Traits and Triggers:

Individual Differences in Neuroticism and Adult Attachment Style Influence Susceptibility to Interpersonal Risk Factors for Suicidal Ideation and Behaviours.

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This thesis is submitted to the University of Western Australia in fulfilment for the degree of Doctor of Philosophy in the Discipline of Psychology and in partial completion of the requirements for the Master of Clinical Psychology degree.

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Contents

Abstract ........................................................................................................................................ v
Acknowledgements ....................................................................................................................... ix
Authors Declaration ....................................................................................................................... xiii
Statement of Contribution .............................................................................................................. xv
Preamble to the Thesis .................................................................................................................... xxi
List of Tables .................................................................................................................................. xxiii
List of Figures ................................................................................................................................. xxv
Suicide Nomenclature .................................................................................................................... xxix

Chapter

1. General Introduction .................................................................................................................. 1
   A. An Interaction of Trait Vulnerabilities and Temporal Triggers ........................................... 6
   B. The Role of Neuroticism ....................................................................................................... 8
   C. The Role of Adult Attachment ............................................................................................ 10
   D. Distinguishing Suicidal Desire from Suicidal Action ......................................................... 12
   E. Establishing Causality and Mechanisms of Action ............................................................ 14
   F. Thesis Aims and Overview ................................................................................................... 16

2. Study 1a: Neuroticism Confers Vulnerability in Response to Experimentally
   Induced Feelings of Thwarted Belongingness and Perceived Burdensomeness:
   Implications for Suicide Risk.
   A. Abstract ............................................................................................................................... 22
   B. Introduction .......................................................................................................................... 23
   C. Method ................................................................................................................................. 28
   A. Introduction ........................................................................................................54
   B. Method ..................................................................................................................56
   C. Results ..................................................................................................................58
   D. Discussion .............................................................................................................59

4. Study 2: Neuroticism, but not acquired capability predicts reactivity to experimentally induced thwarted belongingness and perceived burdensomeness.
   A. Abstract ...............................................................................................................66
   B. Introduction .........................................................................................................67
   C. Method ................................................................................................................73
   D. Results ................................................................................................................78
   E. Discussion .............................................................................................................86

5. Distinguishing suicidal desire from suicidal behaviour: Further exploration of the role of acquired capability for suicide. .................................................................93

   A. Abstract ...............................................................................................................100
   B. Introduction .........................................................................................................101
   C. Method ................................................................................................................108
   D. Results ................................................................................................................110
   E. Discussion .............................................................................................................121
7. Early environmental factors influence neuroticism: The role of adult attachment styles .......................................................... 129

8. Study 4: Adult Attachment and Interpersonal Risk Factors for Suicide: Does Insecure Attachment Always Confer Vulnerability?
   A. Abstract ............................................................................................................. 134
   B. Introduction ....................................................................................................... 135
   C. Method ............................................................................................................ 141
   D. Results ............................................................................................................. 148
   E. Discussion ......................................................................................................... 158

9. General discussion ......................................................................................... 169
   A. Suicide Risk: An Interaction of Trait Vulnerabilities and Temporal Triggers ................................................................. 170
   B. Thoughts and Behaviour: Distinguishing Suicidal Desire from Suicidal Action ............................................................. 172
   C. Overcoming Methodological Limitations in Suicide Research .............. 175
   D. Theoretical Implications ............................................................................. 176
   E. Neuroticism and Attachment ...................................................................... 180
   F. Clinical Implications ..................................................................................... 181
   G. Limitations ..................................................................................................... 186
   H. Conclusions ................................................................................................... 189

10. References ..................................................................................................... 196
Abstract

Research identifies a plethora of diverse ‘risk factors’ for suicide, yet our ability to accurately understand, predict, and explain suicidal thoughts and behaviours is incomplete. The present research program seeks to add to our current understanding of suicide by further exploration of two distal risk factors for suicidal desire and behaviour; neuroticism and insecure adult attachment style. The current research attempts to improve the clinical utility of these risk factors by integrating them into the Interpersonal Theory of Suicide (ITS; Joiner, 2005), a prominent theoretical model which proposes proximal causal risk factors for suicidal ideation and behaviour. Incorporating individual differences into this model permits better understanding of how distal risk factors like neuroticism and insecure attachment, interact with the proximal triggers for suicidal thoughts and behaviours proposed by the ITS and improves the specificity with which we are able to identify those at risk for suicide.

Thus, the current dissertation considers how individuals’ underlying vulnerabilities may interact with proximal triggers to predict suicide. The first empirical chapter examines the relationship between the personality characteristic of neuroticism and the ITS proposed causal precursors for suicidal desire; thwarted belongingness and perceived burdensomeness. Using an experimental design we demonstrate that high neuroticism increases an individual’s sensitivity to the interpersonal triggers of thwarted belongingness and perceived burdensomeness. This is a potential mechanism by which high neuroticism increases vulnerability for experiencing suicidal desire. As such, suicidal desire may be influenced by the interactions between dispositional traits like neuroticism, as well as the proximal risk factors proposed by the ITS.
Following this, the present dissertation incorporates a recent shift in suicide research to considering suicidality along an ideation-to-action framework, where the risk factors for suicidal ideation, suicidal attempts, and the transition between these may be quite different. Thus, studies two and three aim to clarify how dispositional vulnerabilities, such as neuroticism, may confer risk differentially for suicidal desire and suicidal action. We hypothesise that the acquired capability for suicide would facilitate the transition from suicidal desire to suicidal action. In this way, while neuroticism will confer risk for suicidal desire, the acquired capability for suicide would moderate the effect of neuroticism on suicide risk by permitting transition from ideation to action.

Study 2 replicates the findings of the first study, showing that neuroticism confers vulnerability to experiencing the ITS predicates of suicidal desire. In addition, this study also considers the role of acquired capability for suicide, and how this may interact with neuroticism to increase risk. Results suggest that acquired capability does not influence reactivity to the experimental induction of thwarted belongingness and perceived burdensomeness. One possible explanation for the failure to find an effect of acquired capability is that the outcome variable used in this task may be more theoretically similar to suicidal desire, and distinct from the capacity to act upon that desire.

Therefore, study 3 further investigates the relationship between neuroticism and the acquired capability for suicide, as it relates to suicidal actions, as opposed to suicidal desire. This study uses separate questionnaire measures of suicidal desire and action. Results indicate that neuroticism exerts main effects on the measures of suicidal desire, and interacts with the acquired capability for suicide to predict suicidal action. Thus, study 3 demonstrates that high neuroticism is sufficient to confer risk for suicidal
desire, but that this risk will only translate into risk for suicidal action when paired with a concurrently high acquired capability for suicide. This finding has implications for more specifically identifying those individuals at risk of progressing to lethal suicidal action.

The final study in this dissertation considers a developmental antecedent for neuroticism. Since facets of adult attachment (anxiety and avoidance) are differentially associated with suicide, the fourth study explored the relationship between three specific adult attachment styles and the ITS components of suicidal desire. This study identified that not all insecure attachment styles are equal in conferring interpersonal vulnerability for suicide. While a fearful-avoidant attachment style was associated with sensitivity to the interpersonal triggers of thwarted belongingness and perceived burdensomeness, a dismissive-avoidant attachment style conferred resilience. This further illustrates the importance of considering the interaction between temperamental vulnerabilities and interpersonal triggers when assessing risk.

In sum, the present dissertation describes how individual differences interact with the proximal triggers for suicidal desire and suicidal action proposed by the ITS. By establishing how neuroticism and attachment style confer vulnerability or resilience to suicide at different points on the ideation-to-action framework, this research advances understanding of the way individual risk factors may interact with temporal triggers to predict the emergence of suicidal ideation and behaviour. The findings have implications for identifying those individuals at immediate risk for lethal suicidal action, and also for targeting preventative efforts towards those with an underlying vulnerability.
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A PhD isn’t something I ever thought I would do. This journey has been challenging, and throughout the process I have experienced doubts about whether I was capable, whether my research was worthwhile and whether I had made the right choice in taking this path (and if I would ever get out of here). Had I not been surrounded by wonderful, kind, patient people I wouldn’t have completed this thesis, and I am grateful and humbled by all those who supported me.

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Author’s Declaration

I, Elise Hartley, certify that:

This thesis has been substantially accomplished during enrolment in the degree.

This thesis does not contain material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution.

No part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of The University of Western Australia and where applicable, any partner institution responsible for the joint-award of this degree.

This thesis does not contain any material previously published or written by another person, except where due reference has been made in the text.

The work(s) are not in any way a violation or infringement of any copyright, trademark, patent, or other rights whatsoever of any person.

The research involving human data reported in this thesis was assessed and approved by The University of Western Australia Human Research Ethics Committee. Approval #: RA/4/1/6567

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This thesis contains work prepared for publication, some of which has been co-authored (See statement of contribution on page xv).

Elise Hartley

Date: 29-01-2018
Statement of Contribution

This thesis contains work that has been prepared for publication and co-authored. Details of authorship are summarised below.

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Author contribution:

Elise was involved in all aspects of this paper including study design, participant recruitment, data collection, data analysis and preparation of the manuscript. Honours students (Caroline Blades and Kylee Parentich) assisted with data collection. Feedback on the manuscript was provided by the principal supervisor (Werner Stritzke) and co-supervisor (Andrew Page).

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Preamble to Thesis

Consistent with the University of Western Australia’s guidelines for PhD submission, this thesis is presented as a series of manuscripts. Studies 1a, 2, 3 and 4 (Chapters 2, 4, 6 and 8) have been prepared for publication (see Statement of Contribution for details). The presentation of this thesis as a series of papers may lead to some repetition. Further, linking chapters (Chapters 3, 5 and 7) have been included to connect the empirical chapters and facilitate the development of a cohesive overall argument. The linking chapters have not been submitted for publication. Similarly the general introductory chapter (Chapter 1) and general discussion (Chapter 9) have not been submitted for publication. Figures and tables have been inserted into the text to facilitate reading.
List of Tables

Table 2.1

Descriptors Statistics for the Questionnaire Variables by High and Low Neuroticism Groups.................................................................36

Table 2.2

Hierarchical Multiple Regression Within the High PB-TB Condition, with Desire to Escape as the Outcome Variable, and Interest, and Effort Entered in Step 1, and Burdensomeness and Belongingness Entered in Step 2.................................................................43

Table 3.1.

Mean acquired capability and neuroticism scores for the selected groups ..........57

Table 4.1.

Mean acquired capability and neuroticism scores for the selected groups. ........79

Table 6.1

Table to show mean scores for measures of suicidal ideation, suicidal action, and general distress for the selected groups with tests of statistical significance of the moderating effect of acquired capability, evidenced by the effect of neuroticism at high and low levels of AC........................................................................................................120

Table 8.1

Descriptors Statistics, Group Effects, and Contrasts between Attachment Styles for Suicide Risk Variables and the Three Antecedent Risk Variables from the Interpersonal Theory of Suicide ........................................................................................................153
List of Figures


Figure 2.1. Mean belongingness ratings across the six time intervals; error bars represent standard error ................................................................. 38

Figure 2.2. Mean perceived burdensomeness ratings across the six time intervals; error bars represent standard error ................................................................. 40

Figure 2.3. Mean desire to drop out ratings across the six time intervals (error bars represent standard error). ................................................................. 41

Figure 3.1. Graph to show the relationship between AC group and neuroticism group on desire to drop out of the task. As there were no significant effects of time, this figure displays average desire to drop out across the 6 rounds. ............................................. 59

Figure 4.1. Thwarted belongingness ratings across the six time intervals for high and low conditions and high and low neuroticism groups, with standard error bars. .......... 82

Figure 4.2. Perceived burdensomeness ratings across the six time intervals for high and low conditions and high and low neuroticism groups, with standard error bars. .......... 84

Figure 4.3. Desire to drop out ratings across the six time intervals for high and low conditions and high and low neuroticism groups, with standard error bars. ............. 86
Figure 6.1. Graph to show mean acquired capability and neuroticism scores for the selected groups. Error bars represent standard error of the mean. ..........................................112

Figure 8.1. Mean burdensomeness ratings for each attachment style, across the six time intervals; error bars represent standard error. .................................................................155

Figure 8.2. Mean belongingness ratings for each attachment style, across the six time intervals; error bars represent standard error. .................................................................156

Figure 8.3. Mean desire to drop out of the task for each attachment style, across the six time intervals; error bars represent standard error. .................................................................157
Suicide Nomenclature

Suicide is best understood as a diverse spectrum of thought processes and behaviours. Due to this complexity, there remains considerable debate about how best to classify, measure and understand the various manifestations of suicidal thoughts and behaviours. Research identifies inconsistent nomenclature as a barrier to our current understanding of suicide (O'Connor & Nock, 2014; Prinstein, 2008). For example, the use of differing terms and classifications across studies makes the comparison of data and results difficult (O'Carroll et al., 1996). Various guidelines for a more consistent nomenclature have been proposed, but as yet none have been adopted consistently (Giner, Guija, Root, & Baca-Garcia, 2016; O'Carroll et al., 1996; Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007, 2007). The terminology utilised in the current thesis is summarised below:

- **Suicide Ideation**: refers to the cognitive contemplation of suicide. This may be passive (i.e. thoughts of being better off dead) or active (i.e. thoughts of taking one’s life)
- **Suicide Attempt**: refers to deliberate self-injurious behavior with at least some intent to die that does not result in death (i.e. is non-lethal)
- **Suicide Completion**: refers to deliberate self-injurious behavior with at least some intent to die that does result in death (i.e. is lethal)
- **Suicide Gesture**: refers to deliberate self-injury in the absence of intent to die. A suicide gesture is instead intended to give the appearance of a suicide attempt as a means of communicating with others.
- **Non-Suicidal self-injury (NSSI)**: refers to deliberate self-injurious behavior in the absence of the intent to die.
• **Suicidal behavior or Suicidal action** refers to deliberate self-injurious behavior. This broader term includes behaviours that may be lethal (such as suicide completions) or non-lethal (such as suicide attempts or non-suicidal self-injury).

Non-specific terms such as ‘suicide-risk’ and ‘suicidality’ are frequently used in the literature to broadly describe the entire multi-dimensional range of suicidal thoughts and behaviours. Thus the current thesis will also refer to ‘suicidality’ and ‘suicide-risk’ using the more global definitions, provided below, where appropriate:

• **Suicide risk**: refers to the presence of suicidal thoughts and/or behaviors.

• **Suicide risk factor**: refers to any factor that has been positively associated with the presence of suicidal thoughts and/or behaviors.

• **Suicidality**: encompasses suicidal ideation, suicide plans and suicide attempts. Broadly speaking, it refers to the tendency of a person to experience suicidal thoughts and/or behaviours.

However, the use of this more general terminology has been criticized since it is unclear whether such terms refer to suicidal thoughts, suicidal actions or both. In this way, it is ambiguous whether a ‘risk factor for suicide’ refers to a risk factor only for completed suicide, or more generally to a risk factor for a wide spectrum of suicide-related thoughts, communications, and behaviors (including ideation, gestures, attempts, completions and non-suicidal self-injury). Recent research identifies that suicidal ideation and suicidal behaviours represent distinct phenomena, each with their own risk factors and predictors (Klonsky & May, 2014; Klonsky, May, & Saffer, 2016). For this reason, a critical focus of the present thesis is distinguishing suicidal behaviour from suicidal thoughts. Thus, Studies 2 and 3 will specifically differentiate between risk
factors for suicidal ideation or desire, and risk factors for suicidal actions (such as suicide attempts and completions). Following from this, where possible and appropriate the current thesis will utilise more specific terminology such as ‘risk factor for suicide ideation’ and ‘risk factor for suicidal action’. The significance of using the appropriate terminology to differentiate suicidal ideation and suicide attempts will be discussed further in the studies comprising the present research.
Chapter 1.

GENERAL INTRODUCTION
General Introduction

Suicide is an immense public health problem. The World health organisation reports that over one million people die by suicide each year (World Health Organisation, 2014). It is estimated that for every completed suicide there are at least 20 attempts (Klonsky & May, 2014; Nock & Mendes, 2008). Completed suicide and non-fatal suicidal behaviour have significant and far-reaching impacts on individuals, families, first responders, clinicians and communities. Further, the socio-economic impacts of suicide and non-fatal suicidal behaviour are significant. In Australia alone, suicidal behaviour incurs economic costs totalling $6.73 billion dollars in loss of productive capacity and earnings per year (Kinchin & Doran, 2017). Given the scope of this global issue, suicide has been the focus of many research and prevention efforts at an individual, community, and national level. However, despite escalating prevention efforts in recent decades there has been no sustained reduction in suicide rates (World Health Organisation, 2014).

Studies identify numerous risk factors for suicide, including almost all psychiatric disorders (Nock, Hwang, Sampson, & Kessler, 2010), particularly personality disorders (Chioqueta & Stiles, 2005; Yen et al., 2003) and substance abuse disorders (Crumley, 1990; Sher et al., 2006), as well as hopelessness (Cox, Enns, & Clara, 2004), childhood physical and sexual abuse (Brezo et al., 2008), stressful life events (Grover et al., 2009), poor social-support, inability to problem-solve (Speckens & Hawton, 2005), and non-suicidal self-injury (Klonsky, May, & Glenn, 2013), among others. Whilst it is important to identify these vulnerabilities to inform risk assessment and suicide theory, the utility of such a comprehensive list is limited, since it is unwieldy and lacking in specificity. That is, a person may possess many risk factors and not go on to experience suicidal ideation or make an attempt, thus the predictive value
of such risk factors is limited. It is more useful to consider identified risk factors by investigating why they are associated with increased risk. That is, why do some people attempt suicide while others do not?

For this reason, a primary goal of a suicide theory is to integrate this array of established risk factors into a coherent overarching model. This approach permits the identification of those most at risk, and the targeted application of preventative measures for those who may be vulnerable. Various theories have conceptualised suicide differently; as a response to overwhelming psychological pain (psychache; Shneidman, 1985, 1987, 1998); as a consequence of feelings of hopelessness (Abramson et al., 2000; Abramson, Metalsky, & Alloy, 1989; Beck, Brown, & Steer, 1989; Beck, Weissman, Lester, & Trexler, 1974); as a response to extreme social isolation (Durkheim, 1951) and as a means of escaping from painful self-awareness (escape theory; Baumeister, 1990). These theories add to our understanding of suicide by identifying factors that may contribute to, or explain the development of, suicidal ideation. However, they share a number of limitations. Firstly, they fail to account for the interaction between underlying individual vulnerabilities and situational triggers in predicting suicide risk (Magnusson & Stattin, 2007). Secondly, they do not distinguish those individuals who will only think about suicide from those people who will go on to engage in suicidal behaviours. This is a crucial shortcoming since the majority of individuals who consider suicide do not go on to make an attempt (Klonsky & May, 2014; Nock & Mendes, 2008). Thirdly, they typically rely on correlational and cross-sectional evidence which does not permit examination of their proposed causal mechanisms.

With this in mind, the present research program seeks to add to our current understanding of suicide by addressing these limitations. Thus, the current research will
consider underlying vulnerabilities as they interact with temporal triggers to cause suicidal desire and behaviour. Furthermore, the research will overcome limitations associated with identifying risk factors for broadly defined suicidality, by distinguishing suicidal desire from suicidal behaviour and exploring how predispositional vulnerabilities may confer risk or resilience differentially for each of these. Finally, the current research program will use experimental methods in addition to self-report designs to permit identification of the causal mechanisms through which these individual differences may confer risk or resilience. To achieve these aims, four studies investigate temperamental factors associated with risk for suicide; neuroticism and insecure adult attachment by placing them in the context of a contemporary and well-established suicide theory. These studies aim to explore the interaction between an individual’s underlying temperamental vulnerabilities and the causal mechanisms proposed by Joiner’s (2005) Interpersonal Theory of Suicide (ITS) to predicate suicide.

The ITS (Joiner, 2005) proposes that the desire for suicide emerges as a result of two factors; perceived burdensomeness (i.e., feelings of inadequacy, self-hate and perceived failure to contribute) and thwarted belongingness (i.e., loneliness, isolation and alienation from valued social networks). Consistent with this, studies identify robust associations between low belongingness, feelings of burdensomeness, and suicidal ideation (Chu et al., 2017; Ma, Batterham, Calear, & Han, 2016; Stellrecht et al., 2006; Van Orden, Cukrowicz, Witte, & Joiner, 2012; Van Orden et al., 2010). Importantly, the ITS proposes that suicidal desire will only progress to suicidal action when a third construct, the acquired capability for suicide (i.e., increased tolerance for physical pain, fearlessness about death and mental rehearsal of the steps required for suicide) is also present (George, Page, Hooke, & Stritzke, 2016; Joiner et al., 2009; Ribeiro & Joiner, 2009). This assertion is supported by the finding that dispositional, acquired, and
practical aspects of suicide capacity each predicted suicide attempt history over and above current and lifetime suicidal ideation (Klonsky & May, 2015). Thus, it is the simultaneous possession of both the desire and capability for suicide which is associated with maximum risk. The model is depicted in Figure 1.1, demonstrating that only a small proportion of individuals who desire suicide, also possess the capability to act upon this desire.


The interpersonal theory has received promising support, with studies demonstrating that the interaction between perceived burdensomeness and thwarted belongingness significantly predicted current suicidal ideation over and above covariates including depressive symptoms (Chu et al., 2017; Ma et al., 2016; Van Orden, Witte, Gordon, Bender, & Joiner Jr, 2008). Further, the Van Orden study examined a
clinical sample of young adults and found that acquired capability, perceived burdensomeness, and low belonging interacted in accordance with the theory to predict suicide attempt status (Van Orden et al., 2008). In accordance with this the ITS proposes that clinicians should be conscious of their client’s levels of belongingness, burdensomeness, and acquired capability for suicide. This information may be used to inform risk assessment and identify appropriate targets for clinical intervention (Chu et al., 2017; Chu et al., 2015; Joiner, 2005).

**An Interaction of Trait Vulnerabilities and Temporal Triggers**

While the ITS has received some support, it is not without limitations. Recent critiques of suicide research argued that a good theory, in addition to being consistent with identified risk factors, should offer explanation for the interaction between an individual’s contextual or temperamental characteristics and the proximal triggers which predict the emergence of suicidal ideation and behaviour (Barzilay & Apter, 2014; O’Connor, 2011; Prinstein, 2008). Contemporary models of suicide postulate that suicidal behaviour can be explained by a diathesis-stress model, whereby an individual possesses a predisposing vulnerability which is activated by a triggering stress factor (Barzilay & Apter, 2014; O’Connor, 2011; Prinstein, 2008). Therefore, sound theories must consider both the underlying vulnerability as well as the context of the environmental stress factors which will trigger its expression. In this way, suicidal ideation and behaviour likely result from an interplay between trait vulnerabilities and dynamic triggers. The interpersonal theory proposes the three aforementioned causal mechanisms or triggers for suicide. The authors argue that these triggers represent dynamic cognitive-affective states which are influenced by the individuals actual interpersonal environment (Hawkley et al., 2008) as well as their own interpretations of their environments (Downey & Feldman, 1996) and their current emotional state.
(Cacioppo et al., 2006). Thus, the ITS identifies that an individual’s interpretation of their environment and emotional state may influence their risk for suicide, but does not specifically include a discussion of how individual differences or dispositional vulnerabilities might affect these.

There is evidence to suggest that underlying dispositional vulnerabilities may bring about varying behavioural reactions in response to the same trigger (Denissen & Penke, 2008; Mikulincer & Florian, 1998; Mischel, 2004; Suls, Green, & Hillis, 1998). Thus, it follow that individuals may demonstrate systematic variations in the way they interpret and respond to the interpersonal risk factors for suicide proposed by the ITS. Mischel (2004) proposes that an individual’s behaviour is determined by an interaction between person and situation. That is, that each of us has a relatively stable and enduring set of characteristics that inform our thoughts, feelings and behaviours; but that these are activated or triggered by specific situational cues. By focusing only on situational factors, such as fluctuations in feelings of belongingness and burdensomeness, the interpersonal theory does not account for behavioural variations that may associated with person factors. The interpersonal theory proposes that the precursors for suicidal ideation are dynamic cognitive-affective states, resulting from moment to moment fluctuations in interpersonal stressors. Thus, monitoring and tracking fluctuations in these will likely provide valuable information for assessing suicide risk. However, research should also consider how more stable and enduring individual traits may influence a particular person’s reactivity to these temporal triggers. Consistent with the conclusions of Mischel (2004), it is likely that behaviours, including suicidal behaviours, occur as a result of the interaction between personal vulnerabilities and situational triggers.
The Role of Neuroticism

Individual differences in personality may represent one such dispositional risk factor for suicide ideation and behaviour. Personality traits quantify the marked variations in typical responding to the environment that distinguish one person from another (Mischel, 2004). These traits are thought to be relatively stable and enduring. The identification of those personality characteristics associated with vulnerability for suicide ideation and action may permit targeted interventions and preventative efforts to reduce suicidality amongst those at risk. Neuroticism is included in nearly all major models of personality traits (Matthews, Deary, & Whiteman, 2003) and is conceptualised as increased negative reactivity to threat, frustration or loss, characterized by anxiety, fear, moodiness, worry, envy, jealousy, loneliness, feelings of inadequacy, and sensitivity to criticism (Costa & McCrae, 1992; Watson, Clark, & Harkness, 1994). High neuroticism is a robust correlate and predictor of the diagnosis of mental and physical disorders, comorbidity among them, and the frequency of mental and general health service use (Lahey, 2009). This suggests that individual differences in neuroticism may be relevant in assessing suicide risk.

Neuroticism is associated with increased reactivity to environmental stimuli (Eysenck & Eysenck, 1985). Studies have demonstrated that individuals with high levels of neuroticism experience increased negative emotionality when confronted with daily stressors (Bolger & Zuckerman, 1995; Marco & Suls, 1993; Suls et al., 1998). More specifically, individuals with high neuroticism have been shown to be more vulnerable to interpersonal cues of rejection and exclusion (Denissen & Penke, 2008); reporting more frequent interpersonal difficulties and greater and more enduring distress in response to these. Thus, one possibility is that the increased emotional reactivity
associated with high neuroticism will be associated with a vulnerability for experiencing the interpersonal risk factors for suicide proposed by the ITS.

To date, research examining the relationship between neuroticism and suicidality has produced inconsistent results. A meta-analysis (Brezo, Paris, & Turecki, 2006) suggested that neuroticism is positively associated with suicidal ideation (DeShong, Tucker, O’Keefe, Mullins-Sweatt, & Wingate, 2015; Fanous, Prescott, & Kendler, 2004; Farmer et al., 2001; Statham et al., 1998; Velting, 1999), suicide attempts (Beautrais, Joyce, & Mulder, 1999; Nordstrom, Schalling, & Asberg, 1995), and suicide completions (Duberstein, Conwell, & Caine, 1994). However, the positive association between neuroticism and some facets of suicidality was not replicated consistently, with several studies failing to find an association for past or lifetime ideation (as opposed to current ideation), or attempts (Cox et al., 2004; Duggan, Sham, Lee, & Murray, 1991). Interestingly, some studies have even shown that suicide attempters have higher levels of neuroticism than suicide completers (Tsoh et al., 2005; Useda et al., 2007). One possible explanation for this inconsistency is that the personality factors which predispose an individual to suicidal ideation differ from those which influence whether an individual progresses from suicidal ideation to suicidal action (Dhingra, Boduszek, & O'Connor, 2015).

Evidence for this was reported by Rappaport, Flint, and Kendler (2017), who found that while neuroticism increases risk for experiencing suicidal ideation, high neuroticism was linked to lower risk for making a suicide attempt, amongst individuals experiencing suicidal ideation. Further, state-wide studies comparing suicide rates in the U.S. found that lower neuroticism is associated with a higher rate of suicide completions (McCann, 2010; Voracek, 2009). These findings suggest that while neuroticism may be a consistent risk factor for suicidal ideation, it is less consistently
linked to suicidal actions including attempts and completions. The current studies will attempt to address this inconsistency by placing neuroticism in the context of the ideation-to-action framework proposed by Klonsky and May (2015), and distinguishing its association with the interpersonal precursors for suicidal desire from the capacity to act upon that desire.

Furthermore, while neuroticism has been shown to be associated with suicidality, the mechanisms of this association are unclear. By exploring the relationship between neuroticism and the proximal risk factors identified by the interpersonal theory of suicide, our understanding of the mechanisms through which neuroticism acts upon suicidal desire and action may be improved. Understanding the specific mechanisms through which risk is influenced has implications for improving risk assessment, prevention and clinical intervention.

The Role of Adult Attachment

Individual variations in neuroticism are thought to stem from an interaction between genetics and environment. While individual differences in the neuroticism phenotype are associated with specific genetic factors (Riemann, Angleitner, & Strelau, 1997) and neurobiological differences (Canli, 2004; Eysenck & Eysenck, 1985), environmental factors also play an important role. In fact, environmental factors including nutrition, education, and upbringing account for significant variation in personality traits including neuroticism (Baker & Daniels, 1990; Bouchard, 1994). Thus, research considering an individual’s personality in the context of the environment in which it emerges is likely to be beneficial. Consistent with this, Bowlby (1940) proposed that environmental factors such as trauma, early stressful life events, and caregiver relationships also contribute to the development of a neurotic personality style. In particular, he suggested that early relationships with care-givers will shape
personality development across the lifespan (Bowlby, 1940; Bowlby, 1969). Thus, research considering the influence of individual differences in personality on suicide risk, should also consider the environmental circumstances from which those differences emerge. In particular, given the interpersonal nature of the risk factors proposed by the ITS, an individual’s capacity to form successful and healthy relationships is likely to be significant.

Bowlby (1940) theorises that early interactions and experiences with primary care-givers determine an individual’s internal working model of relationships. These working models are termed an attachment style and are said to determine an individual’s level of comfort with intimacy and perceptions of their own self-worth. Attachment styles influence an individual’s interpersonal behaviours, as well as their thoughts and feelings about themselves and others (Cassidy & Shaver, 2008; Mikulincer & Shaver, 2007). In this way, children who experience warm and consistent parenting develop a secure attachment style and a healthy capacity for intimacy and closeness in adulthood (Swanson & Mallinckrodt, 2001). In contrast, children who experience inadequate, inconsistent, or abusive parenting will likely develop an insecure attachment style and be more prone to relationship difficulties and dysfunctional self-perceptions in later life (Swanson & Mallinckrodt, 2001).

