidemalm, Dahlin, Lichtenstein & Långström, 2010; Wichstrom, 2000; Zhang et al., 2005). Each may influence the individual's ability to engage with others, to seek support and to have confidence in oneself. Other risk factors that can also contribute to the aforementioned feelings include experiences with a negative family environment, hopelessness, and a lack of social



ties, all of which can increase the probability of attempted suicide (Borowsky et al., 1999; De Leo et al., 2005; Fergusson et al., 2003; Lizardi et al., 2009; Rew, Thomas, et al., 2001; Spiwak et al., 2011).

Religion, though potentially supportive, can create conflict with one's beliefs, and exacerbate feelings of fear or guilt; alongside a lack of understanding/encouragement from others, this may reduce wellbeing, leading to suicide attempt (Koenig, 2009; Lizardi et al., 2009; Rew, Thomas, et al., 2001). Experiences of friends, family and/or caregivers who attempt or complete suicide, has also been associated with the occurrence of suicide attempt in adulthood; more so if this is encountered during childhood. Exposure to negative or destructive behaviours, modelling and imitation of negative behaviours, environmental factors (e.g., maladaptive parenting) and an unstable home environment, are some of the reasons suggested as to why exposure to suicidality of this kind, has a detrimental effect (Spiwak et al., 2011).

Other factors that increase the chance of suicide attempt occurring include encounters with intimate partner violence, non-partner physical violence and having a mother who experienced intimate partner violence (Devries et al., 2011). Alcohol abuse and a lack of social connectedness have also been associated with suicide attempt (Alberdi-Sudupe et al., 2011; Rew, Thomas, et al., 2001; Rossow et al., 1999; Zhang et al., 2005). Experiences such as these can be isolating and subsequently a loss in sense of belonging, confidence, self-esteem and connectedness with others may be encountered. From this, wellbeing may diminish, thus increasing risk for suicidality. So perhaps, unsurprisingly, difficulty or poor problem solving skills during times of high stress have also been linked with elevated risk of suicide attempt (Grover et al., 2009). Among individuals with pre-

existing suicidal ideation, chronic medical conditions, a low sense of mastery (especially for men) and unemployment also convey risk for suicide attempt (Fairweather et al., 2006). This can be attributed to pressures from cultural expectations, roles within family and/or societal pressures (Möller-Leimkühler, 2003).

### **3.5.2 Factors that may increase likelihood for completed suicide.**

Examination of factors that may increase an individual's likelihood for completing suicide has shown a variety of influences. Age, for instance, has been related to increased risk for completed suicide, with individuals aged 65 years and over being the most vulnerable (Conwell et al., 2002; Kissane & McLaren, 2006; Lawrence et al., 2000; Marty et al., 2010; Pritchard & Hansen, 2005; Waern et al., 2003).

Discussed in further detail later in the current chapter, older adults may be more at risk for suicide due to experiences with loneliness, poor health, marital status (e.g., divorced or widowed), and/or simply not having a reason to live (Lawrence et al., 2000).

As with ideation, physical illness and alcohol abuse have been frequently linked to suicide (Giner et al., 2013; Harwood et al., 2006). Hopelessness after recovering from a depressive episode, a loss of status or role, being elderly with a mental illness, or an older adult with mood disorders (e.g., adjustment reaction and affective psychoses), has also shown connections with completed suicide (Christensen et al., 2013; Heisel, 2006; Lawrence et al., 2000; Quinlan-Downs, 2011). Furthermore, previous suicide attempts have been strongly associated with an increased likelihood of suicide occurrence (Hawton et al., 2013). Each of these factors chips away at individual wellbeing, to the point where adjustment may become difficult, and so negative behaviours ensue. If support is lacking,

communication difficult, or a person does not feel they are being heard, this can be problematic in trying to draw upon positive sources that may enable management of stressors.

The type of suicide attempt also influences future likelihood of completing suicide. Compared to those who attempt using methods such as cutting or drowning, persons who attempt suicide by hanging, strangulation, or suffocation, have a greater likelihood of completing suicide at a future point; risk is further increased if an individual has a psychotic disorder (Runeson et al., 2010). Further, individuals who have friends or families with a more accepting attitude towards suicide, have a greater likelihood of ending their life through suicide (Ventrice, Valach, Reisch & Michel, 2010).

Attempts to reduce the impact of the aforementioned risk factors can create difficulties for an individual. Those who complete suicide are not limited to a small subsection within the community. Suicide completers, for instance, are more likely to be widowed, retired, lived with relatives, had a personality disorder, children and a family history of completed suicide (Giner et al., 2013). Consequently, some risk factors (e.g., the occurrence of mental illness or having a family history of completed suicide) cannot be altered. Thus, while some risk factors may potentially be remediated, this is not wholly effective as a suicide reduction strategy. The presence of multiple protective factors, however, may have a stronger influence on reducing suicide attempt likelihood (Borowsky et al., 1999; Friberg et al., 2009; Werner, 2005).

### **3.6 Gender and Age Differences in Experiencing Suicidality**

Suicidal ideation, plans and attempt patterns are well known to be influenced by gender and age. As discussed in Chapter one, in Australia, suicide rates are

highest amongst men aged 35 – 44 years, and girls/women between 16 – 24 years (Johnston et al., 2009). Individuals who experience suicidal ideation and attempts are often adolescent and adult women (Conwell et al., 2002; Wilson & Deane, 2010). Older men (i.e.,  $\geq 50$  years) have notably higher suicide rates than older women (Conwell et al., 2002). The following section will describe in more detail the gender differences across different aspects of suicidality.

**3.6.1 Male and female differences in suicidality research.** Despite limitations (e.g., gender differences not controlled for; lack of gender mix within a sample), prevalence of gender differences within suicidality consistently varies (Borowsky et al., 1999; Corna et al., 2010; Denney et al., 2009; Fairweather et al., 2006; Vanderhorst & McLaren, 2005). Research has shown that risk factors affect men and women differently. These differences persist from childhood to adulthood (Corna et al., 2010; McLaren et al., 2007; Pritchard & Hansen, 2005). Concerns associated with duty, opinions and beliefs, such as those related to children, responsibility to family, moral objections and fear of suicide, have been linked to a reduced likelihood in engagement with suicidality among women (Denney et al., 2009; Kissane & McLaren, 2006; McLaren, 2011; 2001). Factors associated with a heightened risk of suicide for men, not women, includes marital status (e.g., being widowed, separated, divorced or never married), low levels of education, and having no religious affiliation (Bhui, 2010; Denney et al., 2009; Gearing & Lizardi, 2009). These factors comparative to those for women, are related more to loneliness and lack of beliefs/support.

A loss of stability among women who are separated, such as experiencing significant changes in living arrangements, or loss of employment, leads to a greater disposition to suicidality (Kolves, Ide & De Leo, 2012). Instability and lack of self-

esteem in itself are a pervasive theme for women and increased risk for suicidality. For instance, having never been married, or not being in a long term relationship, poor self-evaluated health status and drug use, have been linked to increased likelihood of a suicide attempt amongst young women (Fairweather-Schmidt et al., 2010; Goldney, 1981; Zhang et al., 2005). Though the presence of substance use, personality and childhood disorders (mental and/or physical) are prevalent across gender, these have been linked more strongly to male suicides; conversely, women who suicide are more likely to have attended university, be employed and have major depression (McGirr et al., 2006). With the role of being a good earner typically falling onto men rather than women, having a good education not only boosts opportunity for this to occur, but may also increase income potential. Thus, with pressures from cultural and personal expectations, it is perhaps not surprising that low income and low educational achievement increases risk of suicide attempt and death by suicide among men, not women (Denney et al., 2009; Zhang et al., 2005). Further, low socioeconomic status for men, which is often associated with fewer resources being available that would otherwise enable control of one's environment, also has a negative impact on wellbeing; (Möller-Leimkühler, 2003). Experiences with financial/property difficulties have a greater impact among men than women, with suicidal ideation occurrence linked to issues with accessing appropriate coping mechanisms (Kolves et al., 2012). Subsequently, when higher income (and consequently higher socioeconomic status) is achieved, suicide risk for men but not women, diminishes (Denney et al., 2009).

In further considering the impact for men in having qualities that are masculine-linked (e.g., mastery or perceived control), an association has been found when these factors are low, for suicidal ideation rate to increase (Hobbs & McLaren,

2009). Previous suicidal ideation has been connected to an increased likelihood of future ideation occurring, particularly amongst men (Kerr et al., 2008). Other risk factors for suicidality among men involves a loss of some kind; separation, loss of social networks or a job (particularly among separated men) has a greater effect on wellbeing for men than for women (Kolves et al., 2010, 2012; Möller-Leimkühler, 2003; Rossow et al., 1999). With men, unlike women, often not being willing to seek out sources of support or discussing problems, loss of any kind, has a greater likelihood of having a negative impact.

Exploration of factors that reduce suicidality risk, have also found gender differences (Denney et al., 2009; Kissane & McLaren, 2006). For instance, as mentioned previously, though men may be more reluctant and subsequently less likely to seek support than women, being married and having the presence of family support can help to reduce suicide risk (Denney et al., 2009; Rickwood, Deane & Wilson, 2007). Furthermore, having close friendships, particularly for women, facilitates increasing feelings of being valued and of belonging, allowing for problems to be unburdened (Vanderhorst & McLaren, 2005). As such, though commonalties persist as to risk factors that influence suicidality occurrence, dependent on the variable that poses a threat to individual wellbeing, gender makes pathways to suicide different (Denney et al., 2009; Kissane & McLaren, 2006).

**3.6.2 Exploring the impacts of age on suicidality.** The likelihood of suicide attempt can elevate during later adulthood (age 29+; 40 – 49 years) (Bruffaerts et al., 2010; Fairweather-Schmidt et al., 2010), with women in their 60s and men in their 20s having a greater likelihood of reporting new occurrences of suicidality if initially suffering depression/anxiety (Fairweather-Schmidt et al., 2010). Though similarities have been observed across age groups for some risk

factors, including being divorced or separated, limitations in activities of daily living and smaller social support groups, differences persist (Dennis et al., 2007). Consequently, while risk factors may influence individuals negatively dependent on current age, other risk factors may have slight or greater effect (Conwell et al., 2002; Waern et al., 2003). Further discussion of factors that influence suicidality across age will be undertaken in the following sections.

**3.6.2.1 Suicidality in adolescence/young adulthood.** With experiences of childhood abuse shown to occur amongst two thirds of the population, this carries significant implications (Burke et al., 2011; Felitti, 2002) in regards to lifetime wellbeing and risk of suicidality. Studies examining transition from childhood to adulthood among those exposed to adversity have observed a strong association between childhood sexual abuse and suicide attempts, which can lead to future vulnerability to lifetime suicidality (Borowsky et al., 1999; Bruffaerts et al., 2010; Enns et al., 2006; Fergusson et al., 2003; Rew, Thomas, et al., 2001). As the number of adverse childhood events (e.g., childhood neglect, psychological and physical abuse) increase, suicidality prevalence also rises (Borowsky et al., 1999; Bruffaerts et al., 2010; Enns et al., 2006; Rew, Thomas, et al., 2001). Thus, adversity in childhood can be considered a strong predictor for the occurrence and persistence of suicidality throughout the life span (Bruffaerts et al., 2010).

Research has evidenced the commonality of suicidal ideation among adolescents, with those who previously attempt suicide being at an increased risk of completing at a future time point compared to those who have never attempted (Borowsky et al., 1999; Conwell et al., 2002; Rew, Thomas, et al., 2001; Wilson & Deane, 2010). Though adolescents are more likely to experience remission of suicidality, they are also the most likely to report new experiences (Fairweather-

Schmidt et al., 2010). In being young, skills have yet to be learnt from experiences that can enable an individual to facilitate effective coping mechanisms.

Changeability in social circles and circumstances (e.g., change of school, moving areas), can lead to the occurrence of factors such as possession of low self-worth, loneliness and being less socially accepted among peers, for adolescents. This can lead to attempts at suicide (Borowsky et al., 1999; Enns et al., 2006; Pompili et al., 2012; Rew, Taylor-Seehafer, et al., 2001; Wichstrom, 2000) due to feeling of disconnection and isolation from others. Similarly, bullying (directly or indirectly, e.g., cyber bullying), the death of a parent, family violence and social rejection, which can also lead to loneliness and a loss in a sense of belonging, also increases suicidality (Borowsky et al., 1999; Bruffaerts et al., 2010; Klomek et al., 2011; Luxton, June & Fairall, 2012; Rew, Taylor-Seehafer, et al., 2001). Inexperience in dealing with difficult situations, and a lack of/inability to seek support can be attributed to this restricted expertise in resolving stressful situations. Further, negative experiences in seeking support during adolescent years can also lead to continued reluctance in seeking appropriate support in adulthood (Rickwood et al., 2007).

Linked to a variety of factors, suicidality among adolescents has been associated with engagement in illegal and legal drug use and poor relationships with parental figures (e.g., less care or over protection) (Borowsky et al., 1999; Enns et al., 2006; Pompili et al., 2012; Rew, Taylor-Seehafer, et al., 2001; Wichstrom, 2000). Risk factors for lowered self-esteem, feelings of self-worth and exclusion, such as binge drinking, the presence of depressive symptoms, affiliations with deviant peers and low school achievements, also has a role in the development of suicide attempt (Borowsky et al., 1999; Fergusson et al., 2003; Fleming, T. M. et



al., 2007; Gonzalez, 2012; Rossow et al., 1999; Wichstrom, 2000). Family experiences, structure and economic resources may also have an influence (Galligan et al., 2010; Shanahan, 2000). Other factors include a limited ability and knowledge of problem solving, early life adversity and the presence of mental and physical disorders (Beautrais et al., 2004; Bruffaerts et al., 2010; Enns et al., 2006; Fergusson et al., 2003; Kerr et al., 2008; Klomek et al., 2011; Wahlström et al., 2010; Werner, 2005). Among individuals with mood disorders, exposure to stressful life events may lead to ideation being experienced, that results in suicide attempt (Pompili et al., 2012).

Though the early years of life are important, it is not solely the experiences encountered during this time that dictates the development of an individual's life course (Schoon, 2006). Moreover, not all individuals are burdened by encounters of significant adversity during childhood (Netuveli et al., 2008; Schoon, 2006), although some adversity is more common than not. Thus while what occurs as we develop and grow may play a part in how individuals react and view the world, it is not a definitive predictor that determines how one will respond to adversity and stress.

**3.6.2.2 *Suicidality in adults.*** Exploration into suicidality in adults has not been as common, compared to investigation of children, adolescents and older adults (Conwell et al., 2002; Fairweather-Schmidt et al., 2007; Fairweather et al., 2006; Kissane & McLaren, 2006; Lawrence et al., 2000; Marty et al., 2010; Waern et al., 2003). Nevertheless, findings have observed that compared to adolescents, adults have a lower incidence of suicidal behaviour, with suicidality risk on average, declining with age (Fairweather-Schmidt et al., 2007; Fairweather et al., 2006; Johnston et al., 2009; Nock et al., 2008). Though skills gained through the life

course (from different experiences and general development) may facilitate the reduction of suicidality likelihood, suicidal thoughts and behaviours still occur among adults. For instance, risk factors for loss of support, rejection and adverse stress, such as interpersonal problems (e.g., arguments with family, friends), work and financial difficulties, play an important role in the development of suicidality among adults (Beautrais et al., 1997; Fairweather-Schmidt et al., 2010; Fairweather et al., 2006; Goldney, Wilson, Dal Grande, Fisher & McFarlane, 2000).

Unemployment, which can lead to a loss of support systems and daily structure, has also been shown to be predictive of suicidality occurrence (Hunt et al., 2006).

As discussed earlier in the chapter, risk factors that cause feelings of isolation or loneliness (Kissane & McLaren, 2006; Roy et al., 2006, 2007; Vanderhorst & McLaren, 2005), such as relationship problems and being unmarried (men in their 40s; women in their 20s) can increase suicidality risk (Dennis et al., 2007; Fairweather-Schmidt et al., 2010; Hunt et al., 2006). Poor physical health, which may prevent an individual from being able to engage socially, has also been shown to be predictive of suicidality (Denney et al., 2009; Fairweather et al., 2006; Johnston et al., 2009).

Though an individual may have strategies in place that would enable them to reduce the impact of adversity, being exposed to adverse events can weaken an individual, and thus increase risk for suicidality. Lifetime traumatic events (e.g., natural disaster, sexual or physical assault), for instance, that can occur at any point during an individual's life, can increase suicidality risk (Goldney et al., 2000). Moreover, with reduced social ties and their disruption associated with risk for suicide in later life (i.e., as older adults), what may impact an individual in adulthood, whether past or current, may influence future suicidality (Conwell et al.,

2002). Subsequently, though suicidality risk factors may primarily influence those in adulthood, the continued effects may be seen into older adulthood.

**3.6.2.3 Suicidality in older adults.** Though suicidality risk declines across adulthood, prevalence increases in older adulthood (Johnston et al., 2009; Miller, J. S. et al., 2001; Rew, Thomas, et al., 2001). Indeed, compared to other age groups, individuals aged 65 – 74 years are noted to be at highest risk for completing suicide (Chan et al., 2007; Conwell et al., 2002; Kissane & McLaren, 2006; Lawrence et al., 2000; Marty et al., 2010; Waern et al., 2003). This prevalence pattern has been observed across several Western countries, including Australia (Corna et al., 2010; McLaren et al., 2007; Pritchard & Hansen, 2005). With an increasing population of older adults, suicide in this age group may become a greater problem across developed populations (Cukrowicz et al., 2008; Hobbs & McLaren, 2009; Kissane & McLaren, 2006; Marty et al., 2010). Indeed, whilst limited, research shows completed suicide by older adults is associated with a greater level of planning and resolve, compared to other age groups (Conwell et al., 2002; Heisel, 2006; Szanto et al., 2002). Further, older adults frequently use more violent and potentially fatal methods relative to younger age groups, and are therefore more likely to die on their first attempt (Conwell et al., 2002; Miller, J. S. et al., 2001). Further, older individuals with a history of attempted suicide are at an elevated risk of engaging in suicidal behaviours, which can lead to an increased likelihood of completing suicide (Lawrence et al., 2000).

Due to the impact that age specific factors may have on the ability to adapt (Charles, 2010; Heisel, 2006), risk factors influencing suicidality have been observed to persist into this age group, with expression of these variables influenced by age. Further, the association of risk factors with age and age-related factors has

been connected to an increase in the impact of negative events, among older adults (Diehl & Hay, 2010). Consequently, risk factors such as experiencing bereavement (especially of a spouse or friends), depressive disorder, loss of roles, living alone for the first time, limitations in activity of daily living and health deterioration (Dennis et al., 2007; Hunt et al., 2006; Kissane & McLaren, 2006; Shen & Zeng, 2010; Waern et al., 2003; Wells, 2009), have a strong influence on the occurrence of suicidality. Indeed, with evidence demonstrating that employment of effective behavioural, attentional and/or positive appraisal methods to cope with adversity can pose challenges for older adults (Charles, 2010), hopelessness and isolation (and consequently suicidality) may endure. Additional impacts of risk factors on older adults includes a reduced quality of life, a lack in availability of social and emotional support, and a diminished sense of belonging and companionship; all of which may potentially lead to increased feelings of isolation (Kissane & McLaren, 2006). This, in turn, can result in suicidality occurring.

A lack of adaptability as individuals age that leads to family conflict, and economic difficulties, can result in a stressful situation (Waern et al., 2003). From this, risk factors such as isolation and hopelessness, in addition to social pressures and psychological stress, can lead to the occurrence of suicidality (Britton et al., 2008; Hunt et al., 2006; Kissane & McLaren, 2006; Lawrence et al., 2000).

Substance use, as with other age groups, can also increase risk for suicidal behaviours (Hawton et al., 2013; Waern et al., 2003). Perceiving change to be overwhelming, and therefore unable to be managed, has also been identified as a predictor of elevated suicide risk for this age group (Heisel, 2006).

Though older adults are at an increased risk for completing suicide when suicidal behaviours occur, not all complete suicide (Manthorpe & Iliffe, 2010;

Waern et al., 2003). Indeed, many are at low risk for suicidality as they do not consider it a viable option (Chan et al., 2007; Lawrence et al., 2000; Marty et al., 2010), particularly if factors (e.g., from family, friends) are in place that provides a sense of belonging or connectivity (Fleming, T. M. et al., 2007; McLaren et al., 2007; Schoon, 2006; Werner, 1993, 2005; Werner & Smith, 1979). Further, if moral objections, child rearing (i.e. grandchildren), child related concerns, family responsibilities, survival and effective coping beliefs, all of which provide a sense of belonging, are present, suicidality risk may subsequently be reduced (Kissane & McLaren, 2006; Miller, J. S. et al., 2001). Consequently, though older adults may be at a greater risk for suicidality due to events that are generally unavoidable (e.g., bereavement) for their age group, factors that enable resilience can diminish some of this effect.

Some risk factors persist as we age, whilst others (e.g., death of family, friends), may have a greater impact in older adulthood, due to the loss of support systems as a consequence of these losses. The following section presents the aims of the current thesis, which considers the suicide and resilience literature across adulthood.

### **3.7 General Aims of the Thesis**

The primary aim of this current thesis is to investigate whether, and if so, how age and gender differentially influence of resilience, and its impact on suicidal thoughts and behaviours. Exploration from a life-course perspective will inform this objective, utilising both cross-sectional and longitudinal methodology to analyse a community based sample, across three age cohorts. Data used to examine this objective are drawn from the Personality and Total Health (PATH) Through Life Project (Anstey et al., 2012). This population based survey provides a novel

opportunity to address resilience and suicidality within a large sample, between gender and across time. Moreover, it facilitates generalisation of findings back to the general community, as PATH participants were randomly selected from the Australian Electoral Roll.

Aside from the Discussion chapter (Chapter nine), subsequent chapters will detail information analysed from the PATH Project, in addressing the aims of the current thesis. The focus of the next several chapters is outlined below.

**3.7.1 Objectives of the following thesis chapters.** Chapter four provides a comprehensive review of the PATH Through Life Project methodology. Details pertaining to the PATH Projects participants, procedure and measures used in the current thesis are described. Demographic characteristics across the four waves of the PATH Project are reported. Attrition between waves 2 and 3 for the full cohort are discussed, and between waves 3 and 4 for the youngest cohort only (only data available at the time of analysis). Wave 2 was included in this analysis, so as to provide a comparison between waves 3 and 4. Wave 1 was not utilised in the current thesis, and so was not incorporated (see Anstey et al. (2012) for further information on wave 1).

Chapter five assesses whether resilience could be investigated pragmatically, that is, using a latent measure of resilience in comparison to a resilience-specific measure (Connor-Davidson Resilience Scale (CD-RISC; Connor and Davidson (2003) among wave 3 PATH participants. Formulated from several non-specific measures reflecting aspects of the CD-RISC, measures were restricted to those available in the PATH Project. Implications for future research, measurement issues related to resilience, and the resulting implications for using different scales to assess the construct of resilience are discussed.

Chapter six further examines the measurement of resilience by investigating invariance of the CD-RISC across age and between genders within each cohort from wave 3 PATH data. Investigation of the CD-RISC through stratification of the sample by age and gender provided further detail as to its applicability to a non-clinical population. It will also inform practice as to whether resilience (as measured by the CD-RISC) is equivalent across different age groups and between gender.

Having assessed the validity of the CD-RISC on a community based population, in Chapter seven, this measure is then used to investigate the association between resilience and suicidality across the lifespan for wave 3 PATH participants. Using cross-sectional data, the association between socio-demographic characteristics, health behaviours, health conditions, psychological characteristics, social support, mental health and resilience, and suicidal ideation is assessed. To further explore whether resilience and suicidal ideation remained consistent across the lifespan, data are stratified by age cohort.

In Chapter eight, the association between resilience and suicidality is further explored using longitudinal analysis. Data from the youngest cohort of the PATH Project at waves 3 and 4 are utilised to identify whether current levels of resilience or suicidality levels can be used to predict future resilience or suicidality status.

The general discussion, (Chapter nine), summarises, compares and explores findings from these chapters and existing literature. Implications and overall benefits and limitations of the current thesis are discussed including future research directions and practical implications. The current thesis concludes with reflections on key research findings and recommendations.

## Chapter Four: Methodology

The current thesis used existing data from the Personality and Total Health (PATH) Through Life Project (Anstey et al., 2012). Devised in 1999, the longitudinal project aimed to explore influences on the development of and recovery from mental health illnesses in a large community-based sample. Participants were drawn from a random sample of the electoral roll. There are now three complete waves derived via a cohort-sequential design, with interviews conducted with participants at four year intervals. To date, data collection has only been completed for the youngest and midlife cohorts. Questions have been omitted and added as appropriate, at each successive wave (Anstey et al., 2012).

Though there are increasing numbers of epidemiological studies emerging in Australia, the PATH Project was selected for the current thesis, due to it being one of the largest available sources ( $n = 7485$ ) of adult Australian population information on resilience and self-reported suicidal ideation, thoughts and behaviours (Anstey et al., 2012). Introduced to address the dearth of longitudinal research on adults as they age, PATH is based on three cohorts born between 1975 – 79 (youngest cohort), 1956 – 60 (midlife cohort) and 1937 – 41 (oldest cohort). The youngest group were aged 20-24 when first surveyed (1999). Assessed again in 2003 (aged 24 – 28 years), 2007 (28 – 32 years) and 2012 (32 – 36 years) interviews are planned to occur (funding permitting) at four-year intervals until 2019. At that time the youngest cohort will be aged 40 – 44, matching the initial age range of the midlife cohort, which was first measured at that age in 2000. The oldest cohort was surveyed for the first time in 2001, aged 60 – 64, and is anticipated to be sampled until aged between 80 – 84 years (Anstey et al., 2012).

This thesis reports cross-sectional (wave 3) analyses from all three age



groups, and a longitudinal (waves 3 and 4) examination of the youngest cohort. Data were obtained for these two time points due to information from a resilience-specific measure being available only from wave 3. Information presented in this chapter concerns ethics, participants and methods used to collate data. All measures used will be detailed in this chapter, as will information relating to demographic characteristics and attrition across the four waves.

#### **4.1 Ethics**

All waves of the PATH project have been approved by the Australian National University Human Research Ethics Committee (wave 1 protocol number: M9807; wave 2 protocol number 2002 / 189; wave 3 protocol number 2006/314; wave 4 protocol number 2010/542). The current thesis was approved by the Human Research Ethics Committee at the University of Adelaide (Code Number 11/69).

#### **4.2 Participants**

The PATH Project was conducted in Canberra and Queanbeyan. The sample was drawn randomly from the electoral rolls by researchers from the Centre for Mental Health Research (CMHR) at The Australian National University. In Australia, it is compulsory for citizens over the age of 18 years to vote. As such, citizen details are available on the electoral roll unless under specific conditions (e.g., that would put them at risk). Initially interviewed by CMHR PATH Project staff in 1999, participants (95.1% of eligible electors) were aged between 20 – 24, 40 – 44 or 60 – 64 at baseline. Each age group were interviewed over a 1-year period, thus allowing for a year in which no interviewing occurs between waves.

At wave 1, information from the electoral roll was released in 10-year age groups for the two youngest cohorts. Potential participants were contacted in the 20 – 29 ( $n = 12,414$ ) and 40 – 49 ( $n = 9,033$ ) age groups and were subsequently

removed if they were over the required age range. This was not necessary for the 60 – 64 ( $n = 4, 831$ ) age group as by the time this information was requested in 2001, modification to the laws governing the Australian electoral roll allowed for more specific age group information to be obtained. Individuals were not included in the study if they had moved out of the region (20 – 24 years,  $N = 1,061$ ; 40 – 44 years,  $N = 280$ ; 60 – 64 years,  $N = 182$ ), were not of the required age (20 – 24 years,  $N = 5,058$ ; 40 – 44 years,  $N = 4,222$ ; 60 – 64 years,  $N = 34$ ), could not be located (20 – 24 years,  $N = 2, 190$ ; 40 – 44 years,  $N = 612$ ; 60 – 64 years,  $N = 209$ ), were deceased (60 – 64 years,  $N = 28$ ), declined or were unable to participate due to limited English skills (20 – 24 years,  $N = 1,701$ ; 40 – 44 years,  $N = 1,389$ ; 60 – 64 years,  $N = 1,827$ ). The final sample for wave 1 consisted of 1,163 men and 1,241 women at age 20 – 24 years (58.6% participation rate of those originally contacted), 1,192 men and 1,338 women at age 40 – 44 (64.6% participation rate), and 1,319 men and 1,232 women at age 60 – 64 (58.3% participation rate).

For Wave 2 (beginning in 2003), participants were recontacted by telephone either at home, work or by mobile phone, and where possible, by the same interviewer as at wave 1. Participation rates were robust, with 2,139 (89%) in the youngest cohort, 2,354 (93%) for those aged 40 – 44 years and 2,222 (87.1%) in the oldest age group interviewed. Where contact was not achieved by these means, the following methods were used: Visiting the last known address; emailing participant; telephoning first ‘secondary contact’ (provided by participant at wave 1); telephoning second ‘secondary contact’ (provided by participant at wave 1); using Electronic White Pages to find current telephone number; and an electoral roll search of participants by full name and date of birth. Of those who did not continue participation from wave 1, reasons include could not be found (20 – 24 years, 2.8%;

40 – 44 years, 1.3%; 60 – 64 years, 1.0%), death (20 – 24 years, 0.3%; 40 – 44 years, 0.3%; 60 – 64 years, 2.7%) and refusal to participate (20 – 24 years, 7.9%; 40 – 44 years, 5.3%; 60 – 64 years, 9.2%).

These procedures were replicated for wave 3 data collection in 2007 (individuals interviewed 82.3%, 20 – 24 years; 86.2%, 40 – 44 years; 77.3%, 60 – 64 years). Due to the efforts by project staff seeking to retain participants in the PATH Project, including cards being sent in December, a PATH Newsletter and a “change of address” card, preservation of participant retention rates across all cohorts and waves remained high for the first three waves (Anstey et al., 2012).

Changes in collection of data at wave 4 (2012) coincided or more likely, a result of a decline in participation of the sample by the youngest cohort. Of the  $n = 2,404$  participants at wave 1, only  $n = 1,286$  (53.5%) were interviewed at wave 4 (refused/dead/not found  $n = 1,118$  (46.5%)). Details as to the midlife and older cohorts cannot be provided, as data for these cohorts was still being collated at the time of completion of the current thesis. Initially, interviewers contacted participants by phone. If consent was given to complete the survey online, a link was emailed to the participant. Once this element had been completed, those who had agreed to the face-to-face components (e.g., cognitive and physical testing) and lived in the Canberra area were then contacted to complete this component. The total number of participants that were available for analysis from each wave of the PATH dataset can be seen in Table 1.

Table 1

*Number of participants for each PATH wave, stratified by age and gender.*

	Men				Women			
	20s	40s	60s	Total Men	20s	40s	60s	Total Women
Wave 1	1162	1193	1134	3672	1242	1337	1060	3813
( <i>n</i> = 7485)	(31.6%)	(32.5%)	(35.9%)	(49.1%)	(32.6%)	(35.1%)	(32.4%)	(50.9%)
Wave 2	1013	1103	1147	3263	1126	1251	1075	3452
( <i>n</i> = 6715)	(31%)	(33.8%)	(35.2%)	(48.6%)	(32.6%)	(36.2%)	(31.1%)	(51.4%)
Wave 3	920	1036	1020	2976	1058	1146	953	3157
( <i>n</i> = 6133)	(30.9%)	(34.8%)	(34.3%)	(48.5%)	(33.5%)	(36.3%)	(30.2%)	(51.5%)
Wave 4	548	-	-	-	738	-	-	-
( <i>n</i> = 1286)	(42.6%)				(57.4%)			

Percentages are within gender, and within age groups for each wave

### **4.3 PATH Procedure**

Participants were initially sent an introductory letter about the survey, stating that an interviewer would contact them soon to see whether they wished to participate. An assigned interviewer called a week later. If no phone number was available, the interviewer called at the person's residential address. If the individual was willing, arrangements were then made for an interview to take place at the individual's home, CMHR or the participant's place of work.

For the majority of participants, computer-assisted self-interviewing (CASI) was used to complete the questionnaire between waves 1 – 3. A Hewlett Packard 620LX palmtop computer with a touch-sensitive screen assisted personal interviewing. At wave 4, participants completed the assessment online, using their own electronic devices. Through waves 1 – 3, participants also completed blood pressure, vision, lung function, muscular strength, memory, reaction time and language assessments. Face-to-face components were completed at wave 4, among participants who gave consent. However, this was limited to those who had completed the survey, and were still residing in Canberra. For those not living in Canberra, or who did not give consent to the face-to-face assessments, only the online questionnaire was completed. These tests were conducted by the interviewer. Measures relevant to the current thesis are described below.

### **4.4 Measures**

An extensive range of fixed and time-varying risk factors and moderators were included in the PATH Project. These included socio-demographic characteristics, adversity in childhood, social support, mental and physical health, personality and recent life events and experiences. A brief summary follows.

**4.4.1 Socio-demographics.** Marital and employment status and highest attained qualification were utilised to assess socio-demographic information. Originally measured in six categories (i.e. married, de facto, separated from someone you have been married to, divorced, widowed and have never married) at wave 1, by wave 3 these categories had altered: married – first and only marriage, re-married – second or later marriage, separated from someone you have been married to, divorced, widowed and have never married. In this thesis, these categories were collapsed into partnered and not partnered for each cohort at wave 3.

Data concerning current employment consisted of six categories: employed full-time, employed part-time, looking for full-time work, unemployed, looking for work and not in the labour force. Similar to marital status, wave 3 employment information used in this thesis was recoded into two categories for the three cohorts; employed and not in the labour force. Education was assessed by observing the highest qualification attained. This originally comprised of 10 categories (i.e. School certificate (or equivalent); High school certificate (or equivalent); Trade certificate/Apprenticeship; Technician's certificate/Advanced certificate; Certificate other than above; Associate diploma; Undergraduate diploma; Bachelor's degree; Post graduate diploma/certificate; Higher degree; Refused). These were recoded into four categories consisting of school qualification, certificate, diploma and university (degree level).

**4.4.2 General health.** Twelve items from the Medical Outcomes Study 36-Item Short-Form (SF-36) was used to assess wellbeing status at wave 3 (Ware, Kosinski & Kellar, 1996). These 12-items (SF-12) concern perceptions of participants' mental health. Response formats varied, dependent on the question

asked. For instance “In general, would you say your health is:” required a response on a 6 point Likert scale ranging from 1 “Excellent” to 6 “Refused;” whilst “Have you accomplished less than you would like as a result of any emotional problems?” was a yes/no answer (mean = 51.4, mode = 57.8, standard deviation = 9.49). Due to copyright, please refer to Ware et al. (1996) for item details.

**4.4.3 Mastery.** Pearlin’s mastery scale (Pearlin, Menaghan, Morton & Mullan, 1981) measures the degree to which an individual perceives themselves to be in control of events importantly affecting their lives (e.g., “There is little I can do to change many of the important things in my life”). Consisting of seven items, responses are made on a four point Likert scale (1 = Strongly agree, 4 = Strongly disagree). Two items require reverse coding so that higher scores equate with greater mastery. Cronbach’s alpha at wave 3 was good ( $\alpha=.81$ ), with mean levels in the PATH sample equalling 22.53 (standard deviation = 3.62).

**4.4.4 Behavioural Inhibition and Activation.** The Behavioural Inhibition System and Behavioural Activation System (BISBAS; Carver & White, 1994) assesses individual differences in the behavioural approach (BAS) and behavioural inhibition (BIS) systems. A self-report questionnaire, it comprises of 24 items that form three BAS scales (Drive, Fun Seeking and Reward Responsiveness) and the BIS, with four items acting as fillers. Responses are given on a four point Likert scale (1 = Very false for me, 4 Very true for me). Items examine family values, emotions, motivation, assertiveness, personal image and impulsiveness. Examples include “I often act on the spur of the moment”, “I worry about making mistakes”, and “a person’s family is the most important thing in life.” As data for the BAS Fun scale was not available for the youngest cohort due to administrative oversight, this item was excluded for all cohorts. Cronbach’s alpha

at wave 3 was  $\alpha=.81$  (mean = 20.99, standard deviation = 2.67) for the BIS,  $\alpha=.71$  (mean = 16.45, standard deviation = 2.24) for the BAS Reward and  $\alpha=.81$  (mean = 10.02, standard deviation = 2.55) for BAS Drive.

**4.4.5 Ruminative style.** Adapted from Nolen-Hoeksema and Morrow (1991), this measure assesses depressed mood, focusing on self (e.g., “I think about how I don’t feel up to doing anything”), or depressive symptoms. Consisting of 10 items, responses were measured on a four point Likert scale ranging from “Never” to “Always.” Questions evaluated thoughts on “how alone I feel,” “how sad I feel” and “how hard it is to concentrate.” For the wave 3 PATH sample, Cronbach’s alpha was  $\alpha=.89$  (mean = 7.13, standard deviation = 5.06).

**4.4.6 Anxiety and Depression.** Symptoms of depression and anxiety are measured by the Goldberg Anxiety and Depression Scales (Goldberg, Bridges, Duncan-Jones & Grayson, 1988). Each scale consists of nine items requiring a yes/no answer. Questions assessed whether symptoms had been experienced over the past month. Examples include asking “have you been worrying a lot?” and “have you lost interest in things?” Cronbach’s alpha for the Anxiety Scale was  $\alpha=.79$  (mean = 3.05, standard deviation = 2.61), with  $\alpha=.78$  (mean = 2.15, standard deviation = 2.16) for the Depression scale at wave 3.

**4.4.7 Positive and negative affect.** The self-report Positive and Negative Affect Schedule (PANAS; Watson & Clark, 1988) evaluates trait and state measures of affect in the past four weeks. Due to an administrative error on the original PATH dataset, two negative affect items were excluded from the questionnaire for the youngest cohort. These items were subsequently removed from the other two cohorts during analysis, leaving ten positive and 8 negative affect items. Due to this, total scores were computed using factor analysis. Responses are made on a



five point Likert scale (1 = Very slightly or not at all, 5 = Extremely). At wave 3, internal consistency for positive affect was  $\alpha=.91$  (mean = 0.00, standard deviation = 1.00), with negative affect reporting  $\alpha=.88$  (mean = 0.00, standard deviation = 1.00).

**4.4.8 Life events.** A life events questionnaire (Brugha & Cragg, 1990; Rodgers, 1996) assessed the occurrence of threatening experiences (e.g., a serious illness or assault). Consisting of 16 items, these questions require a yes or no response to questions about life events over the past six months. Questions include “you thought you would soon lose your job” and “your parent, child or partner died.” Among PATH participants at wave 3, mode was 0, with standard deviation at 1.49 (number of life events reported; 0 = 41.6%;, 1 = 28.3%, 2 =15.2%; 3 = 7.0%, 4 or more = 7.9%).

**4.4.9 Social support.** The Schuster Social Support Scale (Schuster, Kessler & Aseltine, 1990) assessed parental, partner and friend negative and positive support. Consisting of 20 items, responses were measured on a four point Likert scale ranging from “Often” (1) to “Never” (4). Questions include “How often do family criticise you?” and “How often do friends make you feel cared for?” Higher scores represented a greater probability of negative support. Due to a lack of information for the youngest age cohort, partner support was excluded for all cohorts at wave 3 in study one. This left two sub scales: positive and negative support from parents, and positive and negative support from friends in that study. Internal consistency for positive support from friends was  $\alpha = .86$  and  $\alpha = .84$  for family, with negative support from friend ( $\alpha =.72$ ) and family ( $\alpha =.79$ ) showing acceptable internal consistency. In study 3, the positive and negative support sub scales for parents and friends, were summed and averaged to create a single index of

positive (mean = 7.89, mode = 9, standard deviation = 1.20) and negative support (mean = 3.22, mode = 3, standard deviation = 1.70).

**4.4.10 Childhood adversity.** This was assessed using a scale developed by the Centre for Mental Health Research that used items adapted from the Parental Bonding Instrument (Parker, Tupling & Brown, 1979), the British National Survey of Health and Development (Rodgers, 1996) and the US National Comorbidity Survey (Kessler, Davis & Kendler, 1997). Additional open-ended items developed from a cross-sectional study utilising a sample from Canberra (Henderson et al., 1998) were also included. Questions focused on conflict within the home, experiences of parental divorce or permanent separation, experiences of neglect and perceived lack of affection. Issues with parental figures in regards to drinking alcohol or other substance use, financial hardship and emotional or depressive problems were also enquired into. Positive experience questions were also included, such as “I had a happy childhood.” Items required a dichotomous response or a rating from “a lot” to “no mother/father figure,” with some offering multiple response options. Scores were recoded to 0/1 to reflect whether adversity was present or absent with the maximum score equalling 17. Responses for childhood adversity were taken from wave 1, as this measure was not repeated in subsequent waves. Variable score range was 16, with the mean number of adversities (less than 2) 1.69, mode was 0 and standard deviation 2.25.

**4.4.11 Resilience.** The Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) assessed participants’ levels of resilience. Developed as a resilience-specific measure, the CD-RISC provided a comparison in the current thesis to whether individual measures could assess resilience as equally in the PATH sample. The scale consists of 25 items that examine the capacity to cope and

adapt to adversity. Responses are indicated on a five point Likert scale (1 = Not true at all, 5 = True nearly all the time), with higher scores reflecting greater resilience. Questions include “I can deal with what comes my way”, “having to cope with stress can make me stronger”, and, “I am not easily discouraged by failure.” Due to copyright, please refer to Connor and Davidson (2003) paper for item details.

Following previous factorial analysis by Burns et al. (2011), Burns and Anstey (2010), and additional analysis (Chapter seven) conducted within the current thesis (Liu, Fairweather-Schmidt, Burns & Roberts, 2015; Liu, Fairweather-Schmidt, Roberts, Burns & Anstey, 2014), item two (“one relationship that helps when stressed”), item three (“when no solutions, god or fate can help”), and item nine (“good or bad things happen for a reason”) were excluded from analyses. This was due to items reporting low loadings, and when constrained, improved model fit for the CD-RISC. Consequently, a 22-item CD-RISC measure was used for each study. Internal consistency at wave 3 was excellent ( $\alpha=.93$ , mean = 86.51, standard deviation = 12.12).

**4.4.12 Social network.** The Lubben Social Network (Lubben et al., 2006) assesses the number of relatives whom are related by birth or marriage (but excluding children), and friends that provide a connection to that individual. The scale comprises of six items (e.g., “How many relatives do you see or hear from at least once a month?”). Responses ranged from 0 (e.g., not at all), to nine or more times a month. Higher numbers reflects a greater number of people in the social network

**4.4.13 Life satisfaction.** The Satisfaction with Life Scale (Diener, Emmons, Larsen & Griffin, 1985) assesses life satisfaction. Consisting of five

items, responses were rated on a seven point Likert scale that ranged from “Strongly disagree” to “Strongly agree.” Questions include “I am satisfied with my life” and “if I could live my life over, I would change almost nothing.” For PATH participants, Cronbach’s alpha was excellent ( $\alpha=.89$ , mean = 25.86, standard deviation = 6.40).

**4.4.14 Physical health.** A list of medical problems was provided to participants, to assess physical health (see Appendix N). Consisting of eight items, responses required a yes or no response, and established whether participants suffered from common chronic diseases e.g., heart trouble, cataracts or thyroid disorder. In the current thesis, diabetes, arthritis, cancer and heart trouble were utilised to evaluate physical health. Due to low prevalence of medical conditions amongst the youngest cohort, a single binary variable was computed to indicate whether participants had been diagnosed with one or more of these chronic conditions.

**4.4.15 Alcohol use.** To assess alcohol use, participants completed the Alcohol Use Disorders Identification Test (AUDIT, Saunders, Aasland, Babor, De La Fuente & Grant, 1993). Developed as a screening tool to identify hazardous and harmful drinking behaviours in primary health care settings, questions concern quantity, frequency, binge drinking, dependency and problems resulting from consumption. Total score was calculated from all ten items of the AUDIT, with a minimum score of 0, and a maximum of 37. For the PATH sample, AUDIT had a mean of 4.28 (indicating low consumption) and standard deviation of 4.04.

**4.4.16 Suicidality.** Suicidality was assessed with the Psychiatric Symptom Frequency Scale, which was drawn from the British National Survey of Health and Development (Lindelow, Hardy & Rodgers, 1997). At wave 3, this scale consisted

of six items requiring a yes/no response. The first two items evaluated whether participants had even had mild suicidal thoughts (e.g., “In the last year have you ever felt that your life was not worth living?”). An affirmative response to the third item (e.g., “In the last year have you ever thought about taking your own life?”) led to participants being asked, “In the last year have you ever thought taking your own life was the only way out of your problems?” If participants again provided an affirmative response, they were then required to answer the final two questions that concerned plans and attempts.

#### **4.5 Demographic Characteristics; Waves 1, 2, 3 and 4**

Tables 2 - 5 describe and compare the socio-demographic characteristics and prevalence of suicide ideation and attempts for PATH participants at waves 1, 2, 3 and 4, respectively. Comparisons were made between cohorts for 20s vs 40s (superscript a), 40s vs 60s (superscript b) and 20s vs 60s (superscript c) using independent samples t-test (continuous variables) and Pearson’s chi-square tests (categorical variables). Adjusted standardised residuals (AR) were used to contrast the different levels of the categorical variables in further detail. An AR greater than 2 or less than -2, indicates a significant difference (Agresti, 2007).

Examination of marital status between cohorts and gender revealed consistent differences. Men in the youngest cohort remained mostly unmarried until wave 4. A large proportion of women in this cohort were unmarried in the first wave, however, by wave 2, proportions had become more proportionate between married and unmarried. By waves 3 and 4, the majority of women were married. Across waves 1 – 3, the majority of respondents in the midlife and oldest cohorts were married.

Men had higher levels of full-time employment compared to women for all cohorts for waves 1-3. This continued to be the case for the youngest cohort in wave 4. Full time employment status increased for the youngest cohort between waves 1 and 2. In comparing employed and those not in the labour force across cohorts at wave 3, it is evident that the majority of the Midlife and Youngest cohorts are employed, whereas the oldest are not. For those individuals in the oldest cohort, full time employment declined across the three waves. Women overrepresented those in part time work across all three cohorts for waves 1 – 3, and in wave 4 both genders in the youngest cohort. Between waves 2 and 3, men in their 60s were more commonly part time workers relative to their female counterparts.

At wave 1, where mean number of years of education were recorded, men aged 40 – 44 years (midlife) spent the most years gaining qualifications. Between waves 2 and 3, women in the youngest cohort began to surpass men in all three cohorts. Women in their 60s (oldest cohort) across all three waves reported the least number of years spent on education.

Finally, exploration of suicidal ideation and attempts across waves and cohorts revealed a greater proportion of suicidal ideation compared to attempts for all cohorts and genders. At wave 1, the youngest cohort reported a higher prevalence for ideation compared to the older cohorts, with women in the youngest cohort indicating greater prevalence for suicidal ideation. At wave 2, the youngest cohort maintained this trend, with men observed to be the larger proportion of those reporting suicidal ideation. This persisted in wave 3, with ideation at wave 4 being greatest for women in the youngest cohort. The number of attempts across cohorts attenuated across waves for all cohorts. Further information in detailing attrition will be discussed in the following section.

Table 2

*Comparisons between gender and age groups for socio-demographic characteristics, and suicidality of Wave 1 participants (n = 7,486)*

Age Groups	Men			Women			Total Sample
	20-24	40-44	60-64	20-24	40-44	60-64	
Marital Status, %# (AR) *							
Married	6.1 (a -33.5)	74.0 (b -5.3)	82.7 (c 38.0)	11.4 (a -29.4)	68.7 (b 1.0)	66.7 (c 28.1)	52.4
Partnered	12.5 (a 4.0)	7.5 (b -3.8)	4.0 (c -7.8)	16.4 (a 5.9)	8.8 (b 7.5)	2.0 (c -12.4)	8.4
Separated	0.2 (a -6.0)	3.5 (b 1.3)	2.7 (c 5.1)	1.4 (a -5.9)	5.8 (b 3.9)	2.7 (c 2.3)	2.8
Divorced	0.1 (a -7.8)	5.4 (b -1.4)	6.6 (c 8.7)	0.2 (a -10.4)	9.0 (b -3.0)	12.7 (c 12.5)	5.8
Widowed	0 (a -2.4)	0.5 (b -3.0)	1.8 (c 4.6)	0.1 (a -2.9)	0.9 (b 12.0)	12.7 (c 12.8)	2.7
Never married	81.2 (a 35.1)	9.1 (b 7.5)	2.2 (c -40.1)	70.5 (a 33.2)	6.9 (b 4.4)	3.2 (c -34.6)	27.7
Employment, %# (AR) *							
Full-time	60.2 (a -16.2)	89.2 (b -29.5)	31.1 (c 14.6)	53.5 (a -0.4)	52.8 (b 21.7)	12.2 (c -21.8)	49.4
Part-time, looking for full time work	4.6 (a 3.6)	1.8 (b 3.6)	0.4 (c -6.8)	5.1 (a 6.2)	1.0 (b 2.7)	0.2 (c -7.7)	2.1
Part-time	21.1 (a 12.8)	3.8 (b -11.3)	17.8 (c -2.1)	25.7 (a -3.5)	32.0 (b 7.2)	19.5 (c -3.7)	20.2
Unemployed, looking for work	6.7 (a 5.7)	2.0 (b 1.3)	1.3 (c -7.0)	4.8 (a 2.7)	2.6 (b 4.1)	0.6 (c -6.3)	2.9
Not in labour force	7.4 (a 4.6)	3.2 (b -26.0)	49.5 (c 22.8)	10.9 (a -0.6)	11.7 (b -29.0)	67.6 (c -28.8)	25.4
Education, mean, (SE) +							

No. of years to highest qualification	14.0 ( <sup>a</sup> 0.04)	14.7 ( <sup>b</sup> 0.07)	14.3 ( <sup>c</sup> 0.07)	14.3 ( <sup>a,ns</sup> 0.04)	14.2 ( <sup>b,ns</sup> 0.06)	13.3 ( <sup>c,ns</sup> 0.6)	14.1
Suicidality, % <sup>#</sup> (AR) *							
Ideation	12.5 ( <sup>a</sup> 2.9)	8.8 ( <sup>b</sup> 5.1)	3.9 ( <sup>c</sup> -8.0)	13.3 ( <sup>a</sup> 3.7)	8.8 ( <sup>b</sup> 7.3)	2.1 ( <sup>c</sup> -10.5)	2.2
Attempt	1.2 ( <sup>a</sup> 1.3)	0.7 ( <sup>b</sup> 2.1)	0.2 ( <sup>c</sup> -3.3)	1.6 ( <sup>a</sup> 0.9)	1.2 ( <sup>b</sup> 3.9)	0 ( <sup>c</sup> -4.5)	0.8

<sup>#</sup>Percentages are within gender and within age group categories

AR = Adjusted residuals; AR >2 or -2 indicates a significant difference between the two groups being contrasted.