Reports of insecure adult attachment are typically linked to higher rates of suicide ideation and attempts (de Jong, 1992; Lessard M. A & Moretti, 1998; Özer, Yildirim, & Erkoc, 2015; Palitsky, Mota, Afifi, Downs, & Sareen, 2013; Stepp et al., 2008). Further, studies have shown that insecure attachment represents a dispositional vulnerability for experiencing increased reactivity in response to environmental stressors (Mikulincer & Florian, 1998). We may expect this increased reactivity to environmental stressors to be associated with vulnerability for experiencing the
interpersonal triggers associated with suicide risk proposed by the ITS. Moreover, recent studies have proposed that the relationship between insecure adult attachment and suicide risk may be mediated by interpersonal deficits (Gallo, Smith, & Ruiz, 2003; Stepp et al., 2008). Thus, although as yet no study has investigated whether particular adult attachment styles are particularly vulnerable to the interpersonal risk factors proposed by the ITS, there is good reason to expect an association. Given that insecure adult attachment styles are associated with both increased suicidality, as well as a pattern of relationship difficulties and dissatisfaction, it is possible that insecure attachment may confer risk for suicide via the interpersonal mechanisms proposed by the ITS. For this reason, the present thesis will consider the environmental influences on neuroticism; such as the impact of attachment styles as they relate to the interpersonal risk factors for suicide.

**Distinguishing Suicidal Desire from Suicidal Action**

There has been a recent shift in suicide theories towards distinguishing people who think about suicide from those who progress to acting upon their suicidal thoughts. This distinction is useful since most suicide ideators do not attempt suicide, and of those who do, only a small fraction make a lethal attempt. For example, one large international study found that of those individuals who reported experiencing suicidal ideation in their lifetime, only 29% reported making a suicide attempt in their lifetime (Nock et al., 2008). Recent evidence suggests that suicidal ideation, and the progression from ideation to action should be addressed as distinct processes; each with their own risk factors and explanations (Klonsky & May, 2014). Suicide research commonly uses design methodologies which compare a group of suicide ideators or non-lethal attempters to a control group of non-suicidal individuals at one point in time. In the context of the ideation-to-action framework this represents a design flaw. By failing to
distinguish between ideation and action, the literature has generated numerous correlates of suicidality broadly defined, but comparatively less information about the differences between those who attempt suicide and those who have suicidal ideation but never attempt.

Recent research demonstrates that some of the most well-documented correlates of suicide ideation (e.g., hopelessness, impulsivity, major depressive disorder, all mood disorders, post-traumatic stress disorder, and the simultaneous presence of three or more clinical disorders) fail to adequately distinguish between ideators and attempters (Kessler, Borges, & Walters, 1999; Klonsky & May, 2014; Pompili et al., 2014; Vuorilehto, Melartin, & Isometsa, 2006). In fact, one large epidemiological study compared odds ratios for various risk factors in predicting suicidal ideation and action, and concluded that of all the numerous risk factors, all were more strongly related to ideation than to the progression from ideation to a specific suicide plan, or a suicide attempt (Kessler et al., 1999). This finding demonstrates that simply identifying correlates of suicide broadly defined is of limited clinical utility if those correlates are not able to distinguish suicide ideators from those who will act upon that ideation.

Given suicide attempts are more worrisome than suicidal ideation alone, the identification of risk factors which distinguish those who only think about suicide, from those who go on to progress to suicidal action should be a priority. Thus, distinguishing suicide ideators from suicide attempters has implications for improving the predictive utility of identified risk factors.

In addition, a recent review identifies clarification of suicide terminology and phenomenology as a goal for future suicide research (O'Connor & Nock, 2014). For example, the use of differing terms and classifications across studies makes the comparison of data and results difficult (O'Carroll et al., 1996). Thus, suicide research
and theory can be improved by using consistent and universal terminology, and ensuring appropriate measurement of the specific constructs of interest. Research reporting risk factors for suicide broadly defined is likely to be insufficient. Instead, research should adopt a consistent nomenclature, and use measures which appropriately differentiate between all suicidal thoughts and behaviours; ranging from ideation to suicidal intentions, plans, attempts and completions.

Similarly, Klonsky and May (2014) identify the conflating of suicidal ideation with suicidal action as a limitation of suicide theory. For example, major theories propose various causal attributions for suicide including psychache (Shneidman, 1998), escape theory (Baumeister, 1990), and social isolation (Durkheim, 1951), but do not specify whether these factors explain suicide ideation, suicide attempts, or both. Klonsky and May (2014) suggest that suicide research should be guided by an “ideation-to-action” framework, whereby all explanations or risk factors for suicide must specifically state whether they refer to risk for suicidal ideation, suicidal action amongst those with ideation, or both. The ITS is the first comprehensive theory to follow this framework, providing specific risk factors for ideation (i.e., thwarted belongingness and perceived burdensomeness) as opposed to suicidal actions (i.e., acquired capability). For this reason, the current thesis will specifically examine identified risk factors for broadly defined suicidality; neuroticism, and insecure attachment, by clarifying their relationship with suicidal desire and suicidal action separately, with reference to the causal mechanisms for suicidal desire and behaviour proposed by the ITS.

**Establishing Causality and Mechanisms of Action**

While a cross-sectional assessment of the characteristics of people who think about and attempt suicide provides useful information, it does not allow examination of
causality. Thus, while many studies demonstrate a positive correlation between neuroticism, insecure attachment, and suicidality, for suicide research to have practical utility, it needs to go beyond simply identifying associations of suicidal behaviours, and also attempt to uncover the causal mechanisms that produce these behaviours (Brent, 2011; Nock, 2009). In line with this, Van Orden, Witte, Gordon, Bender, and Joiner Jr (2008) identify the imprecision of documented risk factors in the prediction of suicidal behaviour as a limitation of suicide research, suggesting a need for theory-driven research to identify the mechanisms through which these traits might confer vulnerability for suicidal ideation and behaviour.

The current studies attempt to overcome this limitation by using an experimental paradigm which permits inferences about causality. The Interpersonal Persistence Task (Collins, Best, Stritzke, & Page, 2016) is an experimental paradigm designed to induce the interpersonal precursors for suicidal desire: thwarted belongingness and perceived burdensomeness. The task records participants’ resulting shifts in self-reported desire to quit, or to persist, in the face of this interpersonal adversity throughout the task. The Interpersonal Persistence Task is founded on the theory that suicidal desire occurs as a means to escape from intolerable psychological pain (Escape theory; Baumeister, 1990). Furthermore, Joiner (2005) suggests that thwarted belongingness and perceived burdensomeness may contribute to psychological distress in a way that reduces willingness to persist in a goal-related activity and increases escape-seeking behaviours. A decline in persistence is a potential antecedent of a number of self-destructive behaviours (Deci & Ryan, 2000) including suicide (Van Orden et al., 2010). Thus, investigating the extent to which individuals desire to escape from, or are unwilling to persist with an experimental task that induces thwarted belongingness and perceived burdensomeness, is one way to assess the predictions of the interpersonal theory. Hence,
the task provides a way to test the predictions of the interpersonal theory in a safe and controlled setting by examining their effects on a theoretically-relevant variable, the desire to escape from interpersonal adversity. In sum, this experimental paradigm offers the opportunity to examine the relationship between risk factors for suicide; specifically, neuroticism and insecure attachment, in the context of experimentally induced interpersonal risk factors proposed by the ITS.

**Thesis Aims and Overview**

The present thesis will use experimental and self-report methods to examine how individual differences in neuroticism and attachment style confer risk or resilience for suicidality. This research will be the first to consider how individual differences in these traits interact with the more proximal interpersonal risk factors for suicide identified by the interpersonal theory of suicide (ITS, Joiner, 2005). Furthermore, no other study, to our knowledge, has examined how neuroticism and attachment style might confer vulnerability or resilience to suicide at different points on the ideation to action framework. This is likely to be an important contribution since contemporary suicide literature suggests that suicidal ideation, and the progression from ideation to action (i.e., attempts and completions) should be addressed as distinct processes, each with their own risk factors and explanations (Klonsky & May, 2014). The present research will provide a valuable addition to the literature by establishing a greater understanding of the way individual dispositional risk factors may interact with temporal triggers to predict the emergence of suicidal ideation and behaviour. The findings will have implications for more accurately identifying those at immediate risk, and targeting preventative efforts towards those who may have an underlying vulnerability for developing risk. The thesis follows the below structure:
Study 1a examines the relationship between neuroticism and the ITS components of suicidal desire; thwarted belongingness and perceived burdensomeness. The use of an experimental paradigm permits manipulation of the interpersonal precursors for suicidal desire, to examine whether trait neuroticism may confer sensitivity to experiencing these more intensely. Thus, the first study supports a discussion of the mechanisms whereby dispositional traits like neuroticism, may interact with proximal risk factors to confer vulnerability for suicidal desire.

Study 1b presents some preliminary data using a post-hoc analysis to investigate the association between neuroticism and the acquired capability for suicide. The results of this preliminary analysis suggest that neuroticism may interact with acquired capability to determine an individual’s vulnerability for experiencing suicidal desire. This informs subsequent studies investigating the role of acquired capability in moderating the association between neuroticism and suicide risk.

Study 2 incorporates a replication of novel findings from the previous study, and also aims to examine the role of the acquired capability for suicide. Study 2 sought to examine whether the previously identified association between neuroticism and desire to drop out of the task was moderated by the acquired capability for suicide. Study 2 replicates the finding that neuroticism increases vulnerability for experiencing thwarted belongingness and perceived burdensomeness, and adds that it does so regardless of acquired capability for suicide. Thus, this study offers evidence that acquired capability may be unrelated to the desire to persist with the task and informs direction for the subsequent study examining the relationship between neuroticism, acquired capability, and suicide risk at both an ideation, and action level.

Study 3 further examines the distinction between suicidal desire and action. This study explores the relationship between neuroticism and acquired capability for suicide,
selecting individuals with varying levels of neuroticism and acquired capability for suicide to examine the characteristics which might confer risk for suicidal desire and suicidal action. Questionnaire data which separated suicidal desire from suicidal actions was used to investigate how neuroticism interacts with acquired capability for suicide to predict measures of suicidal desire and suicidal action, such as readiness, intent, and the frequency of suicide attempts. This study permits more specific understanding of the relationship between neuroticism and suicide, by exploring the conditions under which the risk for suicidal desire conferred by neuroticism, will translate into risk for suicidal action. This addresses existing ambiguity in the literature; which has found an inconsistent relationship between neuroticism and suicide attempts.

The final manuscript, Study 4, will investigate a developmental antecedent for neuroticism, and how this relates to suicidality. Thus, Study 4 will explore the relationship between adult attachment styles and suicidality. This study will investigate whether all insecure attachment styles are associated with increased risk for suicide, or whether certain insecure attachment styles may confer resilience to the interpersonal precursors for suicidal desire. To do this, participants recruited from two insecure attachment styles (fearful-avoidant and dismissive avoidant) were compared to a group of securely attached individuals.

The final chapter will provide a general discussion of the findings of this research. This discussion will consider the current findings in the context of existing suicide theory, with a specific focus on the implications for identifying and addressing suicide risk in a clinical setting, as well as highlighting avenues for further research and investigation.
Chapter 2.

STUDY 1a: ELEVATED NEUROTICISM CONFFERS VULNERABILITY IN RESPONSE TO EXPERIMENTALLY INDUCED FEELINGS OF THWARTED BELONGINGNESS AND PERCEIVED BURDENSOMENESS: IMPLICATIONS FOR SUICIDE RISK.
Abstract

Objectives: This study investigated the role of individual differences in neuroticism in conferring increased reactivity to the interpersonal antecedents for suicide proposed by the interpersonal theory of suicide.

Method: Undergraduate students \( N = 113 \) were screened and selected to form high \( n = 58 \) and low \( n = 55 \) neuroticism groups and an experimental computer task was used to manipulate participants’ experience of thwarted belongingness and perceived burdensomeness. Participants’ self-reported desire to persist in the face of this induced interpersonal adversity was measured.

Results: Results indicate that high neuroticism confers increased reactivity to the experimental induction of the interpersonal antecedents of suicidal ideation; thwarted belongingness and perceived burdensomeness. Furthermore, this vulnerability corresponds to a diminished desire to persist with the task in the face of interpersonal adversity.

Conclusions: Neuroticism confers vulnerability for suicidal desire via an increased reactivity to the proximal, causal risk factors proposed by the interpersonal theory of suicide. This has implications for considering how personality risk factors such as neuroticism may interact with proximal interpersonal risk factors to increase suicidal ideation.
Neuroticism Confers Vulnerability in Response to Experimentally Induced Feelings of Thwarted Belongingness and Perceived Burdensomeness: Implications for Suicide Risk.

Neuroticism has been conceptualised as an increased reactivity towards negative stimuli (Eysenck & Eysenck, 1985) and is linked to higher rates of suicide ideation and attempts (Brezo et al., 2006; Enns, Cox, & Inayatulla, 2003; Farmer et al., 2001; Velting, 1999). Individuals who die by suicide tend to be higher in neuroticism than non-suicidal controls (Duberstein et al., 1994; Tsoh et al., 2005; Useda et al., 2007), although attempters are higher in neuroticism than completers (Tsoh et al., 2005; Useda et al., 2007). While there is considerable evidence that neuroticism is associated with greater suicide risk, the mechanisms by which neuroticism might influence suicide risk are unknown. Neuroticism is defined as a relatively stable personality pattern of increased emotional responsivity to threat, frustration, or loss (Costa & McCrae, 1992; Goldberg, 1993). One possibility is that people high in neuroticism are more susceptible to perceiving threats to their interpersonal needs to belong and contribute. Thus, neuroticism may increase an individual’s sensitivity to thwarted belongingness and perceived burdensomeness. According to the interpersonal theory of suicide (Chu et al., 2017; Joiner, 2005; Van Orden et al., 2010), the thwarting of these fundamental interpersonal needs increases suicidal desire.

Studies have shown that individuals with high levels of neuroticism are more vulnerable to experiencing negative emotion in response to minor stressors and have a more reactive sympathetic nervous system (Eysenck & Eysenck, 1985). Further, individuals with this enhanced reactivity often experience emotional responses that are frequent and out of proportion to the circumstances (McCrae & Costa, 2003). Such individuals are vulnerable to self-criticism, increased sensitivity to criticism, and
Neuroticism and Interpersonal Antecedents of Suicide

feelings of personal inadequacy (Watson et al., 1994). The increased emotional reactivity associated with high neuroticism may confer vulnerability towards experiencing the interpersonal precursors for suicidal desire; and may offer a partial explanation for the association between neuroticism and suicidal ideation.

The interpersonal theory of suicide posits that the joint influence of thwarted belongingness and perceived burdensomeness is the key causal and proximal antecedent of suicidal desire (Chu et al., 2017; Joiner, 2005; Ma et al., 2016; Van Orden et al., 2010). Thwarted belongingness refers to feeling isolated and alienated from friends, family, and other social networks, and perceived burdensomeness refers to one’s perception of being ineffective to the point of being a burden on others and that one’s death will benefit others more than one’s continued life. People high in neuroticism may be particularly vulnerable to experience the thwarting of these fundamental interpersonal needs to belong and to contribute. For example, neuroticism is associated with low levels of perceived social inclusion and greater sensitivity to cues of social exclusion (Denissen & Penke, 2008), as well as with feelings of being a burden on others (Chochinov et al., 2007). The aim of the present study was to experimentally manipulate feelings of thwarted belongingness and perceived burdensomeness (Collins, Stebbing, Stritzke, & Page, 2017; Collins et al., 2016) and test if neuroticism moderates the effects of induced thwarted belongingness and perceived burdensomeness on the desire to escape from this interpersonal adversity.

Neuroticism and Thwarted Belongingness

Neuroticism may influence the experience of thwarted belongingness. A recent cross-sectional study found that neuroticism is positively associated with thwarted belongingness (DeShong et al., 2015). More generally, neuroticism is also linked to elevated distress in response to interpersonal conflicts such as arguments, tensions, or
Neuroticism and Interpersonal Antecedents of Suicide

criticism (Bolger & Zuckerman, 1995; Zautra, Affleck, Tennen, Reich, & Davis, 2005), and to greater reactivity in situations involving perceived social or interpersonal threat (Denissen & Penke, 2008). That is, individuals high in neuroticism tended to report lower levels of social inclusion such as relationship closeness, meaningful communication, availability of emotional support, understanding and acceptance, and they also exhibited greater negative reactivity in response to imagined scenarios of social exclusion, such as interpersonal conflict and rejection (Denissen & Penke, 2008). Thus, neuroticism represents a predisposition to react vigilantly to interpersonally threatening cues including cues of diminished belongingness. Consequently, individuals high in neuroticism would be more sensitive and reactive to the experience of experimentally induced thwarted belongingness.

Neuroticism and Perceived Burdensomeness

Neuroticism may also influence the experience of perceived burdensomeness. DeShong and colleagues (2015) reported that neuroticism was positively associated with perceived burdensomeness. Similarly, neuroticism correlated positively with feelings of burdensomeness to others amongst a group of terminally ill inpatients (Chochinov et al., 2007) and male prison inmates (Cramer et al., 2012). More generally, neuroticism is associated with a higher sensitivity to the experience of losses and failure to meet expectations (Proto & Rustichini, 2015), negative feedback (Larsen & Ketelaar, 1989; Larsen & Ketelaar, 1991), and increased feelings of guilt and disappointment (Trnka, Balcar, Kuška, & Hnilica, 2012). Joiner (2005) proposed that such feelings are motivators for suicidal behaviour through their influence on perceived burdensomeness. Since neuroticism represents a vulnerability to experience disappointment, guilt, failure, and burdensomeness more intensely, people high in neuroticism would be expected to
be particularly sensitive to the experience of experimentally induced perceived burdensomeness.

**The Present Study**

Previous research examining the relationship between neuroticism and the interpersonal risk factors of thwarted belongingness and perceived burdensomeness has primarily been correlational (Brezo et al., 2006; DeShong et al., 2015). The current study is novel because it is the first experimental test of the hypothesis that people high in neuroticism when faced with interpersonal adversity, may be more vulnerable to experiencing heightened levels of thwarted belongingness and perceived burdensomeness than people low in neuroticism. Consequently, people high in neuroticism may also exhibit a greater tendency of wanting to escape from such interpersonal adversity, whereas people low in neuroticism would exhibit greater resilience. Escape theory (Baumeister, 1990) posits that the primary motivation for suicide is to escape from painful self-awareness, and according to the integrated motivational-volitional model of suicidal behaviour (O’Connor, 2011) perceptions of defeat and humiliation give rise to feelings of entrapment, with suicide being contemplated as a means to escape these intolerable feelings. Joiner (2005) argues that high levels of thwarted belongingness and perceived burdensomeness could constitute this ‘psychological pain’ and could prompt such escape-seeking behaviours.

In the present study we used an interpersonal persistence task designed to experimentally induce high or low feelings of thwarted belongingness and perceived burdensomeness and observe the effects of this manipulation on the desire to escape this interpersonal adversity (Collins et al., 2017; Collins et al., 2016). Escape is operationalised as the desire to drop out of the team activity measured at various time intervals throughout the persistence task. A decline in persistence is a potential
antecedent of various self-defeating behaviours (Deci & Ryan, 2000) including suicide risk (Van Orden et al., 2010).

It is well established that neuroticism is associated with a general increased reactivity to negative stimuli and emotional states (Costa & McCrae, 1992; Eysenck & Eysenck, 1985; Goldberg, 1993; Larsen & Ketelaar, 1989; Larsen & Ketelaar, 1991; McCrae & Costa, 2003; Watson et al., 1994; Zautra et al., 2005). However, this reactivity is considered in the current study in the context of the specific interpersonal risk factors thought to be proximal to suicidal desire. The interpersonal theory of suicide posits that it is the interpersonal nature of feeling disconnected and unable to make meaningful contribution that results in the desire to escape which motivates suicidal behaviour (Ma et al., 2016). It is important that these proposed interpersonal risk factors are distinguished from a more general sense of sadness, failure or disappointment which has also been shown to motivate suicidal behaviour (Baumeister, 1990). Similarly, it is important in an experimental manipulation of perceived burdensomeness and thwarted belongingness to ensure that their adverse effects are due to their interpersonal nature, rather than attributable to general negative feedback or stimuli. The interpersonal persistence task was designed to achieve this aim. Recent evidence showed that when contrasting the standard interpersonal variant of this task, where negative reactivity is induced via specifically interpersonally adverse experiences of failure and inadequacy, with an intra-personal condition, where negative feedback occurs in a competitive rather interpersonally collaborative context, deficits in persistence were much greater among participants in the interpersonal condition (George, Collins, Cao, Stritzke, & Page, 2017). Therefore, the interpersonal persistence task was used in the present study to test whether the increased reactivity associated with high neuroticism specifically confers sensitivity to the experimental induction of the interpersonal risk factors for suicide.
We selected individuals who were either high or low in neuroticism, and within each group, participants were randomly assigned to either a high or low perceived burdensomeness and thwarted belongingness (PB-TB) condition. We tested the following hypotheses:

(1) There will be a main effect of PB-TB condition with participants in the high PB-TB condition reporting higher levels of thwarted belongingness and perceived burdensomeness than participants in the low PB-TB condition. If neuroticism is associated with increased reactivity to the experience of these interpersonal stressors then there will also be a PB-condition by neuroticism group interaction, such that the effect of PB-TB condition will be greater in people high in neuroticism compared to people low in neuroticism.

(2) If hypothesis (1) is supported with people high in neuroticism being more reactive to the induction of thwarted belongingness and perceived burdensomeness, and this vulnerability detrimentally affects persistence, then there would also be a PB-TB condition by neuroticism group interaction effect on the desire to drop out of the interpersonal team task. That is, in the high PB-TB condition, participants high in neuroticism would have a greater desire to drop out compared to participants low in neuroticism, whereas in the low PB-TB conditions there would be no difference in the desire to drop out between the neuroticism groups.

Methods

Participants

Power analysis was calculated for repeated measures ANOVA, with six within subjects levels, two between subjects factors; each with two levels (neuroticism group and task condition) using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). Based on a power of 0.80, an alpha level of .05, and a small to medium interaction effect size
(η² partial = .05), the required sample size to reliably detect a significant interaction between neuroticism group and task condition was estimated at 72. Thus, the current sample provided sufficient statistical power.

Participants (N = 116; 80 females, aged between 17 and 59; M = 19.38, SD = 5.23) were recruited based on scores on the neuroticism subscale of the Eysenck Personality Questionnaire Brief Version (EPQ-BV; Sato, 2005) completed by 1092 first year undergraduate students enrolled in an introductory psychology unit. Those scoring in the upper 15% (high neuroticism; N = 160) or lower 15% (low neuroticism; N = 159) of the distribution were invited to participate in the experimental task. Of the students who met these criteria, 60 and 55 were recruited to form the high and low neuroticism groups, respectively. Participants from each neuroticism group were randomly allocated to either a high PB-TB condition or a low PB-TB condition, resulting in four groups: high neuroticism, high PB-TB; high neuroticism, low PB-TB; low neuroticism, high PB-TB; and low neuroticism, low PB-TB. The study was approved by the UWA Human Research Ethics Committee and all participants provided written informed consent and received partial course credit.

**Experimental Task**

The Interpersonal Persistence Task (Collins et al., 2016; George et al., 2017) is an experimental procedure that was presented to participants as a three-player computer reaction time task requiring players to work as a team to achieve a goal; each making a judgment on whether two characters (e.g., Ý and Ü) presented on a computer screen were alike or different as quickly and as accurately as possible. Participants were told that they were playing with two fellow students, one situated in the testing room opposite, and the other in a separate laboratory down the hall. However, these ‘co-players’ were computer-controlled, and the student seated in the opposite testing room
was either another participant scheduled at the same time or a confederate. Participants were informed that they would win and lose points on the basis of both speed and accuracy. They were instructed that points won and lost by the individual would contribute to a cumulative team total score, and that as a team they were aiming to beat a target score. They were told this target score is based on the average performance of teams who have previously completed the task. An experimental manipulation is used to simultaneously induce perceptions of burdensomeness and thwarted belongingness. This manipulation produces two conditions; a high PB-TB condition, and a low PB-TB condition

**Perceived Burdensomeness Manipulation.** Performance feedback was used to manipulate the experience of perceived burdensomeness. At the end of each block of trials, participants were presented with a score summary table displaying their score, their teammate’s scores, the total score for the team, and the team target score. These scores do not reflect the player’s actual performance, but are instead manipulated to induce feelings of perceived burdensomeness. That is, in the high PB-TB condition participants always score lower than their teammates, while in the low PB-TB condition participants always score equivalent to or better than their teammates. This manipulation ensures that participants in the high PB-TB conditions are not able to effectively contribute to their team’s overall performance and are therefore likely to consider themselves a burden.

**Thwarted Belongingness Manipulation.** Interpersonal feedback statements from the participant’s teammates were used to manipulate belongingness. After every block of trials participants are given the opportunity to send a short feedback message to each of their “team mates”. Prior to commencing the task, they are informed that this feedback may comment on an individual player’s performance, or the performance of
the team more generally, and that this feedback may assist the team’s performance. After the participant has provided feedback messages they receive comments from each of their “co-players”, including spelling and grammatical errors, as well as colloquialisms intended to be consistent with a student population. In the high PB-TB condition comments are increasingly critical, while in the low PB-TB condition the comments are supportive. Thus, participants in the high PB-TB condition were made to feel as though they are not valued by their “co-players” and therefore their need to belong within the team may have been thwarted.

The task began with the on-screen instructions and participants were given the opportunity to complete a practice round. The task then ran for six blocks, comprising three rounds of five trials each. Following each of the six blocks participants were asked to rate their experience of thwarted belongingness, perceived burdensomeness and their desire to drop out of the task using the following statements: (1) *I feel like a burden to my team* (2) *I feel as though I belong in the team*; and (3) *If given the opportunity, I would rather drop out of the task* on a 7-point Likert scale ranging from 0 (not at all true for me) to 6 (very true for me). After completing the task, participants were also asked to rate the extent to which they tried to do well and were interested in the task, also on 7-point scales.

**Questionnaires**

The Eysenck Personality Questionnaire Brief Version (EPQ-BV; Sato, 2005). The 12-item neuroticism subscale of the EPQ-BV personality questionnaire measured individuals’ level of trait neuroticism. Participants responded to statements indicating how true each statement was for them, ranging from 1 (Not at all) to 5 (Extremely), with higher scores indicating greater levels of neuroticism. The
questionnaire has good psychometric properties (Sato, 2005). In the current study, internal consistency for the EPQ was high ($\alpha=0.97$).

**Interpersonal Needs Questionnaire** (INQ; Van Orden, Witte, Gordon, Bender & Joiner, 2008). The 15-item INQ contains two subscales (1) thwarted belongingness: measuring the extent to which individuals feel connected to others and (2) perceived burdensomeness: measuring the extent to which individuals feel a burden on others. Responses are made on a 7-point Likert scale, ranging from 0 (*Not at all true for me*) to 6 (*Very true for me*), with higher scores indicating greater perceptions of burdensomeness and thwarted belongingness. Example items are “The people in my life would be happier without me” (perceived burdensomeness) and “I often feel like an outsider in social gatherings” (thwarted belongingness). The scale has good internal consistency across multiple samples (Conner, Britton, Sworts, & Joiner, 2007; Van Orden et al., 2008). In the current sample the internal consistency was good for both burden ($\alpha = .93$) and belongingness ($\alpha = .88$) subscales.

**Self-Injurious Thoughts and Behaviours Items.** Five items from the Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock, Holmberg, Photos, & Michel; 2007) were used to measure suicidal thoughts, suicidal gestures, previous suicide attempts, non-suicidal self-injury ideation, and non-suicidal self-injury attempts. Responses were made on a 5-point Likert scale, with higher scores indicating higher levels of the above suicidal behaviours. The SITBI has been found to have strong inter-rater reliability, test-retest reliability, and concurrent validity (Nock et al., 2007).

**Intent, Likelihood, and Readiness for Suicide.** Suicide outlook was assessed using three items that measured an individual’s readiness (*If I wanted to kill myself, I feel ready to do so*), intent (*I have no intention of killing myself in the near future*) and likelihood (*It is unlikely that I would die by suicide anytime soon*) of suicide, with
responses ranging from 0 ‘Not at all’ to 8 ‘Very strongly’. The two latter items were reversed scored, such that higher scores indicated greater risk for suicidal behaviour.

**The Kessler Psychological Distress Scale** (K10; Kessler et al., 2002). The 10-item K10 is a non-specific measure of psychological distress in the past four weeks. Responses are made on a 5-point Likert scale, ranging from 1 (*None of the time*) to 5 (*All of the time*), with higher scores indicating greater levels of psychological distress (Kessler et al., 2002). Internal consistency reliability in the current sample was good ($\alpha = .95$). The normative bands for K10 scores in the Australian population are: low distress (10-15), moderate distress (16-21), high distress (22-29), and very high distress (30-50) (Cvetkovski, Reavley, & Jorm, 2012).

**Procedure**

After arriving, participants were seated in individual testing rooms with a standard desktop computer. If there was no other participant scheduled at that time, a confederate was used. Both participants (or participant and confederate) were then briefed on the task requirements, given an information sheet, and asked to sign a consent form while the experimenter ‘checked on the third player in the laboratory down the hall’. The experimenter emphasised that to be correct, responses needed to be both *accurate* and *fast*. This was incorporated to minimise suspicion that the scoring system was pre-determined, since participants could not be sure that their responses were fast enough to be classified as correct.

The task presented on-screen instructions which explained the aim of the task, how to play, as well as the scoring system. Participants first played a practice round, with stimuli pairs appearing on screen followed by feedback indicating whether the response was correct or incorrect. After the practice round, the message ‘*waiting for other players to finish the practice*’ was displayed on the screen, to maximise
plausibility that participants were actually playing with real team-mates. The task then
ran for a total duration of 30 minutes.

After completing the task, participants filled out the questionnaire measures
which were presented in a fixed order using online software. Participants were then
asked to fill out written feedback sheets asking if they had any comments about the
experiment, followed by any comments about their ‘teammates’. These questions were
included to determine whether participants were suspicious about their teammates or the
interpersonal feedback they received. Finally, participants were debriefed on the aims of
the study and provided with details for counselling and other support services available
on campus.

Results

Design

First, the effects of the experimental manipulation on burdensomeness and
belongingness ratings were examined using a 2 (low PB-TB, high PB-TB) × 2 (high
neuroticism, low neuroticism) × 6 (Time Blocks 1-6) mixed-design analyses of variance
(ANOVA). The effects of the experimental procedure on the desire to drop out of the
task was also examined using a 2 (low PB-TB, high PB-TB) × 2 (high neuroticism, low
neuroticism) × 6 (Time Blocks 1-6) mixed-design ANOVA. A significant interaction
between neuroticism group and PB-TB condition for each dependent variable would
support the hypotheses that neuroticism would confer increased sensitivity to the
induction of thwarted belongingness and perceived burdensomeness, and that this would
confer increased desire to drop out of the task.