SE = Standard error of mean.

Pairwise comparisons: <sup>a</sup>20s vs 40s, <sup>b</sup>40s vs 60s and <sup>c</sup>20s vs 60s.

\*significance test =  $\chi^2$ , ns = non-significant; all other comparisons significant  $p < 0.05$ .

<sup>+</sup>significance test = Independent samples t-test, ns = non-significant; all other comparisons significant  $p < 0.05$ .



Table 3

*Comparisons between gender and age groups for socio-demographic characteristics, mental health and suicidality of Wave 2 participants*

(*n* = 6, 715)

Age Groups	Men			Women			Total Sample
	24-28 (20s)	44-48 (40s)	64-68 (60s)	24-28 (20s)	44-48 (40s)	64-68 (60s)	
<b>Marital Status, %<sup>#</sup> (AR) *</b>							
Married	22.0 ( <sup>a</sup> -23.1)	72.3 ( <sup>b</sup> -5.8)	82.6 ( <sup>c</sup> 28.1)	30.2 ( <sup>a</sup> -17.3)	65.8 ( <sup>b</sup> 0.5)	64.8 ( <sup>c</sup> 16.2)	57.0
Partnered	3.1 ( <sup>a</sup> -5.0)	4.3 ( <sup>b</sup> 2.8)	2.0 ( <sup>c</sup> 2.6)	4.6 ( <sup>a</sup> -5.0)	5.7 ( <sup>b</sup> 4.3)	2.0 ( <sup>c</sup> 0.6)	3.3
Separated	0.4 ( <sup>a</sup> -9.0)	6.4 ( <sup>b</sup> -0.2)	6.9 ( <sup>c</sup> 9.2)	0.9 ( <sup>a</sup> -11.8)	11.4 ( <sup>b</sup> 1.1)	13.1 ( <sup>c</sup> 10.8)	6.0
Divorced	0 ( <sup>a</sup> -2.4)	0.5 ( <sup>b</sup> -4.2)	2.2 ( <sup>c</sup> 5.4)	0.2 ( <sup>a</sup> -2.9)	1.1 ( <sup>b</sup> 12.5)	15.2 ( <sup>c</sup> 13.3)	2.8
Widowed	46.8 ( <sup>a</sup> 29.3)	7.7 ( <sup>b</sup> 9.8)	1.7 ( <sup>c</sup> -35.5)	37.5 ( <sup>a</sup> -27.5)	6.6 ( <sup>b</sup> 7.0)	2.9 ( <sup>c</sup> -30.5)	14.9
Never married							
<b>Employment, %<sup>#</sup> (AR) *</b>							
Full-time	2.1 ( <sup>a</sup> 1.8)	1.1 ( <sup>b</sup> 3.1)	0.1 ( <sup>c</sup> -4.6)	1.7 ( <sup>a</sup> 0.5)	1.5 ( <sup>b</sup> 3.6)	0.1 ( <sup>c</sup> -3.9)	1.0
Part-time, looking for full time work	7.3 ( <sup>a</sup> 4.0)	3.4 ( <sup>b</sup> -11.6)	19.4 ( <sup>c</sup> 8.0)	13.2 ( <sup>a</sup> -8.2)	27.0 ( <sup>b</sup> 7.0)	14.9 ( <sup>c</sup> 1.1)	13.1
Part-time	4.2 ( <sup>a</sup> 3.0)	1.9 ( <sup>b</sup> 4.1)	0.2 ( <sup>c</sup> -6.5)	2.6 ( <sup>a</sup> 0.8)	2.1 ( <sup>b</sup> 4.4)	0.1 ( <sup>c</sup> -5.0)	1.6
Unemployed, looking for work	3.9 ( <sup>a</sup> -0.6)	4.5 ( <sup>b</sup> -31.0)	67.5 ( <sup>c</sup> 30.4)	11.6 ( <sup>a</sup> 0.2)	11.4 ( <sup>b</sup> -33.2)	80.3 ( <sup>c</sup> 32.1)	26.7

Not in labour force							
Education, mean, (SE) <sup>+</sup>	14.5 ( <sup>a</sup> -3.28)	14.8 ( <sup>b</sup> 4.44)	14.4 ( <sup>c, ns</sup> 1.77)	14.9 ( <sup>a</sup> 5.90)	14.4 ( <sup>b</sup> 10.64)	13.4 ( <sup>c</sup> 16.58)	14.4
No. of years to highest qualification							
Suicidality, % <sup>#</sup> (AR) *							
Ideation	9.3 ( <sup>a</sup> 2.6)	6.3 ( <sup>b</sup> 4.2)	2.6 ( <sup>c</sup> -6.6)	9.9 ( <sup>a</sup> 2.7)	6.8 ( <sup>b</sup> 5.9)	1.7 ( <sup>c</sup> -8.1)	1.3
Attempt	1.0 ( <sup>a</sup> 1.5)	0.5 ( <sup>b</sup> 1.7)	0.1 ( <sup>c</sup> -2.9)	1.0 ( <sup>a</sup> 1.7)	0.4 ( <sup>b</sup> 0.9)	0.2 ( <sup>c</sup> -2.4)	0.5

<sup>#</sup> Percentages are within gender and within age group categories

AR = Adjusted residuals; AR >2 or -2 indicates a significant difference between the two groups being contrasted.

SE = Standard error of mean.

Pairwise comparisons: <sup>a</sup>20s vs 40s, <sup>b</sup>40s vs 60s and <sup>c</sup>20s vs 60s.

\*significance test =  $\chi^2$ , ns = non-significant; all other comparisons significant  $p < 0.05$

<sup>+</sup>significance test = Independent samples t-test, ns = non-significant; all other comparisons significant  $p < 0.05$

Table 4

*Comparisons between gender and age groups for socio-demographic characteristics, mental health and suicidality of Wave 3 participants*

*(n = 6, 133)*

Age Groups	Men			Women			Total Sample
	28-32 (20s)	48-52 (40s)	68-72 (60s)	28-32 (20s)	48-52 (40s)	68-72 (60s)	
Marital Status, % <sup>#</sup> (AR) *							
Married	42.6 ( <sup>a</sup> -14.0)	70.8 ( <sup>b</sup> -6.1)	82.8 ( <sup>c</sup> -19.9)	48.2 ( <sup>a</sup> -7.9)	64.9 ( <sup>b</sup> 1.9)	60.5 ( <sup>a</sup> -5.6)	50.8
Separated	2.3 ( <sup>a</sup> -1.9)	3.8 ( <sup>b</sup> 2.6)	1.8 ( <sup>c</sup> 0.7)	1.7 ( <sup>a</sup> -4.6)	5.2 ( <sup>b</sup> 4.6)	1.5 ( <sup>c</sup> 0.1)	2.3
Divorced	3.0 ( <sup>a</sup> -7.3)	12.4 ( <sup>b</sup> 2.1)	9.2 ( <sup>c</sup> -4.9)	3.1 ( <sup>a</sup> -9.4)	16.0 ( <sup>b</sup> 0.2)	15.4 ( <sup>c</sup> -8.7)	8.2
Widowed	0 ( <sup>a</sup> -1.1)	0.8 ( <sup>b</sup> -5.8)	3.9 ( <sup>c</sup> -6.8)	0.1 ( <sup>a</sup> -1.8)	2.1 ( <sup>b</sup> -16.7)	19.2 ( <sup>c</sup> -18.7)	3.4
Never married	52.1 ( <sup>a</sup> 25.3)	12.1 ( <sup>b</sup> 6.3)	2.2 ( <sup>c</sup> 31.4)	46.8 ( <sup>a</sup> 22.9)	11.4 ( <sup>b</sup> 4.9)	3.4 ( <sup>c</sup> 26.7)	17.2
Employment, % <sup>#</sup> (AR) *							
Full-time	89.8 ( <sup>a</sup> 0.6)	88.8 ( <sup>b</sup> 65.7)	6.0 ( <sup>c</sup> 64.3)	66.2 ( <sup>a</sup> 1.3)	63.7 ( <sup>b</sup> 34.5)	2.2 ( <sup>c</sup> 35.1)	43.5
Part-time, looking for full time work	0.4 ( <sup>a</sup> -0.5)	0.6 ( <sup>b,ns</sup> 1.7)	0.1 ( <sup>c</sup> 1.2)	0.9 ( <sup>a</sup> -0.4)	1.0 ( <sup>b</sup> 2.6)	0 ( <sup>c</sup> 2.6)	0.4
Part-time	4.6 ( <sup>a</sup> -0.2)	4.8 ( <sup>b</sup> -7.6)	13.8 ( <sup>c</sup> -7.6)	19.2 ( <sup>a</sup> -3.3)	24.6 ( <sup>b</sup> 8.4)	10.4 ( <sup>c</sup> 5.1)	10.9
Unemployed, looking for work	2.3 ( <sup>a</sup> 1.4)	1.4 ( <sup>b,ns</sup> 0.4)	1.2 ( <sup>c</sup> 1.9)	1.8 ( <sup>a</sup> 0.2)	1.7 ( <sup>b</sup> 2.0)	0.6 ( <sup>c</sup> 2.2)	1.2
Not in labour force	2.9 ( <sup>a</sup> -0.9)	4.2 ( <sup>b</sup> -59.9)	78.8 ( <sup>c</sup> -59.1)	11.9 ( <sup>a</sup> 2.1)	9.0 ( <sup>b</sup> -56.2)	86.8 ( <sup>c</sup> -55.1)	25.8

Education, mean, (SE) <sup>†</sup>							
No. of years to highest qualification	15.2 (a, ns 1.52)	15.1 <sup>¥</sup>	0 <sup>¥</sup>	15.4 (a 8.52)	14.7 <sup>¥</sup>	0 <sup>¥</sup>	15.1
Suicidality, % <sup>#</sup> (AR) *							
Ideation	7.2 (a, ns -2.2)	4.8 (b -3.4)	2.1 (c -5.4)	5.7 (a, ns -0.4)	5.2 (b -4.5)	1.6 (c -4.8)	3.6
Attempt	0.5 (a -1.4)	0.1 (b -0.3)	0 (c -1.4)	0.4 (a 0.3)	0.3 (b -1.0)	0 (c -0.8)	0.2

<sup>#</sup> Percentages are within gender and within age group categories

AR = Adjusted residuals; AR >2 or -2 indicates a significant difference between the two groups being contrasted.

SE = Standard error of mean.

Pairwise comparisons: <sup>a</sup>20s vs 40s, <sup>b</sup>40s vs 60s and <sup>c</sup>20s vs 60s.

\*significance test =  $\chi^2$ , ns = non-significant; all other comparisons significant  $p < 0.05$

<sup>†</sup>significance test = Independent samples t-test, ns = non-significant; all other comparisons significant  $p < 0.05$

<sup>¥</sup> Information was not collated for the oldest cohort (60s) at this Wave, so comparison could not be made.

Table 5

*Comparisons between gender for socio-demographic characteristics and suicidality of Wave 4 participants (aged 20 – 24 years at baseline: n = 1, 191)*

	Men	Women	Total
Age Groups	32 – 36 (20s)	32 – 36 (20s)	Sample
<b>Marital Status, %# (AR) *</b>			
Married	61.1 (1.8)	56.2 (-1.8)	58.3
Separated	2.4 (0.1)	2.3 (-0.1)	2.3
Divorced	2.4 (-2.4)	5.0 (2.4)	3.9
Widowed	0 (-1.2)	0.3 (1.2)	0.2
Never married	33.9 (-0.9)	36.2 (0.9)	35.2
<b>Employment, %# (AR) *</b>			
Full-time	89.6 (11.9)	59.4 (-11.9)	72.3
Part-time, looking for full time work	1.1 (0.0)	1.1 (0.0)	1.1
Part-time	4.4 (-11.2)	29.0* (11.2)	18.5
Unemployed, looking for work	2.9 (1.2)	1.9 (-1.2)	2.3
Not in labour force	1.6 (-5.3)	8.6 (5.3)	5.6
<b>Suicidality, %# (AR) *</b>			
Ideation	5.0 (0.0)	5.7 (0.0)	5.4
Attempt	0.2 (0.8)	0.3 (-0.8)	0.2

#Percentages are within gender

AR = Adjusted residuals; AR >2 or -2 indicates a significant difference between the two groups being contrasted.

\*significance test =  $\chi^2$ , ns = non-significant; all other comparisons significant  $p < 0.05$

#### **4.6 Investigating the Effect of Attrition at Waves 3 and 4**

Attrition has the capacity to bias samples in longitudinal studies. As the current thesis' studies examined participants at waves 3 and 4 only, Table 6 presents comparisons on demographic variables, suicidal ideation and suicidal attempts between waves 2 and 3 for all cohorts. Evaluations of these characteristics are also presented for individuals in the youngest cohort between waves 3 and 4. As measurement of resilience was only introduced at wave 3, this could only be assessed for the youngest cohort from wave 3 to wave 4. Logistic regression was used to compare drop out status (e.g., 0 = stayed, 1 = dropped out), on gender, age group, marital status, employment, suicidality and resilience. This was to ascertain whether the analyses in this thesis were affected by attrition.

The variables selected best define the sample for reference in subsequent chapters, though some PATH participants may have not participated due to moving away, passed from other causes or could not be contacted. Compared to those who continued to participate in PATH at wave 3, others who did not continue in the study were more likely to be suicidal ideators and attempters. Consequently, unhealthy participants between these two waves departed the study more frequently than healthy individuals. Accordingly, the overall sample is expected to become healthier at the next time point.

Wave 4 contains data for the youngest cohort only, as at the time of writing data were still being collected for the remaining cohorts. As such, comparison of those who participated with those who did not is only possible for the youngest cohort. Within this cohort, people who ceased to be participants were more frequently either in part-time work and looking for full-time employment, or were

unemployed. No differences were observed in marital status, suggesting that this does not have an influence on continued participation.

Table 6

*Logistic regressions comparing drop out in wave 3 from wave 2 for the full PATH sample, and from wave 3 to wave 4 for the youngest cohort only for socio-demographic characteristics, suicidality and resilience*

Variables	Odds attrition ratio (95% CI)	
	Wave 3 (n = 6,133)	Wave 4 (n = 1,191)
<b>Gender</b>		
Men	1.12* (1.00 – 1.26)	1.64*** (1.37 – 1.97)
Women	0.88* (0.79 – 1.00)	0.60*** (0.50 - 0.72)
<b>Age Group</b>		
20	0.73*** (0.63 – 0.84)	1.01 (0.95 – 1.07)
40	0.74*** (0.63 – 0.86)	-
60	1.36*** (1.18 – 1.56)	-
<b>Marital Status</b>		
Married	0.31 (0.03 – 3.07)	0.72 (0.47 – 1.12)
Separated	0.37 (0.03 – 3.72)	1.23 (0.36 – 4.18)
Divorced	0.37 (0.03 – 3.68)	0.96 (0.33 – 2.76)
Widowed	0.53 (0.05 – 5.31)	0.78 (0.00 – 1.23)
Never married	0.36 (0.03 – 3.53)	0.64 (0.40 – 1.04)
<b>Employment</b>		
Full-time	0.19 (0.01 – 2.15)	1.12 (0.73 – 1.72)
Part-time, looking for f/t work	0.17 (0.01 – 2.27)	3.92* (1.06 – 14.45)
Part-time	0.18 (0.01 – 2.06)	1.04 (0.59 – 1.85)
Unemployed, looking for work	0.41 (0.03 – 4.80)	4.38*** (1.80 – 10.62)



Not in labour force	0.30 (0.02 – 3.42)	0.20 (0.02 – 1.48)
Suicidality		
Ideation	0.13*** (0.05 – 0.33)	0.76 (0.27 – 2.15)
Attempt	0.19*** (0.09 – 0.43)	1.97 (0.17 – 21.86)
Resilience	-	0.99 (0.95 – 1.03)

CI, confidence interval. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Wave 3 participants/non-participants comparison consists of all three age cohorts.

Wave 4 participants/non-participants comparison consists of the youngest cohort only.

## **Chapter Five: Study 1**

### **The utility of non-specific measures of resilience across the lifespan: An investigation of structural invariance across gender and age cohorts**

This chapter consists of a published paper (Appendix O).

Statement of Authorship is on the following page.

# Statement of Authorship

Title of Paper	The utility of non-specific measures of resilience across the lifespan: An investigation of structural invariance across gender and age cohorts.
Publication Status	<input checked="" type="radio"/> Published, <input type="radio"/> Accepted for Publication, <input type="radio"/> Submitted for Publication, <input type="radio"/> Publication style
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## Author Contributions

By signing the Statement of Authorship, each author certifies that their stated contribution to the publication is accurate and that permission is granted for the publication to be included in the candidate's thesis.

Name of Principal Author (Candidate)	Daniya Wei Yee Liu	
Contribution to the Paper	Study inception, design, methodology (including literature searches, statistical analysis and data interpretation) and manuscript preparation.	
Signature		Date 29/04/15

Name of Co-Author	A Kate Fairweather-Schmidt	
Contribution to the Paper	Helped to evaluate data analysis and manuscript preparation.	
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## **Preface**

A reliable measure of resilience is required in order to assess whether resilience alters as we age. Furthermore, a reliable measure is needed to determine whether there are maturational influences or cohort differences (Ryff & Keyes, 1995). Non-specific and specific measures have been used to assess resilience, resulting in variability of findings (Stouthamer-Loeber et al., 1993). Consequently the current chapter set out to develop a latent measure of resilience to examine whether non-specific measures provide a robust assessment of resilience, comparable to a resilience-specific scale, the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). Several independent measures were selected that reflected constructs considered by extant literature to underpin resilience as measured by the CD-RISC. Multi-group structural equation modelling was used to assess model fit across cohorts aged 28 – 32, 48 – 52 and 68 – 72 years. Invariance of this measure was then assessed across age, and between gender for each age cohort.

Liu, D. W. Y., Fairweather, A. K., Burns, R. A., & Roberts, M. R. (2015). The utility of non-specific measures of resilience across the lifespan: An investigation of structural invariance across gender and age cohorts. *Australian Journal of Psychology, Online version, pp. 1-8*

NOTE:

This publication is included on pages 117 - 145 in the print copy of the thesis held in the University of Adelaide Library.

It is also available online to authorised users at:

<http://dx.doi.org/10.1111/ajpy.12091>

## **Chapter Six: Study 2**

### **The Connor-Davidson Resilience Scale: Establishing invariance between gender across the lifespan in a large community based study**

This chapter consists of a published paper (Appendix P).

Statement of Authorship is on the following page.

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## Author Contributions

By signing the Statement of Authorship, each author certifies that their stated contribution to the publication is accurate and that permission is granted for the publication to be included in the candidate's thesis.

Name of Principal Author (Candidate)	Danica Wai Yee Liu	
Contribution to the Paper	Study inception, design, methodology (including literature searches, statistical analysis and data interpretation) and manuscript preparation.	
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Contribution to the Paper	Helped to evaluate data analysis and manuscript preparation.	
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Name of Co-Author	Richard A. Burns	
Contribution to the Paper	Aided in study inception, data analysis and editing of manuscript.	
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Signature		Date 15/5/15

## Preface

In demonstrating that non-specific measures were ineffective as a tool to assess resilience in Chapter five, Chapter six sets out to validate a specific resilience measure to reliably measure resilience in community-based samples. As detailed in Chapter two, evidence is growing in support of the Connor-Davidson Resilience Scale (Connor & Davidson, 2003) being considered the “gold standard” resilience measure (Campbell-Sills & Stein, 2007). Invariance has been previously investigated in two adult populations, one community-based and the other derived from a sample of cricket players (Burns & Anstey, 2010; Gucciardi et al., 2011). At the time of writing this thesis, exploration into invariance of the CD-RISC across the lifespan and between gender still remained to be undertaken. Consequently this chapter uses all three PATH age cohorts (aged 28 – 32, 48 – 52 and 68 – 72 years) to ascertain whether the CD-RISC can be applied to an Australian community sample. Only those who provided complete responses to all items of the CD-RISC were analysed. This resulted in 1892 individuals in the youngest, 2062 in the middle and 1826 in the oldest cohort.



## **Abstract**

**Objective:** The current study sought to examine the measurement invariance of the Connor-Davidson Resilience Scale (CD-RISC) between gender across the lifespan.

**Methods:** Data was drawn from three cohorts (aged 28 – 32, 48 – 52 and 68 – 72 years), who had participated in the PATH study from Canberra, Australia.

**Results:** Whilst some gender and age differences on item means and variances were reported, measurement invariance of a single CD-RISC factor between gender across the lifespan was mostly supported.

**Discussion:** Overall, a single CD-RISC factor was found to be invariant across the lifespan and between gender. Consequently, within an Australian community setting, the CD-RISC can generally be utilised across age and gender.

## **6.1 Introduction**

Resilience is the process by which individuals utilise personal and environmental resources in order to adapt to, or manage, significant daily life-stress or trauma (Windle, 2010). Comprising affective-cognitive components (e.g., a sense of control, positive outlook) and behavioural capacities (biological hardiness), resilience can develop over the lifespan as individuals learn to adapt to life transactions and experiences (Everall et al., 2006; Lundman et al., 2007; Windle, 2010). Resilience has been strongly associated with individuals' perception of life and health behaviours and how they enable positive health responses despite adversity, disease and disability (Lamond et al., 2008). Thus, resilience has been determined to be of relevance to individuals across the lifespan (Windle, 2010).

Robust associations between resilience and multiple physical and mental health outcomes are well established (i.e. increased positive affect; Smith, B. W. et al., 2010; , self-image and optimism; Werner, 1992) though limitations and criticisms abound (Luthar et al., 2000; Masten, 2007; Masten & Obradović, 2006). Debate has arisen over its definition (Luthar et al., 2000; Stouthamer-Loeber et al., 1993) and on criteria utilised in operationalising and measuring resilience (Afifi & Macmillan, 2011; Johnson, Gooding, Wood, Taylor, et al., 2010; Masten, 2007; Miller, E. D., 2003; Stouthamer-Loeber et al., 1993). Inconsistencies in findings relating to resilience processes and prevalence rates are likely to be the result of these aforementioned issues (Windle, 2010). Other limitations include variability in socio-demographic characteristics of samples e.g., time spans between studies

(Diehl & Hay, 2010), with an abundance of research comprising specific age groups (e.g., young children, adolescents and to a lesser degree, older adults; (Campbell-Sills et al., 2006; Lundman et al., 2007; Stewart, 2011). Confounded by the utilisation of single gender cohorts, unbalanced designs (Lundman et al., 2007), small samples or single geographic locations (Rew, Taylor-Seehafer, et al., 2001), research delineating differences in resilience between gender has also been limited. Comparative investigations into resilience across the lifespan (Campbell-Sills et al., 2006; Werner, 2005), particularly in midlife (Lundman et al., 2007) are scarce.

Despite these issues and limitations, resilience research has progressed and its overall effects on positive health and wellbeing are substantial. These include associations with reduced likelihood of engagement in suicidal behaviours (Liu et al., 2014; Roy et al., 2006, 2007) and mental health (Burns et al., 2011). Seminal studies like Werner and Smith's (1979) Kauai longitudinal study have been essential in highlighting the importance of factors promoting resilience, such as having support and/or positive interactions (Werner, 1993). Evidence alludes to gender differences but currently no studies have confirmed this indication. Seeming to occur from a young age (Hjemdal, Friborg, Stiles, Martinussen, et al., 2006) current findings suggest these variations continue into adulthood (Werner, 1993, 2005). For instance, seeking out social resources in times of stress occurs more frequently amongst young (Hjemdal, Friborg, Stiles, Martinussen, et al., 2006) and adult females (Werner, 2005) than males. Diverse influences differentially impact gender; with those stemming from within the individual (e.g., self-esteem, cognition skills) influencing females in relation to coping skills whilst

sources of external support influence high risk males (Werner, 1993). Research suggests that developmental changes linked to emotion, cognition, culture and the social environment underpin resilience gender differences (Masten et al., 1990). Though these findings are informative, the extent to which resilience is labile or stable over the life course and across gender (Luthar et al., 2000) is presently unclear.

Similar to resilience research, measures developed to assess resilience have focused on specific age and/or sample groups (Connor & Davidson, 2003; Friberg et al., 2003). For instance, Wagnild and Young's (1993) 25-item Resilience Scale (RS) was developed from a sample of older women. Responses are scored on a 7-point Likert scale (1 = disagree, 7 = agree). Shown to have respectable internal consistency by its authors in several studies ( $\alpha = .76-.91$ ), the RS has been validated across different age and ethnic groups (Ahern et al., 2006). However, questions have been raised as to whether the RS, in measuring domains that determine resilience (equanimity; self-reliance; perseverance; meaningfulness and existential aloneness), assesses a spectrum of characteristics and resources related to resilience, rather than resilience itself (Ahern et al., 2006; Smith, B. W. et al., 2010). Furthermore, elucidation is required of the RS's reliability and stability over time (Ahern et al., 2006; Lundman et al., 2007).

Other measures that assess resilience in adults include the Resilience Scale for Adults (RSA; Friberg et al., 2003), the Brief Resilience Scale (BRS; Smith, B. W. et al., 2008) and the Connor- Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). With the RSA, its authors incorporated what they determined to

be the three main elements of resilience (positive individual variables, family support and an external environment) (Friborg et al., 2003). Refined to 33 items (Friborg et al., 2005; Friborg et al., 2003). Responses were initially assessed using a Likert-type measure, being altered to a semantic differential-type response in order to lower the issue of acquiescence bias (Friborg et al., 2005). Devised to assess the role of resilience in adapting to high and low stress conditions, the RSA assesses interpersonal and intrapersonal protective resources (Friborg et al., 2006). Consistently shown by its authors to have adequate internal consistency ( $\alpha = .69-.84$ ) on Norwegian samples, the RSA must be treated as an overall measure if reliability is to be maintained. This is because low internal consistency is observed when the measure is broken down into individual domains (Friborg et al., 2006). Furthermore, as with the RS, the RSA was developed and validated on a specific sample. As such, at present it cannot be generalized to other populations/samples.

The Brief Resilience Scale (BRS; Smith, B. W. et al., 2008) was tested on undergraduate students, cardiac rehabilitation patients and women who were healthy or had fibromyalgia. Consisting of six items, responses are measured using a 5-point Likert scale. Internal consistency for this scale was good, ranging from  $\alpha = .80-.91$ . Unlike the aforementioned measures, the BRS was designed to reflect the ability to bounce back or recover from stress. Questions include “It does not take me long to recover from a stressful event” and “I have a hard time making it through stressful events.” As with the RS and RSA, the BRS has not been widely adopted. Furthermore, in examining the ability to bounce back from a stressor, the BRS is mostly useful in testing resilience in order to assess health outcomes in

individuals who are already unwell (Smith, B. W. et al., 2008; Windle et al., 2011). Thus, the BRS is limited in that it cannot be applied to a community based/non-clinical sample in assessing resilience.

The Connor- Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) is a 25-item measure that investigates self-efficacy, optimism, sense of humour, patience and faith in coping with stress or adversity. Conceived to address the paucity of suitable resilience measures at that time, the CD-RISC explores elements purported to capture the fundamentals of resilience (Jowkar et al., 2010). It has been utilised across a diverse range of samples including the general population, students, patients with generalised anxiety, post-traumatic stress disorder, primary care patients, psychiatric outpatients and sporting environments (Burns & Anstey, 2010; Campbell-Sills et al., 2006; Connor, 2006; Gucciardi et al., 2011; Roy et al., 2007; Vaishnavi et al., 2007). Applied to children, adult and elderly cohorts (Campbell-Sills et al., 2006; Campbell-Sills & Stein, 2007; Connor, 2006; Connor & Davidson, 2003; Gucciardi et al., 2011; Lamond et al., 2008), three large scale studies has also been conducted within the adult general population (Burns & Anstey, 2010; Burns et al., 2011; Lamond et al., 2008).

Good reliability has been demonstrated in the CD-RISC in the original study ( $\alpha = .89$ ) (Connor & Davidson, 2003). Comparable findings have been observed when completed by older adults as younger adults ( $\alpha = .92$ ) (Lamond et al., 2008). Good reliability ( $\alpha = .89$ ) and validity in adolescent populations have also been evidenced (Yu et al., 2011). Convergent and discriminant validity has been supported (Campbell-Sills et al., 2006). Further, good internal consistency and test-

retest reliability has been established in clinical and community samples (Connor & Davidson, 2003). Though the CD-RISC has shown promise as a measure of resilience in individuals, further study is required (Campbell-Sills et al., 2006; Connor & Davidson, 2003).

The CD-RISC originally consisted of a five factor structure (Connor & Davidson, 2003). These comprised of internal and external factors that assists effective coping, with another focused on belief systems (Connor & Davidson, 2003; Yu et al., 2011). The idea of personal competence, high standards and tenacity; trust in one's instincts, tolerance of negative affect and strengthening effects of stress; positive acceptance of chance, secure relationships; control and spirituality were reflected within these five factors (Connor & Davidson, 2003). More recently however, the CD-RISC has been reported to comprise a uni-dimensional factor structure whether in its original 25 (Burns & Anstey, 2010; Burns et al., 2011; Yu et al., 2011) or 10-item format (Campbell-Sills & Stein, 2007). Evidence regarding CD-RISC factorial invariance, where the latent variable is considered equivalent or comparable across groups, and factor loadings constrained to be equal (Bontempo, Hofer & Lawrence, 2007) is limited. Guccardi et al. (2011) used Confirmatory Factor Analysis (CFA) to identify invariance between teenagers and young adults. Employing a multi-group CFA analysis, Burns, Anstey and Windsor (2011) observed invariance between young (20s) and midlife (40s) adults, but gender differences were not examined. While Burns and Anstey (2010) established invariance of the CD-RISC between gender in young adults (aged 20 – 24 years), whether gender invariance holds across the lifespan

remains to be demonstrated.

As such, our objective in the current study is to confirm factorial invariance of the uni-variate model (Burns & Anstey, 2010) for the CD-RISC between gender and across adulthood. Utilising the Personality and Total Health (PATH) Through Life Project (Anstey et al., 2012), the current paper will extend previous analysis of this sample by including the oldest sample (aged 68 – 72 years). This will enable examination of invariance of the CD-RISC between gender across age, thus providing insight into the utility of the CD-RISC as a resilience measure across the lifespan between gender.

## **6.2 Method**

### **6.2.1 Participants and Study Design**

Participants were drawn from the PATH Through Life Project (Anstey et al., 2012). Selected randomly through the electoral role, this community based sample originates from Canberra and Queanbeyan, Australia. Results presented here concern cohorts at wave 3 (2009), aged 20 – 24 ( $n = 2404$ ), 40 – 44 ( $n = 2530$ ) and 60 – 64 ( $n = 2551$ ) at baseline (1999). Data used was based on complete responses to all items of the CD-RISC. Thus, the youngest cohort consisted of 1892 individuals (28–32 years; 46% males), with 2062 in the middle (48–52 years; 47.4% males) and 1826 in the oldest group (68–72 years; 51.4% males). The current study was approved by the Human Research Ethics Committee at the University of Adelaide (Code Number 11/69); and, the Centre for Mental Health Research at the Australian National University (Protocol Number 2006/314).

## **6.3 Measures**



**6.3.1 Resilience.** The Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) consists of 25 items ( $\alpha = .93$ ) that assess capacity to change and adapt to adversity over the past month. Responses were indicated on a 5-point Likert scale (1 = Not true at all – 5 = True nearly all of the time). Higher scores indicate greater resilience.

#### **6.4 Statistical Analysis**

Multiple group analysis was employed as our methodological approach as suggested by Kline (2005), to test for age and gender measurement invariance in the CD-RISC. First, Confirmatory Factor Analysis (CFA) tested model fit by comparing goodness of fit indices for each gender within each age cohort. This established whether configural invariance was present for gender, in each cohort. Second, tests of measurement invariance were undertaken separately for gender within each cohort. Several levels of invariance were tested across the three cohorts. Initially, a baseline model consisting of no parameter constraints was examined. Subsequent models became progressively stricter with factor loadings, item intercepts and residual variances being constrained. A range of goodness of fit indices assessed each model. Though known to be influenced by sample size, and so is not relied upon to evaluate model fit, the chi-square test and difference in chi-square is reported (Holbert & Stephenson, 2002). Change in Comparative Fit Index (CFI) values of  $\leq 0.01$  (Cheung & Rensvold, 2002) were used instead to identify factorial invariance. Root mean square error of approximation (RMSEA) values ( $<0.08$ ) and their Confidence Intervals (CI) were compared between models to assess model fit (MacCallum, Browne & Sugawara, 1996). Analyses were

undertaken in Mplus v.6. Maximum likelihood method was utilised, which incorporates Satorra-Bentler chi-square, preferable for skewed data.

## **6.5 Results**

### **6.5.1 Confirming the uni-dimensional nature of the CD-RISC.**

Visual inspection of the CD-RISC item loadings from CFA analyses by gender for each cohort supported configural factorial invariance with loadings comparable between age and gender groups. Substantiating findings from Burns and Anstey (2010) and Burns, Windsor and Anstey (2011), CD-RISC items 2, 3 and 9 reported low loadings (mostly  $< .32$ ) between gender within all three cohorts (Table 1), suggesting that the unitary factor fails to account for less than 10% of the variance in these items. Consequently, these items were removed from subsequent analyses. Internal consistency for this revised 22 item CD-RISC was excellent ( $\alpha=.92$ ). Extending previous observations (Burns & Anstey, 2010; Burns et al., 2011), fitting the model separately for each age cohort indicated the oldest cohort also demonstrated comparable fit ( $\chi^2 = 326.694$ ;  $df = 121$ ;  $p < .001$ ; CFI .98; AIC = 82606.122; RMSEA = .031 [.027 - .035]) with the young ( $\chi^2 = 278.227$ ;  $df = 112$ ;  $p = < .001$ ; CFI = .99; AIC = 84904.999; RMSEA = .028 [.024, .032]) and midlife ( $\chi^2 = 299.753$ ;  $df = 105$ ;  $p < .001$ ; CFI .99; AIC = 90824.731; RMSEA = .030 [.026 - .034]) cohorts. These new findings also establish comparable fit for both males and females for a uni-dimensional factor structure of the CD-RISC within all age cohorts (Table 2).

Table 1

*Estimates of personality, health and wellbeing covariates to predict CD-RISC score, by age cohorts*

Measures	Total Sample		28–32 years		48-52 years		68-72 years (Older)	
			(Young)		(Midlife)			
	(R <sup>2</sup> = .499)		(R <sup>2</sup> = .645)		(R <sup>2</sup> = .553)		(R <sup>2</sup> = .440)	
	b	SE	b	SE	b	SE	b	SE
Negative Affect	-.090***	.022	.023	.035	-.047	.036	-.097*	.042
Positive Affect	.272***	.020	.193***	.037	.260***	.035	.184***	.039
Behavioural	.087***	.023	.064*	.032	.064	.042	.029	.048
Activation Drive								
Behavioural	.281***	.029	.277***	.043	.243***	.057	.417***	.068
Activation Reward								
Behavioural Inhibition	-.356***	.025	-.363***	.046	-.388***	.056	-.390***	.057

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Ruminative Style	-.103***	.023	-.051	.036	-.002	.042	-.132**	.047
Goldberg Anxiety	.060	.051	.115	.076	.092	.085	-.014	.109
Goldberg Depression	.014	.058	.088***	.090	.003	.101	.110	.121
Number of Life Events	.066***	.017	.026	.030	.089***	.028	.088**	.030
Positive Support	.113***	.014	.027	.022	.116***	.022	.058*	.028
(Friends)								
Negative Support	-.049*	.021	.040	.028	-.096***	.028	-.028	.049
(Friends)								
Positive Support	.038**	.014	.012	.034	.015	.023	.046	.028
(Family)								
Negative Support	.020	.020	.305***	.030	.044	.028	.034	.046
(Family)								
Short Form Health	.015	.020	.059	.060	.010	.033	.010	.033

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Survey (SF12)								
Mastery	-.074***	.012	1.16***	.237	-.214***	.032	-.071*	.035
LogLikelihood		-234593.401		-74665.915		-82093.830		-71645.366
BICC		470512.435		150485.486		165356.236		144443.926

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

Table 2

*Estimates of personality, health and wellbeing covariates to predict CD-RISC score between genders by age cohorts*

Measures	28–32 years (Young)				48–52 years (Midlife)				68–72 years (Older)			
	Male		Female		Male		Female		Male		Female	
	(R <sup>2</sup> = .689)		(R <sup>2</sup> = .641)		(R <sup>2</sup> = .567)		(R <sup>2</sup> = .564)		(R <sup>2</sup> = .474)		(R <sup>2</sup> = .439)	
	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Negative Affect	-.065	.047	.117*	.058	-.027	.057	-.062	.049	-.030	.081	-.132*	.055
Positive Affect	.235***	.051	.127*	.060	.271***	.068	.268***	.045	.230***	.057	.158*	.059
Behavioural	.049	.052	.074	.044	.145*	.071	.027	.054	.127	.082	.022	.068
Activation Drive												
Behavioural	.221***	.068	.340***	.061	.130	.094	.301***	.075	.278**	.108	.452***	.097
Activation Reward												
Behavioural	-.301***	.064	-.440***	.073	-.269**	.088	-.465***	.076	-.322***	.080	-.402***	.081

Inhibition

Ruminative Style	-.036	.058	-.026	.055	-.046	.098	.019	.053	-.185*	.084	-.102	.063
Goldberg Anxiety	.021	.108	.259*	.122	-.027	.228	.138	.099	-.317	.236	.114	.140
Goldberg	.116	.127	-.289	.151	.170	.290	-.064	.112	.336	.266	.042	.156
Depression												
Number of Life	-.042	.046	.023	.044	.068*	.045	.104**	.038	.091	.046	.076	.046
Events												
Positive Support	.064*	.032	.088*	.035	.093**	.034	.113***	.032	.024	.048	.035	.040
(Friends)												
Negative Support	.086*	.041	-.019	.044	-.112*	.045	-.075	.039	.060	.107	-.014	.066
(Friends)												
Positive Support	.033	.029	.024*	.035	.002	.038	.032	.035	.087*	.044	.033	.044
(Family)												
Negative Support	.026	.039	.025	.046	.098*	.048	-.006	.040	-.064	.086	.058	.065

(Family)												
Short Form Health Survey (SF12)												
Mastery	-.001	.044	.022	.051	.022	.048	.000	.047	-.022	.051	.037	.045
Mastery	.373***	.049	.200***	.050	-.328***	.048	-.113*	.046	-.044	.056	-.110*	.052
LogLikelihood		-74248.219				-81746.047				-71304.980		
BICC		150803.751				165829.246				144916.348		

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*Note.* b = standard coefficient; SE = standard estimate; BICC = Bayesian intracluster correlation coefficient

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



**6.5.2 Measurement invariance of a single resilience factor.** In order to test measurement invariance between our age and gender cohorts, we compared a baseline model with unconstrained parameters (Model 1) with subsequent models which constrained factor loadings (Model 2), factor loadings and item intercepts (Model 3), and factor loadings, item intercepts and residual variances (Model 4). Invariance analysis between age cohorts revealed significant  $\chi^2$  differences between the unconstrained baseline model and subsequent constrained models (Table 3). However, since  $\chi^2$  is sensitive to large sample sizes, balancing these statistically significant findings with other fit indices is warranted. Indeed, comparison of RMSEA values and their CIs, AIC values, CFI values and change in CFI indicated little decrement of fit between age cohorts between the unconstrained model and Model 2. However, there appeared to be more substantive decrement in fit for Models 3 and 4. Change in CFI for Models 3 and 4 across the three age cohorts indicated that differences between models existed.

Invariance analysis between gender within each age cohort (Table 3) similarly indicated significant  $\chi^2$  differences between the baseline model (unconstrained), and the three increasingly constrained models. Similar to our age invariance results, the inspection of other goodness of fit indices that are less sensitive to sample size and model complexity indicated little decrement of fit between the unconstrained model and that which constrained factor loadings (Model 2) (Table 3). The fit of the most restrictive models (Models 3 & 4) for all cohorts between gender was significantly different to the less constrained and freely estimated models. Indeed change in CFI indicated that differences between models

existed. When comparing Models 3 and 4 however, no decrement of fit occurred between gender for all cohorts.

**6.5.3 Partial Invariance.** Since significant decrement in fit was reported in all analyses for those models that constrained item means and residuals to be equal (Model 3), we decided to examine the extent to which partial invariance for item means was reported since differences between age and gender cohorts could be attributed to mean response on just a few items. For the youngest cohort, mean differences were observed between gender for items 4, 6, 10, 11, 13, 14, 15, 16, 18, 19, 21, 23 and 24 of the CD-RISC. Allowing these items to be free to vary indicated an improved model fit to the data. Given PATH's sample size, when examining  $\Delta\text{CFI}$  and  $\chi^2$  difference, this model was only just statistically significant different from the unconstrained model.

Similar findings were observed for those in the midlife cohort with mean differences for gender reported for items 4, 7, 10, 13, 14, 15, 16, 18, 20, 21, 23 and 24. Improvement of model fit to data was seen, though significant difference from the unconstrained model remained as evidenced by CFI change and  $\chi^2$  difference (Table 3). Examination of the oldest cohort revealed that mean differences were present on items 5, 7, 8, 10, 12, 13, 14, 15, 16, 17, 18, 20, 21, 23 and 24. Allowing these items to vary saw a slight improvement in fit. Change in CFI and  $\chi^2$  difference, however, showed that a significant difference from the unconstrained model remained.

Exploration of differences between age cohorts (i.e. Young v Midlife v Older) also revealed mean differences. These were observed in items 5, 7, 8, 9, 10, 11, 12,

13, 14, 16, 17, 18, 19, 20, 21, 22, 23 and 25. Improvement in model fit to data was also observed (Table 3). Assessment of  $\Delta\text{CFI}$  and  $\chi^2$  difference observed that a significant difference from the unconstrained model remained.

Table 3

*Summary of Goodness-of-Fit statistics to test for invariance of the structural model between age cohorts*

Cohorts	Model	$\chi^2$	<i>df</i>	CFI	AIC	RMSEA	$\chi^2$ diff test
Young v	1	9307.229**	312	.685	441182.753	.119 (.117-.121)	-
Midlife v Older	2	9510.590**	342	.679	441326.113	.115 (.113-.117)	X = 203.361 (30)
	3	12349.416**	372	.580	444104.939	.125 (.124-.127)	X = 3042.187 (60)
	4	30469.732**	386	.000	462197.256	.195 (.193-.197)	X = 21162.5 (74)

*Note.* CFI = comparative fit index; RMSEA = root-mean-square error of approximation;  $\chi^2$  = chi-squared; *df* = degrees of freedom.

\*  $p < .05$ , \*\*  $p < .001$

Table 4

*Summary of Goodness-of-Fit statistics to test for invariance of the structural model between genders by age cohort*

Cohorts	Model	$\chi^2$	<i>df</i>	CFI	AIC	RMSEA	$\chi^2$ diff test
Young (M v F)	1	3265.025**	208	.706	143768.845	.122 (.118-.126)	-
	2	3291.522**	223	.705	143765.343	.118 (.114-.122)	X = 26.497* (15)
	3	3952.181**	238	.642	144396.002	.126 (.122-.129)	X = 687.156** (30)
	4	10602.353**	252	.004	151018.174	.204 (.200-.207)	X = 7310.831** (29)
Midlife (M v F)	1	3581.770**	208	.693	158308.165	.122 (.118-.125)	-
	2	3596.946**	223	.693	158293.341	.118 (.114-.121)	X = 15.176 (15)
	3	4035.848**	238	.654	158702.243	.121 (.118-.124)	X = 454.078** (30)
	4	10670.320**	252	.052	165308.714	.195 (.192-.198)	X = 773.374** (29)
Older (M v F)	1	2756.607**	208	.645	137452.579	.111 (.108-.115)	-
	2	2773.497**	223	.645	137439.468	.108 (.104-.111)	X = 16.89 (15)
	3	3091.802**	238	.603	137727.774	.110 (.107-.114)	X = 335.195** (30)
	4	7037.178**	252	.055	141645.150	.165 (.162-.169)	X = 4263.681* (29)

*Note.* CFI = comparative fit index; RMSEA = root-mean-square error of approximation;  $\chi^2$  = chi-squared; *df* = degrees of freedom.

\*  $p < .05$ , \*\*  $p < .001$

## 6.6 Discussion

This study sought to establish the factorial invariance of the CD-RISC between gender in each cohort, and between age cohorts across the adult lifespan. Established as being invariant amongst teenagers, young adults, those at midlife (Burns et al., 2011; Gucciardi et al., 2011) and between gender among individuals in their early 20's (Burns & Anstey, 2010), the current study progressed these findings by investigating gender invariance in three cohorts of young, middle and older aged adults. Our findings indicated that an unconstrained uni-dimensional CD-RISC factor structure fit comparatively well between gender across the lifespan. Constraining factor loadings between groups indicated no significant decrement in fit between gender or age cohorts. This is an important finding since it suggests that the items reflect a consistent underlying latent construct. However, we also found that constraining item means and residuals to be equivalent between gender for each age cohort indicated a significant decrement in fit in comparison with the freely estimated model.

As full invariance was not achieved, and is unlikely to hold in practice (Milfont & Fischer, 2010), additional analyses exploring partial invariance was conducted. Partial invariance is where a subset of parameters are constrained within a model, whilst another is allowed to vary across groups (Milfont & Fischer, 2010). It can be used when some, but not all parameters, are observed to be invariant across groups (Vandenberg & Lance, 2000). This allows for cross-group comparisons to be made, even when full invariance is not achieved. In conducting partial invariance in the current study, it revealed that although improvement of fit

was evident between gender by age cohort, and between age cohorts when constraining item means and residuals, the decrement of fit still remained. This implies that the levels of the latent construct at which the CD-RISC items become manifest, varies for adults across age and between gender. That is, for each cohort, certain resilience characteristics appear to be more prevalent for one group than another. This supports other resilience research that has observed gender differences within specific age samples (Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Werner, 2005). Similarly for age, research suggests that resilience is not static (Luthar & Cicchetti, 2000) and can be strongly influenced by maturational and developmental changes (Ryff & Keyes, 1995). This highlights that whilst the CD-RISC items may not be equally representative of resilience between particular cohorts, the findings from this study indicate that their loading onto a single latent factor is invariant across gender and age.

Overall, our findings demonstrate that CD-RISC items are equivalent in estimating a latent resilience factor between gender within different age groups and between age cohorts. To emphasise the importance of considering cultural relevance, we would highlight limitations of certain items of the original CD-RISC scale. Inspection of the unconstrained item loadings revealed particularly low items loadings for 2, 3 and 9 of the CD-RISC between gender and age groups. This is consistent with initial examination of the CD-RISC in younger adult populations by Burns and Anstey (2010) and Burns et al. (2011). Overall, it is noted that those items that tap ‘god’ (item 3) or ‘providence’ (item 9) do not appear to be relevant to an Australian population context as perhaps they were in an

American context within which the CD-RISC was originally developed.

## **6.7 Limitations and Strengths**

This nonclinical based study provides robust information as to the applicability of the CD-RISC measures due to the large sample size and the approximately equal numbers of both gender and age cohorts. Nevertheless, though the PATH project is a longitudinal study, due to the current study's cross-sectional design, findings should be considered with care. Reasons for this include that age-group and gender differences may be a product of cohort effects, which we cannot establish using this methodology. Other limitations include the survey having restricted age bands and that data was retrospective and self-reported. Although findings from the current study are more appropriate for generalisation to an Australian population, strengths of this sample include that participants were randomly drawn from the electoral role in Canberra and Queanbeyan, Australia, thus providing some insight into resilience within a community sample. Further, the availability of three cohorts allowed for exploration of resilience across age and gender, outside of clinical and university settings.

## **6.8 Conclusions**

Using data from the PATH Through Life Project, this study provided a unique opportunity to examine resilience in the general population. Invariance of the 25-item CD-RISC between gender and age cohorts identified that whilst significant age and gender differences in the responses to several CD-RISC items were identified, overall, the way each item reflected a latent uni-dimensional resilience factor was invariant between gender and age cohorts. The implication for



clinicians and researchers in studying resilience is that individual manifest indicators of resilience may differ between different groups. That is, dependent on age group and gender, certain resilient characteristics appear to be more prevalent for one group than another. Though the levels of the latent constructs at which the CD-RISC items manifest varies, the unitary underlying CD-RISC factor structure was found to be consistent between cohorts. Future research should confirm these findings in other populations to ascertain whether these results are generalizable. Further, influences on these item-level differences between cohorts need to be determined.

## 6.9 References

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### **Chapter Seven: Study 3**

**Does resilience predict suicidality? A lifespan analysis.**

This chapter consists of a published paper (Appendix Q).

Statement of Authorship is on the following page.

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By signing the Statement of Authorship, each author certifies that their stated contribution to the publication is accurate and that permission is granted for the publication to be included in the candidate's thesis.