Data Screening and Descriptive Statistics

There were no univariate or multivariate outliers and skewness and kurtosis
were within acceptable limits. To ensure consistency in the criteria for allocation to high
and low neuroticism groups, three participants whose EPQ-BV scores changed between pre-recruitment screening and the time of the experimental session to such an extent that they no longer were at least below or above the median consistent with their low or high neuroticism group allocation were removed, leaving a final total sample size of 113. For six participants the second administration of the EPQ-BV was not available due to computer malfunction. Since these participants provided valid data for the interpersonal persistence task, as well as questionnaire measures of non-specific psychological distress, suicide ideation, intention, likelihood and readiness they were not excluded from the following analyses.

Descriptive statistics for the high and low neuroticism groups are shown in Table 2.1. As intended, the high and low groups were significantly different on neuroticism $F(1, 105) = 496.64, p < .001 \eta^2_{\text{partial}} = .83$. The high neuroticism group also reported significantly higher levels of thwarted belongingness and perceived burdensomeness than the low neuroticism group. Therefore, scores on trait-level thwarted belongingness and perceived burdensomeness as measured by the INQ were included as covariates in subsequent analyses of task induced thwarted belongingness and perceived burdensomeness. High neuroticism individuals also reported higher levels of non-specific psychological distress, suicide ideation, intention, likelihood and readiness for suicide (see Table 2.1).
Table 2.1

Descriptive Statistics for the Questionnaire Variables by High and Low Neuroticism Groups.

<table>
<thead>
<tr>
<th></th>
<th>Low neuroticism</th>
<th>High neuroticism</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>20.69</td>
<td>4.55</td>
<td>46.40</td>
<td>7.13</td>
</tr>
<tr>
<td>Thwarted belongingness</td>
<td>1.84</td>
<td>.81</td>
<td>3.37</td>
<td>1.09</td>
</tr>
<tr>
<td>Perceived burdensomeness</td>
<td>1.25</td>
<td>.40</td>
<td>2.76</td>
<td>1.28</td>
</tr>
<tr>
<td>Suicide ideation</td>
<td>1.33</td>
<td>.55</td>
<td>2.22</td>
<td>1.12</td>
</tr>
<tr>
<td>Suicide intent</td>
<td>.17</td>
<td>1.07</td>
<td>.84</td>
<td>1.56</td>
</tr>
<tr>
<td>Suicide likelihood</td>
<td>.21</td>
<td>1.10</td>
<td>.82</td>
<td>1.47</td>
</tr>
<tr>
<td>Psychological distress</td>
<td>15.47</td>
<td>3.33</td>
<td>30.56</td>
<td>7.52</td>
</tr>
</tbody>
</table>

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

Note. df = 110 (except for neuroticism; df = 105)

Manipulation Checks

Those participants who indicated on the feedback sheets that they were suspicious of the task or their teammates were identified. Two researchers examined the feedback sheets and made independent judgments about whether participants were suspicious or not. Interrater reliability was 95%. Eleven participants (9.73%) indicated suspicion; two from the low PB-TB condition and ten from the high PB-TB condition. These participants were excluded from further analyses, although it is noteworthy that there were no significant differences in levels of desire to drop out between those participants who reported suspicion (M = 1.95, SD = 1.88) and those who did not (M = 1.82, SD = 2.04); F (1,112) = .04, p = .835, $\eta^2_{\text{partial}} = .001$. 
Thwarted belongingness

A 2x2x6 ANOVA examining the effects of neuroticism group, PB-TB condition, and time on belongingness revealed a significant main effect of experimental condition; $F(1, 98) = 168.35, p < .001, \eta^2_{\text{partial}} = .63$, confirming that participants in the high PB-TB condition reported lower levels of self-reported belongingness than those in the low PB-TB condition. This suggests that the experimental manipulation of thwarted belongingness was effective (see Figure 2.1).

There was also a condition by time interaction $F(4.33, 424.07) = 30.09, p < .001, \eta^2_{\text{partial}} = 0.24$. To investigate this interaction, the effect of time was examined separately for each condition. In the high PB-TB condition, belongingness ratings were lower at Time 1 and continued to decrease during the task, $F(4.03, 185.23) = 36.49, p < .001, \eta^2_{\text{partial}} = .44$ whereas, in the low PB-TB condition belongingness ratings did not change over time, $F(4.71, 244.88) = .74, p = .73, \eta^2_{\text{partial}} = .01$ (Figure 2.1). Thus, the manipulation was successful in inducing reduced feelings of belongingness and this effect extended over time.

Consistent with the primary hypothesis that, compared to individuals low in neuroticism, individuals high in neuroticism would exhibit greater sensitivity to the induction of thwarted belongingness, there was a significant interaction between neuroticism group and PB-TB condition $F(1, 98) = 5.25, p < .05, \eta^2_{\text{partial}} = .05$. To follow up this interaction, the effect of neuroticism was examined separately for each condition. In the low PB-TB condition, the high and low neuroticism groups did not differ significantly in their perception of belongingness, $F(1,52) = .123, p = .73.05 \eta^2_{\text{partial}} = .002$. But as predicted, in the high PB-TB condition, people high in neuroticism reported lower levels of belongingness than people low in neuroticism $F(1, 46) = 8.03, p < .01 \eta^2_{\text{partial}} = .15$ (see Figure 2.1). This is consistent with the hypothesis that
individuals high in neuroticism are more sensitive to the experimental induction of thwarted belongingness. The potential effects of pre-existing trait levels of thwarted belongingness as measured by the INQ were controlled for, but did not significantly contribute to the model.

Figure 2.1. Mean belongingness ratings across the six time intervals; error bars represent standard error.

Note. Belongingness reflects a feeling of inclusion and fitting in with the team, and therefore a low score is a detrimental outcome.

To examine the effect of pre-existing trait levels of thwarted belongingness, self-reported thwarted belongingness as measured by the INQ was entered as a covariate. Trait levels of thwarted belongingness was not significantly associated with belongingness ratings during the task, indicating that neuroticism confers increased sensitivity to the experimental induction of thwarted belongingness, over and above that accounted for by pre-existing levels of thwarted belongingness.
Perceived Burdensomeness

A 2x2x6 ANOVA examining the effects of neuroticism group, PB-TB condition, and time on burdensomeness revealed a significant main effect of experimental condition $F(1, 98) = 165.88, p < .001, \eta^2_{\text{partial}} = .63$, whereby the high PB-TB condition induced higher levels of perceived burdensomeness (Figure 2.2).

This main effect was qualified by an interaction between condition and time $F(4.39, 430.15) = 3.09, p < .05, \eta^2_{\text{partial}} = .03$. To follow up this interaction, each condition was examined separately. In the high PB-TB condition, burdensomeness was higher at Time 1 and continued to increase over time $F(4.19, 192.82) = 2.98, p < .05, \eta^2_{\text{partial}} = .06$, while in the low PB-TB condition, there was no significant effect of time $F(3.64, 189.41) = 1.14, p = .34 \eta^2_{\text{partial}} = .02$. This indicates that the manipulation was also successful in inducing increased feelings of burdensomeness and that this effect was maintained over time.

It was hypothesised that compared to individuals low in neuroticism, individuals high in neuroticism would exhibit greater sensitivity to the induction of perceived burdensomeness. Consistent with this, there was a significant interaction between neuroticism group and PB-TB condition $F(1, 98) = 5.48, p < .05, \eta^2_{\text{partial}} = .05$. To investigate this interaction, the effect of neuroticism on burdensomeness was examined separately for each experimental condition. In the low PB-TB condition, the high and low neuroticism groups did not differ significantly in terms of their perception of burdensomeness, $F(1, 52) = .05, p = .82, \eta^2_{\text{partial}} = .001$. In contrast, in the high PB-TB condition, the high neuroticism group reported greater feelings of burdensomeness than the low neuroticism group $F(1, 46) = 7.26, p < .01, \eta^2_{\text{partial}} = .14$ (Figure 2.2). This suggests that high neuroticism individuals are more sensitive to the induction of perceived burdensomeness, such that they report higher levels of burdensomeness in
response to the induction, relative to those who are low in neuroticism. The potential effects of pre-existing trait levels of perceived burdensomeness as measured by the INQ were controlled for, but did not significantly contribute to the model.

Figure 2.2. Mean perceived burdensomeness ratings across the six time intervals; error bars represent standard error.

Note. Burdensomeness reflects the perception that one is a burden to one’s teammates. Thus, a high score is a detrimental outcome.

Finally, self-reported perceived burdensomeness, as measured by the INQ, was entered as a covariate. These scores were not significantly associated with burdensomeness ratings during the task, indicating that neuroticism confers increased sensitivity to the experimental induction of perceived burdensomeness, irrespective of pre-existing levels of perceived burdensomeness.
Neuroticism and Desire to Drop Out of the Task

Given the experimental procedure had successfully manipulated burdensomeness and belongingness, a 2×2×6 ANOVA examining the effects of neuroticism group, PB-TB condition, and time on desire to drop out of the task found a significant main effect of condition $F(1, 98) = 71.11, p < .001, \eta^2_{\text{partial}} = 0.42$, where those in the high PB-TB condition had higher desire to drop out of the task than those in the low PB-TB condition (Figure 2.3). There was also a main effect of time $F(3.79, 371.79) = 3.44, p < 0.01, \eta^2_{\text{partial}} = .03$ and a significant interaction between time and PB-TB condition, $F(3.79, 371.79) = 9.81, p < .001, \eta^2_{\text{partial}} = .09$. To follow up this interaction, each experimental condition was examined separately. In the high PB-TB condition, the desire to drop out of the task significantly increased over time $F(3.66, 168.48) = 9.64, p < .001, \eta^2_{\text{partial}} = .17$, whereas in the low PB-TB condition there was no significant effect of time $F(3.34, 173.45) = 1.58, p = .22, \eta^2_{\text{partial}} = .03$.  

Figure 2.3. Mean desire to drop out ratings across the six time intervals (error bars represent standard error).
As hypothesised, there was also a significant interaction between condition and neuroticism, $F(1,98) = 6.99, p < 0.01, \eta^2_{\text{partial}} = 0.07$. To follow up this interaction, each experimental condition was examined separately. In the high PB-TB condition, people higher in neuroticism reported a higher desire to drop out of the task than people lower in neuroticism $F(1,46) = 17.52, p < 0.001, \eta^2_{\text{partial}} = 0.28$. Similarly, in the low PB-TB condition people higher in neuroticism reported a greater desire to drop out of the task than those low in neuroticism $F(1,52) = 4.96, p < 0.05, \eta^2_{\text{partial}} = 0.09$. However, the effect of neuroticism was about three times larger in the high PB-TB condition. This supports the hypothesis that high neuroticism is associated with increased sensitivity to the induction of thwarted belongingness and perceived burdensomeness such that the presence of these interpersonal risk factors will confer additional desire to drop out of the task. The potential effects of pre-existing trait levels of thwarted belongingness and perceived burdensomeness as measured by the INQ were controlled for, but did not significantly contribute to the model.

To further investigate the relative contribution of burdensomeness and belongingness in the high PB-TB condition on desire to drop out of the task, a hierarchical multiple regression analysis was conducted. The influence of self-reported effort and interest in the task was accounted for by including these variables in step one of the analysis. Mean levels of self-reported belongingness and burdensomeness were entered simultaneously at step two. At step one, the model was significant, $F(2, 45) = 3.50, p < 0.05$, adjusted $R^2 = .24$, indicating that interest ($\beta = -.50, p < .05$), but not effort ($\beta = .01, p > .05$), accounted for a significant proportion of the variance in desire to quit, such that higher levels of interest were associated with lower levels of desire to quit (see Table 2.2). At step two, after entering mean burdensomeness and belongingness ratings into the model simultaneously, the model explained an additional 39.4% of variance in
Neuroticism and Interpersonal Antecedents of Suicide

desire to quit over and above interest, $R^2$ change = 0.39, $p < 0.01$, with both thwarted belongingness ($\beta = -.36, p < .01$) and perceived burdensomeness ($\beta = .41, p < .01$), significantly predicting desire to drop out (see Table 2.2). Following the addition of thwarted belongingness and perceived burdensomeness, neither interest nor effort was a significant predictor.

Table 2.2

Hierarchical Multiple Regression Within the High PB-TB Condition, with Desire to Escape as the Outcome Variable, and Interest, and Effort Entered in Step 1, and Burdensomeness and Belongingness Entered in Step 2.

<table>
<thead>
<tr>
<th></th>
<th>$b$</th>
<th>SE $b$</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$R^2$ Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.135*</td>
</tr>
<tr>
<td>Effort</td>
<td>.09</td>
<td>.22</td>
<td>.058</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>-.41</td>
<td>.16</td>
<td>-.38**</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td>.51***</td>
<td>.37***</td>
</tr>
<tr>
<td>Effort</td>
<td>-.01</td>
<td>.18</td>
<td>-.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>-.23</td>
<td>.13</td>
<td>-.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burdensomeness</td>
<td>.45</td>
<td>.20</td>
<td>.33*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belongingness</td>
<td>-.61</td>
<td>.25</td>
<td>-.37*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

$N = 48$
significant predictor.

Note: Burdensomeness reflects the perception that one is a burden to ones teammates. Thus, a high score is a detrimental outcome. Belongingness reflects a feeling of inclusion and fitting in with the team, and therefore a low score is a detrimental outcome.

Finally, the desire to drop out of the task was significantly positively correlated with suicidal thoughts ($r = .23, p < .05$), intent ($r = .22, p < .05$), and readiness ($r = .26, p < .01$). In addition, desire to quit the task positively correlated with non-suicidal self-injury ideation ($r = .28, p < .01$), non-suicidal self-injury behaviours ($r = .29, p < .01$), and general psychological distress as reported on the K10 ($r = .44, p < .01$). Adding
further to the ecological validity of the persistence task, there were moderate
correlations between the interpersonal constructs measured by the INQ and the same
constructs measured as momentary states in the specific context where those constructs
are experimentally induced. That is, in the high PB-TB condition, $r = .312$, $p = .031$,
between INQ perceived burdensomeness and task burdensomeness ratings; and $r = -
.396$, $p = .005$, between INQ thwarted belongingness and task belongingness ratings.
But in the condition where those constructs were not experimentally induced (i.e., low
PB-TB condition), those correlations were weaker or non-significant ($r = .274$, $p = .047$,
between INQ perceived burdensomeness and task burdensomeness ratings, and $r = -
.061$, $p = .663$, between INQ thwarted belongingness and task belongingness ratings).
Similarly, neuroticism was associated with task ratings in the high condition, when PB
and TB were induced ($r = .335$, $p = .025$ for task burdensomeness ratings, and $r = -.444$,
$p = .002$, for task belongingness ratings), but not in the low condition when PB and TB
were not induced ($r = .052$, $p = .719$, and $r = -.038$, $p = .793$, respectively).

Discussion

We examined whether neuroticism would confer increased vulnerability for
experiencing the interpersonal risk factors posited by the interpersonal theory of suicide
(Joiner, 2005) to be causal and proximal antecedents of suicidal desire. Specifically, we
experimentally induced feelings of thwarted belongingness and perceived
burdensomeness and measured their impact on the desire to escape this interpersonal
adversity. As hypothesised, high levels of neuroticism were associated with increased
reactivity to the induction of interpersonal adversity, with these individuals reporting
higher levels of perceived burdensomeness and lower levels of belongingness than those
low in neuroticism. Furthermore, in the high PB-TB condition both high and low
neuroticism groups showed increased desire to drop out of the task, but this increase
was significantly greater for those high in neuroticism. These results highlight how distal risk factors such as individual differences in neuroticism may interact with more proximal interpersonal risk factors to confer increased vulnerability for suicide risk.

Previous research found a positive association between neuroticism and suicidal ideation (Brezo et al., 2006; Enns et al., 2003; Farmer et al., 2001), and studies found higher levels of neuroticism in those who died by suicide compared to non-suicidal controls (Duberstein et al., 1994; Tsoh et al., 2005; Useda, Duberstein, Conner, & Conwell, 2004). This is consistent with findings from the present sample where people high in neuroticism reported significantly higher levels of suicide ideation, intent, and perceived likelihood of suicide occurring in the future. Furthermore, recent cross-sectional evidence suggested that neuroticism may increase suicide risk via its positive association with perceived burdensomeness and thwarted belongingness (DeShong et al., 2015). The results of the current study suggest that the increased emotional responsiveness associated with high neuroticism may confer increased risk for suicide via an increased sensitivity to the interpersonal stressors of thwarted belongingness and perceived burdensomeness. This was also evident in the high neuroticism group’s significantly higher scores on these constructs, as measured by the Interpersonal Needs Questionnaire (Van Orden et al., 2008), compared to the low neuroticism group. This study makes a novel contribution in that it provides experimental evidence that one mechanism by which neuroticism may increase suicide risk is by heightened responsiveness to interpersonally adverse situations that specifically induce feelings thwarted belongingness and perceived burdensomeness. Here we found that individual differences in neuroticism confer vulnerability for experiencing the proximal interpersonal risk factors for suicidal desire more intensely. This is consistent with previous literature demonstrating that neuroticism confers vulnerability for experiencing
negative emotional reactions (Eysenck & Eysenck, 1985; Larsen & Ketelaar, 1989; Larsen & Ketelaar, 1991; Rusting & Larsen, 1999; Watson et al., 1994). However, to our knowledge this is the first experimental evidence to support the positive associations recently reported by DeShong et al. (2015) of neuroticism with thwarted belongingness and perceived burdensomeness, and also with current and historical suicidal ideation. Furthermore, the current study identifies an association between neuroticism and increased emotional reactivity specifically to the interpersonal risk factors for suicide, as distinct from more general negative reactivity.

The interpersonal persistence task (Collins et al., 2016; George et al., 2017) provides an opportunity to safely manipulate the interpersonal risk factors thought to be proximal and causal antecedents to suicidal desire to observe the effect on the desire to escape this adversity. Consistent with previous research using this task, we found reliable and large effects of PB-TB condition on participants’ desire to escape from this interpersonal adversity. Although the interpersonal distress is of course milder and only fleeting in the experimental context, it is plausible to assume that this adversity simulates similar processes as those underlying intolerable psychological pain and self-awareness that according to escape theory (Baumeister, 1990) increase the risk of contemplating suicide as a means to escape this pain. Likewise, the successful experimental induction of feeling that one’s efforts to contribute meaningfully to a collective goal do not appear to measure up, are increasingly futile, and are not appreciated by the other team members is akin to the perception of defeat and entrapment hypothesised by the integrated motivational-volitional model of suicidal behaviour (O’Connor, 2011) to be a key pathway to increased suicide risk. While the desire to escape from the task is clearly not equivalent to the desire for suicide, a decline in persistence has been identified as a potential antecedent of various self-defeating
behaviours (Deci & Ryan, 2000) including suicide (Van Orden et al., 2010).

Furthermore, desire to escape operationalised here as the desire to drop out of the task had some external validity by being positively correlated with measures of suicidal thoughts, intention, readiness, and measures of non-suicidal self-injury thoughts and behaviours, as well as general psychological distress. This offers support for the notion that one mechanism through which neuroticism may confer vulnerability for suicide is via an increased susceptibility to the interpersonal risk factors thought to predicate a desire to escape. These results are encouraging and suggest that this experimental paradigm could be useful for further examining how individual differences in personality may interact with more proximal interpersonal risk factors to confer risk or resilience for suicide.

**Limitations**

A possible limitation of the present experimental paradigm is that it required participants to self-report the extent to which they felt a burden on their teammates, as well as their feelings of belongingness to the team, and their desire to quit throughout. These variables were assessed via explicit questioning throughout the task. This may have influenced the way participants responded to these items; resulting in possible demand effects. However, the large effect of PB-TB condition is evident by the first rating interval, before familiarity with the explicit questioning might have created demand effect, which mitigates concerns about demand characteristics.

The Interpersonal Theory posits the combination of high thwarted belongingness and perceived burdensomeness will result in low persistence but does not explicitly account for a discrepancy in the level of these factors. Research designs have typically been cross-sectional and so have not examined dynamic relationships between thwarted belongingness and perceived burdensomeness. The current study utilised an
experimental manipulation which targeted burdensomeness and belongingness simultaneously. Thus, a limitation of the current study is that manipulation of belongingness and burdensomeness were not carried out orthogonally. Therefore, we are unable to identify whether each one of these constructs is responsible for the observed effects or whether the interaction between the two factors is necessary to bring about a reduction in persistence. Future research could adapt the interpersonal persistence task to manipulate perceived burdensomeness and thwarted belongingness separately in order to identify whether each construct independently influences persistence, and whether the interaction between the two accounts for additional variance. That is, whether the simultaneous presence of high perceived burdensomeness and thwarted belongingness is more pernicious than either construct in isolation.

In addition, the questionnaires used in the current study were presented in a fixed order, and not randomised across participants. This is a potential confound that could be easily rectified by altering the order of administration of the self-report measures. Furthermore, future research may wish to administer the questionnaire measures of ITS risk factors twice: once prior to completing the Interpersonal Persistence Task, and once after the task has been completed. This would permit further examination of how neuroticism influences changes in perceived burdensomeness and thwarted belongingness in response to a negative or positive interpersonal experience. Finding that high neuroticism is associated with increased self-reported thwarted belongingness and perceived burdensomeness following the experimental induction of PB-TB would offer additional support for the experimental findings of the current study.

Another limitation of the current study is that, by investigating neuroticism as a single personality trait, it did not take into account the possibility that some specific
Neuroticism and Interpersonal Antecedents of Suicide

facets of trait neuroticism may be more predictive of this vulnerability than others. For example, DeShong and colleagues (2015) found that the neuroticism facets of depressiveness, self-consciousness, and vulnerability were significantly associated with perceived burdensomeness, but only depressiveness and self-consciousness were associated with thwarted belongingness. Future research may investigate the relationship between individual facets of neuroticism and the components of the ITS to better understand the specific characteristics associated with a vulnerability for experiencing the interpersonal risk factors underlying suicidal desire. A related limitation of the current study is the use of a brief screening measure for neuroticism which does not account for individual facets of neuroticism (EPQ-BV; Sato, 2005).

While the EPQ-BV had good internal consistency in the current sample and has demonstrated sound psychometric properties, longer measures of neuroticism, such as the NEO-PI-3 (McCrae & Costa, 2010) are considered the gold standard for personality assessment, and would permit thorough examination of the individual contribution of each of the facets of neuroticism to the vulnerability effect identified in this study. The use of a more comprehensive personality inventory in subsequent studies would also provide the opportunity to account for the potential moderating effects of the remaining Big Five Factors (i.e., extraversion, openness to experience, agreeableness, and conscientiousness) on vulnerability and resilience to the interpersonal risk factors underlying suicidal desire.

While the ITS identifies thwarted belongingness and perceived burdensomeness as precursors of the development of a desire for suicide, it also states that desire alone is not sufficient for suicidal action. Taking one’s own life is not easy and individuals also need to have acquired the capability to act on their suicidal desire. Acquiring capability involves greater pain tolerance and fearlessness of death, and may include active
behavioural (e.g., attempts, self-harm) and mental (e.g., mental rehearsal and planning) practice (George et al., 2016; Van Orden et al., 2010). The current study did not investigate the relationship between neuroticism and the acquired capability for suicide. It is possible that the neuroticism facets of angry hostility and impulsiveness may confer vulnerability for acquiring a capability for suicide in that they permit habituation to pain, a sense of fearlessness about death, and increase the likelihood of impulsive suicidal action (Cramer et al., 2012). Alternatively, other characteristics of neuroticism, such as characteristics of emotional dysregulation, low distress tolerance and high negative urgency (Anestis, Bagge, Tull, & Joiner, 2011), higher harm avoidance (De Fruyt, Van De Wiele, & Van Heeringen, 2000), and increased sensitivity to physiological pain (Goubert, Crombez, & Van Damme, 2004) may be protective against the acquisition of a capability for suicidal action. Further investigations of the relationship between personality variables such as neuroticism, and all three components of the ITS would permit better understanding of the role of neuroticism in both suicidal desire and the transition to imminent and lethal suicidal behaviour.

**Implications and Conclusions**

The finding that neuroticism confers increased reactivity to the interpersonal antecedents of suicidal ideation has clinical implications for how an individual’s personality predisposition might interact with more acute and transient interpersonal stressors to increase suicide risk. Mindfulness interventions have been shown to enhance persistence in the face of thwarted belongingness and perceived burdensomeness and may confer resilience by enhancing the capacity for emotional regulation (Collins et al., 2017; Collins et al., 2016). Given high neuroticism is associated with diminished emotional regulation (Anestis et al., 2011), mindfulness interventions may be effective in enhancing these individuals’ capacity to recognise,
tolerate, and accept negative emotion induced by interpersonal stressors. This is consistent with studies that have shown that while high neuroticism is associated with increased negative reactivity and poorer emotional outcomes, this effect may be mitigated by mindfulness (Feltman, Robinson, & Ode, 2009; Fetterman, Robinson, Ode, & Gordon, 2010). In this way mindfulness interventions may be effective in ameliorating the vulnerability to interpersonal stressors associated with suicidal desire conferred by neuroticism (Chesin & Jeglic, 2016; Forkmann et al., 2014).

In conclusion, the current study provides the first experimental evidence that neuroticism confers increased sensitivity to acute experiences of thwarted belongingness and perceived burdensomeness, promoting diminished persistence. This complements prior evidence of a positive association between neuroticism and individual differences in perceived burdensomeness and thwarted belongingness (DeShong et al., 2015). Thus, distal risk factors such as personality traits may interact with more proximal interpersonal risk factors to increase vulnerability to suicidal desire.
Chapter 3

STUDY 1B: PRELIMINARY INVESTIGATION OF THE INTERACTION BETWEEN NEOROTICISM AND ACQUIRED CAPABILITY
Preliminary Investigation of the Interaction between Neuroticism and Acquired Capability for Suicide.

The results of the previous study identified that high levels of neuroticism represent a dispositional vulnerability for experiencing the causal risk factors for suicidal desire proposed by the interpersonal theory of suicide (ITS; Joiner, 2005); thwarted belongingness and perceived burdensomeness. In this way, individuals high in neuroticism are more sensitive to the experimental induction of the ITS antecedents for suicidal desire. Consistent with this sensitivity, previous research has identified that individuals with high neuroticism are at greater risk for reporting suicidal ideation (Brezo et al., 2006). The results of Study 1a identify an increased sensitivity to the proximal interpersonal triggers for suicidal ideation as one potential mechanism through which the personality trait of elevated neuroticism may increase suicide risk.

However, contemporary theories of suicide highlight the importance of distinguishing those individuals who will think about, or desire suicide, from those individuals who will act upon this desire (e.g., ITS: Joiner, 2005, Three Step Theory; Klonsky & May, 2014). These theories propose that the desire for suicide will only lead to lethal suicidal action in the presence of a third factor; the acquired capability for suicide, which permits an individual to overcome their innate biological drive to remain alive and act upon this desire (Anestis, Bagge, et al., 2011; Anestis, Bender, Selby, Ribeiro, & Joiner, 2011; George et al., 2016; Ma et al., 2016; Rimkeviciene, Hawgood, O’Gorman, & De Leo, 2016). For this reason, it is important to consider whether the vulnerability to experiencing suicidal desire associated with elevated neuroticism, is impacted upon by a person’s capability to act upon that desire. It may be the case that neuroticism impacts upon suicide risk differently, depending on whether a capacity to act upon suicidal desire has been acquired.
The previous study in the present thesis did not specifically investigate how individual differences in neuroticism may interact with the acquired capability for suicide to confer risk or resilience for suicide. However, participants completed a measure of acquired capability for suicide as part of the questionnaire battery administered. This permitted a post-hoc formation of groups high and low in acquired capability for suicide, and examination of how the interaction between neuroticism and acquired capability may influence an individual’s reactivity to the induction of thwarted belongingness and perceived burdensomeness in the Interpersonal Persistence Task.

To date, limited research has investigated individual differences in personality and the acquired capability for suicide. However, there is evidence to suggest neuroticism may influence suicidal ideation and suicidal action differently, suggesting that acquired capability may be involved. For example, while high neuroticism is consistently associated with increased risk for experiencing suicidal ideation (Brezo et al., 2006; Enns et al., 2003; Farmer et al., 2001; Velting, 1999), the relationship between neuroticism and suicidal action (i.e., suicide attempts and suicide completions) is less consistent (Brezo et al., 2006; Cox et al., 2004). For example, while individuals who die by suicide are higher in neuroticism than non-suicidal controls (Duberstein et al., 1994; Tsoh et al., 2005; Useda et al., 2007), individuals who attempt suicide tend to be higher in neuroticism than those who complete suicide (Tsoh et al., 2005; Useda et al., 2007). Other studies find no relationship between suicide attempts and neuroticism after controlling for comorbid depressive symptoms (Batterham & Christensen, 2012; Fergusson, Woodward, & Horwood, 2000; Pisetsky et al., 2015; Useda et al., 2004), comorbid psychopathology and exposure to stressful life events (Bi et al., 2012; Fang, Heisel, Duberstein, & Zhang, 2012; Fergusson et al., 2000; Zhu et al., 2013).
Since the ITS proposes that the presence of an acquired capability for suicide is what distinguishes suicidal desire from suicidal action, it may be that the inconsistent relationship between neuroticism and suicidal actions can be explained by accounting for the role of the acquired capability for suicide. Acquired capability may permit transition from suicidal ideation and desire for death, to suicidal actions such as attempts and completions. The aforementioned studies investigating neuroticism and suicide attempts and completions do not take into account their particular sample’s variations in acquired capability. Therefore it may be that the inconsistent results are attributable to a moderating effect of acquired capability. One possibility is that while neuroticism consistently confers risk for suicidal ideation, its influence on suicidal action may be tempered by the presence or absence of an acquired capability for suicide. Given there are a number of discrepant findings regarding the relationship between neuroticism and the facets of suicidality, examining how neuroticism acts upon suicidality, in the presence of absence of concurrently high levels of acquired capability may provide further clarity.

The post-hoc formation of four groups; 1) high neuroticism, low acquired capability, 2) high neuroticism, high acquired capability, 3) low neuroticism, low acquired capability and 4) low neuroticism, high acquired capability permits examination of how individuals who are high or low in acquired capability and high or low in neuroticism may have differing levels of desire to drop out of the Interpersonal Persistence Task.

**Method**

**Participants**

The sample was identical to that used in the previous study, and thus participants had already been selected to be high or low in neuroticism. Participants had also already
completed the Acquired Capability with Rehearsal for Suicide Scale (ACWRSS: George et al, 2016) as part of the questionnaire battery administered in the previous study. This 7-item questionnaire assesses capability to engage in suicidal behaviour and includes items assessing pain tolerance, fearlessness about death and mental rehearsal for suicide on a 9-point Likert scale. Higher scores indicate higher capability to engage in suicide, with two items reverse scored. Internal consistency in the current sample was good ($\alpha = .844$).

The current study utilised a post-hoc analysis whereby a median split was used to form two groups which were high or low in acquired capability. This process formed four distinct groups (High N, Low AC; High N, High AC; Low N, High AC; Low N, Low AC). Note, that participants who were indicated that they were suspicious of the task were excluded from the analysis. Participant characteristics are summarized in table 3.1.

Table 3.1.

*Mean acquired capability and neuroticism scores for the selected groups.*

<table>
<thead>
<tr>
<th></th>
<th>Acquired Capability Score</th>
<th>Neuroticism Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Neuroticism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Acquired</td>
<td>$M$ 1.18</td>
<td>20.04</td>
</tr>
<tr>
<td>Capability</td>
<td>$SD$ .75</td>
<td>4.44</td>
</tr>
<tr>
<td>N=30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Acquired</td>
<td>$M$ 3.99</td>
<td>20.58</td>
</tr>
<tr>
<td>Capability</td>
<td>$SD$ 1.25</td>
<td>4.72</td>
</tr>
<tr>
<td>N=21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Neuroticism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Acquired</td>
<td>$M$ 1.33</td>
<td>43.26</td>
</tr>
<tr>
<td>Capability</td>
<td>$SD$ .80</td>
<td>7.45</td>
</tr>
<tr>
<td>N=24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Acquired</td>
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<td>48.73</td>
</tr>
<tr>
<td>Capability</td>
<td>$SD$ 1.43</td>
<td>6.21</td>
</tr>
<tr>
<td>N=27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total $N = 102$
Preliminary Investigation of Neuroticism and Acquired Capability

Procedure

As this analysis used data collected from a previous study, details of the procedure and measures used may be found in the method section of the previous chapter.

Results

As this study sought to conduct a preliminary investigation of the interaction between neuroticism group and acquired capability group on persistence, a 2 (neuroticism group) by 2 (acquired capability group) analysis of variance (ANOVA) was conducted with desire to drop out of the task as the dependent variable. Since the role of thwarted belongingness and perceived burdensomeness was addressed in the previous study, and to avoid reducing power by creating a large number of cells, PB-TB condition was not entered as a variable in this analysis. In this way the effect of acquired capability and neuroticism was examined across the high and low PB-TB conditions. There was a significant main effect of neuroticism $F(1, 98) = 15.41, p < .001, \eta^2_{\text{partial}} = .136$. This was qualified by a significant interaction between neuroticism group and AC group $F(1, 98) = 4.62, p = 0.034, \eta^2_{\text{partial}} = .045$. To clarify this interaction, each of the acquired capability groups was examined separately. For the high acquired capability group there was a significant main effect of neuroticism group $F(1, 46)= 20.58, p<.001, \eta^2_{\text{partial}} = .309$. This indicates that for individuals with high levels of acquired capability, high neuroticism was associated with increased desire to drop out of the task, while low neuroticism was associated with lower desire to drop out (See Figure 3.1). For the low acquired capability group, there was no significant effect of neuroticism group $F(1, 52) = 1.48, p = .230, \eta^2_{\text{partial}} = .028$, suggesting that when acquired capability is low, desire to drop out of the task remains low regardless of
neuroticism.

Figure 3.1. Graph to show the relationship between AC group and neuroticism group on desire to drop out of the task. As there were no significant effects of time, this figure displays average desire to drop out across the six rounds.

Discussion

The current chapter used a post-hoc median split to form high and low acquired capability groups, in order to investigate the interaction between neuroticism and acquired capability for suicide. Consistent with the hypotheses, exploratory analyses suggested that neuroticism and acquired capability may interact to influence desire to drop out of the Interpersonal Persistence Task. We found that for individuals with low levels of neuroticism, high acquired capability is not associated with significantly increased desire to escape, while at high levels of neuroticism high acquired capability is associated with increased desire to escape. As such, neuroticism may represent a stable dispositional risk factor, the expression of which is more likely in the context of high acquired capability for suicide.
Interestingly, although non-significant, results from the Interpersonal Persistence Task suggest a possible trend whereby at low levels of neuroticism, high acquired capability may in fact confer resilience, with these individuals reporting the lowest desire to drop out of the task of all four groups. One possible explanation for this unusual finding is that acquired capability, when paired with low levels of neuroticism, may confer resilience via its relationship with distress tolerance. Simons and Gaher (2005) define distress tolerance as the ability to withstand aversive affective states. High levels of self-reported distress tolerance have been shown to be associated with higher levels of acquired capability in a nonclinical sample (Bender, Gordon, Bresin, & Joiner Jr, 2011). Furthermore, low distress tolerance has been linked to increased levels of thwarted belongingness, and perceived burdensomeness, well-established antecedents for suicidal desire (Anestis, Bagge, et al., 2011). It has been argued that high distress tolerance is not likely to be problematic in isolation, and may even be protective in that it makes an individual insensitive to affective adversity that others might find distressing (Anestis, Bender, et al., 2011). However, the authors proposed that distress tolerance will likely only correspond to increased risk in the presence of concurrent suicidal desire (Anestis, Bender, et al., 2011). This is consistent with the results of the current study. In this way, for those individuals with low levels of neuroticism, who are less susceptible to the ITS components of suicidal desire, acquired capability may be associated with an increased capacity to tolerate unpleasant affective states and may confer resilience to suicidality. However, when high acquired capability is paired with high neuroticism; which is in turn associated with increased sensitivity to the ITS precursors of suicidal desire (Hartley, Stritzke, Page, Blades, & Parentich, 2017) risk will be elevated. The trends of the current study, although non-significant, are consistent with this assertion and merit further clarification.
However, these are analyses conducted post-hoc for the purpose of identifying future avenues for investigation, and as such have a number of limitations. Firstly, the formation of the AC groups used a median split in order to preserve sample size and avoid reducing statistical power. Power analysis for a repeated measures ANOVA, with six within subjects levels (time), three between subjects factors; each with two levels (neuroticism group, acquired capability group and PB-TB task condition) estimated that a sample of at least 120 would be required to reliably detect a small to medium interaction effect size (Faul et al., 2007). Given that this exceeded the available sample for this post-hoc analysis ($N = 116$) the PB-TB conditions were not examined separately, so the potential three-way interaction between PB-TB condition, neuroticism group and acquired capability group is not known.

Further, a consequence of using a median split is that the groups formed may not be sufficiently extreme, or different from one another, to be justifiably termed ‘high’ or ‘low’ in acquired capability. For this reason, the following empirical chapter will specifically screen and select participants to form groups which are high and low in both acquired capability and neuroticism.

The findings described in these preliminary analyses suggest an interesting pattern whereby neuroticism and acquired capability may interact to confer risk or resilience for suicide. However, due to the limitations associated with this post-hoc analysis, further more thorough examination of the relationship is needed before conclusions can be drawn. The following chapter will attempt to address these identified limitations and provide more comprehensive exploration of the interaction between neuroticism and acquired capability. The ensuing chapter will also permit replication of the previous study, which did not consider the acquired capability for suicide. Thus, the next study will allow us to determine whether the previous identification of neuroticism
as a vulnerability for experiencing the ITS causal determinants of suicidal ideation is reliable, and also whether this association is affected by acquired capability.
Chapter 4.

STUDY 2: ELEVATED NEUROTICISM, BUT NOT ACQUIRED CAPABILITY PREDICTS REACTIVITY TO EXPERIMENTALLY INDUCED THWARTED BELONGINGNESS AND PERCEIVED BURDENSOMENESS.
Abstract

Objectives:
This study sought to replicate the finding that neuroticism confers vulnerability for experiencing the interpersonal risk factors for suicidal desire proposed by the ITS, and to clarify the nature of the relationship between acquired capability, neuroticism and suicidal desire.

Method:
Undergraduate students (N = 107; 69 female) were screened and selected to form four groups who were high and low in neuroticism, and high and low in acquired capability for suicide. Participants then completed an experimental task intended to evoke feelings of thwarted belongingness and perceived burdensomeness. Participants’ experience of these interpersonal precursors for suicidal desire, as well as their desire to escape from the experimentally induced adversity was measured.

Results:
Results indicate that high neuroticism conferred vulnerability for the interpersonal precursors for suicidal ideation regardless of acquired capability for suicide. Acquired capability for suicide was unrelated to the experimental induction of thwarted belongingness, perceived burdensomeness and desire to drop out of the task.

Conclusions
As expected, neuroticism conferred vulnerability for the interpersonal precursors for suicidal desire. In contrast, acquired capability for suicide was unrelated to the causal proponents for suicidal desire, and the desire to persist in the face of interpersonal adversity. We speculate that acquired capability may be less related to suicidal desire, and more closely related to the capacity to act upon this desire. Future research should examine the relationship between neuroticism and acquired capability using measures of both suicidal action and suicidal desire.
Neuroticism, but Not Acquired Capability Predicts Reactivity to Experimentally Induced Thwarted Belongingness and Perceived Burdensomeness.

Neuroticism is defined as a relatively stable personality pattern of increased emotional reactivity to threat, loss, and negative affect. It is associated with a higher incidence of anxiety, depression, and non-specific psychological distress and has been identified as risk factor for suicide (Brezo et al., 2006; Costa & McCrae, 1992; Enns et al., 2003; Farmer et al., 2001; Goldberg, 1993; Velting, 1999). In particular, neuroticism has been consistently identified as a dispositional risk factor for experiencing suicidal ideation or desire (Brezo et al., 2006; Duberstein et al., 2000; Tsoh et al., 2005; Useda et al., 2007). In contrast, the relationship between neuroticism and suicidal action, including suicide attempts and suicide completions, is less consistent (Rappaport et al., 2017; Useda et al., 2007).

The distinction between the desire for suicide, and the transition to acting upon this desire, is a key feature of contemporary theories of suicide, including the ITS (Joiner, 2005), the three step theory (Klonsky & May, 2015) and the motivational volitional model of suicidal behaviour (O’Connor, 2011). These theories argue that suicidal desire alone is not sufficient for serious or lethal suicidal behaviour, and propose that to enact lethal self-injury one must first acquire a capability to overcome the inherent drive for self-preservation (Joiner, 2005). Acquired capability refers an increased physical pain tolerance, diminished fear of death, and a process of mentally preparing for suicide (Ribeiro & Joiner, 2009; Van Orden et al., 2010). Risk factors, such as family history of suicide, previous suicide attempt, NSSI, exposure to combat, violence, self-injecting drug use and childhood maltreatment, among others, contribute to the development of acquired capability (Ribeiro & Joiner, 2009).

Following from the distinction between suicidal desire and action, Klonsky and colleagues (Klonsky & May, 2014, 2015; Klonsky et al., 2016) suggest that suicide
Neuroticism, Acquired Capability and Persistence

research and theory should be grounded in an ideation-to-action framework in which risk factors are identified as contributing to specific aspects of risk. Thus, risk factors be separated into those which predict ideation and those which predict action. The ITS provides one such theoretical framework which separates suicidal desire from suicidal action. The ITS framework may be used to consider individual dispositional risk factors, such as neuroticism in the context of the theory’s proposed proximal, causal, risk factors for both suicidal desire and the transition to suicidal action. Law, Khazem, and Anestis (2015) suggest that placing identified risk factors, such as neuroticism, into context, by identifying how they may impact on suicidal desire and action, will have implications for assessing risk, by distinguishing those at risk for ideation from those at risk for making a suicide attempt. For this reason, the current study will explore the relationship between neuroticism and suicide risk, by specifically distinguishing the components of suicidal desire from the acquired capability to act upon this desire.

Neuroticism and Suicidal Desire

Neuroticism has been shown to influence suicide risk through the mechanism of increased vulnerability for experiencing the interpersonal precursors for suicidal desire proposed by the interpersonal theory of suicide (DeShong et al., 2015; Hartley et al., 2017). For example, individuals with high levels of neuroticism have been shown to experience greater reactivity to cues of interpersonal exclusion (Denissen & Penke, 2008) and be more vulnerable to experiencing feelings of burdensomeness (Chochinov et al., 2007). Consistent with this, DeShong et al. (2015) found that individuals with high neuroticism reported higher levels of thwarted belongingness and perceived burdensomeness. Similarly, Study 1 of the present dissertation describes an experimental test of the relationship between neuroticism and the interpersonal components of suicidal desire. Study 1 found that individuals with high neuroticism
were more sensitive to an experimental induction of thwarted belongingness and perceived burdensomeness. The induction of thwarted belongingness and perceived burdensomeness resulted in diminished persistence in a goal related activity and increased desire to escape from the interpersonal adversity, amongst individuals with high neuroticism. Consequently, the association between neuroticism and suicidal desire may be explained by vulnerability for experiencing thwarted belongingness and perceived burdensomeness.

**Neuroticism and Acquired Capability for Suicide**

Whilst the previously described studies have identified a relationship between neuroticism and suicidal desire, these did not consider acquired capability for suicide. To date, no study has considered how individual differences in acquired capability may influence the relationship between neuroticism and suicide risk. This represents a gap in our current understanding of the relationship between neuroticism and the interpersonal theory of suicide. Since neuroticism is associated with risk for experiencing the interpersonal precursors for suicidal ideation, the current study sought to examine whether the association between neuroticism and suicidal desire was impacted upon by acquired capability for suicide.

**The Current Study**

To do this, the current study selected participants to be high or low in trait neuroticism, and high or low acquired capability for suicide. This process formed four groups: (1) high neuroticism, low acquired capability (High N- Low AC); (2) high neuroticism, high acquired capability (High N- High AC); (3) low neuroticism, high acquired capability (Low N- High AC); (4) low neuroticism, low acquired capability (Low N-Low AC). The participants were then asked to complete an experimental task assessing their ability to persist in the face of interpersonal adversity (The Interpersonal
Neuroticism, Acquired Capability and Persistence

The Interpersonal Persistence Task experimentally induces feelings of perceived burdensomeness and thwarted belongingness and monitors the participants' desire to persist or escape. Diminished desire to persist motivates a number of deleterious behaviours, including suicidality (Tucker & Wingate, 2014; Twenge, Catanese, & Baumeister, 2002; Van Orden et al., 2010). Thus, the Interpersonal Persistence Task facilitates empirical exploration of the interpersonal antecedents of suicidal desire and how these impact upon an individual's desire to persist or escape when confronted with interpersonal adversity. Importantly, the dependent variable of desire to persist is likely to be more conceptually similar to suicidal desire than it is to suicidal action.

Consideration of the theoretical predictions of the ITS as well as existing empirical evidence and the preliminary results of study 1b of this dissertation lead to the formation of three alternative predictions regarding the relationship between acquired capability and performance on the Interpersonal Persistence Task.

Firstly, a key theoretical underpinning of the ITS is that the desire for suicide is distinct from the capacity to act upon that desire. The ITS argues that perceptions of being a burden to others and feelings of social alienation will instil a desire for death, but individuals will not act upon this desire unless that have acquired a capability to do so (Joiner, 2005; Van Orden et al., 2010). In this way, an individual may possess a capability for suicide but have no desire to die, and conversely may desire suicide and be incapable of acting upon this desire (Joiner et al., 2009; Van Orden et al., 2008). Thus, the interpersonal theory would inform the hypothesis that the acquired capability for suicide will exert no effects on suicidal desire. If this is the case, we would expect that acquired capability for suicide would be unrelated to desire to persist with the Interpersonal Persistence Task and will not confer vulnerability to the induction of the
ITS components of suicidal desire; thwarted belongingness and perceived burdensomeness.

Secondly, while the ITS asserts that suicidal desire is distinct from the capacity to act upon this desire, this has not been consistently demonstrated in the literature. For example, a recent meta-analysis identified that the distinction between suicidal desire and the acquired capability to act upon desire is not consistently demonstrated (Ma et al., 2016). In this meta-analysis, over half (57.1%) of the included studies found a significant relationship between the acquired capability for suicide and suicidal ideation. Further, acquired capability has a small significant positive correlation with both thwarted belongingness and perceived burdensomeness (Silva, Ribeiro, & Joiner, 2015), suggesting that the components of suicidal desire share some variance with the acquired capability to act upon this desire. If it is the case that acquired capability for suicide is positively associated with the ITS proposed causal risk factors for suicidal desire and with self-reported suicidal ideation, then we may expect to find a positive association between acquired capability and desire to escape from interpersonal adversity. Thus, high acquired capability may be associated with greater vulnerability to the induction of thwarted belongingness and perceived burdensomeness, corresponding to diminished persistence in the Interpersonal Persistence Task.

Finally, the results of the preliminary study 1b of this thesis suggest that acquired capability for suicide may have a buffering effect when paired with low neuroticism. Study 1b found that when neuroticism was low, high levels of acquired capability for suicide were associated with resilience against the induction of thwarted belongingness and perceived burdensomeness and greater persistence in the face of this interpersonal adversity. Additionally, there is some evidence in the existing literature to suggest that acquired capability, when paired with low levels of neuroticism, may
Neuroticism, Acquired Capability and Persistence

confer resilience via its relationship with distress tolerance. Simons and Gaher (2005) define distress tolerance as the ability to withstand aversive affective states. High levels of self-reported distress tolerance have been shown to be associated with higher levels of acquired capability in a nonclinical sample (Bender et al., 2011). Furthermore, low distress tolerance has been linked to increased levels of thwarted belongingness, and perceived burdensomeness; well established antecedents for suicidal desire (Anestis, Bagge, et al., 2011). It has been argued that high distress tolerance is not likely to be problematic in isolation, and may even be protective in that it makes an individual insensitive to affective adversity that others might find distressing (Anestis, Bender, et al., 2011). Thus, for those individuals with low levels of neuroticism, who are less susceptible to the ITS components of suicidal desire, acquired capability may be associated with an increased capacity to tolerate unpleasant affective states and may confer resilience. However, when high acquired capability is paired with high neuroticism; which is in turn associated with increased sensitivity to the ITS precursors of suicidal desire (Hartley et al., 2017), risk will be elevated. If this is the case, we would hypothesise an interaction between neuroticism group and acquired capability group whereby high acquired capability confers distress tolerance, and therefore resilience when paired with low neuroticism, but vulnerability when paired with high neuroticism.

The current study had two primary aims;

1. The current study aims to replicate the results of Study 1a of this dissertation. It is hypothesised that neuroticism will confer increased sensitivity to the experimental induction of thwarted belongingness and perceived burdensomeness, such that it is associated with reduced desire to persist with the Interpersonal Persistence Task.
Further, the current study sought to clarify the nature of the relationship between acquired capability, neuroticism and suicidal desire. We identify three alternative predictions for this relationship.

i) Firstly, if the ITS proposed distinction between suicidal desire and the capability to act upon this desire is supported, then we would predict that the acquired capability groups will not differ in their sensitivity to the induction of thwarted belongingness and perceived burdensomeness, nor in their desire to escape from this interpersonal adversity.

ii) However, if the positive association between acquired capability and the ITS precursors for suicidal desire, identified by several studies, is supported, then we would predict that the high acquired capability for suicide groups will be more vulnerable to the induction of thwarted belongingness and perceived burdensomeness and will exhibit reduced persistence in the Interpersonal Persistence Task.

iii) Finally, if the preliminary results of Study 1b of this dissertation are replicated then we would predict that acquired capability will exert a moderating effect on the relationship between neuroticism and desire to persist. That is, when neuroticism is low, high acquired capability is not expected to confer additional risk, and may even confer a heightened tolerance for distress, increasing resilience. Conversely, when neuroticism is high, high levels of acquired capability are expected to be associated with increased risk; operationalised here as an increased desire to escape from the task.

Method

Participants

107 undergraduate students enrolled in an introductory psychology unit ($M_{age} = 19.98$ years, $SD = 6.09$, 69 female) participated in the experiment in exchange for partial course credit. As the study sought to compare individuals with high and low
levels of neuroticism, as well as high and low levels of acquired capability for suicide, the entire cohort ($N = 839$) were pre-screened and participants were selected from the top or bottom 30% of scores on measures of Neuroticism (Eysenck Personality Questionnaire Brief Version; EPQ-BV: Sato, 2005) and Acquired Capability (Acquired Capability with Rehearsal for Suicide Scale; ACWRSS; George et al, 2016). This process formed four distinct groups: (1) High N (top 30%), Low AC (bottom 30%); (2) High N (top 30%), High AC (top 30%); (3) Low N (bottom 30%), High AC (top 30%); (4) Low N (bottom 30%), Low AC (bottom 30%).

The selected participants were then randomly assigned to one of two interpersonal persistence task experimental task conditions: (1) low perceived burdensomeness/thwarted belongingness (low PB-TB); (2) high perceived burdensomeness/thwarted belongingness (high PB-TB).

**The Interpersonal Persistence Task**

The Interpersonal Persistence Task (Collins et al., 2017; Collins et al., 2016; George et al., 2017) is presented to participants as a three-player computer task requiring them to judge whether a pair of symbols appearing in random locations on screen are matched (i.e., Ŷ and Ŷ) or mismatched (i.e., Ŷ and Ū). Participants are told that points scored as an individual will contribute to a cumulative team total, and that they must work as a team to beat a target score; based on the average performance of teams who have previously completed the task. Participants are informed that they will win and lose points for their team on the basis of both speed (reaction-time) and accuracy. Two manipulations were used with the aim of inducing perceptions of burdensomeness to the team and feelings of diminished belongingness, in order to observe the effects on desire to persist with the task.
**Perceived Burdensomeness Manipulation.** To manipulate perceived burdensomeness performance feedback is presented to participants after each round. This feedback is presented in the form of a score summary table which displays points won and lost by the player, points won and lost by their teammates, the team total score, and the team target score. These scores are not a reflection of performance, but are manipulated according to pre-determined probabilities. In this way, the probability of scoring points on any given trial was determined based on the experimental condition that the participant was allocated to. The probability for participants’ allocated to the high PB-TB condition were set such that they typically scored lower (i.e., around 40% success) than their teammates (who had a success rate around 60%), while those allocated to the low PB-TB condition always score equivalent to or better than their teammates (i.e., around 60% success). Similarly, participants allocated to the low PB-TB condition are always lead to believe their team is beating the target score, while participants allocated to the high PB-TB condition are lead to believe their team is failing to beat the target score. Thus participants in the high PB-TB condition are unable to contribute effectively to their teams overall score, and their team is unable to beat the target score. In this way, the experimental manipulation is intended to make participants feel as though they are a burden on their teammates.

**Thwarted Belongingness Manipulation.** To manipulate participants’ experience of belongingness, interpersonal feedback statements were used. Participants believed they were playing with fellow students. However, in reality both “teammates” are computer controlled, and the interpersonal feedback the participant receives is pre-set. After every three rounds of five trials participants are given the opportunity to send feedback to each of their “teammates” with the instruction that they may provide either individual or more general performance feedback to their co-players. Once they have
submitted their own feedback, they are presented with comments from each of their “teammates”. To maximise plausibility these comments include colloquialisms, grammatical and spelling errors and are intended to be consistent with a student population. In the high PB-TB condition comments are critical (e.g. “ur falling behind hang in there” and “try a bit harder next time”), while in the low PB-TB condition comments are supportive (e.g. “well done, keep it up!” and “good job, keep going like that”). This manipulation aimed to make participants in the high PB-TB condition feel alienated from their “teammates”, thus thwarting their need to belong within the team.

To increase the plausibility of the manipulation, two participants; or a participant and a confederate, are tested concurrently in adjacent booths and are told there is a third participant in a laboratory down the hall. On-screen instructions are presented at the outset and participants are given the opportunity to complete a practice round, during which they may ask questions and seek clarification from the experimenter. The main task then runs for six blocks, with each block comprising three rounds of five trials (i.e. 15 trials in each block, for a total of 90 individual trials). Following each of the blocks participants are asked to indicate their levels of perceived burdensomeness, thwarted belongingness and desire to persist with the task by rating extent to which: (1) they feel a burden on their team; (2) they feel like they do not belong in the team; and (3) if given the opportunity, they would rather drop out of the task. Each of these questions utilise a 7-point Likert scale ranging from 0 (not at all true for me) to 6 (very true for me).

**Measuring Interest, Effort and Engagement.** When the game was completed, participants were asked to answer a series of questions to assess interest, effort and engagement in the task, respectively: 1). I found that the task was interesting 2). I made an effort to do well on the task 3). I found the task engaging. This would allow for the
assessment of potentially confounding factors that may diminish the effects of the task (i.e. participants who do not put forth their best effort). Responses were measured on a 7-point Likert scale (0 = Not at all true for me, 6 = Very true for me).

After completing the task, participants were asked to fill out an electronic battery of questionnaire measures which were presented in a fixed order using online software. Specifically, participants completed questionnaire measures of Neuroticism (EPQ-BV: Sato, 2005) and Acquired Capability (ACWRSS; George et al, 2016), thwarted belongingness and perceived burdensomeness (INQ; Van Orden et al, 2012), Zest for Life (ZLS; George et al, 2016), non-specific psychological Distress (K10; Kessler et al., 2002), the frequency of suicidal ideation and attempts (SITBI; Nock et al, 2007), as well as self-reported intention, likelihood, and readiness for suicide. The questionnaire data will be discussed in Study 3 of this dissertation, but not included in the results of the current study.

In addition, all participants completed written feedback sheets which asked them to indicate whether they had any comments about the experiment, followed by any comments about their ‘teammates’. These questions were included in order to determine whether participants were suspicious about the nature of the task, their teammates or the interpersonal feedback they received. Participants were then debriefed, and informed that their scores and their teammate’s feedback were not accurate or reflective of the participant’s true performance, and were instead predetermined and contingent on the condition they were allocated to. They were also provided with resources for several on campus mental health support services in case participation in the experiment had caused them any distress.
Results

Screening and Participant Selection Criteria

The entire cohort of first year university students enrolled in an introductory psychology unit (N=846) were screened and selected to form groups based on extreme scores on measures of neuroticism (EPQ-BV; Sato, 2005) and acquired capability for suicide (ACWRSS: George et al, 2016). Based on these criteria, 107 participants were selected to form four groups. To ensure reliability of group allocation, these measures were administered for a second time as part of the questionnaire battery. Participants were selected as ‘high’ if their scores fell in the top 30% of scores, and ‘low’ if their score fell in the bottom 30% of scores at the time of screening. To remain classified as ‘high’ at the time of completing the questionnaire battery, participants were required to have a score that at least exceeded 50% of the screening scores, and to remain classified as ‘low’ participants were required to have a score that did not exceed 50% of the screening scores. Based on this criterion, 9 participants whose scores had changed substantially from the time of screening, to the time of completing the questionnaire battery, were identified and excluded from further analyses. This left 98 participants for the remainder of the analyses. The mean acquired capability and neuroticism scores for the selected groups are summarised in Table 4.1.

Manipulation Checks

Those participants who gave any indication of suspicion regarding the task or their ‘team-mates’ were identified. Two researchers examined the written feedback sheets filled out by participants, and made independent judgments on whether participants were suspicious that the experiment or their ‘co-players’ may have been manipulated. The inter-rater reliability was 100%. Nine subjects indicated suspicion and
were excluded. From the low burdensomeness and thwarted belongingness condition four participants were suspicious and from the high burdensomeness and thwarted belongingness condition five participants were suspicious. This is to be expected, since the nature of the feedback statements in the high PB-TB condition was more confronting, and thus more likely to evoke suspicion. Interestingly, there were no significant differences in levels of desire to drop out between those participants who reported suspicion ($M = 1.77, SD = 1.71$) and those who did not ($M = 1.53, SD = 1.71$); $F(1,106) = 0.20, p > 0.05$. This suggests that even when participants were suspicious of the task, they still responded to the manipulation in the same way as those participants who were not suspicious. After excluding participants whose neuroticism or AC scores had changed substantially or who had reported suspicion, 89 participants remained. The mean AC and neuroticism scores for each of the four groups is summarized in Table 4.1.

Table 4.1.

Mean acquired capability and neuroticism scores for the selected groups.

<table>
<thead>
<tr>
<th>Low Neuroticism</th>
<th>Neuroticism score</th>
<th>Acquired Capability Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Acquired Capability</td>
<td>$M$ = 21.38</td>
<td>$SD$ = 3.91</td>
</tr>
<tr>
<td>$N = 24$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Acquired Capability</td>
<td>$M$ = 23.19</td>
<td>$SD$ = 5.34</td>
</tr>
<tr>
<td>$N = 21$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Neuroticism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Acquired Capability</td>
<td>$M$ = 42.95</td>
<td>$SD$ = 6.11</td>
</tr>
<tr>
<td>$N = 22$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Acquired Capability</td>
<td>$M$ = 46.41</td>
<td>$SD$ = 6.12</td>
</tr>
<tr>
<td>$N = 22$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total $N = 89$
Design and Analytic Strategy

The effects of the experimental manipulation on participants’ ratings of burdensomeness, belongingness and desire to persist with the task were examined using a 2 (low PB-TB condition, high PB-TB condition) × 2 (high neuroticism, low neuroticism) x 2 (high acquired capability for suicide, low acquired capability for suicide) 6 (Time Blocks 1-6) mixed-design analyses of variance (ANOVA). In each case, the assumption of sphericity was violated so a Huynh-Feldt correction was applied for all within-subjects effects.

The first hypothesis of the present study was that neuroticism would confer increased susceptibility to the induction of thwarted belongingness and perceived burdensomeness, and that this would be associated with increased desire to drop out of the task. Thus, a significant interaction between neuroticism group and PB-TB condition for each dependent variable was hypothesised. Further, the current study sought to clarify the nature of the relationship between acquired capability for suicide and desire to drop out of the task. We propose three alternative predictions for this relationship;

i) That acquired capability would be distinct from the ITS components of suicidal desire. Thus, acquired capability will not exert significant main effects, or interaction effects for thwarted belongingness, perceived burdensomeness or desire to drop out of the task.

ii) That acquired capability will be positively associated with the ITS causal risk factors for suicidal ideation. Thus, the high AC group will report increased thwarted belongingness, perceived burdensomeness and desire to drop out of the task.

iii) That acquired capability will influence desire to persist with the task via an
interaction with neuroticism. Thus, when neuroticism is low, high acquired capability will be associated with distress tolerance and therefore resilience to the induction of thwarted belongingness and perceived burdensomeness, corresponding to increased persistence in the face of interpersonal adversity.