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## **Preface**

Chapter 3 highlights that research into suicidality and resilience has been limited to a handful of studies despite an association being demonstrated to exist (Liu et al., 2014; Roy et al., 2006, 2007). Two of these studies explored the development and psychometric properties of a measure (Suicide Resilience Inventory-25) (Osman et al., 2004; Rutter, P. A. et al., 2008). Another investigated associations between suicidal ideation, risk factors and resilience (Heisel & Flett, 2008). Specific populations (e.g., elderly, adolescents, young adults and students) and small samples (Heisel & Flett, 2008; Osman et al., 2004; Rutter, P. A. et al., 2008), have limited findings. Resilience and its role in altering the impact of adverse events on individual wellbeing, and any associated reduction of suicide attempt likelihood requires further exploration (Roy et al., 2011; Stewart, 2011). As such, this chapter set out to extend previous studies by examining the association between resilience and suicidality.

As the 22-item version of the CD-RISC measure has been validated in the PATH cohorts, this scale is engaged to assess the association between resilience and suicidal ideation. This chapter utilises a general population sample from the PATH project. Involving three cohorts aged 28-32, 48-52 and 68-74 years at the time of the wave; a cross-sectional analyses across the lifespan and gender is conducted. Analyses was adjusted for a range of socio-demographic characteristics and known risk factors for suicidality.

## **Abstract**

### **Objective**

We examined the association between resilience and suicidality across the lifespan.

### **Method**

Participants (n = 7485) from the Personality and Total Health (PATH) Through Life Project, a population sample from Canberra and Queanbeyan, Australia, were stratified into three age cohorts (20-24, 40-44, 60-64 years of age). Binary Logistic regression explored the association between resilience and suicidality.

### **Results**

Across age cohorts, low resilience was associated with an increased risk for suicidality. However, this effect was subsequently made redundant in models that fully adjusted for other risk factors for suicidality amongst young and old adults.

### **Conclusions**

Resilience is associated with suicidality across the lifespan, but only those in midlife continued to report increased likelihood of suicidality in fully-adjusted models.

## 7.1 Introduction

Defining resilience as a unitary construct has proved problematic; frequently definitions reflect quite different theoretical approaches. As Ahern et al. (2006) describe, resilience can be operationalised as 1) a set of temporally stable set of individual traits (e.g., mastery, self-esteem) that allows the individual to successfully cope with changes in the environment and within the individual themselves; 2) a process that reflects the affective, cognitive and behavioural adaptations to coping with a stressful event; or 3) the successful outcome of such stressful transactions. Of particular relevance for process and outcome definitions, Burns and Anstey (2010) highlight the role of both genetic (e.g., 5-HT<sub>1A</sub> functionality) and environmental resources (e.g., social support networks) in moderating individuals' capacity to cope with stressors, whilst (Gillespie, Chaboyer & Wallis, 2009) emphasise that resilience appears to be shaped by age and life experiences. Regardless of definition, resilience is associated with an internal locus of control, positive self-image and optimism (Cederblad, 1996; Werner, 1992). In contrast, low resilience has been associated with an increased incidence of suicidal behaviours (Roy et al., 2006, 2007), likelihood of psychiatric symptoms and development of disorders (Roy et al., 2007) and poor health status (Connor & Davidson, 2003).

“Suicidality” is an encompassing term constituting suicidal ideation (thinking about ending one's life), attempts (nonfatal self-injurious behaviour, some intent to die), plans (formulating a strategy of how to end one's life) and completed suicide (death by suicide) (Silverman, 2006). Currently, few studies have focused on

resilience to suicidal behaviours, with only a handful (Heisel & Flett, 2008; Osman et al., 2004; Rutter, P. A. et al., 2008) examining the impact of resilience on suicidality. Previous work has focused on adolescent, young adult, university, geriatric and clinical populations (Heisel & Flett, 2008; Johnson, Gooding, Wood & Tarrrier, 2010; Osman et al., 2004; Roy et al., 2007; Rutter, P. A. et al., 2008). Consequently, whether resilience is associated with suicidality risk in the general population has yet to be fully elucidated (Johnson et al., 2011). The current study aims to examine the association between resilience and suicidality across the lifespan utilising a general population sample that involves three cohorts aged 28-32, 48-52 and 68-74. Analyses will be adjusted for a range of socio-demographic characteristics and known risk factors for suicidality risk.

## **7.2 Method**

**7.2.1 Participants and Study Design.** Participants were drawn from the Personality and Total Health (PATH) Through Life Project (Anstey et al., 2012), a large, randomly selected community based sample from Canberra and Queanbeyan, Australia. The PATH sample comprises three cohorts initially aged between 20–24 years, 40-44 years, and 60–64 years at baseline. The first wave commenced in 1999, with those in the youngest cohort assessed first, followed yearly by the other two cohorts. The current study utilises data from all cohorts at wave 3, at which point a resilience measure was administered. The sample comprised 2404 participants in the youngest (28–32 years; 46.5% male) age cohort, 2530 in the middle (48–52 years; 47.5% male) age cohort and 2551 in the oldest age cohort (68–72 years; 51.7% male). The study was approved by the Human Research



Ethics Committee at the University of Adelaide (Code Number 11/69), and the Centre for Mental Health Research at the Australian National University (Protocol Number 2006/314).

### **7.3 Measures**

All measures in the current study were self-reported by participants. Socio-demographic items comprised current partnered status (partnered/not partnered), employment (employed, not in the labour force), and highest qualification attained (school, certificate, diploma, degree). Medical health was determined by establishing the existence of several medical conditions (diabetes, arthritis, cancer, or heart trouble). Due to the low prevalence of medical conditions amongst the younger age cohorts, a single binary variable was computed to indicate whether participants had been diagnosed with one or more of the aforementioned conditions. One item from the Alcohol Use Disorders Identification Test (AUDIT) scale (Saunders et al., 1993) evaluated frequency of alcohol use while a single item queried whether the participant was a smoker (Jorm et al., 1999).

A range of psychological variables were assessed including mastery (Pearlin et al., 1981), rumination (1991), positive and negative affect (PANAS; Watson & Clark, 1988), and life satisfaction (Diener et al., 1985). Current and past life stressors were assessed using the brief life events questionnaire (Brugha & Cragg, 1990; Rodgers, 1996). A single item queried experiences of childhood adversity. Mental health symptoms were measured using the Goldberg Anxiety and Depression Scales (Goldberg et al., 1988). Physical health activity status was measured using the Physical Health component score from the SF-12 Health

questionnaire (Ware et al., 1996). The Lubben Social Network Scale (Lubben et al., 2006) assessed social network size, whilst the Schuster Social Support Scale (Schuster et al., 1990) measured quality of social interactions of friends, family and partner. Due to complexities of social relationships across the lifespan (e.g., younger adults less likely to have partners), this measure was summed and averaged to create an index of overall positive and negative support. Resilience was assessed with the original 25-item Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). Previous factor analysis by Burns et al. (2011) indicated items 2, 3 and 9 failed to load onto a uni-dimensional resilience factor and were therefore excluded from this analysis. To aid interpretation of Odds Ratios <1.0, resilience scores were reversed so that high scores reflected lower levels of resilience. The Psychiatric Symptom Frequency Scale (Lindelow et al., 1997) evaluated suicidality. The first two items inquired whether life was worth living and whether participants had thought that they were better off dead. Serious suicidality was assessed by asking “in the last year have you ever thought about taking your own life?” followed by the question “in the last year have you ever thought that taking your life was the only way out of your problems?”

#### **7.4 Statistical Analyses**

All statistical analyses were conducted using PASW 20 and were stratified by the three age-cohorts (young, midlife and older). Binary logistic regression was used to evaluate the association of demographic, health behaviours/conditions, psychological characteristics, social support, mental health and resilience with suicidal ideation. This was to ascertain whether lower levels of resilience were

associated with the likelihood of suicidality.

Multiple cases had information missing within each cohort across all variables. Little's MCAR test (Little, 1988) determined that the data were not missing completely at random (MCAR) for the youngest ( $\chi^2 = 1196.639$ ,  $df = 689$ ,  $p < .001$ ), midlife ( $\chi^2 = 1455.216$ ,  $df = 752$ ,  $p < .001$ ) or oldest ( $\chi^2 = 1621.000$ ,  $df = 853$ ,  $p < .001$ ) cohorts. We therefore imputed missing data ( $m = 5$ ) using Multiple imputation (MI) (Rubin, 1978, 1987). MI involves the production of multiple datasets of the original results, for which each missing value is replaced with two or more imputed values (Rubin, 1987). These values are predicted from the participant's other non-missing values, based on a conditional distribution (Newsom, Jones & Hofer, 2012).

## **7.5 Results**

Significant differences were observed between the three age cohorts for each of the variables used within the current study (Table 1). Response patterns to some variables were clearly disparate between cohorts such as being married and the existence of medical conditions was greatest in the oldest cohort; being employed and experiencing rumination in the youngest; and social network and life events (midlife). Prevalence statistics (Table 2) also demonstrate significant differences between cohorts for each item addressing suicidal ideation. Prevalence for the first three items was greater for the youngest cohort, with those at midlife increasing on the fourth item. For the oldest cohort, prevalence was low compared to the other cohorts across all four items.

Table 1  
*Descriptives of variables, stratified by age cohort*

Variables	Younger	Midlife	Older	Differences between age cohorts		
	(28 – 32 years) n = 1978	(48 – 52 years) n = 2182	(68 – 72 years) n = 1973			
	Range			$\chi^2$	F	
Qualification	13.7	15.8	22.7	439.33*	-	60s > 20s, 40s
School (%)			29.4			20s > 40s
Certificate (%)	31.5	31.3	11.3			
Diploma (%)	10.2	11.0	36.6			
University (%)	44.4	40.8				
Current Smoker				204.30*	-	20s > 40s, 60s
Yes (%)	20.9	13.5	5.5			40s > 60s
No (%)	79.1	86.2	94.5			

Employed				3372.41*	-	20s > 40s, 60s
Yes (%)	90.2	91.6	16.4			60s > 40s
No (%)	9.8	8.2	83.6			
Partner Status				343.00*	-	60s > 20s, 60s
Married (%)	45.6	67.8	72.1			40s > 60s
Not Married (%)	54.3	32.2	27.9			
Medical health <sup>2</sup>				2407.97*	-	40s > 20s, 60s
						60s > 20s
Yes (%)	2.3	10.5	26.0			
No (%)	30.1	25.2	5.9			
Alcohol Consumption <sup>1</sup>				331.545*	-	60s > 20s, 40s
						40s > 20s
Occasional/light (%)	8.6	9.7	5.5			
Medium (%)	17.5	14.1	10.3			

Hazardous/harmful (%)		6.8	12.3	15.2			
Resilience (mean, sd)	22-97	46.05 (11.68)	45.93 (12.28)	44.39 (12.31)	-	11.06*	20s > 40s, 60s 40s > 60s
Childhood Adversity (mean, sd)	0-14	1.70 (2.21)	1.68 (2.29)	1.65 (2.18)	-	0.34	20s > 40s, 60s 40s > 60s
Physical Health <sup>3</sup> (mean, sd)	12-66	52.08 (7.62)	50.27 (8.64)	46.99 (10.40)	-	162.89*	60s > 20s, 40s 40s > 60s
Life Satisfaction (mean, sd)	5-35	26.14 (6.67)	25.06 (6.84)	26.45 (5.50)	-	27.38*	20s > 40s, 60s 60s > 40s
Positive Affect (mean, sd)	10-50	33.58 (7.64)	32.97 (7.69)	32.39 (7.54)	-	11.94*	20s > 40s, 60s 40s > 60s
Negative Affect (mean, sd)	8-40	12.65 (5.16)	11.75 (4.75)	11.68 (4.72)	-	24.23*	60s > 20s, 40s 20s > 40s
Rumination (mean, sd)	0-30	8.53 (5.81)	7.14 (4.95)	5.37 (3.70)	-	204.36*	20s > 40s, 60s

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							40s > 60s
Social Network	0-30	18.14 (5.08)	16.34 (5.43)	18.26 (5.28)	-	86.75*	40s > 20s, 60s
(mean, sd)							20s > 40s
Life Events (mean, sd)	0-16	1.26 (1.54)	1.37 (1.63)	0.80 (1.20)	-	86.27*	40s > 20s, 60s
							60s > 20s
Anxiety (mean, sd)	0-9	3.72 (2.71)	3.27 (2.67)	2.13 (2.12)	-	206.96*	20s > 40s, 60s
							40s > 60s
Depression (mean, sd)	0-9	2.63 (2.44)	2.22 (2.31)	1.62 (1.80)	-	104.07*	20s > 40s, 60s
							40s > 60s
Mastery (mean, sd)	7-28	23.08 (3.54)	22.53 (3.76)	21.89 (3.44)	-	54.28*	60s > 20s, 40s
							40s > 60s
Negative Support (mean, sd)	0-11	3.43 (1.61)	3.60 (1.72)	2.60 (1.60)	-	212.09*	20s > 40s, 60s
							40s > 60s
Positive Support (mean, sd)	1-9	8.00 (1.10)	7.67 (1.33)	8.05 (1.08)	-	48.18*	40s > 20s, 60s

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<sup>1</sup>Frequency of alcohol consumption

<sup>2</sup>Existence of several medical conditions (diabetes, arthritis, cancer or heart trouble).

<sup>3</sup>Measured using the SF12 PCS measure

AUDIT, Alcohol Use Disorders Identification Test;  $\chi^2$ , Chi-squared; F, F ratio.

\*  $p < 0.001$ .



Table 2

*Twelve-month prevalence of suicidal ideation (positive responses to items) stratified by age cohort and gender.*  
 $\chi^2$ , Chi-squared; *df*, degrees of freedom, \*  $p < 0.001$ .

Psychiatric Symptom Frequency Scale Item	Younger (28 – 32 years)			Midlife (48 – 52 years)			Older (68 – 72 years)			Difference between age cohorts		
	Total	Males	Females	Total	Males	Females	Total	Males	Females	$\chi^2$	<i>df</i>	
(1) Life hardly worth living	12.1%	12.1%	12.2%	9.6%	9.1%	10.1%	5.9%	6.3%	5.6%	45.04*	2	20s > 40s, 60s 60s > 40s
(2) Thought they were better off dead	7.9%	8.3%	7.7%	6.9%	6.8%	7.1%	3.6%	3.7%	3.5%	34.73*	2	60s > 20s, 40s 40s > 60s
(3) Thought of taking one's own life	6.4%	7.2%	5.7%	5.0%	4.8%	5.2%	1.8%	2.1%	1.6%	50.49*	2	40s > 20s, 60s 40s > 60s
(4) Taking one's life only way out of their problems	2.8%	2.3%	3.2%	3.2%	3.0%	3.3%	1.0%	0.8%	1.3%	23.09*	2	40s > 20s, 60s 60s > 20s

**7.5.1 Resilience and suicidal ideation across the life span.** Analyses investigating the association between resilience and suicidality were stratified by age cohort for four suicidality items (Tables 3-6). Across all suicidality items for the three age cohorts, lower levels of resilience were associated with suicidal ideation for all age cohorts.

Specifically, for the item “Life is hardly worth living” (Table 3), effects for low levels of resilience became non-significant for the oldest cohort with the inclusion of physical health and life conditions (Model 4). In contrast, the effect in the youngest cohort was accounted for when psychological constructs and mental health variables (Model 6) were introduced into the model. Association between low levels of resilience and suicidal ideation for those at midlife remained significant across all models. As such, those at midlife had higher odds of suicidal ideation, when resilience levels were low compared to the other two cohorts. With thoughts of feeling “better off dead” (Table 4), the effect of not being resilient became non-significant for both the youngest and midlife cohorts with the inclusion of psychological constructs and mental health (Model 6), and with the addition of social support (Model 5) for the oldest. With regards the item assessing serious suicidal ideation (“thought of taking own life”) (Table 5), effects became non-significant with the inclusion of psychological constructs and mental health (Model 6) for the youngest cohort and with the inclusion of physical health and life conditions (Model 4) for the oldest cohort. However, the association between low levels of resilience and suicidal ideation remained significant for those at midlife when adjusting for all covariates. Similarly, as for the previous item, both midlife

and younger cohorts became non-significant at the same model, with those at midlife having higher odds than the younger.

The second item examining serious suicidal ideation, “thought taking life only way out of problems” (Table 6), was significantly related to low levels of resilience among the youngest and midlife cohorts. Here it was observed that the youngest cohort had higher odds than those at midlife, in considering suicide. Effect of low levels of resilience on suicidality items for those in the oldest cohort became non-significant with the inclusion of psychological constructs and mental health (Model 6).

In view of the overall impact that low levels of resilience had on suicidality, we explored the extent to which resilience moderated the effects of risk factors for suicidality (i.e. demographic, health and psychological covariates). Results (not shown) revealed that resilience did not moderate the association between these risk factors and the suicidality items when adjusting for main effects.

Table 3

*Pooled odds ratios and 95% confidence intervals for low levels of resilience among young, midlife and older adults for “In the last year, have you ever thought that your life was hardly worth living?”*

Variables entered	Younger		Midlife		Older	
	(28 – 32 years)		(48 – 52 years)		(68 – 72 years)	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Model 1 – Low Resilience	1.09***	1.07-1.10	1.09***	1.07-1.10	1.04***	1.03-1.06
Model 2 – Low Resilience	1.08***	1.07-1.10	1.08***	1.07-1.10	1.04***	1.02-1.06
Model 3 – Low Resilience	1.08***	1.06-1.10	1.08***	1.07-1.10	1.04***	1.03-1.06

Model 4 –	1.04***	1.03-1.06	1.06***	1.05-1.08	1.02	1.00-1.03
Low Resilience						
Model 5 –	1.04**	1.02-1.06	1.06***	1.04-1.08	1.01	1.00-1.03
Low Resilience						
Model 6 –	1.01	0.99-1.03	1.02*	1.00-1.04	0.98	0.96-1.00
Low Resilience						

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CI, confidence interval. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

N.B. Model 1 baseline model includes resilience. Model 2 = Model 1 with socio-demographic information. Model 3 = Models 1 and 2 with health behaviours. Model 4 = Models 1 -3 with physical health and life conditions. Model 5 = Models 1 – 4 with social support; and Model 6 = models 1 – 5 with psychological constructs and mental health.

Table 4

*Pooled odds ratios and 95% confidence intervals for low levels of resilience among young, midlife and older adults for “In the last year, have you ever thought that you really would be better off dead?”*

Variables entered	Younger		Midlife		Older	
	(28 – 32 years)		(48 – 52 years)		(68 – 72 years)	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Model 1 – Low Resilience	1.08***	1.06-1.09	1.09***	1.07-1.10	1.05***	1.03-1.08
Model 2 – Low Resilience	1.07***	1.06-1.09	1.08***	1.07-1.10	1.05***	1.03-1.08
Model 3 – Low Resilience	1.07***	1.06-1.09	1.08***	1.07-1.10	1.05***	1.03-1.08
Model 4 – Low Resilience	1.04***	1.02-1.06	1.06***	1.04-1.07	1.03***	1.00-1.05
Model 5 – Low Resilience	1.04***	1.02-1.06	1.06***	1.04-1.07	1.03	1.00-1.05
Model 6 – Low Resilience	1.01	0.99-1.04	1.02	0.99-1.04	1.00	0.97-1.02

CI, confidence interval. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Table 5

*Pooled odds ratios and 95% confidence intervals for low levels of resilience among young, midlife and older adults for “In the last year have you ever thought about taking your own life?”*

Variables entered	Younger		Midlife (48 – 52 years)		Older	
	(28 – 32 years)				(68 – 72 years)	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Model 1 – Low Resilience	1.07***	1.06-1.09	1.09***	1.07-1.10	1.05***	1.02-1.08
Model 2 – Low Resilience	1.07***	1.05-1.09	1.09***	1.07-1.10	1.05***	1.02-1.08
Model 3 – Low Resilience	1.07***	1.05-1.09	1.09***	1.07-1.10	1.05**	1.02-1.08
Model 4 – Low Resilience	1.04***	1.02-1.06	1.06***	1.05-1.09	1.03	1.00-1.07
Model 5 – Low Resilience	1.03***	1.01-1.06	1.07***	1.05-1.09	1.03	0.99-1.06
Model 6 – Low Resilience	1.01	0.99-1.04	1.03*	1.01-1.06	1.02	0.98-1.06

CI, confidence interval. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

NB. Model 1 baseline model includes resilience. Model 2 = Model 1 with socio-demographic information. Model 3 = Models 1 and 2 with health behaviours. Model 4 = Models 1 -3 with physical health and life conditions. Model 5 = Models 1 – 4 with social support; and Model 6 = models 1 – 5 with psychological constructs and mental health.



Table 6

*Pooled odds ratios and 95% confidence intervals for low levels of resilience among young, midlife and older adults for “In the last year have you ever thought that taking your own life was the only way out of your problems?”*

Variables entered	Younger		Midlife		Older	
	(28 – 32 years)		(48 – 52 years)		(68 – 72 years)	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Model 1 – Low Resilience	1.11***	1.08-1.14	1.10***	1.07-1.12	1.08***	1.03-1.12
Model 2 – Low Resilience	1.11***	1.08-1.13	1.09***	1.07-1.12	1.08***	1.04-1.13
Model 3 – Low Resilience	1.11***	1.08-1.13	1.09***	1.07-1.12	1.08***	1.04-1.13
Model 4 – Low Resilience	1.08***	1.05-1.11	1.07***	1.04-1.09	1.05*	1.05-1.00
Model 5 – Low Resilience	1.08***	1.05-1.11	1.06***	1.04-1.09	1.04*	0.99-1.09
Model 6 – Low Resilience	1.06**	1.02-1.10	1.03*	1.00-1.07	1.00	0.94-1.07

CI, confidence interval \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

NB. Model 1 baseline model includes resilience. Model 2 = Model 1 with socio-demographic information. Model 3 = Models 1 and 2 with health behaviours. Model 4 = Models 1 -3 with physical health and life conditions. Model 5 = Models 1 – 4 with social support; and Model 6 = models 1 – 5 with psychological constructs and mental health.

## **7.6 Discussion**

Findings in the literature regarding the association between low levels of resilience and suicidality have differed, with variations in how resilience is explored within suicidal behaviours (e.g., an internal factor protecting against suicidality; (Rutter, P. A. et al., 2008); a regulator of suicidal ideation through aptitude, ability or access to resources (Osman et al., 2004); and as a factor that can mitigate or cushion the strength of the link between risk and suicidality (Johnson et al., 2011)). In the current study, resilience was defined as the individual's ability to access internal and external sources of support whilst using individual qualities to enable successful development despite adversity (Connor & Davidson, 2003; Windle, 2010). With the purpose of the current study being to assess the effect of low levels of resilience on suicide, multiple explanatory variables such as health behaviours, physical health and social support were included in the analysis. This was to promote an understanding of the impact these additional factors may have on the association between resilience and suicidality.

Previous research has largely drawn from clinical samples and there has been a lack of population-based research on this topic. This study employed a novel perspective to investigate the relative contribution of resilience on likelihood of suicidal ideation among three age cohorts from a community sample. Consistent with previous research linking increased likelihood of suicidal behaviours with low resilience (Roy et al., 2006, 2007), the present study demonstrated the association of lower levels of resilience with suicidality across three age cohorts aged between 28 to 72 years. For the oldest group of participants, resilience did not remain

significantly associated with any of the suicidality items. Meanwhile, for the youngest cohort, resilience was significantly associated with the suicidality item “thought taking life only way out of problems.” Low resilience remained a significant risk factor for items 1 (“life hardly worth living’), 3 (“thought of taking own life”) and 4 (“thought taking life only way out of problems”) for the midlife aged cohort. Of the four items, bar the final one, it was found that the midlife cohort had a higher likelihood of engaging in these behaviours, when resilience levels are low.

These results consistently showed that the covariates accounted for much of the effect of resilience. In other words, as other constructs are added in (e.g., social support), low levels of resilience and suicidal ideation were subsequently reduced, as observed in the younger and oldest cohorts. Nevertheless, a low level of resilience appeared a key attribute for the midlife cohort, persisting as a significant predictor for the majority of the models. Interestingly, a lower level of resilience for this cohort was observed in association with suicidal ideation across all six models, aside from item 2 (“feel better off dead”). Thus, in the current study population, this indicates that compared to the younger and oldest cohorts, the midlife group had a greater vulnerability to suicidal ideation when resilience levels are low. In light of this, further analysis into how resilience can be boosted so as to reduce suicidality, and moreover, how protective it is, could be beneficial in reducing vulnerability; particularly for those at midlife.

## **7.7 Limitations and Strengths**

Strengths of this study include the large number of participants drawn

randomly from the general community and the use of a resilience-specific measure. The age range of the participants allowed for comparisons between the three cohorts. With approximately equivalent numbers of both genders in each cohort, results from the current study are robust.

A limitation of a cross-sectional design prevents us from making causal inference about the possible direction between suicidal ideation and resilience. Due to data being drawn from a section of the Australian community, one should practise caution if generalising findings beyond this population. Other limitations include the retrospective and self-report nature of the questionnaires used in the current study.

## **7.8 Implications and Future Research**

Individuals in the midlife group were found to be more vulnerable to suicidality when resilience levels were low. This is in keeping with previous research in this domain, where males (35 – 44 years) and females (16 – 24 years) were noted to be more vulnerable to suicidality (Johnston et al., 2009). The Australian Bureau of Statistics (Afifi & Macmillan, 2011; Agani, Landau & Agani, 2010; Australian Bureau of Statistics, 2012), also noted suicide rates to be highest among middle aged males (40 – 44 years) in 2008, the same time point at which the sample in the current study participated in wave 3. Interestingly, in the following year elderly males (28.2 per 100,000 population) had the highest suicide rate, while males 40 – 44 years were the highest group for suicide related deaths in 2010. Significantly, results of the present study concord with the aforementioned studies, where our findings contribute further to the understanding of vulnerability to suicide

among those at midlife. Other explanations for significance found in the midlife cohort, could be due to their unadjusted effect being slightly larger compared to the other two cohorts. Further, the Global Financial Crisis occurring between 2007–2008 may have influenced resilience and suicidality levels, particularly for those at midlife where life changes already occur.

The current study indicates that more research is needed to explore the relationship between resilience and suicidal behaviours, particularly for those aged in their 40s and 50s. With low resilience indicating vulnerability towards suicidal behaviours in this cohort, further exploration would be beneficial to ascertaining whether these results are generalisable to other population samples. It is the authors' intent to follow the current study with longitudinal analyses, further elucidating whether attenuated levels of resilience remain low as participant's age, and whether gender has an effect.

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## **Chapter Eight: Study 4**

### **Psychological resilience provides no independent protection from suicidal risk**

This chapter consists of an unpublished paper that is currently undergoing peer review with Crisis. Statement of Authorship is on the following page.

# Statement of Authorship

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By signing the Statement of Authorship, each author certifies that their stated contribution to the publication is accurate and that permission is granted for the publication to be included in the candidate's thesis.

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## Author Contributions

By signing the Statement of Authorship, each author certifies that their stated contribution to the publication is accurate and that permission is granted for the publication to be included in the candidate's thesis.

Name of Principal Author (Candidate)	Danica Wai Yee Liu		
Contribution to the Paper	Study inception, design, methodology (including literature searches, statistical analysis and data interpretation) and manuscript preparation.		
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Name of Co-Author	Kaarin J. Anstey		
Contribution to the Paper	Is the leader of the PATH Project. Contributed to the overall design of the study that was worked on (PATH Thru Life Project), including choosing measures, recruitment, writing grants to obtain funding for the project. Researched and chose the resilience measure that was added into PATH. For the current study, helped to evaluate and edit the manuscript.		
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## **Preface**

Chapter seven determined the strength of the association between low resilience and suicidal ideation. Though informative, the previous chapter and other studies exploring this area are limited by their cross-sectional design. A further study employing longitudinal methodology permits an assessment of the robustness of this relationship. Moreover, it may also provide information concerning the stability of resilience across time in an adult, non-clinical sample. The current chapter extends Chapter seven by tracking the association of resilience and suicidality over time. Suicidality and resilience levels were assessed at baseline and follow-up (four year time period) to determine the capacity of baseline data to predict resilience or suicidal ideation at follow-up. Suicidality risk factors were included in the analysis in order to account for their impacts on the predictability of resilience and suicidal ideation at the second time point. Participants (N = 1, 162) were drawn from waves 3 and 4 of the PATH Through Life project.



## **Abstract**

**Background.** The role of resilience in likelihood of suicidal ideation (SI) over time is relatively unknown.

**Aims.** We examined the association between resilience and suicidality in a young-adult cohort over 4 years. Objectives were to determine whether resilience was associated with SI at follow-up; or conversely, whether SI was associated with lowered resilience at follow-up.

**Methods.** Participants were selected from the Personality and Total Health (PATH) Through Life Project from Canberra and Queanbeyan, Australia, aged 28–32 years at the first time point and 32–36 at the second. Multinomial, linear and binary regression analyses explored the association between resilience and suicidality over two time points. Models were adjusted for suicidality risk factors.

**Results.** While unadjusted analyses identified associations between resilience and suicidality, these effects were fully explained by the inclusion of other suicidality risk factors.

**Conclusions.** Despite strong cross-sectional associations, resilience and SI appear to be unrelated in a longitudinal context, once risk/resilience factors are controlled. As independent indicators of psychological wellbeing, suicidality and resilience are essential if current status is to be captured. However, the addition of other factors (e.g., support, mastery) makes this association tenuous. Consequently, resilience per se may not be protective of SI.

## 8.1 Introduction

Despite a vast body of research on the area, agreement on a single definition of resilience is lacking. As such, defining resilience as a unitary construct has proved problematic, with definitions frequently reflecting several different theoretical approaches. As Ahern et al. (2006) describe, resilience can be operationalised as 1) a temporally stable set of individual traits (e.g., mastery, self-esteem) that enables successful coping to occur when changes in the environment and within the individual themselves, arise; 2) a process that reflects cognitive, affective and behavioural adaptations in handling an adverse event; or 3) the efficacious outcome of such stressful experiences. Regardless of definition, resilience is associated with positive self-image, optimism and an internal locus of control (Cederblad, 1996; Werner, 1992).

“Suicidality” is an encompassing term constituting suicidal ideation (thinking about ending one’s life), attempts (nonfatal self-injurious behaviour, some intent to die), plans (formulating a strategy of how to end one’s life) and completed suicide (death by suicide) (Silverman, 2006). Increased suicidality risk involves a pattern of thoughts and behaviours including ideation or attempted suicide; it has been linked to multiple psychological, social and biological factors (Heisel, 2006). These include ruminative style, depression (Fairweather-Schmidt et al., 2007), and low social support (Corna et al., 2010).

Potentially context and time-specific (Herrman et al., 2011), low resilience has shown an association with an increased incidence of suicidal behaviours (Liu et al., 2014; Roy et al., 2006, 2007) and poor health status (Connor & Davidson, 2003;

Fairweather et al., 2006). Resilience may be undermined if adversity faced becomes overwhelming, or if adaptation to a situation becomes too challenging (Masten et al., 1990). Furthermore, over time, experiences of stress or adversity may impact upon resilience, with accumulation of hardships potentially diminishing resilience whilst increasing vulnerability to suicidality (Netuveli et al., 2008).

Conversely, greater resilience, acknowledged as an important factor, is associated with reduced likelihood of psychiatric disorder and psychological symptoms development (Burns et al., 2011; Das, Cherbuin, Tan, Anstey & Eastaer, 2011; Roy et al., 2007). Individuals with elevated resilience levels, compared to highly vulnerable individuals, have a diminished likelihood of reporting suicide attempt/ideation (Fergusson et al., 2003). Psychological factors (e.g., problem solving) may facilitate resilience to suicidality; indeed, positive self-appraisals may confer resilience, thus reducing SI occurrence (Johnson, Gooding, Wood, Taylor, et al., 2010; Johnson et al., 2011).

Though an association between resilience and suicidality has been found (Liu et al., 2014; Roy et al., 2007), whether SI reduces future levels of resilience, or if resilience influences suicidality risk, is unclear (Johnson et al., 2011; Luthar et al., 2000; Roy et al., 2007). Few studies have focused on resilience to suicidal behaviours, with exploration limited to a handful of cross-sectional, population specific studies (e.g., adolescent, geriatric and clinical; Heisel & Flett, 2008; Osman et al., 2004; Rutter, P. A. et al., 2008). To further examine the relationship between suicidality and resilience beyond small, cross-sectional studies, longitudinal (moreover, large) community/population based studies are needed (Chan et al.,

2007; Lamond et al., 2008; Marty et al., 2010). Consequently, the present study addresses two aims. First, we will examine the association between resilience and suicidality over time. The extent to which resilience predicts suicidality, and contrariwise, whether suicidality predicts resilience will be investigated. Specifically, a reciprocal effects model will assess whether: (1) presence of suicidality at time point 1 (TP1) predicts resilience at time point 2 (TP2); and (2) if resilience at TP1 predicts suicidality at TP2. Second, we will examine the extent to which change in suicidality and resilience covary. As existing literature links low resilience with increased likelihood of SI (Liu et al., 2014; Roy et al., 2006, 2007), a decline in resilience is expected to predict SI occurrence at TP2. Further, low SI at TP1 is anticipated to predict high resilience at TP2.

Covariates, including health behaviours and psychological characteristics, are known to attenuate the association between resilience and suicidal ideation (Liu et al., 2014); thus, models will adjust for covariates of suicidality risk.

## **8.2 Method**

**8.2.1 Participants.** Participants were drawn from the Personality and Total Health (PATH) Through Life Project (Anstey et al., 2012). Randomly selected from the electoral roll in Canberra and Queanbeyan, Australia, data concerns the youngest PATH cohort at waves 3 ( $n = 2404$ : TP1; 2009) and 4 ( $n = 1191$ : TP2; 2012). At the time of the study, data were not available for the older cohorts. At wave 3, computer-assisted self-interviewing (CASI) using PATH hardware, was used to collect participant responses. Data at wave 4, however, was collated using an online questionnaire, accessed on participant's personal electronic

devices. The present study constituted participants ( $n = 1162$ ) who completed the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003), at both waves 3 (28–32 years; 46.5% males) and 4 (32–36 years; 41.6% males). The current study was approved by the Human Research Ethics Committee at the University of Adelaide (Code Number 11/69); and the Australian National University (Protocol Number 2006/314).

### **8.3 Measures**

**8.3.1 Resilience.** Resilience was assessed using the CD-RISC (Connor & Davidson, 2003). Invariant across adult populations (Burns et al., 2011; Gucciardi et al., 2011; Liu et al., 2015), and between gender (Burns & Anstey, 2010; Liu et al., 2015), the uni-dimensional structure of the 25-item CD-RISC is valid across different populations (Burns & Anstey, 2010; Burns et al., 2011; Yu et al., 2011). Good internal consistency ( $\alpha = .89$ ) within a community sample has been cited ( $n = 577$ , Mean = 80.4,  $SD = 12.8$ ) (Connor & Davidson, 2003). Following previous factorial analysis of the CD-RISC on the PATH sample (Burns & Anstey, 2010; Burns et al., 2011; Liu et al., 2015; Liu et al., 2014), items 2, 3 and 9, failed to load above 0.32 on a single resilience latent factor. Subsequently, these were removed, with total score reflecting a 22-item CD-RISC measure (TP1 [ $\alpha = .93$ ]; TP2 [ $\alpha = .94$ ]).

Resilience was assessed as a continuous score, with the impact of change in resilience as a predictor of suicidality also examined. Identified using standardised residuals (SR) obtained from a regression analysis in which resilience score at TP2 was regressed on resilience score at TP1, three discrete groups were derived: those

whose SR scores remained stable (Stable), decreased (Decliners) or increased (Improvers) between time points. Decliners were defined as those who were  $< -1$  SR, with Improvers  $> + 1$  SR. The Stable group was the reference group. Residuals were not found to be associated with either baseline or follow-up scores.

**8.3.2 Suicidality.** Questions from the Psychiatric Symptom Frequency Scale (PSFS; Lindelow et al., 1997) assessed suicidal ideation occurrence, for the past 12 months. Consisting of six items, responses required a yes/no answer. Association between resilience and suicidality was examined item-wise. This was to glean information pertaining to each item, which reflects a different aspect of suicidal ideation (e.g., mild – severe). Affirmative responses comprised the predictors of/outcome of low resilience in the current study.

The first two items of the PSFS determined whether participants thought that “life was worth living” (Item 1) and whether they had “thought that they were better off dead” (Item 2). To assess serious suicidality, questions asked whether thoughts about taking their own life (Item 3), and whether taking their life was the only way out of their problems had occurred (Item 4). Participants went on to answer questions five and six (i.e., concerning plans and attempts), only if they had responded affirmatively to Item 4. Due to a low affirmative response rate for Items five and six, these were not excluded from analysis. When the scale included all four items, Cronbach’s alpha was good (TP1 [ $\alpha = .82$ ]; TP2 [ $\alpha = .88$ ]). Impact of change in suicidality on low resilience was examined by forming four groups, for each of the four PSFS items. These consisted of ‘Always suicidal’ (reported suicidality at both time points), ‘No longer suicidal’ (reported suicidality at TP1,

but not at TP2), 'Became suicidal' (reported no suicidality at TP1, but reported at TP2), and 'Never suicidal (did not report suicidality at either time point). 'Never suicidal' was the reference group.

**8.3.3 Psychological variables.** Factors known to influence suicidality were identified and controlled for. All measures selected have shown good psychometric properties by their authors and for the current sample as baseline covariates at wave 3. Scales used include Pearlin's Mastery scale (Pearlin et al., 1981; Cronbach's alpha = .81), Goldberg Anxiety and Depression scales (Goldberg et al., 1988; Anxiety [ $\alpha = .79$ ], Depression [ $\alpha = .78$ ]), and a life satisfaction measure (Diener et al., 1985; Cronbach's alpha = .89). The Behavioural Inhibition System and Behavioural Activation System (BISBAS; Carver & White, 1994) consists of one BIS (inhibition;  $\alpha = .81$ ), and two BAS scales (Drive;  $\alpha = .81$ , Reward Responsiveness;  $\alpha = .71$ ). BAS Fun Seeking data were not available for this cohort, and was excluded from analysis. Rumination ( $\alpha = .89$ ), and social network size ( $\alpha = .82$ ), were also assessed (Lubben et al., 2006; Nolen-Hoeksema & Morrow, 1991).

#### **8.4 Statistical Analysis**

Descriptive data for the covariates between the two time points are reported in Table 1. Differences in resilience scores, attained through the t-test, are also presented. The four items from the Psychiatric Symptom Frequency Scale (e.g., whether "life was worth living" (Item 1); "thought they were better off dead" (Item 2); "thought about taking their own life" (Item 3); and whether they had ever "thought that taking their life was the only way out of their problems" (Item 4))

were also assessed for differences using chi-squared analysis. Items were assessed individually, to allow for more in-depth understanding to be gained in regards to resilience and suicidal ideation. Suicidal ideation change between times was also assessed. Initial analyses involved logistic regression when suicidal ideation was the dependent variable; maximum likelihood estimation was utilised when resilience was the dependent variable. Using multinomial logistic regression, odd ratios or regression (dependent on whether suicidal ideation or resilience was the predictor), evaluated the relationship between suicidal ideation and change in resilience.

Several models (Figure 1) evaluated the temporal associations between resilience and suicidal ideation. The first (Model (i)) explored whether suicidal ideation at TP1 predicted resilience score at TP2, whilst the second (Model (ii)) looked at resilience score at TP1 predicting suicidal ideation at TP2. Models (iii) and (iv) examined whether suicidality predicted resilience change group, and vice versa. In examining resilience group change and its association with suicidality, three groups (Stable/Decliners/Improvers), were compared whereby Stable was the reference group. Models (v – viii) followed the same format as Models (i – iv); here, suicidal ideation was measured as change in suicidal ideation between the two time points. Covariates were added to all Models (i<sub>a</sub> – viii<sub>a</sub>). Analyses were undertaken in Mplus v.7.11.



Table 1

*Descriptives at TP1 and TP2 for resilience score, items of the Psychiatric Symptom Frequency Scale (positive responses to items) and covariates.*

Variables	TP1 (n = 1162)	TP2	Change between TP1 and TP2	
			$\chi^2$	t
CD-RISC (resilience) score (mean, s.d.)	64.15 (11.43)	60.89 (13.06)	-	10.39*
Psychiatric Symptom Frequency Scale Item;				
(1) Life hardly worth living (n, %)	139 (12)	147 (12.7)	147.34*	-
(2) Thought they were better off dead (n, %)	87 (7.5)	117 (10.1)	192.09*	-
(3) Thought of taking one's own life (n, %)	68 (5.9)	102 (8.8)	144.27*	-
(4) Taking one's life only way out of their problems (n, %)	28 (2.5)	59 (5.1)	99.32*	-
TP1 Covariates;				
Low Mastery (mean, s.d.)	11.79 (3.49)	-	-	-
Anxiety (mean, s.d.)	3.65 (2.68)	-	-	-
Depression (mean, s.d.)	2.58 (2.39)	-	-	-
<i>Behavioural Activation System Drive</i> (mean, s.d.)	10.73 (2.43)	-	-	-
<i>Behavioural Activation System Reward</i> (mean, s.d.)	17.10 (2.05)	-	-	-
<i>Behavioural Inhibition System (mean, s.d.)</i>	21.19 (3.60)	-	-	-
Life Satisfaction (mean, s.d.)	26.46 (6.66)	-	-	-
Social Network (mean, s.d.)	18.50 (4.87)	-	-	-
Rumination (mean, s.d.)	8.79 (5.87)	-	-	-

$\chi^2$ , Chi-squared; t, t-test; s.d., standard deviation

\* $p < 0.001$

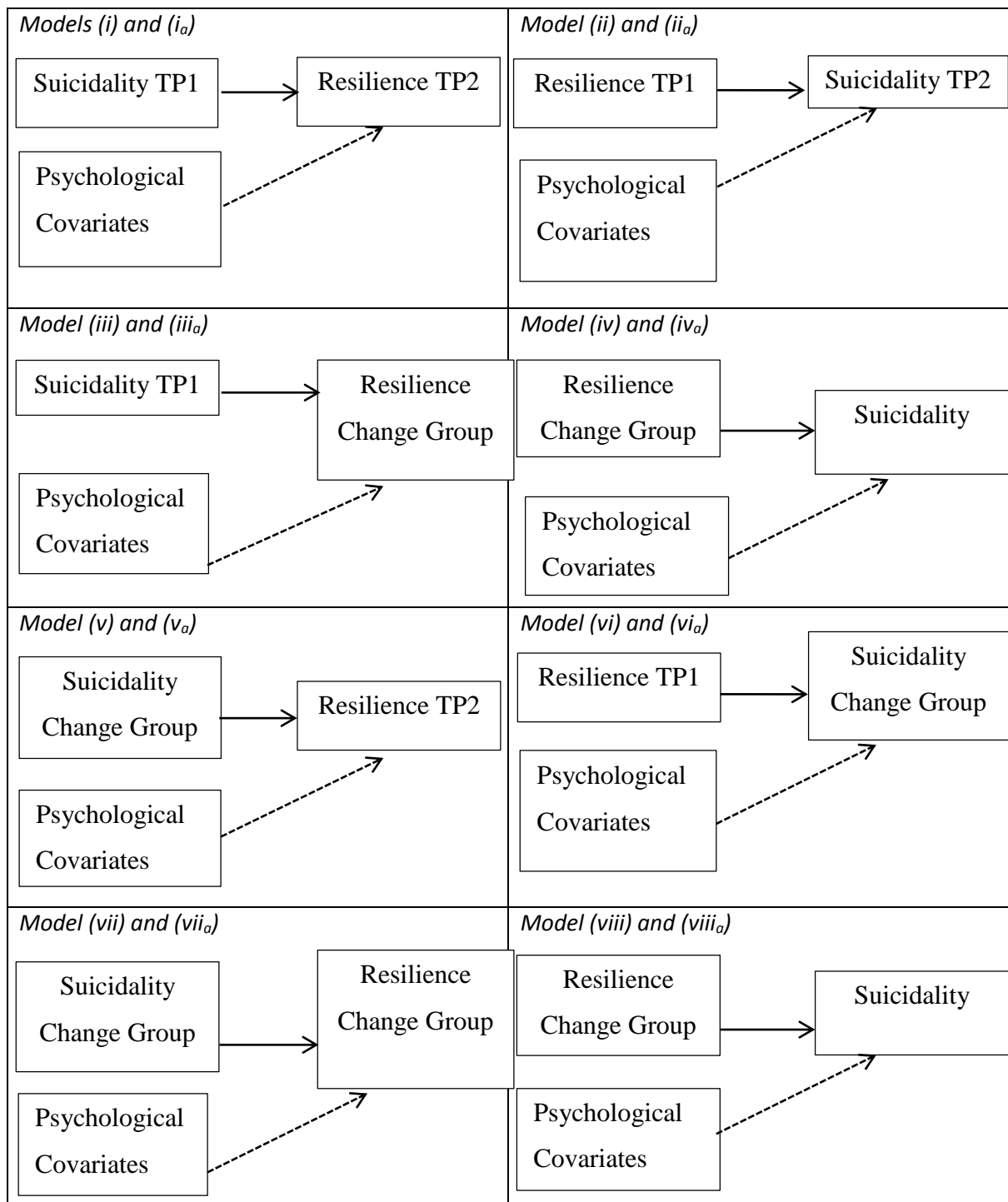


Figure 1

Multinomial regression models used to examine the association between resilience and suicidality over time. Models (i<sub>a</sub> - viii<sub>a</sub>; indicated by dotted arrow) are as models 1 – 8, but controlling for psychological covariates (i.e., depression, anxiety, rumination).

## 8.5 Results

Descriptive statistics for the covariates between the two time points are reported in Table 1. Bivariate correlation between resilience scores measured at both time points was strong ( $r = .65, p < 0.001$ ). Robust associations for all items of the PSFS between time points were observed. Participants who experienced SI at TP1, were more likely to report it at TP2 for all four PSFS items (Item 1, OR = 8.71, 95% CI 6.27 – 12.10,  $p < 0.001$ ; Item 2, OR = 14.51, 95% CI 9.73 – 21.64,  $p < 0.001$ ; Item 3 OR = 12.55, 95% CI 8.10 – 19.44,  $p < 0.001$ ; Item 4 OR = 18.78, 95% CI 9.71 – 36.33,  $p < 0.001$ ).

**8.5.1 Suicidality at TP1 predicting resilience score at TP2.** The first model (i) examined the effects of SI at TP1 on resilience at TP2. All four PSFS items were associated with lower resilience scores four years later: (Item 1,  $\beta = -0.23$ , s.e. = 0.02,  $p < 0.001$ ; Item 2,  $\beta = -0.16$ , s.e. = 0.02,  $p < 0.001$ ; Item 3,  $\beta = -0.15$ , s.e. = 0.02,  $p < 0.001$ ; Item 4,  $\beta = -0.14$ , s.e. = 0.02,  $p < 0.001$ ). However, when psychological covariates were added (Model i<sub>a</sub>), the relationship no longer remained significant (Table 2 [a]). Inclusion of covariates improved model fit (Item 1  $AIC_{unadjusted} = 9280.13$  vs.  $AIC_{adjusted} = 8689.54$ ; Item 2  $AIC_{unadjusted} = 9310.83$  vs.  $AIC_{adjusted} = 8690.47$ ; Item 3  $AIC_{unadjusted} = 9313.62$  vs.  $AIC_{adjusted} = 8690.06$ ; Item 4  $AIC_{unadjusted} = 9308.50$  vs.  $AIC_{adjusted} = 8683.31$ ).

Resilience score at TP1 predicting suicidality at TP2.

The second model (ii) examined whether resilience at TP1 predicted SI at TP2. Higher levels of resilience were associated with lower likelihood of SI on all four PSFS items (Item 1, OR = 0.93, 95% CI 0.92 – 0.95,  $p < 0.001$ ; Item 2, OR =

0.94, 95% CI 0.92 – 0.95,  $p < 0.001$ ; Item 3, OR = 0.95, 95% CI 0.93 – 0.97,  $p < 0.001$ ; Item 4, OR = 0.94, 95% CI 0.91 – 0.96,  $p < 0.001$ ). As with Model ia, adjusting for covariates (Model [ii<sub>a</sub>]) improved model fit (Item 1  $AIC_{unadjusted} = 836.01$  vs.  $AIC_{adjusted} = 743.01$ ; Item 2  $AIC_{unadjusted} = 730.15$  vs.  $AIC_{adjusted} = 650.72$ ; Item 3  $AIC_{unadjusted} = 679.46$  vs.  $AIC_{adjusted} = 617.09$ ; Item 4  $AIC_{unadjusted} = 454.67$  vs.  $AIC_{adjusted} = 424.51$ ), however, resilience at TP1 no longer predicted suicidality at TP2 (Table 3 [a]).

**8.5.2 Suicidality at TP1 predicting resilience change group.** Since level of suicidality and resilience were unrelated to distal outcomes when controlling for covariates, we examined the extent to which change in resilience or suicidality was associated with distal outcomes. As a significant amount of variance (42%) in resilience at TP2 was unaccounted for by prior resilience at TP1, there may be stronger associations between suicidality and change in resilience. Model (iii) examined the effects of suicidality at TP1 predicting resilience change group ('Stable' = reference group). Comparative to those with stable resilience levels, presence of suicidality at TP1 was associated with greater likelihood of decline in resilience for each of the PSFS items (Item 1, RRR = 12.44, CI 6.80 – 22.78,  $p < 0.001$ ; Item 2, RRR = 11.66, 95% CI 5.49 – 24.76,  $p < 0.001$ ; Item 3, RRR = 9.97, 95% CI 4.45 – 22.31,  $p < 0.001$ ; Item 4, RRR = 14.48, 95% CI 4.40 – 47.62,  $p < 0.001$ ).

No difference was found between the 'Improvers' and 'Stable' group on item 4 (RRR = 1.36, 95% CI 0.39 – 4.70  $p = 0.62$ ). However, 'Improvers' reported substantially higher rates of suicidality on items 1 (RRR = 2.40, 95% CI 1.33 –

4.32,  $p < 0.001$ ) item 2 (OR = 2.51, 95% CI 1.19 – 5.25,  $p < 0.01$ ), and 3 (RRR = 2.24, 95% CI 1.01 – 4.95,  $p < 0.04$ ). These results can be explained by ‘Improvers’ reporting increases in resilience but still remaining considerably lower than the ‘Stable’ group at follow-up.