**Thwarted belongingness**

There was a significant main effect of PB-TB condition, $F(1,81) = 182.93$, $p<0.01$, $\eta^2 = 0.69$ where the high PB-TB condition was associated with a significantly lower mean level of self-reported belongingness than the low PB-TB condition. This suggests that the experimental manipulation of thwarted belongingness was effective in inducing diminished feelings of belongingness.

There was also a main effect of time on belongingness, $F(4.86, 393.45) = 26.66$, $p < 0.001$, partial $\eta^2 =0.25$, where participants reported feeling less like they belonged as the task went on. This was qualified by a significant interaction between PB-TB condition and time, $F(4.86, 393.45) = 28.29$, $p < 0.001$, partial $\eta^2 =0.26$. Further analysis indicated that in the low PB-TB condition there was no effect of time on belongingness, $F(4.41, 198.44) = .86$, $p =.496$, partial $\eta^2 =.02$, while in the high PB-TB condition participants ratings of belongingness decreased across trials, $F(4.83, 141.25) = 28.73$, $p<.001$, partial $\eta^2 =0.44$, suggesting that the effect induction of thwarted belongingness was effective from the outset, and intensified over time (See Figure 4.1).

There was a significant main effect of neuroticism, $F(1,81) = 5.49$, $p =.022$, $\eta^2 = 0.06$ suggesting that individuals high in neuroticism experienced lower levels of belongingness than those with low neuroticism. Finally, consistent with the hypothesis that neuroticism would confer increased sensitivity to the experimental induction of thwarted belongingness, there was a significant interaction between neuroticism group
and PB-TB condition, \( F(1, 81) = 4.32, p = 0.041, \eta^2_{\text{partial}} = 0.05 \). To follow up this interaction, the effect of neuroticism was examined separately for each condition. In the low PB-TB condition, there was no effect of neuroticism group, \( F(1,45) = .09, p = .772, \eta^2_{\text{partial}} = .002 \). However, in the high PB-TB condition, both neuroticism groups reported lower levels of belonging, but this decrease was greater for the high neuroticism participants \( F(1,36) = 5.28, p = .027, \eta^2_{\text{partial}} = 0.13 \). (See Figure 4.1.).

![Figure 4.1. Thwarted belongingness ratings across the six time intervals for high and low conditions and high and low neuroticism groups, with standard error bars.](image)

There were no significant main effects, or interactions for acquired capability for suicide on thwarted belongingness, indicating that individuals with high acquired capability did not differ in their experience of thwarted belongingness from those with low acquired capability.

**Perceived Burdensomeness**

There was a significant main effect of PB-TB condition, \( F (1, 81) = 186.59, p < .001, \eta^2_{\text{partial}} = .70 \), whereby the high PB-TB condition induced higher levels of perceived burdensomeness than the low PB-TB condition. This effect was qualified by a
PB-TB condition by time interaction, $F(4.07, 329.69) = 5.76, p < .001$, partial $\eta^2_{\text{partial}} = .07$. In the low PB-TB condition feelings of burdensomeness significantly decreased over time, $F(3.31, 149.11) = 2.98, p = .006$, $\eta^2_{\text{partial}} = .08$. While in the high PB-TB condition, feelings of burdensomeness was higher at time 1 and continued to increase over time $F(4.10, 147.64) = 3.10, p = .017$, $\eta^2_{\text{partial}} = .08$. This suggests that the experimental induction of burdensomeness was successful in inducing increased feelings of burdensomeness and that this effect was maintained over time.

It was hypothesised that individuals with high levels of neuroticism would be more sensitive to the experience of perceived burdensomeness. Consistent with this there was a main effect of neuroticism, $F(1, 81) = 22.62, p < .001$, $\eta^2_{\text{partial}} = .22$, suggesting that high neuroticism is associated with higher ratings of perceived burdensomeness. This effect as qualified by an interaction between neuroticism and PB-TB condition $F (1, 81) = 6.31, p = .014$, $\eta^2_{\text{partial}} = .07$. To investigate this interaction, the effect of neuroticism on burdensomeness was examined separately for each experimental condition. In the low PB-TB condition, the high neuroticism group reported higher levels of burdensomeness, $F(1, 45) = 4.25, p = .045$, $\eta^2_{\text{partial}} = .09$. In the high PB-TB condition, the high neuroticism group also reported significantly higher levels of burdensomeness, $F(1, 36) = 16.81, p < .001$, partial $\eta^2_{\text{partial}} = .32$, and this effect was over three times larger than in the low PB-TB condition ($\eta^2_{\text{partial}} = .09$ in the low PB-TB condition, and $\eta^2_{\text{partial}} = .32$ in the high PB-TB condition). This suggests that high neuroticism individuals are more sensitive to the induction of perceived burdensomeness, than those who are low in neuroticism (See Figure 4.2).
Neuroticism, Acquired Capability and Persistence

Figure 4.2. Perceived burdensomeness ratings across the six time intervals for high and low conditions and high and low neuroticism groups, with standard error bars.

There were no significant main effects, or interactions for acquired capability for suicide on perceived burdensomeness. This means that the high and low acquired capability groups did not differ in their experience of perceived burdensomeness.

Neuroticism and Desire to Drop out

There was a significant main effect of condition, $F(1, 81) = 47.71, p < .001, \eta^2_{\text{partial}} = .37$, whereby those in the high PB-TB condition reported higher desire to drop out of the task than those allocated to the low PB-TB condition. There was also a main effect of time, $F(3.97, 322.15) = 5.09, p = .001, \eta^2_{\text{partial}} = .06$ where desire to drop out of the task increased across trials. These effects were interpreted in the context of a condition by time interaction, $F(3.97, 322.15) = 12.86, p < .001, \eta^2_{\text{partial}} = 0.14$. In the low PB-TB condition, there was a significant main effect of time, $F(3.40, 152.96) = 3.28, p = .018, \eta^2_{\text{partial}} = .07$ where participants’ desire to drop out of the task decreased over time. In the high PB-TB condition there was a significant effect of time, $F(4.07, 146.67) = 8.94, p < .001, \eta^2_{\text{partial}} = .20$, where desire to drop out of the task increased.
across time. In this way, the experimental induction of perceived burdensomeness and thwarted belongingness led to a reduction in desire to persist with the task.

There was a main effect of neuroticism, $F(1, 81) = 10.34, p = .002$, partial $\eta^2 = .11$, where participants from the high neuroticism group had higher desire to drop out of the task, relative to those in the low neuroticism group. The primary hypothesis; that there would be an interaction between neuroticism and thwarted belongingness and perceived burdensomeness condition, which would predict desire to drop out of the task, was supported. There was a significant interaction between neuroticism group and condition, $F(1, 81) = 8.54, p = .004$, partial $\eta^2 = .10$. To clarify this, the effect of neuroticism was examined separately for each condition. In the low PB-TB experimental condition the neuroticism groups did not differ in their desire to persist, $F(1, 45) = .12, p = .731$, partial $\eta^2 = .003$. However, in the high PB-TB experimental condition where high neuroticism was associated with higher desire to drop out of the task relative to the low neuroticism group, $F(1,36) = 9.78, p < .003$, partial $\eta^2 = .21$. In this way, as hypothesised, high neuroticism was associated with significantly diminished persistence in the face of experimentally induced interpersonal adversity (See Figure 4.3).

There were no significant main effects, or interactions for acquired capability for suicide on desire to persist with the task. This means that the high and low acquired capability groups did not differ in their desire to persist with, or conversely to escape from, the induction of interpersonal adversity.
Neuroticism and Suicidal Desire

The current study aimed to replicate the finding that neuroticism confers vulnerability to the experimental induction of the ITS causal components of suicidal desire: thwarted belongingness and perceived burdensomeness, that was previously demonstrated in Study 1a of this dissertation. Thus, it was hypothesised that individuals with high neuroticism would be more sensitive to the experimental induction of thwarted belongingness and perceived burdensomeness and that this would correspond to an increased desire to escape from this interpersonal adversity. This hypothesis was supported, with high levels of neuroticism conferring increased reactivity to the experimental induction of interpersonal adversity, such that individuals in the high neuroticism group reported higher levels of perceived burdensomeness and lower levels of belongingness, relative to those in the low neuroticism group. Furthermore, in the high PB-TB experimental condition, while both neuroticism groups exhibited increased

Figure 4.3. Desire to drop out ratings across the six time intervals for high and low conditions and high and low neuroticism groups, with standard error bars

Discussion
desire to drop out of the task, this increase was significantly larger for those with high levels of neuroticism. The results of the current study demonstrate how temperamental risk factors, such as individual differences in neuroticism, can interact with the proximal interpersonal risk factors proposed by the ITS to increase vulnerability for suicide. This offers partial explanation for the relationship between neuroticism and suicidal ideation (Brezo et al., 2006). It may be that individuals with high neuroticism are vulnerable for experiencing thwarted belongingness and perceived burdensomeness which predisposes them to experiencing suicidal desire (Joiner, 2005; Van Orden et al., 2010).

Via this means, the results of the current study offer further support for the notion that the association between neuroticism and suicidal ideation is attributed to the increased emotional responsiveness associated with high neuroticism. Thus, the findings of the current study are consistent with previous literature demonstrating that neuroticism confers vulnerability for experiencing negative emotional reactions (Eysenck, 1985; Larsen & Ketelaar, 1989; Larsen & Ketelaar, 1991; Rusting & Larsen, 1997, Watson, Clark & Harkness). Further, the present study demonstrates the association between neuroticism and increased emotional reactivity specifically for interpersonal risk factors for suicide (George et al., 2017). Thus, the current study offers support for the positive association between neuroticism, thwarted belongingness and perceived burdensomeness (DeShong et al., 2015) and provides additional experimental evidence that neuroticism increases reactivity to interpersonal adversity, specifically to the induction of feelings of thwarted belongingness and perceived burdensomeness (Hartley et al., 2017).

**Acquired Capability and Suicidal Desire**

While the relationship between neuroticism and suicidal desire appears to be robust, previous studies examining the relationship between neuroticism and suicidal
Neuroticism, Acquired Capability and Persistence

action have not accounted for their samples’ levels of acquired capability, and have produced inconsistent results (Brezø et al., 2006; Rappaport et al., 2017; Tsoh et al., 2005; Useda et al., 2007). For this reason, the current study also sought to examine the proposed distinction between suicidal desire and the acquired capability to act upon this desire. Consistent with the predictions of the ITS, there were no main effects or interactions involving acquired capability on thwarted belongingness, perceived burdensomeness or desire to drop out of the task. This suggests that acquired capability is disparate to the ITS causal risk factors for suicidal desire.

The finding that acquired capability is unrelated to thwarted belongingness and perceived burdensomeness is consistent with the ITS proposed distinction between suicidal desire and the capability to act upon this desire. The theory states that a high acquired capability for suicide may be present in individuals with no desire for suicide (Joiner et al., 2009; Van Orden et al., 2008), and similarly, that an individual may desire suicide, yet be incapable of acting upon this desire. Further, these findings are accordant with the ideation to action framework proposed by Klonsky and May (2015), which suggests that the development of a desire for suicide, and the progression from suicidal desire to lethal suicidal action, are separate processes. Thus, the predictors and explanations for suicidal ideation may differ from the predictors and explanations for suicidal behaviours (Klonsky et al., 2016).

Interestingly, a recent review identified that the distinction between suicidal desire and the acquired capability to act upon desire is not consistently demonstrated (Ma et al., 2016), with several studies finding an association between acquired capability and suicidal ideation. This review identified that of the selected studies approximately half (57.1%) did find an association between acquired capability and suicidal ideation, while the other half (42.9%) did not. This apparent lack of consensus
in the literature illustrates the need for further clarification of the relationship between suicidal desire, and the acquisition of a capability to act upon this desire. In any case, the current work appears to be supportive of the notion that the two constructs, desire and capability, are unrelated.

Finally, the results of Study 1b of this thesis suggested that acquired capability may moderate the association between neuroticism and desire to drop out of the Interpersonal Persistence Task. The findings of Study 1b, although non-significant, appeared to suggest that high acquired capability may confer vulnerability when paired with high neuroticism, whilst conferring resilience and distress tolerance when paired with low neuroticism. This preliminary prediction was not supported by the current study. Study 1b utilised a post-hoc design with a number of limitations. As such, the failure to replicate the moderation relationship in the current study suggests that this effect was spurious, and that acquired capability does not moderate the association between neuroticism and desire to drop out of the interpersonal persistence task.

The finding that acquired capability does not moderate the association between neuroticism and desire to persist does not necessarily indicate that neuroticism and acquired capability do not interact to predict suicide risk. This finding may instead indicate that the desire to persist with the interpersonal persistence task, while a valid measure of desire to escape from interpersonal adversity that is conceptually related to suicidal desire, is not a valid measure of the capacity to act upon that desire. As such, the dependent variable in the interpersonal persistence task is likely more theoretically comparable to suicidal desire than it is to suicidal action. The task does not measure physical pain tolerance, feelings about death or mental rehearsal which are thought to be necessary for enacting suicidal behaviours (George et al., 2016; Van Orden et al., 2010). Thus, the interpersonal persistence task may provide a valid proxy means for examining
how individual differences interact with more proximal interpersonal risk factors to confer risk or resilience for desiring suicide. However, this experimental paradigm does not capture the capability to progress from suicidal desire to acting upon that desire.

In this way, the use of the Interpersonal Persistence Task may constitute a limitation in the current study, since it does not allow investigation of the relationship between neuroticism and suicidal capacity. For this reason, the relationship between neuroticism and acquired capability for measures more proximal to suicidal action, as opposed to suicidal desire, merits further investigation. The current study supports existing literature that demonstrates that neuroticism is associated with suicidal desire, but the relationship with suicidal action (i.e. attempts and completions) remains unclear. Future research may wish to clarify the nature of the relationship between neuroticism and measures of suicidal action (i.e., the frequency of suicide attempts, non-suicidal self-injury, plans and preparations for suicide and suicide completions) to determine whether the transition from desiring suicide, to acting upon that desire, is impacted upon by neuroticism.

A further limitation of the current study is that although both acquired capability and neuroticism represent characteristics which exist on a continuum, the current study used a dichotomous approach, grouping participants into “high” (top 25%) and “low” (bottom 25%). This decision was informed by previous literature which has demonstrated that it is “high” neuroticism and “high” acquired capability which is associated with increased suicide risk, relative to those individuals with lower levels of these constructs. Thus the middle ranges for these variables were expected to be less relevant to the current study. However, this approach does limit the applicability of the current findings to those individuals existing in the middle 50% of scores for neuroticism and acquired capability. Certainly future research may wish to utilise
continuous variables and regression analyses to determine whether the vulnerability conferred by neuroticism on suicidal desire is continuous and incremental, or whether there is a particular cut-off point at which risk increases sharply. This could provide additional and valuable information which would improve our ability to accurately and specifically assess suicide risk.

In conclusion, the current study provides support for the notion that neuroticism confers vulnerability to the acute interpersonal stressors of thwarted belongingness and perceived burdensomeness, corresponding to diminished desire to persistence. This is consistent with previous literature highlighting neuroticism as a risk factor for suicidal desire (DeShong et al., 2015) and replicates the experimental evidence from Study 1a in this thesis, that N increases vulnerability to the causal antecedents of suicidal desire. Thus, dispositional risk factors such as neuroticism interact with proximal interpersonal risk factors to increase vulnerability to suicidal desire. The current study also demonstrates the distinction between suicidal desire and acquired capability. The ITS suggests that thwarted belongingness and perceived burdensomeness contribute to suicidal desire, while the addition of acquired capability is related to suicide attempts. In the current study it was evident that participants in the high PB-TB condition reported a significantly greater desire to drop out, while an increased capability for suicide did not significantly affect the desire to drop out. The non-significant main effect of acquired capability is consistent with the ITS assertion that acquired capability is distinct from suicidal desire. This has implications for investigating the role of dispositional factors, like neuroticism in conferring risk for suicide by considering both the desire for suicide and the transition to acting upon this desire.
Chapter 5.

DISTINGUISHING SUICIDAL DESIRE FROM SUICIDAL BEHAVIOUR: FURTHER EXPLORATION OF THE ROLE OF ACQUIRED CAPABILITY FOR SUICIDE.
Distinguishing suicidal desire from suicidal behaviour: Exploration of the role of acquired capability for suicide using questionnaire methods.

The previous studies identify that one mechanism via which neuroticism may increase vulnerability for suicidal desire is increased sensitivity to the interpersonal risk factors of thwarted belongingness and perceived burdensomeness. Via this means, elevated neuroticism represents a trait vulnerability, which when paired with the proximal triggers of thwarted belongingness and perceived burdensomeness, may result in increased suicidal desire. Consistent with this, there is substantial literature identifying a positive association between neuroticism and suicidal ideation (Brezo et al., 2006). However, the relationship between neuroticism and suicidal action, including suicide attempts and suicide completions is less consistent. Thus, elevated neuroticism appears to represent a consistent vulnerability for suicidal desire, whilst only conferring risk for suicidal action under certain circumstances. Identification of the circumstances under which the underlying vulnerability of neuroticism will translate into an increased risk for suicidal actions could enhance the specificity of risk assessment.

Suicidal action is distinguished from suicidal desire in the interpersonal theory of suicide. The theory states that an individual will only die by suicide if they both desire suicide, and are capable of acting upon this desire (Joiner, 2005; Van Orden et al., 2008). The act of taking one’s own life requires overcoming the innate biological drive to remain alive, and a capacity to tolerate potential considerable physical pain (George et al., 2016; Rimkeviciene et al., 2016). Many individuals who desire suicide are incapable of tolerating the pain and fear that would permit lethal suicidal action, meaning that suicidal desire is not a sufficiently accurate predictor of suicide attempts and completions. Thus, contemporary suicide theories highlight the importance distinguishing those individuals who will think about, or desire suicide, from those
individuals who will act upon this desire (e.g., ITS: Joiner, 2005, Three Step Theory; Klonsky & May, 2014). These theories propose that the desire for suicide will only lead to lethal suicidal action in the presence of a third factor; the acquired capability for suicide.

For this reason, it is important to consider how personality differences might impact upon suicidality at each stage of the ideation to action framework. The previous studies identify that elevated neuroticism confers risk for the antecedents of suicidal ideation, but it is not clear whether this risk corresponds to increased suicidal behaviour. To be of practical utility in informing risk assessment, it is important to identify whether risk factors are proximal predictors of suicidal ideation only, or predictors of suicidal behaviour above and beyond the effects of suicidal ideation (Prinstein, 2008). For example, it is possible that elevated neuroticism represents an underlying vulnerability for experiencing suicidal desire, but not necessarily suicidal behaviour. In this way, high neuroticism may only be associated with an increased likelihood for suicidal action when paired with a concurrently high acquired capability for suicide. Thus, exploration of the interaction between neuroticism and acquired capability for suicide may permit better identification of those individuals who are at the greatest risk for progressing from suicidal ideation, to a lethal suicide attempt.

Study 2 sought to investigate this proposed interaction between neuroticism and acquired capability using the Interpersonal Persistence Task and found that the acquired capability for suicide did not moderate the association between neuroticism and desire to escape from experimentally induced interpersonal adversity. One possible reason for this finding is that the desire to escape from the task is more conceptually similar to suicidal desire, and thus unrelated to the capability to act upon this desire. This is consistent with the ITS and studies which demonstrate that suicidal desire is distinct
from the capability to act upon that desire. The interpersonal persistence task captures a reduced persistence with a goal directed activity which is conceptually similar to the diminished persistence associated with suicidal behaviour (Baumeister, 1990; Deci & Ryan, 2000). However, the task does not reflect the increased tolerance for physical pain, fearlessness of death, development of plans and intent for suicide, and mental rehearsal that is thought to be necessary for suicidal action. Thus, the failure to find a relationship between neuroticism and acquired capability may be attributable to the use of an outcome variable which is too theoretically dissimilar to suicidal action.

For this reason, the following chapter will attempt to clarify the relationship between neuroticism, acquired capability, and suicidal action, as opposed to suicidal desire. To do this, the study will utilise questionnaire measures intended to represent the spectrum of thoughts and behaviours ranging from suicidal ideation through to suicide plans, preparations and suicide attempts. These questionnaires were administered to participants who completed the Interpersonal Persistence Task in the previous study. Thus, the following study will utilise the same sample as the previous, but will consider their questionnaire data, rather than the experimental data that was discussed in the previous chapter. Consistent with the findings of Studies 1a and 1b, it was expected that neuroticism would confer vulnerability for measures of suicidal desire. Further, the present study also sought to examine whether this vulnerability for suicidal desire would only translate into increased risk for suicidal action when acquired capability was also high.
Chapter 6.

STUDY 3: ELEVATED NEUROTICISM IS SUFFICIENT FOR SUICIDAL DESIRE, BUT NOT ACTION: THE ROLE OF ACQUIRED CAPABILITY IN AMPLIFYING RISK.
Abstract

Objectives:

This study sought to clarify the role of neuroticism in conferring risk for suicidal thoughts and behaviours using the ideation-to-action framework. It was hypothesised that neuroticism would increase risk for suicidal desire and that acquired capability for suicide would moderate the association between neuroticism and suicidal action.

Method:

Undergraduate students \((N = 107; 69 = \text{female})\) were screened and selected to form four groups who were high and low in neuroticism, and high and low in acquired capability for suicide. Participants then completed questionnaires measures of suicidal ideation, as well as suicidal behaviours.

Results:

Results indicated that high neuroticism confers increased risk for suicidal ideation regardless of acquired capability for suicide. Neuroticism was only associated with increased scores on measures proximal to suicidal behaviour when acquired capability was also high, indicating that acquired capability moderates the association between neuroticism and suicidal action.

Conclusions:

Neuroticism confers vulnerability for suicidal desire, but will only confer risk for suicidal action when acquired capability for suicide is also high. This offers support for theoretical frameworks which distinguish ideation from action and considers the risk factors for each separately. Identifying the characteristics associated with suicidal action has implications for improving the specificity of risk assessment.
Neuroticism is Sufficient for Suicidal Desire, But Not Action: The Role of Acquired Capability in Amplifying Risk.

The ideation-to-action framework for understanding suicide risk emphasises the importance of distinguishing suicidal ideation from suicidal behaviour (Klonsky & May, 2014). The development of a desire for suicide, and the progression from suicidal desire to lethal suicidal action, are distinct phenomena, each with their own predictors and explanations (Klonsky et al., 2016). Further to this, O’Connor (2011) suggests that stage-specific moderators act to facilitate movement between the stages of suicidal ideation and suicidal behaviours. This means that the factors which moderate risk may be different for suicidal ideation than for suicidal behaviour. Individual differences in personality may be of interest for both the development of suicidal ideation and the progression to suicidal action since they represent stable patterns of reactivity which directly influence cognitions and emotions (O’Connor & Nock, 2014). Within personality research, neuroticism, has been consistently identified as a risk factor for suicidality (Brezo et al., 2006; Nordstrom et al., 1995). However, the impact of neuroticism on suicide risk at the stages of suicidal desire and suicidal action has not yet been systematically investigated.

The interpersonal theory of suicide (ITS; Joiner, 2005) posits that two factors contribute to the development of suicidal desire. Thwarted belongingness refers to the perception that one is disconnected from valued social networks (Van Orden et al., 2010), and perceived burdensomeness describes feelings of ineffectiveness, worthlessness, and failure to contribute (Ribeiro & Joiner, 2009). Meta-analyses of cross-sectional evidence has shown that the interaction between thwarted belongingness and perceived burdensomeness was positively associated with suicidal ideation across
hospital, primary care, school, and community populations (Chu et al., 2017; Ma et al., 2016).

However, according to the ITS, desire for suicide will not lead to lethal suicidal action unless a person has also acquired the capability for suicide (Chu et al., 2017; Joiner, 2005). That is, someone wanting to die by suicide must have the capability to overcome the innate biological drive to remain alive. The capability for suicide is thought to be acquired through a diminished fear of death, habituation to pain, and mentally rehearsing the steps necessary to overcome fear of death and pain (George et al., 2016). A review of the predictions of the ITS found that of nine studies testing the main effect of acquired capability on suicide attempts, 55.5% were statistically significant, with a moderate to large average effect size (Ma et al., 2016). Consistent with this, studies have demonstrated that amongst individuals with a history of suicidal ideation, diminished fear of death distinguished those who went on to attempt suicide from those who did not (Linehan, Goodstein, Nielsen, & Chiles, 1983). Furthermore, individuals with elevated pain tolerance are at increased risk for a suicide attempt (Orbach, Mikulincer, King, Cohen, & Stein, 1997; Orbach et al., 1996).

The ITS provides a theoretical framework which separates suicidal desire from suicidal action. This framework may be used to consider individual dispositional risk factors, such as neuroticism in the context of the ITS proposed proximal, causal risk factors for both suicidal desire and the transition to suicidal action. Law et al. (2015) suggest that placing identified risk factors into context, by identifying how they impact specifically on suicidal desire and action, will have implications for assessing risk. This study found that one such risk factor (emotional dysregulation) exerted different effects at the stage of suicidal ideation, than it did at the stage of transitioning to suicide attempts. As such, Law et al. (2015) highlight the importance of examining individual
differences which confer risk for suicide, as they relate to both suicidal ideation and suicidal behaviour. Thus, the current study will investigate whether neuroticism is associated with increased suicide risk at the ideation stage, the action stage, or both.

**Neuroticism and Suicidal Desire**

Higher levels of neuroticism are consistently associated with greater suicidal ideation (Brezo et al., 2006; Duberstein et al., 2000; Heisel, Links, Conn, van Reekum, & Flett, 2007; Useda et al., 2004). Previous literature has identified that neuroticism exerts an effect on suicidal desire via an increased reactivity to the interpersonal precursors proposed by the ITS to underlie suicidal desire (DeShong et al., 2015). That is, that individuals with high neuroticism have higher levels of thwarted belongingness and perceived burdensomeness (DeShong et al., 2015). Similarly, individuals high in trait neuroticism are more sensitive to interpersonal rejection and exclusion (Denissen & Penke, 2008), and more likely to report feelings of burdensomeness to others (Chochinov et al., 2007). The vulnerability conferred by neuroticism to experiencing thwarted belongingness and perceived burdensomeness has also been supported experimentally in Study 1a of this thesis. Using the Interpersonal Persistence Task (Collins et al., 2016; George et al., 2017) individuals high in neuroticism were more sensitive to an experimental induction of thwarted belongingness and perceived burdensomeness than individuals low in neuroticism, which in turn increased desire to escape from this interpersonal adversity (Hartley et al., 2017). Consequently, neuroticism may be associated with suicidal desire, and that this effect may be explained via a vulnerability to experiencing the interpersonal risk factors of thwarted belongingness and perceived burdensomeness.
Neuroticism and Suicidal Action

The relationship between neuroticism and lethal suicidal action is a little more ambiguous. While some evidence suggests that individuals with a prior suicide attempt have higher levels of neuroticism than those without a history of prior attempts (Fergusson et al., 2000; Nordstrom et al., 1995; Useda et al., 2004), a large national comorbidity study found no association of neuroticism with a prior suicide attempt within the past 12 months or lifetime (Cox et al., 2004). Further, several studies found that the positive association between neuroticism and suicide attempts no longer held after controlling for comorbid depressive symptoms (Batterham & Christensen, 2012; Fergusson et al., 2000; Pisetsky et al., 2015; Useda et al., 2004), and exposure to stressful life events (Bi et al., 2012; Fang et al., 2012; Fergusson et al., 2000; Zhu et al., 2013). Taken together, these findings illustrate that the association between neuroticism and suicidal behaviour is inconsistent.

Taking the position that suicidal ideation is distinct from suicidal action, it may be the case that the factors which predispose an individual to suicidal ideation differ from those which influence whether an individual progresses from suicidal ideation to suicidal action. In this way, the correlates of suicidal ideation may differ from the correlates of attempted suicide among individuals who report suicidal ideation. Consistent with this, Rappaport et al. (2017) find that while neuroticism increases risk for suicidal ideation, high neuroticism was in fact associated with lower risk for suicide attempt among individuals with suicidal ideation. This is consistent with studies examining state-wide suicide rates and the personality characteristics of those states, which have found that higher neuroticism is associated with a lower rate of suicide completions (McCann, 2010; Voracek, 2009). This suggests that while neuroticism alone may be a risk factor for suicidal ideation, it is not sufficient to confer risk for
progression to suicidal action. Further, these findings illustrate the importance of considering specifically, the conditions under which suicidal ideation will progress to suicide attempt.

According to the ITS, acquired capability for suicide is likely to distinguish those individuals who only think about suicide, from those who go on to act upon these thoughts. Consistent with this, a recent study found that correlates of acquired capability, including exposure to suicide, impulsivity, and fearlessness about death found that these traits moderated the association between suicidal desire and suicide attempts/completions (Dhingra et al., 2015). Thus, the inconsistent relationship between neuroticism and suicidal attempts and completions may be explained via the moderating role of acquired capability for suicide.

The Current Study

It is possible that one reason for the seemingly inconsistent results in the literature regarding the relationship between neuroticism and suicidal action, could be that previous studies have not considered their individual samples’ differences in acquired capability for suicide. That is, there may be a systematic relationship, but the strength and direction of the relationship may vary depending on acquired capability for suicide. In this way, the acquired capability for suicide may moderate the association between neuroticism and suicide risk, such that neuroticism alone may confer increased suicidal desire, which only translates into suicidal action when acquired capability is present and concurrently high.

The current study sought to investigate the proposed moderating effect of acquired capability for suicide on the association between neuroticism and suicidality by selecting groups of individuals to be high or low in trait neuroticism, and high or low
acquired capability. This procedure produced four groups: (1) high neuroticism, low acquired capability (High N- Low AC); (2) high neuroticism, high acquired capability (High N- High AC); (3) low neuroticism, high acquired capability (Low N- High AC); (4) low neuroticism, low acquired capability (Low N-Low AC). These four groups were then compared on questionnaire measures selected to represent the continuum of suicidality proposed by the ideation-to-action framework.

**Suicidal Desire**

Suicidal desire was conceptualised according to the ITS causal precursors for suicidal ideation; thwarted belongingness and perceived burdensomeness, as well as the frequency of self-reported suicidal thoughts in the previous year.