Adjusting for covariates (Model iii<sub>a</sub>) attenuated the association between suicidality and resilience change group (Table 2, [b] and [c]). Model fit improved from inclusion of covariates for both ‘Improvers’ and ‘Decliners’ (Item 1  $AIC_{unadjusted} = 3146.87$  vs.  $AIC_{adjusted} = 1454.34$ ; Item 2  $AIC_{unadjusted} = 3192.41$  vs.  $AIC_{adjusted} = 1456.46$ ; Item 3  $AIC_{unadjusted} = 3213.64$  vs.  $AIC_{adjusted} = 1455.20$ ; Item 4  $AIC_{unadjusted} = 3209.06$  vs.  $AIC_{adjusted} = 1456.21$ ).

Table 2

*Parameter estimates for covariates in adjusted Models  $i_a$ ,  $iii_a$  and  $v_a$*

Variables	CD-RISC			
	b (s.e.)	b (s.e.)	b (s.e.)	b (s.e.)
<b>(a) Model <math>i_a</math></b>				
SI Item 1	-1.05 (1.08)	-	-	-
SI Item 2	-	0.11 (1.29)	-	-
SI Item 3	-	-	-0.90 (1.39)	-
SI Item 4	-	-	-	-1.62 (2.07)
<b>(b) Model <math>iii_a</math> – Decliner Resilience Group</b>				
SI Item 1	0.63 (0.56)	-	-	-
SI Item 2	-	0.05 (0.68)	-	-
SI Item 3	-	-	0.86 (0.88)	-
SI Item 4	-	-	-	-0.35 (1.25)
<b>(c) Model <math>iii_a</math> – Improvers Resilience Group</b>				
SI Item 1	0.25 (0.50)	-	-	-
SI Item 2	-	-0.00 (0.61)	-	-
SI Item 3	-	-	0.86 (0.82)	-
SI Item 4	-	-	-	-0.47 (1.17)
<b>(d) Model <math>v_a</math> – Suicidal Change Group</b>				
SI No longer suicidal	0.54 (1.80)	2.25 (2.37)	2.09 (2.88)	10.75** (4.02)
SI Became suicidal	-0.53 (1.71)	-2.44 (1.83)	-0.82 (1.96)	-0.90 (2.25)
SI Always suicidal	0.10 (2.03)	1.35 (2.37)	0.11 (2.69)	2.02 (6.12)

Suicidal Ideation (SI) Item 1: Life hardly worth living; Item 2: Thought they were better off dead; Item 3: Thought of taking one's own life; Item 4: Taking one's life only way out of their problems.

Models i<sub>a</sub>; Suicidality predicting resilience score at TP2, iii<sub>a</sub>; Suicidality at TP1 predicting resilience change group v<sub>a</sub>; Change in suicidality predicting resilience score at TP2.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

### 8.5.3 Resilience change group predicting suicidality at TP2. In

Model (iv), for two PSFS items, ‘Decliners’ (Item 1, RRR = 7.40, 95% CI 3.80 – 14.35,  $p < 0.001$ ; Item 2, RRR = 7.04, CI 3.33 – 14.88,  $p < 0.001$ ), but not ‘Improvers’ (Item 1, RRR = 1.78, 95% CI 0.00 – 1.20,  $p = 0.07$ ; Item 2, RRR= 1.97, 95% CI 0.96 – 4.01,  $p = 0.06$ ), were more likely to report suicidality at TP2 relative to the ‘Stable’ group. Comparative to the ‘Stable’ Group, both ‘Decliners’ and ‘Improvers’ were more likely to report suicidality at TP2 on items 3 (Decliners, RRR= 4.97, 95% CI 2.22 – 11.14,  $p < 0.001$ ; Improvers, RRR = 2.14, 95% CI 1.01 – 4.55,  $p = 0.04$ ), and 4 (Decliners, RRR = 5.13, CI 1.89 – 13.93,  $p < 0.001$ ; Improvers, RRR = 1.80, 95% CI 0.69 – 4.66,  $p = 0.21$ ). As mentioned previously, increased suicidality risk in the ‘Improvers’ group may be due to initial low resilience scores.

After adjusting for covariates, ‘Decliners’ and ‘Improvers’ were found to be at no increased risk of reporting suicidality at TP2 (Table 3 [b]) compared to the Stable group. Inclusion of covariates improved model fit (Item 1  $AIC_{unadjusted} = 849.15$  vs.  $AIC_{adjusted} = 742.42$ ; Item 2  $AIC_{unadjusted} = 743.36$  vs.  $AIC_{adjusted} = 652.31$ ; Item 3  $AIC_{unadjusted} = 690.20$  vs.  $AIC_{adjusted} = 619.04$ ; Item 4  $AIC_{unadjusted} = 470.44$  vs.  $AIC_{adjusted} = 426.16$ ).

### 8.5.4 Change in suicidality predicting resilience score at TP2. Model (v) assessed whether change in suicidality was associated with resilience score at TP2. For Item 1, ‘No longer suicidal’ ( $\beta = 1.51$ , s.e. = 2.21, $p = 0.49$ ), ‘Became suicidal’ ( $\beta = -1.51$ , s.e. = 2.11, $p = 0.48$ ) and ‘Always suicidal’ ( $\beta = 1.28$ , s.e. = 2.53, $p = 0.61$ ) groups were no more likely to report resilience score at TP2 in



comparison with the 'Never suicidal' group. Items 2 (No longer suicidal  $\beta= 1.75$ , s.e. = 2.81,  $p= 0.53$ ; Became suicidal  $\beta= -2.46$ , s.e. = 2.28,  $p= 0.28$ ; Always suicidal  $\beta= 2.37$ , s.e. = 2.94,  $p= 0.42$ ) and 3 (No longer suicidal  $\beta= 1.97$ , s.e. = 3.47,  $p= 0.57$ ; Became suicidal  $\beta= -1.39$ , s.e. = 2.41,  $p= 0.56$ ; Always suicidal  $\beta= 1.17$ , s.e. = 3.36,  $p= 0.73$ ) observed similar findings. For Item 4, 'No longer suicidal' ( $\beta= 9.92$ , s.e. = 5.02,  $p < 0.05$ ) but not 'Became suicidal' ( $\beta= -0.14$ , s.e. = 2.75,  $p= 0.95$ ) and 'Always suicidal' ( $\beta= 2.70$ , s.e. = 7.63,  $p= 0.72$ ) were more likely to report a decline in resilience at TP2, relative to the 'Never' group. Whilst model fit improved (Item 1  $AIC_{unadjusted} = 4554.54$  vs.  $AIC_{adjusted} = 4256.60$ ; Item 2  $AIC_{unadjusted} = 4553.55$  vs.  $AIC_{adjusted} = 4253.64$ ; Item 3  $AIC_{unadjusted} = 4555.07$  vs.  $AIC_{adjusted} = 4256.07$ ; Item 4  $AIC_{unadjusted} = 4551.85$  vs.  $AIC_{adjusted} = 4249.39$ ), inclusion of covariates (Model [v<sub>a</sub>]; Table 2 [d]) did not strongly attenuate these estimates.

Table 3

*Parameter estimates for covariates in adjusted Models ii<sub>a</sub> and iv<sub>a</sub>.*

Variables	Psychiatric Symptom Frequency Scale Item							
	1		2		3		4	
	RRR	95% CI.	RRR	95% CI.	RRR	95% CI.	RRR	95% CI.
<b>(a) Model ii<sub>a</sub></b>								
Resilience score	1.00	-0.02 – 0.02	1.00	0.98 – 1.03	1.00	0.97 – 1.03	0.99	0.95 – 1.02
<b>(b) Model iv<sub>a</sub></b>								
Resilience (Decliners)	0.85	0.34 – 2.07	0.82	0.34 – 1.69	0.88	0.30 – 2.59	0.61	0.16 – 2.35
Resilience (Improvers)	0.64	0.31 – 1.31	0.76	0.34 – 1.69	0.98	0.43 – 2.25	0.68	0.24 – 1.96

Item 1: Life hardly worth living; Item 2: Thought they were better off dead; Item 3: Thought of taking one's own life; Item 4: Taking one's life only way out of their problems; RRR, relative risk ratio; CI, confidence interval.

Models ii<sub>a</sub>; Resilience score at TP1 predicting suicidality at TP2 iv<sub>a</sub>; Resilience change group predicting suicidality at TP2

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

### **8.5.5 Resilience score at TP1 predicting change in suicidality.** In

Model (iv), for those who did not report suicidality at TP2 ('No longer suicidal'), a significant association was observed for Item 1 of the PSFS, regardless of the addition of covariates. Compared to the 'Never suicidal' group, Items 2 - 4 showed no difference (Table 4, [a]) between the adjusted and unadjusted models.

Both the 'Became suicidal' and 'Always suicidal' groups, in comparison to the 'Never suicidal' reference group, showed no differences in resilience predicting change in suicidality (Table 4 [b & c]). This remained so for the 'Always suicidal' group when covariates were added. For the 'Became suicidal' group though, a significant association was found at the  $p = 0.04$  level (Table 4, [b]). Increased resilience levels in this group may be due to initial high resilience scores. Model fit improved with the addition of covariates (Item 1  $AIC_{unadjusted} = 1090.20$  vs.  $AIC_{adjusted} = 713.08$ ; Item 2  $AIC_{unadjusted} = 852.49$  vs.  $AIC_{adjusted} = 571.85$ ; Item 3  $AIC_{unadjusted} = 765.52$  vs.  $AIC_{adjusted} = 504.95$ ; Item 4  $AIC_{unadjusted} = 477.88$  vs.  $AIC_{adjusted} = 308.81$ ).

Table 4

*Model iv and iv<sub>a</sub> – Does resilience score at TP1 predict change in suicidality?*

	CD-RISC							
	RRR	95% CI.	RRR	95% CI.	RRR	95% CI.	RRR	95% CI.
<b>(a) No longer suicidal</b>								
Model (iv) Resilience Score	1.03**	1.00 – 1.05	1.02	0.99 – 1.05	1.02	0.99 – 1.06	1.03	0.98 – 1.09
Model (iv <sub>a</sub> ) Resilience Score	1.03*	1.00 – 1.07	1.02	0.98 – 1.06	1.02	0.98 – 1.07	1.07	0.94 – 1.22
<b>(b) Became suicidal</b>								
Model (iv) Resilience Score	1.02	0.99 – 1.05	1.01	0.97 – 1.05	0.99	0.95 – 1.04	1.01	0.94 – 1.09
Model (iv <sub>a</sub> ) Resilience Score	1.03*	0.99 – 1.08	1.01	0.96 – 1.06	0.99	0.93 – 1.06	1.06	0.92 – 1.22
<b>(b) Always suicidal</b>								
Model (iv) Resilience Score	1.00	0.98 – 1.04	1.00	0.97 – 1.03	1.02	0.98 – 1.06	1.02	0.97 – 1.09
Model (iv <sub>a</sub> ) Resilience Score	1.00	0.96 – 1.04	0.99	0.95 – 1.04	1.01	0.96 – 1.07	1.04	0.91 – 1.19

Model iv = unadjusted model; Model iv<sub>a</sub> = adjusted model; RRR, relative risk ratio;; CI, confidence interval. \* $p < 0.05$ , \*\* $p < 0.01$ ,

\*\*\* $p < 0.001$

### **8.5.6 Change in suicidality predicting resilience change group.**

In comparison to those with stable resilience levels, change in suicidality was not associated with a greater likelihood of decline or improvement in resilience for the four PSFS items (Table 5, [a] and [b]). With exception to Item 2 for the ‘Always suicidal’ group, adjusted analysis (Model [vii<sub>a</sub>], Table 5, [c] and [d]) did not strongly attenuate these estimates. Here, the ‘Always suicidal’ group were more likely to report decline in resilience. This indicates that for this cohort, individuals who consistently reported suicidal ideation are vulnerable for declines in resilience. Inclusion of covariates improved model fit (Item 1  $AIC_{unadjusted} = 1661.94$  vs.  $AIC_{adjusted} = 1661.97$ ; Item 2  $AIC_{unadjusted} = 1659.93$  vs.  $AIC_{adjusted} = 1659.93$ ; Item 3  $AIC_{unadjusted} = 1661.46$  vs.  $AIC_{adjusted} = 1661.46$ ; Item 4  $AIC_{unadjusted} = 1657.65$  vs.  $AIC_{adjusted} = 1657.65$ ).

Table 5

*Model vii and vii<sub>a</sub> – Does change in suicidality predict resilience change group?*

	CD-RISC							
	RRR	95% CI.	RRR	95% CI.	RRR	95% CI.	RRR	95% CI.
<b>(a) Model vii Decliners Resilience Group</b>								
SI No longer suicidal	1.29	0.53 – 3.10	1.82	0.52 – 6.35	1.21	0.36 – 4.06	1.52	0.25 – 9.24
SI Became suicidal	1.24	0.57 – 2.72	0.78	0.32 – 1.91	0.76	0.31 – 1.85	0.68	0.24 – 1.95
SI Always suicidal	0.86	0.33 – 2.26	0.89	0.29 – 2.72	0.43	0.11 – 1.71	0.00	-1.12 – 0.87
<b>(b) Model vii Improvers Resilience Group</b>								
SI No longer suicidal	0.93	0.45 – 1.90	1.27	0.43 – 3.75	0.75	0.27 – 2.08	0.72	0.14 – 3.58
SI Became suicidal	0.79	0.41 – 1.50	0.84	0.43 – 1.65	0.70	0.36 – 1.39	0.61	0.28 – 1.34
SI Always suicidal	0.81	0.39 – 1.68	0.83	0.35 – 1.96	0.60	0.25 – 1.47	0.64	0.17 – 2.42
<b>(c) Model vii<sub>a</sub> Decliners Resilience Group</b>								
SI No longer suicidal	1.20	0.30 – 4.92	3.86	0.59 – 25.46	2.53	0.25 – 25.32	3.72	0.19 – 74.90
SI Became suicidal	2.17	0.50 – 9.35	0.57	0.10 – 3.17	0.45	0.08 – 2.48	0.38	0.05 – 3.711



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SI Always suicidal	1.42	0.28 – 7.13	7.60*	0.99 – 52.23	1.05	0.14 – 8.00	0.00	-5.11 – 4.74
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**(d) Model vii<sub>a</sub> Improvers Resilience Group**

SI No longer suicidal	0.76	0.30 – 1.91	1.41	0.35 – 5.62	0.98	0.17 – 5.60	1.16	0.10 – 13.35
SI Became suicidal	1.14	0.39 – 3.29	0.72	0.25 – 2.03	0.55	0.19 – 1.57	0.51	0.15 – 1.80
SI Always suicidal	0.69	0.22 – 2.18	2.32	0.49 – 10.99	0.56	0.13 – 2.44	0.19	0.01 – 3.24

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Model vii = unadjusted; Model vii<sub>a</sub> = adjusted; SI – suicidal ideation; RRR, relative risk ratio; CI, confidence interval.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

### **8.5.7 Resilience change group predicting change in suicidality.**

Examination as to whether resilience change group predicted change in suicidality (Model [viii]) revealed that comparative to ‘Never suicidal,’ no differences were observed in the other three change groups (Table 6). Addition of covariates did not alter this result; however for Item 2, Decline in resilience predicted change in suicidality for the ‘Always suicidal’ group. Decline in resilience was also significantly predictive of an individual no longer being suicidal. This could be attributed to resilience still being low, or initial scores being slightly higher, despite no ideation having not occurred within the previous 12 months. Item 4 of the PSFS was unable to be calculated due to insufficient numbers in both change groups. Inclusion of covariates improved model fit (Item 1  $AIC_{unadjusted} = 1356.10$  vs.  $AIC_{adjusted} = 887.61$ ; Item 2  $AIC_{unadjusted} = 1064.115$  vs.  $AIC_{adjusted} = 600.43$ ; Item 3  $AIC_{unadjusted} = 938.48$  vs.  $AIC_{adjusted} = 600.43$ ).

Table 6

*Model viii and viii<sub>a</sub> – Does resilience change group predict change in suicidality?*

	CD-RISC					
	RRR	95% CI.	RRR	95% CI.	RRR	95% CI.
<b>Model viii - Unadjusted</b>						
<b>(a) Decliners Resilience Group</b>						
SI No longer suicidal	1.16	0.33 – 4.12	1.12	0.26 – 4.88	2.32	0.38 – 14.08
SI Became suicidal	1.50	0.29 – 7.78	2.04	0.24 – 17.68	2.80	0.26 – 29.80
SI Always suicidal	1.44	0.30 – 6.89	0.88	0.14 – 5.45	1.75	0.21 – 14.43
<b>(b) Improvers Resilience Group</b>						
SI No longer suicidal	1.24	0.47 – 3.24	1.21	0.39 – 3.76	1.66	0.51 – 5.37
SI Became suicidal	1.15	0.31 – 4.21	1.53	0.26 – 9.16	1.24	0.22 – 7.15
SI Always suicidal	0.97	0.28 – 3.34	1.02	0.25 – 4.10	1.17	0.28 – 4.89
<b>Model viii - Adjusted</b>						
<b>(c) Decliners Resilience Group</b>						
SI No longer suicidal	0.78	0.09 – 6.76	0.13*	0.01 – 1.96	0.95	0.06 – 16.48
SI Became suicidal	0.97	0.06 – 15.65	0.67	0.02 – 25.68	2.53	0.04 – 175.55
SI Always suicidal	1.51	0.11 – 21.24	0.08	0.00 – 1.99	0.44	0.01 – 13.23
<b>(d) Improvers Resilience Group</b>						
SI No longer suicidal	1.39	0.35 – 5.46	0.56	0.08 – 3.77	1.38	0.23 – 8.53

SI Became suicidal	1.14	0.20 – 6.72	0.78	0.06 –	1.47	0.08 – 25.99
				10.80		
SI Always suicidal	1.15	0.20 – 6.85	0.29*	0.03 – 2.64	0.59	0.07 – 5.16

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SI = suicidal ideation; RRR, relative risk ratio; CI, confidence interval. \* $p < 0.05$

## Discussion

Though links between resilience and suicidality have been reported, designs have involved cross-sectional and population-specific samples (e.g., student, geriatric) (Heisel & Flett, 2008; Osman et al., 2004; Rutter, P. A. et al., 2008). Consequently, this study set out to determine whether resilience was associated with SI over time, or conversely, whether SI was associated with resilience at follow-up. Overall, neither level of or change in resilience was associated with level or change in suicidality risk; nor was level or change in suicidality risk linked to change or level of resilience in fully-adjusted models.

Exploration of low resilience being a predictor/outcome was significant to those who reported suicidality at both time points, or at the first time point only. Overall, results suggest resilience does not provide any unique contribution to the prediction of suicidality risk, after accounting for other risk factors. Suicidality, similarly, as a predictor/outcome, was significant when resilience was low, with effects diminished when covariates were added. Examination of change in suicidality between the two time points observed no difference in predicting or being an outcome of resilience between those who were ‘never suicidal,’ and those who experienced suicidality at one or both time points. This was irrespective of whether risk factors were controlled for. An exception to this was when resilience change group was examined to determine whether each group predicted change in suicidality. Irrespective of the addition of these factors, decline in resilience was still predictive for

suicidal ideation being present at both time points. This is broadly supportive of prior research, that observed resilience to be associated with suicidal ideation; however, when covariates were added, this relationship diminished (Liu et al., 2014). Findings also substantiate links between a reduced likelihood of suicidal ideation, and high levels of resilience (Fergusson et al., 2003).

Results from the present study address whether suicidality predicts resilience (and contrariwise) in relation to future resilience and suicidality, whilst offering significant insight into the prediction of wellbeing across time. Consistent with previous findings linking low resilience with increased suicidality likelihood (Liu et al., 2014; Roy et al., 2006, 2007), individuals whose resilience (CD-RISC) scores attenuated between time points (Decliner group) significantly predicted suicidality across all four PSFS items at the second time point. Those whose suicidality scores persisted (Always), or lessened (Decrease) over time, were associated with low resilience for two PSFS items (i.e., “thought about taking their own life,” “thought that taking your life was the only way out of your problems?”). It also became evident that there was a greater vulnerability to suicidal ideation when resilience levels decreased.

## **8.6 Limitations and Strengths**

Limitations of the study include that findings can only be reliably generalised to an Australian population. Thus, caution is needed when interpreting the current study findings. Strengths include the sample being

randomly drawn from the Australian electoral roll. Further, as participant selection was voluntary, and not guided by the risk of suicidal ideation, the current study offers a unique, non-clinical perspective of suicidality and resilience in the general community over time.

## **8.7 Conclusion**

Using data from the PATH Through Life Project provides a novel perspective of resilience and suicidality across time. Though suicidality and low resilience were associated, this diminished when psychological covariates were introduced. An exception to this was observed among those whose resilience score improved over time, and when suicidality was measured as four discrete groups. As such, the use of assessments or measures determining risk of suicidality, or level of resilience, provides only a snapshot in time. Reliability of prediction of suicidality or resilience should be treated cautiously, due to the varying influence of psychological factors.

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## **Chapter Nine: General Discussion**

This final chapter summarises, discusses and integrates information presented in the previous chapters. In conducting non-clinically-based studies, findings from the current thesis provide in-depth information about resilience and suicidality in the general community. The relevance of the results of this thesis to current literature, implications, methodological issues and future research directions will now be addressed.

### **9.1 Main Research Findings**

The main aims of the current thesis were (1) to explore whether a combination of proxy measures could be compiled as a measure of resilience, and if so, whether it was invariant across age and gender; (2) to establish the underlying factor structure of a specified measure of resilience across the lifespan and gender, from data derived from a community based sample; (3) to examine cross-sectional association between low resilience levels and suicidality across three age cohorts; and (4) to establish whether low resilience predicts future suicidality, and in turn whether presence of suicidality predicts future low resilience levels.

**9.1.1 Measurement of resilience.** Within the literature, resilience has been frequently measured using non-specific measures deemed to be related to the construct of resilience. As such, the current thesis explored whether a combination of these proxy measures could be used to assess resilience within a community based sample. A comparison was made between this measure, and the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). This was to ascertain whether non-specific measures could assess resilience as comprehensively

as a measure specifically designed to measure resilience. The potential invariance of the combination of non-specific measures as a scale of resilience was also explored.

Differences across gender for each age cohort (young, midlife and older), and between the three age cohorts were revealed. This infers that use of non-specific measures may not function equally across gender, or age. Personality, health and wellbeing covariates were found not to be equally representative across age. Additional analysis demonstrated differences between age cohorts, and between gender for each cohort. However, the magnitude of these differences (e.g., between gender for mastery) though significant, were small.

The structural model (i.e., a measure comprising of proxy measures of resilience) was found not to function as effectively for the two older cohorts compared to the youngest. The amount of variance explained in the total sample was only 50% (44% in the oldest cohort and 65% in the youngest). When stratified by gender, the proportion of variance explained elucidated by the proxy measures was still insufficient to consider them equivalent to a specifically designed measure (i.e., CD-RISC; youngest - men 69%; women 64%; midlife - men 57%; women 56%; and oldest - men 47%; women 44%). Consequently, across age groups and between gender for each cohort, an indirect measure of resilience could not be constructed that explained resilience as effectively as the CD-RISC.

**9.1.2 Invariance and reliability of a resilience measure.** As independent measures were identified as being insufficient for measuring the construct of resilience (Study 1), Study 2 set out to assess the invariance and reliability of a

resilience-specific measure (i.e., the CD-RISC). That is, the utility of the CD-RISC (Connor & Davidson, 2003) as a resilience measure across the lifespan and between genders within a community based sample. A factor analysis of this measure extended Burns and Anstey's (2010) study, where three items related to relationships, faith and why good or bad things happen, were observed to have low loadings. These were omitted from subsequent analyses. Accordingly, a 22-item version of the CD-RISC was examined. Results identified the CD-RISC as invariant across the lifespan and gender within each age cohort. Thus, current evidence supports the CD-RISC measure to be invariant in Australian community samples and reliable across age and gender.

**9.1.3 The association between resilience and suicidality.** Few studies have explored the role of resilience on suicidality (Heisel & Flett, 2008; Osman et al., 2004; Rutter, P. A. et al., 2008). Those that have, have concentrated upon adolescent, young adult, university, geriatric and clinical populations (Heisel & Flett, 2008; Johnson, Gooding, Wood & Tarrier, 2010; Osman et al., 2004; Roy et al., 2007; Rutter, P. A. et al., 2008). Few investigations have been conducted with general population samples (Johnson et al., 2011). With the CD-RISC shown to be a reliable measure, Study 3 reports the use of the CD-RISC to examine resilience in a community-based sample (PATH Project). Results highlighted low resilience as being associated with an increased risk for suicidality across the lifespan (Liu et al., 2014). However, this effect became redundant for those in the younger (28 – 32 years) and older (68 – 72 years) cohorts when models adjusted for other suicidality risk factors. While this did occur amongst the midlife participants (48 – 52 years)



for items indicative of less serious suicidality, the more severe questions (“thought about taking your own life” and ‘thought that taking your own life was the only way out of your problems’) did continue to report increased likelihood of suicidality in fully-adjusted models. This suggests that in a community-based population, compared to the younger and oldest cohorts, the midlife group had a greater vulnerability to suicidal ideation when resilience levels were low.

**9.1.4 Predicting future positive or negative wellbeing.** As links between low resilience and suicidality were established in Study 3, Study 4 determined to ascertain whether this association persisted over time. Participants consisted of the youngest cohort (aged 28 – 32 years at time point 1; aged 32 – 36 at time point 2) of the PATH Project. As with Study 3, findings demonstrated that suicidality and low resilience were significantly related across time. Once psychological covariates were controlled, however, this relationship became redundant. Suicidality risk/resilience factors (e.g., anxiety, mastery levels) were shown to affect these predictions. An exception was reported amongst participants whose resilience score improved over time. In this case, the associations between resilience and suicidality were not significant. Further, irrespective of controlling of psychological covariates, a decline in resilience was predictive of suicidal ideation at both time points. As such, the prediction of resilience or suicidality should be undertaken cautiously.

## **9.2 Comparison of the Current Thesis with Existing Literature**

In this section, aspects from each of the aforementioned studies will be discussed, before broadening the commentary to explore differences and similarities

with previous literature.

**9.2.1 Assessing resilience.** As detailed in Chapter 2, application of non-specific or partially linked measures to evaluate resilience has led to differences in the criteria and definitions used across studies (Stouthamer-Loeber et al., 1993; Windle, 2010). An abundance of criticism has been levelled at resilience research, including suggestions that the resilience construct has not been fully identified and/or effectively represented (Ahern et al., 2006; Friborg et al., 2005; Herrman et al., 2011; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006). Despite these issues, no detailed analysis of non-specific measures of resilience has been previously undertaken in order to assess the construct as thoroughly as the current thesis within its first Study. Chapter five (Study 1) demonstrated that indirect measures did not identify resilience as comprehensively as the CD-RISC, a resilience-specific measure (Connor & Davidson, 2003). Consequently, this thesis adds further evidence to extant studies by clearly establishing that assessment of resilience using non-specific measures in a community based sample is an unreliable, non-valid method.

The validity and reliability of direct measures of resilience, as highlighted in Chapter 2, is wanting. It is probable that the discord and inconsistency (discussed earlier in Chapters 2, 5 and 6) in the resilience literature, contributed to a lack of an acknowledged “gold standard” resilience measure (Ahern et al., 2006; Friborg et al., 2005; Herrman et al., 2011; Hjemdal et al., 2007; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Lundman et al., 2007; Von Soest et al., 2010; Windle et al., 2011). Research on the effectiveness of these measures has either been

conducted by the authors of the measures being investigated [(e.g., the Resilience Scale for Adults (Friborg et al., 2006), the Resilience Scale for Adolescents (Friborg et al., 2006; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006)], or has used specific samples [(e.g., a university pool, older women) (Friborg et al., 2009; Friborg et al., 2003; Friborg et al., 2006; Hjemdal et al., 2011; Jowkar et al., 2010; Wagnild & Young, 1993)]. To support both researchers and clinicians needing a psychometrically strong measure of resilience, the most promising resilience-specific measure, the CD-RISC (Connor & Davidson, 2003), would benefit from further validation prior to further use (see Chapter 6).

The CD-RISC was introduced into the PATH Thru Life Project (Anstey et al., 2012) at wave 3. It has been utilised in a range of samples and age cohorts (e.g., educational, clinical, sporting; child, adult and elderly) and in three large scale community based studies (Burns & Anstey, 2010; Burns et al., 2011; Campbell-Sills et al., 2006; Campbell-Sills & Stein, 2007; Connor, 2006; Connor & Davidson, 2003; Gucciardi et al., 2011; Lamond et al., 2008; Roy et al., 2007; Vaishnavi et al., 2007). Chapter 6 extends Gucciardi et al.'s (2011) and Burn & Anstey's (2010) work by stratifying analyses across the lifespan and between gender.

The 22-item form of the CD-RISC was found to be invariant across gender, and in a variety of age groups. In addition, as detailed in Chapter 8, it can be used to assess resilience over time. This implies that the CD-RISC has the capacity to be used in different communities in the Australian population to evaluate resilience.

**9.2.2 Suicidality as an outcome.** Though interest into the role of resilience in suicidality has increased over recent years, whether it alters suicidality

risk is not well understood (Johnson, Gooding, Wood, Taylor, et al., 2010; Johnson et al., 2011; Roy et al., 2007). The current thesis attended to this deficit, as until now, whether resilience is negatively associated with suicidality risk across age in the general population, was yet to be adequately investigated (Johnson et al., 2011). If a population is to flourish, attention needs to be directed towards healthy individuals as well as clinical populations (The Government Office for Science, 2008).

Introduction of psychological constructs such as mastery, positive affect and employment status, diminished the influence of low resilience on the presence of self-reported suicidal thoughts and behaviours for the PATH cohorts. This suggests that positive influences including pro-social behaviours, supportive associations with family, peers and other adults (e.g., teachers) and mastery promotes resilience, and accords with resilience literature (Everall et al., 2006; Friborg et al., 2003; Jew et al., 1999; Masten et al., 1990; Schoon, 2006; Werner, 1993, 2005; Werner & Smith, 1979). Social support, for instance, shown to be important in enabling the development and maintenance of resilience (Everall et al., 2006; Herrman et al., 2011; Lamond et al., 2008; Netuveli et al., 2008; Purcell et al., 2011; Vanderhorst & McLaren, 2005; Wagnild, 2003), was found to reduce the effects of low resilience on suicidality for the youngest and oldest cohorts. Thus, while individuals may experience low levels of resilience, and potentially be more susceptible to suicidality, internal (e.g., perception of a masterful self) and external (e.g., support from a trusted individual) factors can attenuate this effect (Everall et al., 2006; Rutter, P. A. et al., 2008; Wells, 2009).

Nevertheless, introduction of factors such as life satisfaction and social networks did little to alter the effect of low resilience on suicidality for those in mid-age, as demonstrated by analysis of the midlife cohort in this thesis. These findings are in accord with suicidality research (Maris, 1995). Experiences of significant life changes typically occur at midlife (e.g., divorce, death of a parent); further adding to daily and/or life stress; this appears to have an additional impact on resilience levels (Afifi & Macmillan, 2011; Everall et al., 2006; Jew et al., 1999; Levine, 2009; Netuveli et al., 2008).

**9.2.3 Resilience and suicidality over time.** While Chapter 8 established the influence of low resilience on suicidality outcomes, Chapter 9 focused on exploring this association over time, particularly as prior longitudinal exploration has been limited (Chan et al., 2007; Marty et al., 2010). Chapters 8 and 9 (Studies 3 and 4) contribute to our understanding of the role of resilience in a non-vulnerable/non-clinical sample, whilst offering a unique perspective of resilience across time in adulthood. Further, in utilising a sample that randomly selected participants from the electoral role, Chapters 8 and 9 present studies which differ from other resilience and suicidality research. They do this by adding to existing findings derived from high-risk samples (Cowen et al., 1997; Cowen et al., 1990; Werner, 1993, 2005; Werner & Smith, 1979), by including a community non-clinical sample. This means that more is now known about individuals with varying degrees of resilience, regardless of suicidality risk status. Furthermore, as resilience was measured categorically and continuously, this permitted the measurement of the distribution of scores as well as variations in the overall scale of the CD-RISC.

Consistent with previous research, high resilience was associated with a reduced likelihood of suicidality, while suicidality was linked to low resilience (Fergusson et al., 2003; Roy et al., 2006, 2007). Suicidality change was not found to be predictive of low resilience, when compared to the 'Never suicidal' reference group. The effectiveness of resilience/suicidality in being a predictor/outcome (including reciprocally), became redundant when models were adjusted for suicidality risk/resilience factors. Consequently, though resilience and suicidality measures can be useful in ascertaining risk status, they should not be considered as sole predictors for calculating future wellbeing. This is due to psychological covariates shown in the current thesis rendering redundant the measures assessing suicidality and resilience predictive ability, and thus it is essential for other variables (e.g., rumination, life satisfaction) to be considered when evaluating future risk likelihood. For example, when resilience levels were high, covariates like social network, rumination and life satisfaction were found to remove the predictive capacity of resilience. This is perhaps unsurprising as life satisfaction has been linked to the occurrence of successful ageing (Lamond et al., 2008; Masten & Obradović, 2006; Wagnild, 2003). Rumination, meanwhile, predicts suicidality (Batterham & Christensen, 2012; Fairweather-Schmidt et al., 2007; Smith, J. M. et al., 2006), whilst social support appears vital in facilitating the maintenance or development of individual wellbeing (Everall et al., 2006; Herrman et al., 2011; Kutek et al., 2011; Lamond et al., 2008; McLaren & Challis, 2009; Netuveli et al., 2008; Purcell et al., 2011; Vanderhorst & McLaren, 2005; Wagnild, 2003). So, although inclusion of covariates undermined the capacity of the CD-RISC to predict

suicidality (and the PSFS in estimating low resilience), the utility of these constructs may be in identifying variables that strengthen (or diminish) resilience (and in turn, reduce suicidality risk).

**9.2.4 Noteworthy null findings.** As resilience literature has often utilised measures linked to the construct of resilience (e.g., life events, social support) to assess the role of resilience (Ahern et al., 2006; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Nettles et al., 2000; Stouthamer-Loeber et al., 1993), the current thesis sought to identify whether a reliable structural measure (a model comprising non-resilience-specific measures that assess elements of resilience) could be developed. Subsequently, this model was tested to determine whether the construct of resilience could be adequately explained. If shown to be a reliable measure of resilience, the current thesis intended to use this model to assess resilience at earlier waves where a resilience measure had not been included in the assessment battery.

Although a model of resilience could not be formulated, findings from Chapter 5 were crucial in demonstrating the futility in measuring a construct such as resilience with non-specific measures. This supports literature upholding the view that indirect measures only partially assess resilience (Friborg et al., 2005; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006). Moreover, results indicate that resilience may possess distinct and independent characteristics from related individual elements. Accordingly, this lends support to the suggestion that complex associations exist between variables that enable resilience (Davydov et al., 2010).

**9.2.5 Other findings.** The structural model of resilience (i.e., a combination of proxy measure) used to predict the CD-RISC (Connor & Davidson, 2003) appears most appropriate to the youngest cohort. This may be due to the measures (e.g., the items constituting the measure) having been developed for younger age groups. Consequently, what represents resilience in one cohort may not be so for another. Factors such as anxiety, depression and negative support from family members, for instance, were shown to have the greatest effect on the youngest cohort. These findings are supported by resilience and suicidality literature (Wagnild, 2003; Wells, 2009; Werner, 1993). Parental support is essential in fostering the capacity to be resilient among young individuals (Borowsky et al., 1999; Everall et al., 2006; Fenaughty & Harré, 2003; Werner, 1993). Further, positive support and interactions making life more meaningful have been shown to increase chances for successful adaptation among adults (Wagnild, 2003; Wells, 2009; Werner, 1993). Not surprisingly then, positive affect and positive support from friends was more influential for the midlife group. Life events, meanwhile, can influence resilience positively and negatively in older adults (Everall et al., 2006; Lamond et al., 2008; Lundman et al., 2007; McLean et al., 2008; Netuveli et al., 2008; Wagnild, 2003; Wells, 2009). This was observed within the current thesis where ruminative style and life events conveyed greater impact on the oldest cohort.

When stratifying results by gender, factors such as mastery, positive affect, positive and negative support from friends were more strongly related to resilience in men; this is in accordance with the literature (Werner, 1993). Sources of external support, for instance, appears influential for high risk (and low resilience)



men more than women (Friborg et al., 2003; Hjemdal et al., 2011; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006; Jowkar et al., 2010; Werner, 2005). Consistent with existing literature, items relating to personal competence were linked to resilience among participants (e.g., behaviours that lead to rewards) (Hjemdal et al., 2011; Hjemdal, Friborg, Stiles, Martinussen, et al., 2006). Consequently, findings from Chapter 5 contributed to extant knowledge by demonstrating the influence of different factors on different age cohorts and between gender.

### **9.3 Methodological Considerations: Strengths and Limitations**

With the PATH project being based on a large community based sample, random selection, longitudinal design, and concurrent assessment of the three age groups provides strength to the current thesis findings. In studying individuals from a range of ages, different perspectives have been assembled. By 2019, cohort effects are likely to underpin differences observed among 40 year olds at 1999, and 32 year olds at 2012. Furthermore, with sampling bias being limited and high statistical power being evident, this allows for discrimination between age and cohort effects (Anstey et al., 2012). A wide range of covariates is also available in the PATH Project; this provides a diverse assortment of predictors that can be examined. Other strengths of the current thesis include the assessment of resilience from a large, non-clinical sample. With approximately equivalent members of both genders in each cohort, results are robust. This suggests that the study findings are generalisable between gender, across the lifespan. As this study involved Australians in the PATH project, this provided an alternative cultural snapshot for

the CD-RISC as the measure was developed with US samples (Connor & Davidson, 2003).

There are limitations, however, in using a data source such as PATH. Though within the PATH Project, dropout rates have been relatively low, but as mentioned in Chapter 4, attrition has the capacity to bias samples towards being healthier. For the current thesis, this resulted in a smaller sample for Studies 3 and 4, as only those who completed the resilience measure were assessed. With respect to the suicidal ideation scale, particularly for Study 4, this also resulted in less power being available for analysis, as fewer were suicidal (see Table 5, Chapter 2). Specific measures may not be as in-depth compared to that of a study with a single focus. Information of completed suicides was not available. Participants also self-report, so data are dependent on memory recall and may be subject to social desirability bias. Measures may not be equally representative between age or across gender. Data are restricted to the Canberra and Queanbeyan population at wave 1, and the limited age range means that results cannot be generalised to all adult ages. Other considerations include that measures selected for the current thesis were limited by the numbers available from the PATH dataset. Consequently, use of alternative measures may have led to different results.

Despite these limitations, findings from studies 1 – 4 contribute to the literature by providing further validation to methods used in assessing resilience. They also demonstrate the impact of the role of resilience on suicidality.

#### **9.4 Implications**

**9.4.1 Clinical implications.** Clinicians should consider examining resilience, and if they choose to do so, the CD-RISC (in either its 22- or shorter 10-item version, depending on time constraints) is suggested as being the most optimal measure to complete the task. Scales examining social support, mastery and rumination may be beneficial in providing additional characterisation of a person's current health status. Moreover, low resilience scores were related to increased suicidality risk (Chapters 7 and 8). As such, it is recommended that both constructs be tracked among patients, so that those with low resilience but who are not reporting suicidality can be monitored, to reduce future risk.

**9.4.2 Research implications.** Several issues within the area of resilience and suicidality research deserve particular attention. First, as highlighted previously in this thesis, researchers are encouraged to adopt a resilience-specific measure (e.g., the CD-RISC) rather than using a compilation of proxy scales of resilience when examining the construct of resilience. The CD-RISC is established by the current thesis as invariant across age and gender, and of being a unitary measure in both its 22- and 25-item format. Also established as a 10-item measure (Campbell - Sills & Stein, 2007; Gucciardi et al., 2011), this provides researchers with a resilience measure, in three different formats. A deeper understanding of resilience and its contributing factors will provide a fundamental basis for the development of strategies for promoting and enhancing resilience effectively, in the general population.

The relationship between low resilience and suicidality has been reported within samples possessing diverse characteristics; however these studies have been

few in number (Liu et al., 2014; Roy et al., 2006, 2007). Thus, as findings are derived from a restricted number of studies, researchers need to be cautious in generalising these results to other samples. Nonetheless, with low resilience being linked to the occurrence of suicidality in US, Italian and Australian samples (Liu et al., 2014; Roy et al., 2006, 2007), this has implications for individuals designing suicide prevention programs, or developing interventions to build resilience. Reflection needs to be given as to the groups which developers are targeting; if individual wellbeing is to be improved in the population, those who are not at risk (regardless of whether resilience is low, high or moderate) as well as those who are, need to be considered in policies/strategies. Through this, those who are not at risk can improve their wellbeing, thus preventing them from becoming at risk of developing suicidality. Meanwhile those at risk can be provided with strategies that will reduce suicidality occurrence, and subsequently, improve wellbeing. Consequently, consideration of the findings from this thesis could inform such programs, with respect to what factors may need to be examined. Interventions can then be developed based on this knowledge, and disseminated across high-risk individuals, among those requiring treatment, whilst also enhancing wellbeing among the general population (Beddington et al., 2008).

A final point needs to be made to the research community in relation to the manner in which resilience is measured and analysed. The resilience literature has considered resilience either as a continuous score or has created groups based on standard deviations (e.g., low, high resilience). Study 4 measured resilience as both a categorical and as a continuous measure. This was to accommodate the possibility

that resilience may not be stable across time for participants. Both methods lend themselves to reporting similar, but slightly different information, as the former and not the latter, provides additional detail otherwise missed. Caution, however, should apply in measuring resilience as a categorical score. Individuals may score low on a resilience measure due to how they perceive the question should be answered (e.g., social desirability effect). Consequently, researchers cannot be certain that utilisation of the method in defining low resilience as being -1 below the standard deviation, reflects low resilience. With no clinical cut-off for resilience, researchers may wish to consider the way in which they assess resilience within their research.

## **9.5 Future Research**

The overall findings from the current thesis identify the need for further research to advance resilience literature. To that end, recommended future research projects include additional research into the CD-RISC to clarify whether it should be applied as a 22- or 10- item measure. Within the PATH sample, the 22-item was shown to be stable, across other samples, a 10-item version has been observed to be as sufficient (Campbell-Sills & Stein, 2007; Gucciardi et al., 2011). Research examining Campbell-Sills and Stein (2007) 10-item measure on the PATH sample, observed a lack of similarity in the ten items identified for the PATH sample (Burns & Anstey, 2010). However, comparisons of the two 10-item measures were analogous (Burns & Anstey, 2010). With the 10-item measure arguably providing a better notion of resilience (Campbell-Sills & Stein, 2007; Gucciardi et al., 2011), further research into the CD-RISC's applicability as a shortened 10-item or full

length 22-item measure would be advantageous. In doing this, additional support can be provided as to whether the CD-RISC should be considered the “gold standard” of resilience measures, regardless of its format (e.g., 22-, 25- or 10- item).

Already shown to be applicable across clinical samples, other research directions may also consider employing the CD-RISC to compare community and clinical samples in relation to resilience outcomes. Similarities and/or differences in resilience between clinical and non-clinical samples would highlight whether programs aimed at improving resilience could be applied simultaneously across both populations. Moreover, if outcomes are similar, investigation could ascertain what may help to reduce future risk in samples that are not currently at high risk, to minimise future difficulties. From this, programs and/or interventions into minimising suicide risk or building resilience can be informed.

Though the current thesis demonstrated that non-specific measures were not a reliable method in assessing resilience, these results cannot be generalised to other samples (e.g., clinical) at present. Consequently, further exploration would be prudent. Further examination into low resilience and vulnerability to suicidality, across other samples and countries, would be beneficial in identifying similarities and differences. This is due to factors that may impact upon resilience and individual wellbeing differing dependent upon geographical location and other influences (i.e., cultural attitudes). Knowledge gained from this could highlight information that may be utilised in designing suicide prevention programs and/or interventions to build resilience.

As mentioned earlier in this chapter, issues remain in providing a true

reflection of low resilience. Scoring resilience according to a scale, whether continuously or categorically, can be problematic as scores are dependent on how an individual interprets and responds to the questions. With no clinical cut off, the practice of defining low and high resilience as being +/- 1 standard deviation may not be a reliable indication of an individual's level of resilience. Dividing a response measure into sections is necessary for analytical purposes, but if a true reflection of an individual's level of resilience is to be demonstrated, further work is needed. How resilience is best categorised (e.g., percentile; quintile; median split; percentages of individual ordinal categories) and defined in terms of cut-offs (e.g., low, moderate, high) needs to be determined, if a more accurate depiction of resilience levels are to be reported. As such, further evaluation of how resilience should best be reported (e.g., as a continuous or categorical outcome) would be advantageous. This would provide researchers and clinicians with added knowledge of the most effective methods for measuring individual wellbeing.

In further identifying the impact that factors have on individual wellbeing and resilience, continued longitudinal investigation is essential. Impacts of adverse events (i.e., local government instability, the global financial crisis, threats to national wellbeing) on different age ranges would provide in-depth information as to current and long term effects. Longitudinal assessment could identify factors that influence individuals in different age groups, at different points in time.

Furthermore, in looking at the impact of time, exploration into whether resilience moderates the influence of other risk factors on suicidality at different time points would also be beneficial. This would provide a broader but also deeper picture of

how resilience operates, whilst indicating what factors are essential in boosting or facilitating resilience in reducing suicidality risk.

Finally, examination of how resilience may be increased could assist practitioners, researchers and policy makers to formulate plans to improve resilience to adversity, and from this, reduce suicidality risk likelihood. An understanding gained from identifying factors enabling resilience, that in turn reduces suicide risk, provides the fundamental basis for health promotion and policy makers, to begin to enable individuals to build resilience. Opportunities such as mentor-based programs, public education campaigns and social groups for older adults, that provide access to environmental and personal resources, could be formulated to help facilitate this. Advocated by other research (Huppert & So, 2013; The Government Office for Science, 2008), and with governments showing increasing interest in individual wellbeing, locating and integrating these findings is essential if resilience is to be built and sustained within the general population. The current thesis has contributed to this basis.

## **9.6 Conclusion**

This thesis sought to investigate resilience and its impact on suicidality within a community based sample, across three age cohorts. From this, several important implications have arisen in understanding the role of resilience on suicidality. Though the first three studies were limited by being cross-sectional in design, they contribute novel information relevant to resilience and to the association of resilience with suicidality. This includes addressing the fundamental issue of resilience measurement. Use of individual measures was demonstrated to be



ineffective in assessing the construct of resilience when compared to a resilience-specific measure. Implications of these findings include the discontinuation of independent measures being used to assess resilience. From this, resilience literature is progressed as the validity of a resilience-specific measure, which has received some support by other authors, has now been shown to be applicable between gender and across the lifespan in a community based sample. Accordingly, this thesis advocates that researchers acknowledge the importance of using a resilience-specific measure in assessing the resilience construct. It is also recommended that the CD-RISC be the preferred tool for clinicians and researchers alike. Gender and age differences should also be taken into account when examining individual wellbeing.

There is also benefit in evaluating resilience in conjunction with suicidality, in predicting suicidality risk. Low resilience has consistently been shown to be associated with the likelihood of suicidal thoughts and behaviours. This remains the case across the lifespan, though effects can be reduced for young and older adults by the presence of other factors such as social support and mastery. Examination of the predictability of resilience and suicidality over time also demonstrated similar results. Presence of internal and external factors diminished the probability of a resilience or suicidality scale predicting suicidality or resilience at a future time point. As such, the use of assessments or measures determining risk of suicidality, or level of resilience, provides only a snapshot in time. Reliability of prediction of suicidality or resilience should be treated cautiously, due to the varying influence of psychological factors.

To summarise, this thesis advocates that if resilience is to be effectively researched, resilience-specific measures need to be the preferred assessment tool - particularly the CD-RISC as it is shown to be reliable and invariant across age and gender in a community sample. Further, in assessing individual wellbeing, clinicians and researchers need to consider the impact that low resilience (and other psychological covariates), may have on potential (current or future) suicidality occurrence.

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**Appendix A: The Utility of Non-specific Measures of Resilience Across  
the Lifespan: An Investigation of Structural Invariance Across Gender and  
Age Cohorts**

**Liu, D. W. Y., Fairweather, A. K., Burns, R. A., & Roberts, M. R. (2015).**

The utility of non-specific measures of resilience across the lifespan: An investigation of structural invariance across gender and age cohorts. *Australian Journal of Psychology*, 37, 340-348. doi: 10.1111/ajpy.12091

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**Appendix B: The Connor-Davidson Resilience Scale: Establishing  
Invariance Between Gender Across the Lifespan in a Large Community Based**

**Liu, D. W. Y., Fairweather-Schmidt, A. K., Burns, R., & Roberts, R.**

(2014). The Connor-Davidson Resilience Scale: Establishing Invariance Between Gender Across the Lifespan in a Large Community Based Study. *Journal of Psychopathology and Behavioral Assessment*, 1-9. doi: 10.1007/s10862-014-9452-z

Liu, D.W.Y., Fairweather-Schmidt, A. K. Burns, R., Roberts, R.M. (2014). The Connor-Davidson Resilience Scale: Establishing invariance between gender across the lifespan in a large community based study.  
*Journal of Psychopathology and Behavioral Assessment*, v. 37 (2), pp. 340-348

NOTE:

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It is also available online to authorised users at:

<http://dx.doi.org/10.1007/s10862-014-9452-z>

## **Appendix C: Does Resilience Predict Suicidality? A Lifespan Analysis**

**Liu, D. W. Y., Fairweather-Schmidt, A. K., Roberts, R. M., Burns, R. A., & Anstey, K. J.** (2014). Does resilience predict suicidality? A lifespan analysis. *Archives of Suicide Research, 18*, 453 - 464. doi:10.1080/13811118.2013.833881.

Liu, D.W.Y., Fairweather-Schmidt, A. K., Roberts, R.M., Burns, R. & Anstey, K.J. (2014). Does resilience predict suicidality? A lifespan analysis. *Archives of Suicide Research*, v. 18 (4), pp. 453-464,

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