**Suicidal Action**

Items assessing suicidal action included self-reported lifetime frequency of suicide attempts. This behavioural marker is the strongest clinical indicator of risk for future suicide behaviours (Fawcett et al., 1990; Joiner et al., 2005). The current study also operationalised suicidal action using questionnaire measures of suicide intent and suicide readiness. Current suicidal intent and readiness are proposed to be more proximal to action in the ideation to action framework (Chu et al., 2015). Nock and Kessler (2006) suggest that the formation of explicit plans and preparations (represented in the current study as suicide readiness) and intention to enact a suicide attempt (represented in the current study as suicide intention) should be conceptualised as distinct from suicidal desire. Consistent with this, suicidal intent has been associated with more lethal self-injury (Brown, Henriques, Sosdjan, & Beck, 2004) and an increased likelihood of death by suicide (Nock & Kessler, 2006).
**General Distress**

We will also consider broader measures of non-specific psychological distress, thought to be negatively associated with psychological adjustment and positively associated with suicidal desire. Further, O'Connor and Nock (2014) highlight the importance of considering protective factors which may buffer against the development of suicidal ideation and behaviours. One such protective factor is zest for life, which has been shown to confer resilience to suicidal ideation (Collins et al., 2016; George et al., 2017). For this reason, a measure of zest for life was also included to facilitate exploration of the impact of neuroticism and acquired capability for suicide on a factor expected to confer resilience to suicide.

It was hypothesised that neuroticism and acquired capability would interact to predict measures proximal to suicidal action, but not suicidal ideation. In this way, we proposed that:

1) Neuroticism would exert a main effect on measures more proximal to suicidal desire regardless of whether the individual was high or low in acquired capability for suicide. Thus, high neuroticism would be associated with higher suicidal desire, higher general distress, and lower zest for life than low neuroticism, irrespective of acquired capability.

2) The relationship between neuroticism and suicidal actions or behaviours would be moderated by acquired capability for suicide. We hypothesised an interaction between neuroticism and acquired capability whereby neuroticism would not confer increased risk for suicide when acquired capability was low, but would be associated with higher scores on measures of suicidal action when paired with concurrently high levels of acquired capability for suicide.
Method

Participants

Participants ($N = 107, M_{age} = 19.98$ years, $SD = 6.09, 69$ female) were selected from a pool of 839 undergraduate students enrolled in an introductory psychology unit, based on their scores on measures of neuroticism (Eysenck Personality Questionnaire Brief Version- EPQ-BV, Sato, 2005) and acquired capability (Acquired Capability with Rehearsal for Suicide Scale- ACWRSS, George et al, 2016). Participants scoring in the top or bottom 30% of scores on both measures were recruited to form four distinct groups: (1) High N-Low AC, (2) High N-High AC, (3) Low N-High AC, and (4) Low N-Low AC.

Materials

_Eysenck Personality Questionnaire Brief Version_ (EPQ – BV, Sato, 2005) The 12-item EPQ-BV assesses neuroticism on a 5-point Likert scale (1 = not at all, 5 = extremely), with higher scores indicating higher neuroticism. The internal consistency in the current sample was good ($\alpha = .95$).

_Acquired Capability with Rehearsal for Suicide Scale_ (ACWRSS: George et al, 2016). This 7-item questionnaire assesses capability to engage in suicide in the domains of pain tolerance, fear of death and mental rehearsal for suicide on a 9-point Likert scale (0 = not at all, 8 = very strongly). Higher scores indicate higher capability to engage in suicide, with two items reverse scored. Internal consistency in the current sample was good ($\alpha = .84$).

_Interpersonal Needs Questionnaire_ (INQ: Van Orden, Cukrowicz, Witte, & Joiner, 2012). The 15-item INQ measures perceived burdensomeness (6 items; e.g., ‘The people in my life would be happier without me’) and thwarted belongingness (9
items; e.g., ‘I feel disconnected from other people’) on a 7-point Likert scale from 0 (not at all true for me) to 6 (very true for me). The scale has good psychometric properties (Van Orden et al., 2012), and internal consistency reliability in the current sample was high for both burdensomeness ($\alpha = .92$) and thwarted belongingness ($\alpha = .86$) subscales.

Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007). Two items from the SITBI were used to assess suicidal ideation (the number of times an individual has thought about suicide in the past 12 months, from 0 = never to 5 = almost every day), and suicide attempts (the number of times in their lifetime a person has made an attempt in which they had at least some intent to die). Although the SITBI is typically administered as a semi-structured interview, the self-report format is psychometrically sound (Latimer, Meade, & Tennant, 2013).

Intent and Readiness for Suicide. Intent and readiness for suicide were assessed using two items (“I have no intention of killing myself in the near future” and “If I wanted to kill myself, I feel ready to do so”) measured on a 9-point scale from 0 (agree not at all) to 8 (agree very strongly). The intention item is reverse scored so that higher scores reflect higher levels of risk.

Kessler Psychological Distress Scale (Kessler et al., 2002) The 10-item K10 measures psychological distress and has good psychometric properties (Kessler et al., 2002). Items assessing the prevalence of mood disorder symptoms such as nervousness, agitation and depression over the previous four weeks are rated on a 5-point Likert scale from 1 (none of the time) through to 5 (all of the time), with higher scores indicating greater psychological distress. The normative bands for K10 scores commonly used in the Australian population are: low distress (10-15), moderate distress (16-21), high
distress (22-29), and very high distress (30-50) (Cvetkovski, Reavley, & Jorm, 2012). Internal consistency reliability in the current sample was good ($\alpha = .88$).

Zest for Life Scale (ZLS; George et al, 2016). This 12-item measure assesses a person’s positive outlook on life and their positive engagement with living using a 9-point Likert scale (e.g., ‘I am embracing life’). The scale includes six reverse-scored items (e.g., ‘Life seems to hold less for me than it used to’). Responses range from 0 (not at all) to 8 (very strongly), with higher scores indicating higher levels of zest for life. Internal consistency in the current sample was good ($\alpha = .95$). Zest for life is negatively associated with suicide risk (Collins et al., 2016) and mediates the protective effect of mindfulness on suicide risk.

Procedure

Participants were scheduled to participate in pairs, and were seated in separate testing booths with the doors closed following the informed consent procedure. Participants first took part in a computerised team task, not reported here (Interpersonal Persistence Task; Collins et al, 2016) and then completed a battery of questionnaires administered using online survey software. These included the measures described in the methods section as well as demographic information (gender, age, and ethnicity), and two items designed to detect careless responding (Meade & Craig, 2012). Upon completion, participants were debriefed and provided with resources for on campus psychological support.

Results

Reliability of Group Allocation

To check the reliability of the allocation to the four neuroticism/acquired capability groups based on the pre-screening scores on measures of neuroticism (EPQ-
Neuroticism, Suicidal Desire and Suicidal Action.

BV; Sato, 2005) and acquired capability for suicide (ACWRSS: George et al, 2016) these measures were re-administered at the time of testing. Participants had been selected as ‘high’ if their scores fell in the top 30% of scores, and ‘low’ if their score fell in the bottom 30% of scores at the time of screening. To remain classified as ‘high’ on the respective neuroticism and acquired capability dimensions, participants had to still score at least above the median of the screening scores, and to remain classified as ‘low’, participants had to still score below the median. Nine participants no longer met their respective group allocation criteria and were excluded. For the remaining 98 participants, means and standard errors for neuroticism and acquired capability scores by group are shown in Figure 6.1.

As intended, the two low neuroticism groups (i.e., Low N-Low AC and Low N-High AC) did not differ significantly in neuroticism, \( t(48) = 1.02, \ p = .313 \), but did differ in acquired capability, \( t(48) = 14.32, \ p < .001 \). Similarly, the two high neuroticism groups (i.e., High N-Low AC and High N-High AC) did not differ significantly in neuroticism, \( t(46) = 1.53, \ p = .133 \), but did differ in acquired capability, \( t(46) = 12.25, \ p < .001 \). Likewise, the two low acquired capability groups (i.e., Low N-Low AC and High N-Low AC) did not significantly differ in acquired capability, \( t(48) = .56, \ p = .582 \), but did differ in neuroticism, \( t(48) = 15.26, \ p < .001 \). Finally, the two high acquired capability groups (i.e., Low N-High AC and High N-High AC) did not significantly differ in acquired capability, \( t(46) = -1.77, \ p = .083 \), but did differ in neuroticism, \( t(46) = -13.66, \ p < .001 \) (see Figure 6.1).
Power analysis was conducted for an ANOVA with neuroticism group and acquired capability group as the two between groups factors, each with two levels (high and low), using G*Power (Faul, Erdfelder, & Lang, 2013). Assuming an acceptable statistical power of 0.80, an alpha level of 0.05, and anticipating small to medium interaction effect sizes (approximately $\eta^2_{\text{partial}} = .05$), the required sample size to reliably detect a significant interaction between neuroticism group and acquired capability group was estimated at 76. Thus, the remaining sample size of 98 was estimated to provide adequate statistical power.

**Suicidal Desire**

The current study hypothesised that neuroticism alone would be sufficient to confer vulnerability for suicidal desire. For this reason, it was expected that for
Neuroticism, Suicidal Desire and Suicidal Action.

measures proximal to suicidal desire, there would be a significant main effect of neuroticism, regardless of the level of acquired capability. To investigate this hypothesis, a 2 (neuroticism group) by 2 (acquired capability for suicide group) analysis of variance was conducted, with measures of suicidal desire, including the INQ (Van Orden et al., 2012) subscales of thwarted belongingness and perceived burdensomeness, as well as self-reported frequency of suicidal ideation as the dependent variable. It was hypothesised that there would be a significant main effect of neuroticism for each of these measures. Descriptive statistics for each of these variables measuring suicidal desire are presented in Table 6.1.

**Perceived burdensomeness:** Consistent with the first hypothesis, participants with high neuroticism reported significantly higher levels of perceived burdensomeness, $F (1, 94) = 55.19, p<.001, \eta^2_{\text{partial}} = .37$. There was also a significant main effect of acquired capability, $F (1, 94) = 31.97, p<.001, \eta^2_{\text{partial}} = .25$, whereby high AC was associated with higher ratings of perceived burdensomeness. These effect were qualified by a significant interaction, $F (1, 94) = 22.70, p<.001, \eta^2_{\text{partial}} = .19$. For the low acquired capability group, there was a significant main effect of neuroticism on thwarted belongingness, $F (1, 48) = 12.41, p = .003, \eta^2_{\text{partial}} = .17$. Thus, even when acquired capability was low, high neuroticism was associated with higher levels of perceived burdensomeness, relative to the low neuroticism group. For the high acquired capability group, there was a larger effect of neuroticism, whereby high neuroticism was associated with higher levels of perceived burdensomeness than low neuroticism, $F (1, 46) = 43.71, p<.001, \eta^2_{\text{partial}} = .49$. In this way, neuroticism alone is sufficient to confer risk for experiencing perceived burdensomeness, but this effect is larger in the presence of concurrently high acquired capability ($\eta^2_{\text{partial}} = .49$ for individuals with high acquired capability vs. $\eta^2_{\text{partial}} = .17$ for individuals with low acquired capability)
Thwarted Belongingness: Consistent with the hypothesis that neuroticism would be associated with increased feelings of thwarted belongingness, there was a significant main effect of neuroticism, $F(1, 94) = 58.45, p < .001, \eta^2_{\text{partial}} = .38$. There was also a significant main effect of acquired capability, $F(1, 94) = 19.26, p < .001, \eta^2_{\text{partial}} = .17$, whereby high AC was associated with higher ratings of thwarted belongingness. These effect were qualified by a significant interaction, $F(1, 94) = 13.03, p < .001, \eta^2_{\text{partial}} = .12$. To follow up this interaction, the acquired capability groups were examined separately. For the low acquired capability group, there was a significant main effect of neuroticism on thwarted belongingness, $F(1, 48) = 11.04, p < .001, \eta^2_{\text{partial}} = .19$. This indicates that even when acquired capability was low, high neuroticism was associated with higher levels of thwarted belongingness, relative to the low neuroticism group. For the high acquired capability group, there was also a significant effect of neuroticism, whereby high neuroticism was associated with higher levels of thwarted belongingness than low neuroticism, $F(1, 46) = 48.71, p < .001, \eta^2_{\text{partial}} = .52$. In this way, neuroticism alone is sufficient to confer vulnerability for thwarted belongingness, but this effect is larger in the presence of concurrently high acquired capability ($\eta^2_{\text{partial}} = .52$ for individuals with high acquired capability vs. $\eta^2_{\text{partial}} = .19$ for individuals with low acquired capability).

Suicide ideation: Suicidal ideation was assessed using an item from the SITBI (Nock et al., 2007) asking participants to indicate the frequency of suicidal ideation in the past year. As hypothesised, high neuroticism was associated with significantly higher frequency of suicidal ideation than low neuroticism, $F(1, 94) = 21.97, p < .001, \eta^2_{\text{partial}} = .19$. There was also a significant main effect of acquired capability, $F(1, 94) = 44.31, p < .001, \eta^2_{\text{partial}} = .32$, with higher acquired capability associated with higher frequency self-reported suicidal ideation in the previous year. In addition, there was a
significant interaction between acquired capability group and neuroticism group, $F(1, 94) = 5.93, p = .017, \eta^2_{\text{partial}} = .06$, which followed the same pattern as the previously discussed variables. For individuals with low acquired capability, high neuroticism was associated with significantly higher frequency of suicidal ideation, $F(1, 48) = 6.45, p = .014, \eta^2_{\text{partial}} = .12$, than low neuroticism. For individuals with high acquired capability, there was also a significant, and larger effect of neuroticism, $F(1, 46) = 15.32, p < .001, \eta^2_{\text{partial}} = .25$. In this way, neuroticism alone was sufficient to confer increased frequency of suicidal ideation, although this effect was about twice as large for those individuals with concurrently high acquired capability ($\eta^2_{\text{partial}} = .25$ for individuals with high acquired capability vs. $\eta^2_{\text{partial}} = .12$ for individuals with low acquired capability).

**Suicidal Action**

It was hypothesised that neuroticism would not confer increased risk for suicidal action, unless paired with a concurrently high acquired capability for suicide. In this way, neuroticism would not be associated with increased risk for suicide when acquired capability was low, but would be associated with higher scores on measures of suicidal action when paired with high levels of acquired capability for suicide. To test this hypothesis a $2 \times 2$ univariate ANOVA examined the influence of neuroticism group (high or low) and acquired capability group (high or low) on questionnaire measures of behaviours thought to be related specifically to suicidal action, as distinct from suicidal desire. Measures thought to be proximal to suicidal action included the following, in order of severity: current self-reported suicidal intent, current self-reported ratings of readiness for suicide, and the lifetime frequency of previous suicide attempts. It was predicted that acquired capability for suicide would moderate the relationship between neuroticism and suicidal actions. Thus, when acquired capability was low the neuroticism groups would *not* differ in their scores for suicidal action, but when
acquired capability was high, high neuroticism would be associated with increased scores for the suicidal action variables. Descriptive statistics for each of these variables measuring suicidal action are presented in Table 6.1.

**Suicide Intention:** There were significant effects of neuroticism group, \( F(1, 94) = 4.15, p = .045, \eta^2_{\text{partial}} = .04 \), and acquired capability for suicide, \( F(1, 94) = 4.15, p = .045, \eta^2_{\text{partial}} = .04 \) on participants self-reported intention for suicide. In each case, higher neuroticism, and higher acquired capability were associated with higher ratings of suicidal intent. Consistent with the primary hypothesis, there was a significant interaction between neuroticism group and acquired capability group, \( F(1, 94) = 9.42, p = .003, \eta^2_{\text{partial}} = .09 \). To explore this interaction, the effect of neuroticism was examined separately for each of the acquired capability groups. When acquired capability was low, the high neuroticism group did not report significantly higher levels of intent than the low neuroticism group, \( F(1, 48) = .53, p = .470, \eta^2_{\text{partial}} = .01 \). However, when acquired capability was high, individuals from the high neuroticism group reported significantly higher levels of suicidal intent than those from the low neuroticism group, \( F(1, 46) = 13.16, p = .001, \eta^2_{\text{partial}} = .22 \). This suggests that high neuroticism was only associated with increased suicidal intent in the presence of concurrently high acquired capacity.

**Suicide Readiness:** Individuals with high neuroticism reported significantly higher suicide readiness than those with low neuroticism, \( F(1, 94) = 5.68, p = .019, \eta^2_{\text{partial}} = .06 \). Similarly, individuals in the high acquired capability groups reported higher readiness than those in the low acquired capability groups, \( F(1, 94) = 42.10, p < .001, \eta^2_{\text{partial}} = .31 \). Consistent with the hypothesis that acquired capability would moderate the association between neuroticism and suicidal action, there was a significant interaction between acquired capability group and neuroticism group, \( F(1, 94) = 5.50, p \)
Neuroticism, Suicidal Desire and Suicidal Action.

117

= .021, η^2_{partial} = .06. As expected, when acquired capability was low, there was no significant difference in suicide readiness between the high and low neuroticism groups, 

\[ F(1, 48) = .02, \quad p = .896, \quad η^2_{partial} = .00, \]

suggesting that neuroticism alone is not sufficient to increase suicide readiness. However, when acquired capability was high, high neuroticism was associated with significantly higher ratings of suicide readiness than low neuroticism, 

\[ F(1, 46) = 5.50, \quad p = .024, \quad η^2_{partial} = .11. \]

Thus, consistent with the primary hypothesis, high neuroticism was only associated with increased readiness for suicide in the presence of concurrently high acquired capacity.

**Suicide attempts:** Individuals with high neuroticism reported significantly higher frequency of suicide attempts than those with low neuroticism, 

\[ F(1, 94) = 8.89, \quad p = .004, \quad η^2_{partial} = .09. \]

Similarly, individuals in the high acquired capability groups reported higher frequency of attempts than those in the low acquired capability groups, 

\[ F(1, 94) = 19.51, \quad p < .001, \quad η^2_{partial} = .17. \]

Consistent with the hypothesis that acquired capability would moderate the association between neuroticism and suicidal action, there was a significant interaction between acquired capability group and neuroticism group 

\[ F(1, 94) = 8.89, \quad p = .004, \quad η^2_{partial} = .09. \]

For individuals with low acquired capability there was no significant difference in the frequency of attempts between the high and low neuroticism groups. In fact, of the 50 participants in the low acquired capability group, none of the participants reported making a suicide attempt, regardless of their level of neuroticism. However, for individuals with high acquired capability for suicide, 16 of the 48 participants reported making at least one suicide attempt in their lifetime, with individuals with high neuroticism reporting significantly more attempts than individuals with low neuroticism, 

\[ F(1, 46) = 8.54, \quad p = .005, \quad η^2_{partial} = .16. \]
Neuroticism, Suicidal Desire and Suicidal Action.

General Distress

The relationship between neuroticism, acquired capability and general psychological distress was investigated using scores on the K10 (Kessler et al., 2002). Similarly, participants’ ratings of their zest for life, which has been shown to confer resilience to suicidal ideation (Collins et al. 2016) was measured to permit examination of the impact of neuroticism and acquired capability on this protective factor. As these general indicators of well-being are more proximal to suicidal desire than to suicidal action, a similar pattern to suicidal desire was hypothesised. That is, that high neuroticism alone would be associated with increased general distress, and lower zest for life regardless of acquired capability for suicide, though its effects would be amplified in the context of concurrently high acquired capability for suicide. Descriptive statistics for each of these variables measuring general psychological distress and zest for life are presented in Table 6.1.

**Kessler Psychological Distress Scale:** As hypothesised, participants with high neuroticism reported significantly higher levels of non-specific psychological distress than those with low neuroticism, $F (1, 94) = 129.56, p<.001, \eta^2_{\text{partial}} = .58$. Similarly, there was a significant main effect of acquired capability, $F (1, 94) = 28.76, p<.001, \eta^2_{\text{partial}} = .23$, whereby high AC was associated with higher ratings of non-specific psychological distress. These effects were qualified by a significant interaction between neuroticism and acquired capability for suicide, $F (1, 94) = 24.55, p<.001, \eta^2_{\text{partial}} = .21$. For the low acquired capability group, there was a significant main effect of neuroticism. In this way, even when acquired capability was low, high neuroticism was associated with higher non-specific psychological distress than low neuroticism, $F (1, 48) = 26.65, p<.001, \eta^2_{\text{partial}} = .36$. For the high acquired capability group, there was also a significant effect of neuroticism, whereby high neuroticism was associated with
higher distress than low neuroticism, $F(1, 46) = 107.45, p < .001, \eta^2_{\text{partial}} = .70$. Thus, as hypothesised, neuroticism alone is sufficient to confer risk for experiencing general distress, but this effect is larger in the presence of concurrently high acquired capability ($\eta^2_{\text{partial}} = .70$ for individuals with high acquired capability vs. $\eta^2_{\text{partial}} = .36$ for individuals with low acquired capability).

**Zest for Life**: As hypothesised, participants with high neuroticism reported significantly lower levels of zest for life than individuals with low neuroticism, $F(1, 94) = 91.11, p < .001, \eta^2_{\text{partial}} = .49$. Similarly, there was a significant main effect of acquired capability, $F(1, 94) = 26.59, p < .001, \eta^2_{\text{partial}} = .22$ whereby high AC was associated with significantly lower ratings of self-reported zest for life. These effects were qualified by a significant interaction between neuroticism group and acquired capability, $F(1, 94) = 9.70, p = .002, \eta^2_{\text{partial}} = .07$. For the low acquired capability group, high neuroticism was associated with lower zest for life than the low neuroticism group, $F(1, 48) = 26.65, p < .001, \eta^2_{\text{partial}} = .39$, suggesting that neuroticism alone, irrespective of acquired capability, is sufficient to significantly negatively impact upon an individual’s engagement and enjoyment of life. In the high acquired capability group there was also a significant main effect of neuroticism group, $F(1, 46) = 58.71, p < .001, \eta^2_{\text{partial}} = .56$, with higher neuroticism associated with lower zest for life. Thus, consistent with the hypothesis neuroticism conferred decreased zest for life regardless of acquired capability, though this effect was larger when paired with concurrently high acquired capability for suicide ($\eta^2_{\text{partial}} = .56$ for individuals with high acquired capability vs. $\eta^2_{\text{partial}} = .39$ for individuals with low acquired capability).
Table 6.1.

Table to show mean scores for measures of suicidal ideation, suicidal action, and general distress for the selected groups with tests of statistical significance of the moderating effect of acquired capability, evidenced by the effect of neuroticism at high and low levels of AC.

<table>
<thead>
<tr>
<th></th>
<th>Low AC</th>
<th>High AC</th>
<th>AC x N Interaction</th>
<th>AC-Low</th>
<th>AC-High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low N (N=27)</td>
<td>High N (N=23)</td>
<td>Low N (N=23)</td>
<td>High N (N=25)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Suicidal Ideation</td>
<td>PB</td>
<td>1.21</td>
<td>0.37</td>
<td>1.69</td>
<td>.67</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>TB</td>
<td>1.73</td>
<td>0.75</td>
<td>2.46</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>.04</td>
<td>.19</td>
<td>.43</td>
<td>.79</td>
</tr>
<tr>
<td>Suicidal Action</td>
<td>Intent</td>
<td>.89</td>
<td>2.56</td>
<td>.43</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td>Readiness</td>
<td>.07</td>
<td>.27</td>
<td>.09</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td>Attempts</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>K10</td>
<td>15.26</td>
<td>3.35</td>
<td>22.13</td>
<td>5.90</td>
</tr>
<tr>
<td></td>
<td>Zest</td>
<td>7.07</td>
<td>.66</td>
<td>5.57</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

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

For individuals with low acquired capability, there were no reported suicide attempts, so it is not possible to calculate an F value.
Discussion

The current study sought to investigate the relationship between neuroticism, the acquired capability for suicide, and measures of suicidal desire and action. It was hypothesised that neuroticism alone would be sufficient to confer risk for increased suicidal desire regardless of an individual’s acquired capability for suicide. This hypothesis was supported. Consistent with this, there was a significant main effect of neuroticism on measures proximal to suicidal desire, at each level of acquired capability for suicide. In this way, individuals with high levels of neuroticism will have significantly higher levels of suicidal ideation, thwarted belongingness, perceived burdensomeness and non-specific psychological distress, and significantly lower levels of zest for life. This is consistent with previous research suggesting that neuroticism represents a vulnerability for experiencing suicidal desire (Brezó et al., 2006; DeShong et al., 2015; Hartley et al., 2017)

Furthermore, there was a significant interaction between neuroticism and acquired capability, whereby the deleterious effect of neuroticism is amplified in the presence of simultaneously high acquired capability. This suggests that while neuroticism confers risk for suicidal desire, reduced engagement with life and general psychological dysfunction, this risk is greater when paired with an acquired capability for suicide. While the ITS proposes that acquired capability for suicide is distinct from suicidal desire, it is possible that higher acquired capability may also be associated with elevations in self-reported suicidal desire and non-specific psychological distress. Since the questionnaire measure of acquired capability for suicide used in this study includes items specifically asking about tolerance for physical pain, fearlessness about death, and mental preparation for suicide, it is likely that individuals who score highly on this measure may also be experiencing greater distress and poorer positive engagement with life.
The second hypothesis of the current study was that the neuroticism alone would not be sufficient to confer increased risk for measures of suicidal action. It was expected that neuroticism would only confer increased risk for suicidal action in the presence of a simultaneously high acquired capability for suicide. Consistent with this, when acquired capability for suicide was low, high neuroticism was not associated with increased suicidal intent, readiness for suicide, or frequency of previous suicide attempts. However, when paired with a high acquired capability for suicide, high neuroticism was associated with significantly higher risk for suicidal action, which was evident in elevated intention and readiness for suicide, and a greater frequency of previous suicide attempts.

The finding that neuroticism will only confer vulnerability for suicidal behaviour when acquired capability for suicide is also present is consistent with the ITS. The ITS proposes that suicidal desire will not lead to suicidal action unless the increased pain tolerance and diminished fear of death associated with an acquired capability for suicide is also present (Joiner et al., 2009; Ribeiro & Joiner, 2009; Van Orden et al., 2008). Thus, while neuroticism in isolation increases suicidal desire and distress, this will only be reflected in increased suicidal behaviour when a capability for suicide is acquired. This offers support for the notion that it is the simultaneous presence of all three components of the ITS which confers the greatest risk for suicide attempts and completions (Joiner, 2005; Van Orden et al., 2010).

Implications for Suicide Theory

The finding that neuroticism is predicative of suicidal desire regardless of acquired capability for suicide, whilst only conferring risk for suicidal action in the presence of high acquired capability for suicide has implications for suicide theory. In line with contemporary theories, including the interpersonal theory (Joiner, 2005), the motivational-volitional theory
Neuroticism, Suicidal Desire and Suicidal Action. (O’Connor, 2011) and the three-step theory (Klonsky & May, 2015) these findings suggest that suicide action and desire should be conceptualised as distinct constructs. Further, the current findings suggest that stage-specific moderators act to enable the progression from the suicidal ideation stage, to the stage of suicidal behaviours. This is consistent with the premise that moderating factors determine whether a specific individual will transition from merely thinking about suicide, to acting upon those thoughts (Dhingra et al., 2015; O’Connor, 2011).

Thus, future research should consider suicidal desire as distinct from suicidal action, and consider the predictors for each stage separately. For this reason considering proposed risk factors within the ideation-to-action framework may better inform risk assessment (Klonsky & May, 2014). Additionally, future research may wish to consider those factors which facilitate movement between the stages of suicidal ideation and action. For example, the current study demonstrates that predispositional vulnerabilities such as neuroticism may increase the incidence of suicidal desire; which will correspond to increased suicide intent, readiness and attempts through the moderating influence of high acquired capability for suicide.

The current findings offer an explanation for the discrepant relationship between neuroticism and suicide attempts. Previous research has been mixed, with some studies finding that individuals with a prior suicide attempt have higher levels of neuroticism than those without a history of prior attempts (Fergusson et al., 2000; Nordstrom et al., 1995; Useda et al., 2004), while others find no association of neuroticism with a prior suicide attempt either lifetime or within the past 12 months (Cox et al., 2004), and yet others finding that the positive association between neuroticism and suicide attempts no longer held after controlling for extraneous variables such as comorbid depressive symptoms (Batterham & Christensen, 2012; Fergusson et al., 2000; Pisetsky et al., 2015; Useda et al., 2004). The current study sought to address this inconsistency by separating suicidal ideation from
suicidal action and considering how the factors which predispose an individual to suicidal ideation may differ from those which influence whether an individual progresses from suicidal ideation to suicidal action. This is consistent with, Rappaport et al. (2017) who found that while neuroticism increases risk for suicidal ideation, high neuroticism was in fact associated with lower risk for suicide attempt among individuals with suicidal ideation. Importantly, none of these studies considered the role of acquired capability in facilitating the transition from suicidal ideation to suicide attempts.

The current study suggests that neuroticism is associated with increased suicidal ideation, but that this will only be expressed as suicidal action in the simultaneous presence of more proximal risk factors, such as high acquired capability for suicide. Thus, previous samples’ acquired capability characteristics may have impacted upon whether or not those studies found an association between neuroticism and suicide attempts. Studies which found an association between neuroticism and suicide attempts included a hospital population of suicide attempters (Nordstrom et al., 1995), a group of depressed adults aged 50 and over (Useda et al., 2004) and adolescents with varying exposure to trauma, family dysfunction and psychiatric problems (Fergusson et al., 2000). Given the history of attempts and trauma in those samples, it is likely that these groups also experienced higher levels of acquired capability for suicide. In contrast, studies did not find an association when they accounted for socio-demographic factors (Cox et al., 2004), and depressive symptoms (Batterham & Christensen, 2012; Fergusson et al., 2000; Pisetsky et al., 2015; Useda et al., 2004). This illustrates that the relationship between neuroticism and suicide attempts is likely moderated by extraneous variables. The current study suggests that acquired capability for suicide is one such moderating factor.
Clinical implications

The current study found that high levels of neuroticism were associated with greater ratings of burdensomeness and diminished belongingness regardless of acquired capability levels. However, the present study also suggests that neuroticism only confers vulnerability for suicidal action in the presence of simultaneously high acquired capability for suicide. For this reason, clinicians should consider distal personality risk factors for suicide in the context of more proximal interpersonal risk factors. Furthermore, the current study offers support for the assessment of suicidal desire and suicidal action as distinct processes, each with their own causal mechanisms. Considering how pre-dispositional personality factors such as neuroticism might interact with more proximal interpersonal risk factors will improve the specificity and accuracy of suicide risk assessment.

The current study illustrates that neuroticism may place an individual at greater risk for suicidal desire. Neuroticism has also been shown to increase the frequency of self-destructive behaviours such as rumination, NSSI (Allroggen et al., 2014), substance abuse, impulsivity (Dougherty et al., 2004; Witte et al., 2008) and risk-taking (Cooper, Agocha, & Sheldon, 2000). The ITS suggests that these behaviours may serve to habituate the individual to pain and provocation, which may facilitate the acquisition of a capability (Joiner, 2005). Thus, while neuroticism may be conceptualised as a relatively static, difficult to modify personality trait, clinical interventions can target the mechanisms through which a capability is acquired and enhanced (i.e. risk taking behaviour, NSSI, substance abuse). This may prevent the transition from suicidal thoughts to suicidal action. Further, there is evidence to suggest that the deleterious impact of neuroticism on suicidal ideation can also be mitigated. For example, studies have demonstrated that mindfulness enhances resilience to the interpersonal adversity thought to cause suicidal desire (Collins et al., 2016). Mindfulness can also mitigates the relationship between neuroticism and a host of negative outcomes (Feltman
et al., 2009) including suicidal ideation (Tucker et al., 2014). In this way mindfulness interventions may be effective in ameliorating the vulnerability to suicidal desire conferred by neuroticism (Chesin & Jeglic, 2016; Forkmann et al., 2014), essentially short-sircuiting the development of suicidal desire and preventing the progression from suicidal desire to suicidal action.

**Limitations**

The current study selected groups to be high and low in neuroticism and acquired capability and did not specifically investigate how neuroticism and acquired capability may correlate with one another. It is likely that certain combinations of these characteristics occur more frequently than others. For example, neuroticism has been shown to be associated with diminished pain tolerance (Goubert et al., 2004; Lynn & Eysenck, 1961), harm-avoidance (De Fruyt et al., 2000) and increased fear of death by suicide (Segal, Marty, Meyer, & Coolidge, 2012) so we may expect that individuals with high neuroticism will be less able to acquire the necessary tolerance for pain and provocation to acquire a capability for suicide. In contrast to this, facets of neuroticism such as angry-hostility and impulsivity may be positively associated with the habituation to pain, violence and provocation associated with acquired capability for suicide (Cramer et al., 2012; Witte et al., 2008). This highlights the need to further clarify the relationship between neuroticism and acquired capability for suicide, and to specifically identify which facets of neuroticism may confer risk or resilience for the acquisition of the ability to enact lethal self-injury.

**Conclusions**

In conclusion, the current study provides support for the distinction between suicidal desire and action proposed by Klonsky’s (2013) ideation-to-action framework. Further, this study illustrates the importance of considering how identified risk factors, such as
neuroticism may exert their effects at different stages of the framework. Neuroticism was found to be sufficient to increase suicidal desire, but not suicidal action. Neuroticism was only associated with vulnerability for suicidal actions when paired with concurrently high acquired capability for suicide. This finding offers partial explanation for the failure to identify a consistent relationship between neuroticism and suicide attempts and completions that exists in current literature (Duberstein et al., 1994; Duberstein et al., 2000; McCann, 2010; Rappaport et al., 2017; Tsoh et al., 2005; Useda et al., 2007). It is possible that the presence or absence of acquired capability for suicide determines whether the risk for suicidal desire conferred by high neuroticism will correspond to an increase in suicidal behaviour.
Chapter 7.

EARLY ENVIRONMENTAL FACTORS INFLUENCE NEUROTICISM: THE ROLE OF ADULT ATTACHMENT STYLES.
Early Environmental Factors Influence Neuroticism: The Role of Adult Attachment Styles

The previous chapters have identified that neuroticism represents a vulnerability for suicidal ideation, and that it may exert this vulnerability via increasing an individual’s sensitivity to experiencing thwarted belongingness and perceived burdensomeness. Moreover, we identified that neuroticism also had a relationship with suicidal action, but that this association was moderated by the acquired capability for suicide. As such, high neuroticism alone will increase the risk for experiencing suicidal desire, but will only increase the risk for suicidal action when paired with a simultaneously high acquired capability for suicide. Thus, the previous three studies present evidence that individual differences in personality can interact with interpersonal triggers to influence suicidality at the level of both suicide ideation and suicidal actions.

Individual differences in personality are thought to result from both genetic variation, as well as environmental influence. In particular, personality traits have been shown to be affected by an individual’s early experiences of significant relationships. For example, the personality characteristic of neuroticism may develop as a result of early environmental factors such as inadequate, inconsistent or abusive parenting (Bowlby, 1940). Attachment theory proposes that a person’s early interactions with their primary caregivers will determine their internal working models and expectations for future relationships throughout their lifespan (Bowlby, 1940; Bowlby, 1969). These attachment styles encompass one’s capacity for intimacy as well as perceptions of self-worth. Secure attachment is associated with healthy capacity for intimacy and closeness in relationships, and a positive perception of one’s own self-worth (Cassidy
& Shaver, 2008). In contrast, insecure attachment is associated with interpersonal difficulties and maladaptive self-perceptions (Swanson & Mallinckrodt, 2001).

As well as being linked to interpersonal deficits, insecure adult attachment is also linked to higher likelihood of suicide ideation and attempts (de Jong, 1992; Lessard M. A & Moretti, 1998; Özer et al., 2015; Palitsky et al., 2013; Stepp et al., 2008). However, the mechanisms through which insecure attachment exerts its effect on suicidality are unclear. Given that insecure adult attachment styles are associated with both increased suicidality, as well as a pattern of relationship difficulties and dissatisfaction, it is possible that insecure attachment may confer risk for suicide via the interpersonal mechanisms proposed by the ITS: thwarted belongingness and perceived burdensomeness. Recent studies find that the association between insecure adult attachment and suicide risk is mediated by interpersonal deficits (Stepp et al., 2008), but no study yet has considered how insecure attachment may influence reactivity to the proposed causal antecedents of suicide as proposed by the ITS. The following chapter will investigate adult attachment styles and how these may confer risk or resilience with respect to the causal antecedents of suicidal ideation identified by the ITS.
Chapter 8.

STUDY 4: ADULT ATTACHMENT AND INTERPERSONAL RISK FACTORS FOR SUICIDE: DO ALL INSECURE ATTACHMENT STYLES CONFER VULNERABILITY?
Abstract

Objectives:
This study sought to investigate how individual adult attachment styles may be differentially associated with risk or resilience for experiencing the interpersonal antecedents for suicide proposed by the interpersonal theory of suicide.

Method:
Undergraduate students (N=135, 85 females) were screened and selected on the basis of their adult attachment style. This produced three groups; secure attachment, dismissive-avoidant attachment, and fearful-avoidant attachment. These groups were compared using self-report questionnaire measures of suicide risk, as well as performance on an experimental task intended to manipulate participants’ experience of thwarted belongingness and perceived burdensomeness.

Results:
Fearful-avoidant attachment was associated with reduced desire to persist with the task. No differences in desire to persist were found between the dismissive-avoidant and secure groups, indicating that individuals with a dismissive-avoidant attachment style may exhibit the same protective factors as securely attached individuals.

Conclusions:
The current study suggests that fearful avoidant insecure attachment is associated with vulnerability to interpersonal risk factors for suicide. In contrast, a dismissive avoidant insecure attachment style protects against the deleterious effects of unmet interpersonal needs. This may be because the individual’s needs to belong and contribute are dismissed as irrelevant, which is the core feature of a dismissive-avoidant attachment style that emphasises self-reliance and independence from affirmation by others. This has implications for assessing suicide risk and suggests that not all insecure attachment styles are equally problematic.
Adult Attachment and Interpersonal Risk Factors for Suicide: Does Insecure Attachment Always Confer Vulnerability?

Insecure adult attachment is typically linked to higher rates of suicide ideation and attempts (de Jong, 1992; Lessard M. A & Moretti, 1998; Özer et al., 2015; Palitsky et al., 2013; Stepp et al., 2008). The relationship between insecure adult attachment and suicide risk may be mediated by interpersonal deficits (Gallo et al., 2003; Stepp et al., 2008), however, not all insecure attachment characteristics are equally problematic in conferring risk for suicide; with some characteristics having protective properties (Stepp et al., 2008). No study yet has considered specific adult attachment styles as they relate to interpersonal risk factors for suicide. It is possible that certain attachment styles may differentially confer vulnerability or resilience for experiencing the interpersonal risk factors proposed by the ITS to increase suicidal desire (Joiner, 2005; Van Orden et al., 2010).

Adult Attachment

Adult attachment styles are thought to develop in response to early interactions and experiences with caregivers. These experiences shape an individual’s internal working model of self-perception and relationships (Bowlby, 1969; Mikulincer & Shaver, 2007). While attachment is formed during childhood, it continues to influence an individual’s relationship behaviours across their lifespan, and shape their thoughts and feelings about themselves and others (Cassidy & Shaver, 2008). In this way, children who experience warm and consistent parenting develop a secure attachment style, and a healthy capacity for intimacy in adulthood (Swanson & Mallinckrodt, 2001). In contrast, children who experience inadequate, inconsistent or abusive parenting will likely develop an insecure attachment style and be more prone to
relationship difficulties in later life (Swanson & Mallinckrodt, 2001). Adult attachment styles are proposed to result from individual variation across two orthogonal dimensions; anxiety and avoidance (Brennan, Clark, & Shaver, 1998). These dimensions may be conceptualised as internal working models for perceiving the self and others respectively. Thus, individuals with high levels of anxious attachment tend to hold negative perceptions of self and are likely to anticipate rejection and abandonment (Mikulincer, 1995). In contrast, high levels of avoidance are associated with a negative perception of others and reluctance to seek out intimacy and closeness (Mikulincer & Shaver, 2007).

Variation along these two dimensions produces four attachment styles (Bartholomew & Horowitz, 1991). Individuals with a secure attachment have low anxiety and avoidance (Feeney & Noller, 1990). They have positive perceptions of themselves and others and are able to balance the need for independence and intimacy in their relationships. In contrast, those with a fearful-avoidant attachment style score highly on the anxiety dimension, perceiving themselves as unworthy and unlovable, and anticipate rejection from others (Collins & Read, 1990). Fearful-avoidant individuals also score highly on the avoidance dimension, perceiving others as unsafe and rejecting. Thirdly, individuals with a dismissive-avoidant attachment style also score highly on the avoidance dimension, perceiving others as threatening and experiencing discomfort in relationships. However, unlike fearful-avoidant individuals, those with a dismissive-avoidant attachment style score low on the anxiety dimension and exhibit high levels of self-worth. These people tend to be dismissing of the need for relationships, valuing independence and self-reliance (Feeney & Noller, 1990). Finally, those in the preoccupied category have high anxiety paired with low avoidance. These individuals crave proximity and intimacy. However, due to their poor perception of self they often
fear abandonment and rejection, and report that their partners are unable to fulfil their
need for closeness (Collins & Feeney, 2004).

**Adult Attachment and Suicide**

Secure attachment is associated with psychological resilience (Florian, Mikulincer, & Bucholtz, 1995), while insecure attachment has been linked to various psychopathology including depression in adolescents (Allen, Moore, Kuperminc, & Bell, 1998; Armsden, McCauley, Greenberg, Burke, & Mitchell, 1990) and adults (Conradi & de Jonge, 2009), anxiety (Enns, Cox, & Clara, 2002; Papini & Roggman, 1992), substance abuse (Enns et al., 2002; Torresani, Favaretto, & Zimmermann, 2000), deficits in problem solving (Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1993), and suicide risk (Grunebaum et al., 2010; Levi-Belz, Gvion, Horesh, & Apter, 2013; Palitsky et al., 2013). Insecure attachment is also associated with greater reactivity to stressful circumstances, corresponding to higher levels of distress (Mikulincer & Florian, 1998). Further, insecurely attached individuals have higher rates of suicidal ideation and behaviour including non-suicidal self-injury (NSSI) and suicide attempts (de Jong, 1992; Lessard M. A & Moretti, 1998; Özer et al., 2015; Palitsky et al., 2013; Stepp et al., 2008).

**Adult Attachment and Interpersonal Deficits**

There is evidence to suggest that interpersonal difficulties may mediate the relationship between insecure attachment and suicide risk (Stepp et al., 2008). In this study, higher scores on the anxiety attachment dimension were associated with increased interpersonal sensitivity, interpersonal aggression, and lack of sociability, which in turn was associated with higher rates of suicide-related behaviours. Additionally, in a psychiatric sample, interpersonal influences were cited by 61% of
patients as reasons for engaging in self-harm and 45% of patients as reasons for attempting suicide (Brown, Comtois, & Linehan, 2002). Furthermore, deficits in interpersonal problem solving discriminate between suicidal and non-suicidal individuals (Howat & Davidson, 2002; Kehrer & Linehan, 1996). The interpersonal theory of suicide (ITS) posits that thwarted belongingness and perceived burdensomeness are the two key interpersonal variables that are causal and proximal antecedents to suicidal desire (Joiner, 2005). Thwarted belongingness describes feelings of alienation, loneliness and disconnection from significant social networks, and perceived burdensomeness encompasses feelings of guilt, inadequacy and the belief that one is a burden on family and friends. Importantly, the theory proposes that suicidal desire will not progress to suicidal action unless a third factor, the acquired capability for suicide, is also present.

Whilst there is evidence that both anxiety and avoidance attachment dimensions are related to suicide risk and interpersonal adversity (Levi-Belz et al., 2013; Lizadi et al., 2011; Palitsky et al., 2013; Stepp et al., 2008), the literature has not yet considered how specific insecure attachment styles may experience differing levels of vulnerability for suicide. Neither has it investigated the relationship between specific insecure attachment styles and the interpersonal antecedents of suicide risk proposed by the interpersonal theory of suicide: perceived burdensomeness and thwarted belongingness (Van Orden et al., 2010). However, studies have shown that variation along the dimensions of attachment may be differentially associated with interpersonal deficits (Gallo et al., 2003) and capacity to cope with stressful events (Mikulincer & Florian, 1995; Mikulincer & Florian, 1998). For example, Mallinckrodt and Wei (2005) found that individuals with high levels of attachment anxiety tend to feel less social self-efficacy, which leads to a reduction in perceived social support. For this reason, we may
expect attachment styles associated with high anxiety to be associated with higher levels of the interpersonal risk factors for suicide. More, specifically, Erozkan (2011) has demonstrated that fearful-avoidant attachment is a predictor of loneliness, which may facilitate increased thwarted belongingness. Further, fearful-avoidant individuals report lower levels of perceived competence and global self-esteem than do secure or dismissive individuals (Bylsma, Cozzarelli, & Sumer, 1997) which may increase their vulnerability for experiencing perceived burdensomeness. Thus, fearful-avoidant individuals’ sensitivity to rejection and low perception of self may make them vulnerable to experiencing the interpersonal precursors for suicide.

In contrast, there is evidence to suggest that a dismissive-avoidant attachment style may confer resilience to interpersonal adversity. For example, high avoidance scores are associated with reduced interpersonal sensitivity, and diminished need for social approval, corresponding to decreased risk for self-injury (Stepp et al., 2008). More specifically, dismissive-avoidant individuals report significantly lower aversion to aloneness (Goossens, Marcoen, van Hees, & van de Woestijne, 1998) and a lower incidence of self-disclosure and support seeking (Florian et al., 1995; Mikulincer & Nachshon, 1991) than securely attached individuals. The dismissive-avoidant attachment style may buffer these individuals against experiencing thwarted belongingness. Furthermore, dismissive-avoidant individuals report levels of self-esteem and competence at a level equivalent to securely attached individuals (Erozkan, 2011) and therefore they may be protected from the deleterious effects of perceived burdensomeness. Consistent with this, Mikulincer and Florian (1995) have shown that dismissive-avoidant individuals do not differ from securely attached individuals in their perception of their capacity to cope with stressful situations. In this way, dismissive-avoidant individuals’ high perception of self, paired with a diminished need for
acceptance by others may make them resilient to the interpersonal precursors for suicide proposed by the ITS, and thus correspond to lower risk for suicide.

Finally, given adult attachment styles are likely more proximal to the ITS precursors for suicidal desire, and distinct from the capability to act upon this desire, it is expected that the groups will not differ on levels of acquired capability. The acquired capability for suicide is unrelated to interpersonal difficulties, and perceptions of acceptance and rejection by others, and thus is not predicted by theory to be moderated by attachment style.

**The Current Study**

The present study aimed to examine three adult attachment groups (secure, fearful-avoidant, and dismissive-avoidant) on questionnaire measures of suicide risk (suicidal ideation, suicide attempts, and suicide intention), and measures of the three antecedents for suicide proposed by ITS (thwarted belongingness, perceived burdensomeness, acquired capability; Van Orden et al., 2010). In addition, an experimental task; The Interpersonal Persistence Task (Collins, 2016), was used to investigate whether adult attachment styles are associated with different levels of sensitivity to the experimental induction of perceived burdensomeness and thwarted belongingness. This task aims to induce the proximal causal risk factors for suicidal desire proposed by the interpersonal theory of suicide, in order to observe the effects on participants’ desire to persist with the task. It has been suggested that the desire to persist or escape in the face of interpersonal hardship, although clearly not equivalent to the desire to persist or escape from life, is a potential antecedent to suicide risk. For example, Deci and Ryan (2000) argue that thwarting an individual’s needs for connectedness and contribution will lead to a reduction in motivation, energy, and
persistence in goal-directed activities. Interference with these fundamental needs has been shown to be associated with adverse outcomes in health and wellbeing and to motivate suicidality (Tucker & Wingate, 2014; Twenge, Catanese, & Baumeister, 2002; Van Orden et al., 2010). In this way, the task permits safe exploration of the putative causal risk factors for suicidal desire. Further, the task allows examination of how insecure attachment styles may confer vulnerability or resilience to suicidality via their relationship with these interpersonal risk factors.

It was hypothesized that, relative to the secure attachment group, individuals with a fearful-avoidant attachment style would experience higher levels of the interpersonal precursors for suicidal ideation, perceived burdensomeness and thwarted belongingness and higher scores on the measures of suicide risk. Similarly, fearful-avoidant individuals were expected to exhibit increased reactivity to the experimental induction of interpersonal adversity and would report a greater desire to withdraw than the securely attached individuals.

In contrast, it is expected that dismissive-avoidant individual’s lack of interpersonal sensitivity and high self-esteem may have a protective effect. These individuals are not expected to differ from the securely attached group in terms of their levels of perceived burdensomeness and thwarted belongingness, suicide risk or desire to withdraw from the Interpersonal Persistence Task.

Method

Participants

An adult attachment style screening measure (The Experiences in Close Relationships- Revised Scale; ECR-RS; Fraley, Heffernan, Vicary, & Brumbaugh, 2011) was administered to all first-year undergraduate students enrolled in an
introductory psychology unit. Participants \((N = 135)\) aged 17 to 44 years \((M = 20.40, SD = 5.03; \text{Female} = 85)\) were selected to form three groups: secure \((N = 42)\), dismissive-avoidant \((N = 43)\), and fearful-avoidant \((N = 50)\). Participants from each attachment group were randomly allocated to participate in either a high perceived burdensomeness-thwarted belongingness condition (high PB-TB), or a low perceived burdensomeness-thwarted belongingness condition (low PB-TB). Participants received partial course credit points in exchange for their participation. The study was approved by the UWA Human Research Ethics Committee and all participants provided written informed consent.

**Experimental Task**

**The Interpersonal Persistence Task.** The persistence task is presented to participants as a three-player teamwork tasks requiring them to indicate using the keypad, whether shapes (i.e., Ý and Ü) presented in random locations on the screen are a match or a mismatch. Participants are told that they are playing with two other team members, one of whom they could see being seated in a testing room adjacent to theirs, and another supposedly down the hall in a separate room. The ‘teammate’ in plain sight, was either another participant scheduled to participate at the same time, or a confederate. Participants are told that they must respond as quickly and accurately as possible in order to score points as an individual, which will contribute to their team’s score, with the goal of beating a target score. Participants were required to complete six sets of 15 trials (a total of 90 trials across the task), with each set comprising of three rounds of five trials. At the end of each of these six sets, a score summary table is displayed and participants are invited to type and send a short feedback message to each of their teammates. In turn they receive a message from each teammate.
In reality, both the score table presented to participants, and the messages they receive, are computer generated with the intention of manipulating levels of perceived burdensomeness and thwarted belongingness to investigate participants’ desire to persist with, or withdraw from, the game. In this way, the feedback and score tables are adjusted such that participants are allocated to one of two conditions: a high PB-TB condition or a low PB-TB condition.

**Burdensomeness Manipulation.** To manipulate the participants’ experience of perceived burdensomeness the score summary table was altered. At the end of each of the six sets a score summary table was displayed detailing the participant’s individual score, their teammate’s individual score, the team’s total score, as well as the target score they were aiming to beat. The target score was presented to participants as an average of ‘previous team scores’ achieved at the same point in the game and participants were informed at the beginning of the task that, as a team, they were to attempt to beat this score. These scores were manipulated according to odds rations in order to evoke feelings of perceived burdensomeness. Individuals in the high PB-TB condition were shown scores reflecting a success rate of 40%. Thus, these participants consistently scored lower than their teammates, and their team failed to successfully beat the target score. In this way, these participants are not able to effectively contribute to their team’s overall performance, contributing to feelings of burdensomeness. In contrast, individuals in the low PB-TB condition were shown scores reflecting a success rate of 60%. Thus, these participants scored consistently higher than their teammates, and were successful in meeting the target score, thus inducing feelings of contribution and competence.

**Belongingness Manipulation.** To manipulate the participants’ experience of thwarted belongingness, the interpersonal feedback they received from their teammates
was utilised. At the end of each of the six sets of 15 trials participants were asked to type and send a short message to each of their ‘teammates’, after which, they were presented with messages from their teammates, displayed on their screens. Participants in the high PB-TB condition received negative, critical interpersonal feedback (e.g., ‘try a bit harder next time’). These messages became increasingly critical as the game progressed (e.g., ‘are you even hitting the right keys!?!’). It was anticipated that the negative, critical interpersonal feedback would be associated with diminished feelings of belongingness to the team. In contrast, participants in the low PB-TB condition received more supportive, encouraging messages (e.g., ‘good job, keep going like that’), which were expected to evoke feelings of connectedness and inclusion with their teammates.

**Task Performance Ratings.** After the score summary and feedback components of the task were complete, participants were required to answer additional questions after each feedback interval. These questions assessed participants’ feelings of belongingness, burdensomeness and desire to withdraw from the game. The first question measured the extent of the participants’ feelings of belongingness by asking them to indicate on a 7 point Likert scale the extent to which they felt accepted or excluded by their team, ranging from feeling like an outsider (0) to feeling like they belonged (6). The second question measured the extent to which participants felt like a burden on the team, with responses ranging from 0 (an asset to the team) to 6 (a burden on the team). The final question was designed to measure participants’ desire to persist with the task, asking ‘If I had the option, I would rather drop out of the game.’ with responses ranging from 0 (not at all true for me) to 6 (very true for me).
Two additional statements designed to assess interest (*I found the task interesting*), and effort (*I made an effort to do well on the task*), in the game were presented after the last interval, with responses again ranging from 0 (*not at all true for me*) to 6 (*very true for me*). These statements were used to assess the degree to which the participant was engaging, and putting forth their best effort in the task. These items were presented only once, at the conclusion of the task.

Finally, at the conclusion of the experiment, participants were required to answer three experiment feedback questions: “*Do you have any comments about the experiment?*”, “*Did you consider some of the procedures strange?*”, and “*Did you wonder what we were really studying?*” These questions were designed to ascertain whether any participants suspected that they had not been playing with other individuals.

**Questionnaire Measures**

A questionnaire battery was presented on-screen after completion of the persistence task. The following questionnaires were completed:

**Experiences in Close Relationships – Relationship Structures** (ECR-RS; Fraley et al., 2011). The 9-item ECR-RS measures an individual’s general adult attachment style on two dimensions, anxiety (e.g., *“I often worry that other people do not really care for me”*) and avoidance (e.g. *“I don’t feel comfortable opening up to others”*). Participants indicate their response using a 7 point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale has good psychometric properties (Fraley et al., 2011). In the current sample internal consistency was adequate for the anxiety scale (*α = 0.89*) and for the avoidance scale (*α = 0.90*).
Interpersonal Needs Questionnaire (INQ-15; Van Orden et al., 2012). The 15-item INQ assesses perceived burdensomeness (e.g., “I think I make things worse for the people in my life”) and thwarted belongingness (e.g., “I feel disconnected from other people”). Participants indicate their response on a 7 point Likert scale ranging from 0 (not at all true for me) to 6 (very true for me). The scale has been well validated (Van Orden et al., 2012). Internal consistency in the current sample was adequate for both the belongingness ($\alpha = 0.91$) and burdensomeness ($\alpha = 0.93$) subscales.

Suicidal Ideation and Behaviour. Three items from the Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock et al., 2007) were administered, “How many times in the past year have you thought about suicide?”, indicating suicidal ideation, “How many times in your lifetime have you made an actual attempt to kill yourself in which you had at least some intent to die?”, indicating suicide attempt, and “How many times in your lifetime have you purposely attempted to hurt yourself without wanting to die?” indicating non-suicidal self-injury (NSSI). Responses for suicidal ideation ranged from 1 (never) to 6 (almost every day), and for suicide attempt and NSSI from 1 (never) to 5 (five or more times). The self-report version of the SITBI has been found to have strong inter-rater reliability, test-retest reliability, and concurrent validity (Nock et al., 2007).

Acquired Capability with Rehearsal for Suicide Scale (ACWRSS; George et al., 2016). The seven-item ACWRSS was used to measure an individual’s capability to engage in suicidal behaviour by assessing fear of death, pain tolerance, and mental and psychological preparedness. Participants respond to statements (e.g., Picturing my own death is a very scary thing for me.) indicating the degree to which they agreed with the statement, ranging from 0 ‘Not at all’ to 8 ‘Very strongly’, with two items reverse scored for polarity. High scores indicate a higher capability to enact suicidal behaviour.
The scale has demonstrated validity in cross-sectional and prospective studies (George et al., 2016). Internal consistency in the current sample was good ($\alpha = 0.80$), and convergent validity was sufficient, displaying positive relationships with a number of suicide risk factors (e.g., suicide ideation, suicide attempts, NSSI).

**Kessler Psychological Distress Scale** (K-10; Kessler, Andrews, Colpe, Hiripi, Mroczek, Normand, Walters, & Zaslavsky, 2002). The 10-item K-10 is a brief measure of non-specific psychological distress. Participants respond to indicators of distress (e.g., “About how often do you feel nervous?”) on a 5-point Likert scale, ranging from 1 (None of the time) to 5 (All of the time), with higher scores indicating greater levels of psychological distress (Kessler et al., 2002). The Australian normative bands for the K-10 are: low distress (10-15), moderate distress (16-21), high distress (22-29), and very high distress (30-50) (Cvetkovski, Reavley, & Jorm, 2012). The K-10 has good psychometric properties and internal consistency in the current sample was adequate ($\alpha = 0.91$).

**Intention for suicide.** A single item assessing the participants’ intention for suicide; “I have no intention of killing myself in the near future”, was measured on a 9-point Likert scale with responses ranging from 0 (agree not at all) to 8 (agree very strongly). The intention item was reverse-scored so higher scores suggested greater intention for suicide.

**Procedure**

Each participant was seated in a testing room at a standard desktop computer with another participant (or confederate) visible in an adjacent room, and instructed that the third participant would be playing from a separate laboratory. Participants were briefed jointly and informed consent was obtained. On commencement of the task, each
participant was provided with on-screen instructions detailing how to play the game, followed by a practice round which gave feedback on correct and incorrect responses and familiarised participants with the process of scoring points and providing feedback. At the conclusion of the practice round, a message, “waiting for other players to finish the practice”, was displayed on the screen before commencing the game. The purpose of this message was to maximise plausibility that the participants were playing with real teammates. Upon completing the computer tasks, the electronic battery of questionnaires described in the materials section, was presented. The entire procedure lasted approximately 60 minutes.

Each participant was debriefed individually in another room and informed whether they had been assigned to an advantaged (low PB-TB), or disadvantaged (high PB-TB) condition. A debriefing sheet, including details for crisis and telephone support services, as well as on campus counselling, was provided to each participant.

Results

Screening and participant characteristics

Participants’ scores on the Adult Attachment Measure (ECR-RS; Fraley et al., 2011) at screening and at the time of testing were compared. Nine participants had moved into the preoccupied attachment group, which was not a focus of the current study, and were therefore excluded. Additionally, 14 participants indicated that they were suspicious of their teammates and the nature of the task, suggesting that they may have inferred the purpose of the task. These participants were excluded from additional analysis.

Of the remaining 112 participants, over half (59.82%) of the reported experiencing suicidal ideation within the past year and a fifth (20.54%) reported
experiencing suicidal ideation at least once or twice a month. There were eleven participants (9.82%) who reported at least one lifetime suicide attempt, and 2.68% reported multiple attempts. Additionally, 36.61% of participants indicated that they had engaged in NSSI on at least one occasion in their lifetime, with 10.71% reporting engaging in this behaviour on more than five occasions.

**Questionnaire Measures of Suicide Risk**

It was hypothesised that fearful-avoidant attachment would be associated with higher scores on the questionnaire measures of suicide risk relative to the securely attached group. In contrast, it was hypothesised that dismissive-avoidant attachment would confer resilience and would not differ significantly from the securely attached group. To test these hypotheses, a multivariate analysis of variance was run comparing the three attachment groups.

Questionnaire scores for suicidal ideation, the frequency of previous suicide attempts, the frequency of non-suicidal self-injury and self-reported intention for suicide were the dependent variables of interest in this analysis. However, since this questionnaire data was collected following the completion of the Interpersonal Persistence Task, the experimental task PB-TB condition was also included as an independent variable. By including task condition as an additional between-subjects factor any confounding effects of experimental condition on questionnaire responses were controlled for. Wilk’s statistic indicated that task condition did not exert a significant effect on the dependent variables of interest, $F (4, 103) = .67, p = .62, \eta^2 = .03$. This indicates that the PB-TB condition did not account for significant variance in the questionnaire measures of suicide risk (i.e. participants allocated to the high PB-TB
condition did not differ from those allocated to the low PB-TB condition in their responses to the questionnaire measures of suicide risk).

Wilks’ statistic indicated that there was a significant main effect of attachment style on the questionnaire measures of risk, $F(8, 206) = 5.70, p > .001, \eta^2 = .18$. The descriptive statistics, univariate group effects, and Fisher’s LSD contrasts between the attachment styles are reported in Table 8.1.

There were significant main effects of attachment style on each suicide risk variable (i.e. the frequency of suicidal ideation, suicide attempts and NSSI as well as participants’ current intention for suicide). Follow-up contrasts showed that, consistent with the first hypothesis, the fearful-avoidant group had higher scores on each of the suicide risk variables than the secure attachment group. Also, as predicted, the fearful-avoidant group had higher scores on attempts, NSSI, and intention, than the securely attached group. The dismissive-avoidant group did not significantly differ from the secure control group on these suicide risk indicators (see Table 8.1). The only variable on which scores for the dismissive and secure attachment styles differed significantly was suicidal ideation; with the dismissive group reporting significantly more frequent ideation than the securely attached group. In any case, the fearful attachment style reported significantly greater suicidal ideation than either of the dismissive-avoidant or secure attachment styles.

**Questionnaire Measures of Perceived Burdensomeness and Thwarted Belongingness**

It was hypothesised that relative to the securely attached group, fearful-avoidant attachment would be associated with higher scores on questionnaire measures of the ITS risk factors for suicidal ideation; thwarted belongingness and perceived
burdensomeness. In comparison, it was hypothesised that dismissive-avoidant attachment would confer resilience and that this group would not differ significantly from the securely attached group. To test these hypotheses, a second multivariate analysis of variance was run comparing the three attachment groups. In this analysis, self-reported perceived burdensomeness, thwarted belongingness, and acquired capability scores were the dependent variables.

General psychological distress was analysed using scores on the K-10 and it was found that the three attachment styles differed significantly in their experience of non-specific distress, $F(2,111) = 36.29, p < .001, \eta^2 = .40$. The secure attachment group reported scores at the low end of the “moderate distress” range ($M = 16.70, SD = 3.95$), while the dismissive-avoidant group reported scores at the high end of the “moderate distress” range ($M = 21.27, SD = 6.73$), and the fearful-avoidant group reported scores at the high end of the “high distress” range ($M = 29.14, SD = 7.56$). Further, K10 scores and task condition were included as independent variables to assess whether distress or task condition had any confounding influence on participants' reports of thwarted belongingness and perceived burdensomeness. It was discovered that non-specific psychological distress, as measured by K10 scores, was a significant covariate, $F(3,103) = 18.35, p < .001, \eta^2 = .35$. Thus, to control for levels of current psychological distress, K-10 scores were included as a covariate in the analyses. Task condition had no significant effect on the dependent variables of interest (perceived burdensomeness and thwarted belongingness), $F(3,103) = .33, p = .802, \eta^2 = 0.01$, indicating that the task did not influence the participants' responses to the questionnaire battery.

Wilks' statistic suggested a significant effect of attachment style on the three causal risk factors for suicide as proposed by the ITS, $F (6, 206) = 6.26, p < .001, \eta^2 = .15$. As predicted, there were significant main effects of attachment style on both
perceived burdensomeness, $F(2,111) = 8.67, p < .001, \eta^2 = .14$, and thwarted belongingness, $F(2,111) = 12.83, p < .001, \eta^2 = .20$, but not acquired capability, $F(2,111) = 2.74, p = .07, \eta^2 = .05$. The descriptive statistics, group effects and contrasts between the attachment styles for thwarted belongingness and perceived burdensomeness are reported in Table 8.1.

Consistent with the primary hypothesis, individuals with a fearful-avoidant attachment reported significantly higher scores on the interpersonal risk factors for suicidal desire; perceived burdensomeness and thwarted belongingness, than the secure attachment group. Furthermore, as hypothesised, the dismissive-avoidant group was statistically equivalent to the securely attached group on self-reported perceived burdensomeness. The dismissive-avoidant group did report significantly higher thwarted belongingness than the secure group, however, this difference was significantly smaller than the difference between the secure and fearful-avoidant groups. Thus, of the two insecure attachment styles, the fearfully-avoidant individuals report significantly higher levels of the interpersonal risk factors proposed by the ITS, while the dismissive-avoidant individuals appear to be relatively resilient to these.
Table 8.1
Descriptive Statistics, Group Effects, and Contrasts between Attachment Styles for Suicide Risk Variables and the Three Antecedent Risk Variables from the Interpersonal Theory of Suicide

<table>
<thead>
<tr>
<th>Variable</th>
<th>Secure (S)</th>
<th>Dismissive (D)</th>
<th>Fearful (F)</th>
<th>Main Effect</th>
<th>S vs F</th>
<th>D vs F</th>
<th>S vs D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideation</td>
<td>1.36 (0.60)</td>
<td>1.93 (1.05)</td>
<td>2.38 (1.04)</td>
<td>9.52***</td>
<td>.000</td>
<td>.037</td>
<td>.012</td>
</tr>
<tr>
<td>Attempts</td>
<td>1.03 (0.17)</td>
<td>1.07 (0.34)</td>
<td>1.38 (0.68)</td>
<td>7.33***</td>
<td>.000</td>
<td>.001</td>
<td>.758</td>
</tr>
<tr>
<td>NSSI</td>
<td>1.52 (1.12)</td>
<td>1.40 (0.86)</td>
<td>2.76 (1.71)</td>
<td>13.19***</td>
<td>.000</td>
<td>.000</td>
<td>.707</td>
</tr>
<tr>
<td>Intention</td>
<td>0.21 (1.23)</td>
<td>0.48 (1.55)</td>
<td>1.41 (2.07)</td>
<td>4.80**</td>
<td>.004</td>
<td>.016</td>
<td>.500</td>
</tr>
<tr>
<td>TB</td>
<td>1.84 (0.71)</td>
<td>2.96 (1.03)</td>
<td>4.02 (0.99)</td>
<td>12.83***</td>
<td>.000</td>
<td>.008</td>
<td>.001</td>
</tr>
<tr>
<td>PB</td>
<td>1.23 (0.33)</td>
<td>1.67 (0.72)</td>
<td>2.97 (1.12)</td>
<td>8.67***</td>
<td>.001</td>
<td>.000</td>
<td>.770</td>
</tr>
<tr>
<td>AC</td>
<td>1.90 (1.50)</td>
<td>3.22 (1.67)</td>
<td>4.08 (1.62)</td>
<td>2.74</td>
<td>.042</td>
<td>.643</td>
<td>.035</td>
</tr>
</tbody>
</table>

Note. N = 112; Ideation = Suicidal Ideation in the previous year; Attempt = Frequency of lifetime suicide attempts; Intention = Intention for suicide; TB = Thwarted belongingness; PB = Perceived burdensomeness; AC = Acquired capability for suicide. *p < .05. **p < .01. ***p < .001.
Task-Induced Perceived Burdensomeness, Thwarted belongingness, and Desire to Escape.

Finally, it was hypothesised that each attachment style would differentially confer risk or resilience to the experimental induction of thwarted belongingness and perceived burdensomeness, corresponding to differing levels of desire to escape from the task. It was expected that fearful-avoidant individuals would be more vulnerable to the induction and would report higher desire to escape than securely attached individuals. Further, it was expected that the dismissive-avoidant attachment group would be buffered against the induction and would not differ from the secure group in their desire to escape from the task. To test these hypotheses, a 3 (Attachment Style) x 2 (Condition) x 6 (Time Interval) mixed-design ANOVA was conducted for each of the task variables; perceived burdensomeness, thwarted belongingness, and desire to escape. In each analyses the assumption of sphericity was violated so a Huynh-Feldt correction was applied.

**Perceived Burdensomeness**. There was a significant main effect of task condition, $F(1, 106) = 4.84, p = .30, \eta^2_{\text{partial}} = .04$. As expected, participants in the high PB-TB condition reported significantly higher levels of burdensomeness overall than the participants in the low PB-TB condition, indicating that experimental manipulation of burdensomeness was successful (see Figure 8.1). Additionally, there was a significant interaction between time and attachment style, $F(9.28, 491.95) = 1.94, p < .05, \eta^2_{\text{partial}} = .04$. To follow up on this interaction, the effect of time was examined separately for each attachment group. For the securely attached individuals there was a significant main effect of time, $F(4.57, 141.62) = 2.53, p < .05, \eta^2_{\text{partial}} = .08$, whereby burdensomeness increased across trials. For the dismissive individuals there was no significant effect of time, $F(4.36,174.39) = 1.78, p = .13, \eta^2_{\text{partial}} = .042$, indicating that
burdensomeness did not increase over time for these individuals. Finally, for the fearful attachment group there was no significant effect of time, \( F(4.00, 140.10) = 0.35, \ p = .84, \ \eta^{2}_{\text{partial}} = .01 \) where ratings of burdensomeness did not change as a function of time. There were no other significant interactions or main effects with attachment group, suggesting that the groups did not differ in their sensitivity to the induction of perceived burdensomeness.

Figure 8.1. Mean burdensomeness ratings for each attachment style, across the six time intervals; error bars represent standard error.

**Thwarted Belongingness.** There was a significant main effect of task condition, \( F(1, 106) = 7.25, \ p < .01, \ \eta^{2}_{\text{partial}} = .06 \), with participants in the high PB-TB condition reporting significantly lower levels of belongingness than the participants in the low PB-TB condition. Additionally, there was a significant main effect of time, \( F(3.97, 420.64) = 3.53, \ p < .01, \ \eta^{2}_{\text{partial}} = .03 \) whereby ratings of belongingness decreased over time. Contrary to the hypothesis, there were no significant main or interaction effects with attachment group, indicating that the three attachment styles did not differ
significantly in their reactivity to the induction of thwarted belongingness (see Figure 8.2).

![Belongingness ratings for each attachment style](image)

**Figure 8.2.** Mean belongingness ratings for each attachment style, across the six time intervals; error bars represent standard error.

**Desire to Quit.** Once more, there was a significant main effect of condition, $F(1, 106) = 58.60, p < .001, \eta^2_{\text{partial}} = .36$, with participants in the high PB-TB condition reporting a greater desire to quit the task than participants in the low PB-TB condition. There was also a significant effect of time, $F(5, 102) = 6.48, p < .001, \eta^2_{\text{partial}} = .24$, and a Condition x Time interaction, $F(5, 102) = 5.35, p < .001, \eta^2_{\text{partial}} = .21$. In this way, desire to quit the task increased over time in the high PB-TB condition, $F(5, 48) = 8.64, p < .001, \eta^2_{\text{partial}} = .47$, but stayed consistently low in the low PB-TB condition with no significant effect of time, $F(5, 50) = .98, p = .439, \eta^2_{\text{partial}} = .09$.

There was also a significant main effect of attachment group, $F(2, 106) = 3.41, p < .05, \eta^2_{\text{partial}} = .06$, which was qualified by a significant interaction between task
condition and attachment group, $F(2, 106) = 9.60, p < .001, \eta^2_{\text{partial}} = .15$. To investigate this interaction, the effect of attachment group was examined separately for each task condition. In the low PB-TB condition there was a significant main effect of attachment group, $F(2, 54) = 5.18, p = .009, \eta^2_{\text{partial}} = .16$. Similarly, in the high PB-TB condition there was a significant main effect of attachment group, $F(2, 52) = 6.51, p = .003, \eta^2_{\text{partial}} = .20$ (see Figure 8.3).

Figure 8.3. Mean desire to drop out of the task for each attachment style, across the six time intervals; error bars represent standard error.

Consistent with the primary hypothesis, the fearful-avoidant attachment style reported significantly higher desire to drop out of the task relative to the secure ($p = .011$) and dismissive-avoidant ($p = .001$) groups. Furthermore, the secure and dismissive-avoidant attachment groups were statistically equivalent ($p = .379$) in their desire to persist with the task, indicating that the insecure dismissive-avoidant attachment style has a protective effect similar in magnitude to that of the secure attachment style. Both
show increased resilience to the interpersonal adversity induced during the task. Indeed, the dismissive-avoidant group reported the lowest desire to drop out of the task.

**Discussion**

**Adult Attachment and Suicide Risk**

The current study aimed to investigate the relationship between the three selected adult attachment styles (secure, fearful-avoidant, and dismissive-avoidant) on measures of suicidal desire. It was predicted that a fearful-avoidant attachment style would be associated with vulnerability relative to the secure control group on suicide risk variables. This hypothesis was supported, with fearful-avoidant individuals reporting increased suicidal ideation, previous suicide attempts, non-suicidal self-injury, and suicidal intention, relative to individuals with an insecure dismissive-avoidant attachment style or a secure attachment style. Further, it was hypothesised that individuals with a dismissive-avoidant attachment style would be resilient to suicide risk. This hypothesis was also supported with dismissive-avoidant individuals reporting levels of suicide risk that were equivalent to that of the securely attached individuals. Thus, not all insecure attachment styles confer vulnerability; individuals with a dismissive-avoidant attachment style appear to exhibit similar protective factors against suicide risk as individuals with a secure attachment style. This finding is consistent with studies showing that dismissive-avoidant individuals are able to cope with stressful experiences at a level equivalent to their securely attached peers, and superior to individuals with a fearful-avoidant attachment style (Mikulincer & Florian, 1995).

**Adult Attachment, Thwarted Belongingness and Perceived Burdensomeness**

In addition, the current study examined the relationship between the three selected attachment styles and the interpersonal antecedents of suicide risk proposed by
the ITS (Joiner, 2005; Van Orden et al., 2010). It was hypothesised that individuals with a fearful-avoidant attachment style would be more vulnerable to experiencing these interpersonal precursors for suicide and that this would be reflected in higher scores on the Interpersonal Needs Questionnaire thwarted belongingness and perceived burdensomeness subscales. In contrast, it was hypothesised that the dismissive-avoidant attachment group, characterised by a preference for autonomy and self-reliance and high perceptions of their own self-worth, would be buffered against the experience of these interpersonal risk factors.

**Perceived burdensomeness:** As predicted, individuals with a fearful-avoidant attachment style reported higher levels of perceived burdensomeness than individuals with a dismissive-avoidant attachment style and the secure control. This suggests that fearful-avoidant individuals are more susceptible to feelings of burdensomeness and inadequacy. This attachment style is characterised by high anxiety, meaning that fearful-avoidant individuals are sensitive to rejection and have a low perception of their own self-worth (Collins & Read, 1990). This likely explains their elevated scores on the perceived burdensomeness subscale. In contrast, the participants with dismissive-avoidant and secure attachment styles reported statistically equivalent levels of perceived burdensomeness. Both dismissive-avoidant and secure attachment styles are characterised by low scores on the anxiety attachment dimension, meaning they have high opinions of themselves and are not particularly sensitive to rejection (Bartholomew & Horowitz, 1991; Collins & Feeney, 2004). It is likely that this low sensitivity to rejection, paired with a high self-worth buffers both the secure, and dismissive-avoidant attachment groups from experiencing perceived burdensomeness.

**Thwarted Belongingness:** As hypothesised, individuals with a fearful-avoidant attachment style reported significantly higher levels of thwarted belongingness relative
to both the dismissive-avoidant and secure attachment styles. This vulnerability is consistent with the finding that fearful-avoidant individuals are often unsuccessful in close relationships (Collins & Feeney, 2004). Furthermore, (Erozkan, 2011) has shown that loneliness, which is a key facet of thwarted belongingness, is significantly and positively predicted by a fearful-avoidant attachment style. Similarly, participants with a dismissive-avoidant attachment style also reported increased thwarted belongingness relative to the securely attached group, though this difference was smaller than the difference between the secure and fearful-avoidant groups. The finding that both insecure attachment styles report reduced belongingness suggests that the commonality between the dismissive and fearful attachment styles (i.e., high levels of avoidance) is associated with increased thwarted belongingness relative to securely attached individuals. This is consistent with literature linking high scores on the avoidance dimension to feelings of loneliness and social isolation (Erozkan, 2011).

Interestingly, despite both insecure attachment styles sharing the characteristic of high avoidance, the fearful avoidant individuals were particularly vulnerable to experiencing perceived burdensomeness relative to the dismissive-avoidant individuals. This disparity may be explained by the finding that the anxiety and avoidance dimensions relationships with loneliness are mediated by different factors (Wei, Russell, & Zakalik, 2005). High levels of anxiety were found to be associated with low social self-efficacy, which in turn increased loneliness, while high levels of avoidance contributed to diminished self-disclosure (Mikulincer & Nachshon, 1991), and reduced support seeking (Florian et al., 1995) prompting reduced capacity for connection and belonging. In contrast, high levels of avoidance in the absence of high anxiety was associated with compulsive self-reliance and a high perception of social self-efficacy. Thus, the fearful avoidant individual, with both high anxiety and avoidance, will likely
be vulnerable to both the social self-efficacy and diminished self-disclosure mediating pathways to loneliness. A dismissive avoidant individual may be vulnerable to the diminished self-disclosure pathway, but buffered against the social self-efficacy pathway. The differing levels of risk associated with the insecure attachment styles, are congruent with the explanation that a fearful-avoidant attachment style is characterized by a conscious desire for social contact which is inhibited by fears of its consequences, while a dismissive-avoidant attachment style is characterized by a defensive denial of the desire for closeness and intimacy (Bartholomew, 1990). Bartholomew (1990) propose that the distinction between the two styles is the differing perceptions of self (i.e. the anxiety dimension). In this way, people who fearfully avoid intimacy view themselves as undeserving of the love and support of others, and people who dismiss intimacy possess a positive model of the self which permits the minimization of the subjective awareness of distress or social needs.

**Attachment Styles and Reactivity to the Experimental Manipulation**

The current study also compared the three attachment styles with respect to reactivity to the induction of the interpersonal antecedents of suicide risk using an experimental paradigm. Similarly to the pattern of the questionnaire data, and as predicted, participants with a fearful-avoidant attachment style had a greater desire to drop out of the task when confronted with the induction of thwarted belongingness and perceived burdensomeness, when compared to participants with a dismissive-avoidant attachment style. Thus, the insecure attachment styles are not equally vulnerable to the induction. That is, fearfully attached individuals reported greater desire to escape situations where they feel like they do not belong, or perceive that they are a burden, than do those with an insecure dismissive-avoidant attachment style. The experimental task findings are consistent with the questionnaire data, which also suggests that
individuals with a fearful-avoidant attachment style may be at greater risk for suicidal desire when experiencing interpersonal adversity as assessed by the Interpersonal Needs Questionnaire (Van Orden et al., 2012).

There was no significant effect of attachment style on participant’s ratings of thwarted belongingness and perceived burdensomeness in the Interpersonal Persistence Task. This raises a potential concern since it is not possible to determine with certainty whether the increased desire to drop out of the task associated with a fearful-avoidant attachment style is attributable to increased reactivity to the ITS risk factors of thwarted belongingness and perceived burdensomeness. Thus, a critic may argue that the differences in persistence are attributable to differing reactivity to negative feedback or stimuli more generally, as opposed to vulnerability to the interpersonal risk factors for suicide specifically. However, the Interpersonal Persistence Task was designed to ensure the manipulation of thwarted belongingness and perceived burdensomeness exert their adverse effects on persistence due to their interpersonal nature. A recent test of the task demonstrated that the use of interpersonal feedback which targets thwarted belongingness and perceived burdensomeness is significantly more detrimental to the desire to persist than intra-personal feedback in which negative feedback occurs in a competitive rather interpersonally collaborative context (George et al., 2017). Further, the pattern of results for desire to drop out of the task very closely mirror the questionnaire ratings of thwarted belongingness, perceived burdensomeness and other questionnaire measures of risk. Thus, it is reasonable to conclude that the reduction in persistence in the task evident for the fearful-avoidant group, and the resilience displayed by the dismissive-avoidant group, is a result of differing sensitivity to the interpersonal risk factors for suicide proposed by the ITS.
Interestingly, participants with a dismissive-avoidant attachment style were statistically equivalent to the securely attached control participants in their reactivity to experimentally induced interpersonal adversity. In fact, at several time-points these individuals reported a lower desire to quit the task than even the securely attached controls. Thus, dismissive-avoidant attachment may confer resilience to the experimental manipulation of thwarted belongingness and perceived burdensomeness, corresponding to a reduction in desire to drop out of the task. We speculate that individuals with a dismissive-avoidant attachment style, who value autonomy and self-reliance, may feel the least need to belong. Furthermore, the dismissive characteristic of a positive self-perception likely protects them from experiencing feelings of burdensomeness, potentially explaining why these individuals reported the lowest desire to quit the task. Indeed, it appears that having an insecure dismissive-avoidant attachment style may act as a protective factor against interpersonal suicidal antecedents in much the same manner as being securely attached does. As the similarity between dismissive-avoidant and secure attachment styles is the high levels of self-esteem and self-worth exhibited by these individuals (Bartholomew & Horowitz, 1991), it appears that low levels of interpersonal anxiety acts as a protective factor against suicidal desire. The vulnerability conferred by elevated anxiety in the current study is consistent with the finding that high scores on the anxiety attachment dimension correspond to increased interpersonal sensitivity and higher rates of suicide behaviours (Stepp et al., 2008), as well as reduced perceptions of social competence and support (Mallinckrodt & Wei, 2005).

Limitations

The current study did not select or test individuals in the preoccupied adult attachment group. Therefore, we cannot definitively conclude that all attachment styles
high on the dimension of anxiety are at a greater risk for suicidal desire. It is possible that the preoccupied attachment style’s characteristics of high relationship anxiety, in the absence of avoidance would be associated with increased vulnerability due to a low sense of self, or sense of self that is heavily dependent on approval from others. Though perhaps to a lesser extent than when paired with concurrently high avoidance as in the fearful avoidant individuals, since these individuals will still be able to seek out and access support and experience closeness and intimacy in their relationships (Collins & Feeney, 2004). Further clarification of the relationship between pre-occupied adult attachment and the interpersonal risk factors for suicide would be an interesting avenue for future research.

**Clinical Implications**

The current study suggests that insecure attachment styles should be considered differently when assessing suicide risk. Since both the fearful-avoidant and dismissive-avoidant styles share the characteristic of elevations on the avoidance continuum, we cannot conclusively state that avoidance increases the risk of suicide, unless paired with concurrently high anxiety. Conversely, elevated avoidance in the absence of anxiety (i.e., the dismissive style) appears to confer resilience. The potential buffering effect of a dismissive-avoidant attachment style has implications for approaching assessment and intervention. Clinician’s should be mindful of their clients dispositional vulnerabilities (or strengths) and how these may interact with situational triggers of thwarted belongingness and perceived burdensomeness to influence suicide risk. The results of the current study suggest that fearful-avoidant individuals may be especially vulnerable to the experience of thwarted belongingness and perceived burdensomeness. Thus, experiences which trigger these states, such as loss of employment, financial instability, relationship breakdown, loss or rejection may be particularly pernicious for individuals
with a fearful-avoidant attachment style. In contrast, dismissive-avoidant individuals may be resilient to these experiences.

Encouragingly, there is evidence that adult attachment styles represent a pattern of relationships and interactions that are flexible and susceptible to change (Mikulincer & Shaver, 2007). Amongst adult studies, approximately 30% of participants are found to have changed their self-reported attachment style if re-assessed at a later point in time (Baldwin & Fehr, 1995; Davila, Burge, & Hammen, 1997; Ruvolo, Fabin, & Ruvolo, 2001). Further, attachment theory is now used explicitly to inform interventions in individual (Fosha, 2000; Obegi & Berant, 2010) and group therapy (Marmarosh, Markin, & Spiegel, 2013). In particular, Johnson (2009) identifies emotion focussed therapy (EFT) as a promising approach to addressing attachment related dysfunction in adults. Thus, it may be possible to therapeutically ameliorate the risk conferred by fearful-avoidant attachment style.

In conclusion, the current study illustrates that there are significant differences between the way that two insecure attachment styles, fearful-avoidant and dismissive-avoidant, respond to the suicidal antecedents of thwarted belongingness and perceived burdensomeness. The current study demonstrates that fearful-avoidant attachment is associated with increased reactivity to these interpersonal antecedents as evidenced by both questionnaire measures as well as an experimental induction. In contrast, dismissive-avoidant attachment is associated with resilience equivalent to that of securely attached individuals. Thus, it is not specific or sufficient to say that insecure attachment confers risk, since dismissive-avoidant attachment appears to confer resilience. As both styles share similar elevations on the avoidance continuum, we cannot conclude that avoidant behaviours increase the risk of suicide. Our results suggest that avoidance and alienation will only confer risk when paired with
concurrently high sensitivity to acceptance and rejection, that is, when interpersonal anxiety is high. The discovery of a differential relationship between the dimensions of attachment and risk has implications for assessing and identifying at risk individuals. The inclusion of a 9-item adult attachment measure such as the Experiences in Close Relationships – Relationship Structures (Fraley et al., 2011) may assist in identifying individuals with a temperamental vulnerability for experiencing the causal interpersonal risk factors for suicide; thus potentially permitting early intervention. The current study also has implications for improving suicide theory by considering how individual differences such as attachment, interact with proximal and dynamic risk factors to predict suicidality.
Chapter 9.

GENERAL DISCUSSION.
General Discussion

This dissertation sought to address four identified opportunities to complement the existing research in suicide. Specifically, there are opportunities for (i) theory-based research to (ii) consider dispositional factors and situational triggers in a way that (iii) distinguishes between suicide ideators and suicide attempters, and (iv) establishes evidence of causal relationships. The current research program adds to our existing understanding of suicide by speaking to these four identified opportunities. Four studies used experimental and questionnaire methodologies to explore the relationship between dispositional vulnerabilities, neuroticism and insecure adult attachment, and the causal triggers for suicidal desire and action proposed by the ITS. The findings of these studies have implications for improving suicide theory, advancing the accuracy and specificity of risk assessment in clinical practice, and targeting prevention and intervention efforts.

Suicide Risk: An Interaction of Trait Vulnerabilities and Temporal Triggers

The current research aimed to investigate the interaction between underlying individual vulnerabilities and situational triggers in predicting suicide risk. Suicide research has identified numerous temperamental risk factors. These risk factors typically reflect a chronic but not necessarily imminent risk for suicidal ideations or actions. Thus, the practical utility of such a comprehensive list is limited. The interpersonal theory of suicide proposes three proximal causal triggers which together indicate imminent risk for suicidal desire and behaviour. However, the theory does not consider whether dispositional characteristics may influence a person’s susceptibility to these triggers. Thus, the current study selected two well established dispositional risk factors for suicide, neuroticism and insecure adult attachment, and aimed to integrate them into a coherent overarching model of suicidal behaviour. Doing so allows us to identify the circumstances under which these distal trait risk factors will interact with
proximal triggers to increase risk for suicide. It was anticipated that these dispositional factors would confer vulnerability to interpersonal triggers of suicidal desire and suicidal behaviours. By considering the interaction to between underlying vulnerabilities and temporal triggers, we can potentially improve the accuracy and specificity with which we can predict who is at risk for suicide, and identify which factors might be causally associated with this increased risk.

We have identified that neuroticism and fearful avoidant attachment styles are associated with a trait vulnerability for suicidal desire, and that the expression of this vulnerability is triggered by the interpersonal risk factors of thwarted belongingness and perceived burdensomeness. In keeping with this, it was found that high neuroticism (Studies 1 and 2) and fearful-avoidant adult attachment (Study 4) do interact with the ITS proximal triggers for suicidal desire thereby increasing desire to escape through a reduction in persistence. Thus, studies 1, 2, and 4 have implications for considering both the characteristics of the individual, as well as situational factors when assessing clients risk for developing suicidal desire. Clinicians may wish to formally assess the dispositional personality and attachment characteristics of their clients, and be mindful of how these will increase their reactivity to situational triggers of burdensomeness (e.g., unemployment, financial difficulty, chronic illness) or threats to belonging (e.g., relationship breakdown, loss, social alienation, exclusion or interpersonal conflict).

The findings of these studies suggest that dispositional personality and attachment traits interact with proximal interpersonal triggers for suicide. Via this means, increased trait reactivity to thwarted belongingness and perceived burdensomeness represents one potential mechanism through which neuroticism and fearful-avoidant attachment may increase suicide risk. This is consistent with Sveticic and De Leo (2012) who propose that distal risk factors, such as personality, reduce an
individual’s threshold for experiencing suicidal desire, by making them more vulnerable to the experience of proximal triggers for suicide. They suggest that the cumulative burden of dispositional and situational risk factors is likely to be more predictive of risk than individual, specific risk factors. Our findings are consistent with the idea of a cumulative burden representing the most pernicious risk for suicide. The simultaneous presence of dispositional vulnerabilities such as high neuroticism and fearful-avoidant attachment, as well as the causal proximal risk factors of perceived burdensomeness, thwarted belongingness, and acquired capability for suicide was associated with the greatest risk. Thus, the current thesis expands on our understanding of suicide by identifying both the underlying vulnerability, as well as the proximal factors which will trigger its expression.

**Thoughts and Behaviour: Distinguishing Suicidal Desire from Suicidal Action**

A limitation of suicide research is that many studies fail to distinguish between those individuals who will only think about suicide from those individuals who will go on to engage in suicidal behaviours, including suicide attempts and suicide completions. This is a crucial shortcoming since the overwhelming majority of individuals who consider suicide do not go on to make an attempt (Klonsky & May, 2014; Nock & Mendes, 2008). Current research suggests that suicide should be conceptualised following an ideation to action framework, where suicidal desire, and the process of transitioning from desire to action are considered as distinct phenomena, each with their own predictors (Klonsky & May, 2014, 2015). Consistent with the ideation to action framework, the current research program examined suicidal desire and suicidal action as distinct phenomena, and considered the role of temperamental vulnerabilities at each stage. We utilised the interpersonal persistence task (Study 2), as well as questionnaire measures of suicidal ideation, suicidal intent, readiness for suicide and suicide attempts.
(Study 3) to investigate the relationship between neuroticism and suicide risk at both the ideation and action stages.

Studies 2 and 3 found that identified risk factors, such as neuroticism, may exert their effects at different stages of the framework. In Study 2, neuroticism was consistently associated with vulnerability for experiencing reactivity to interpersonal adversity, corresponding to increased desire to escape. Further, questionnaires administered in Study 3 identified that high neuroticism was associated with increased thwarted belongingness, perceived burdensomeness, suicidal ideation and non-specific psychological distress, but in isolation was not sufficient to increase risk for suicidal action, assessed in Study 3 as the frequency of suicide attempts, preparation for suicide, and suicidal intent. Neuroticism was only associated with vulnerability for these measures of suicidal action when paired with concurrently high acquired capability for suicide. This is consistent with the core premise of the interpersonal theory of suicide, that an individual must have acquired the capability to act on suicidal desire in order for an attempt to take place, and also consistent with the notion of an ideation-to-action framework in which suicidal ideation and the capability to act on this ideation are theoretically distinct constructs.

The finding that acquired capability for suicide moderates the association between neuroticism and suicidal action offers a partial explanation for the failure to identify a consistent relationship between neuroticism and suicide attempts and completions that exists in current literature (Duberstein et al., 1994; Duberstein et al., 2000; McCann, 2010; Tsoh et al., 2005; Useda et al., 2007). It is possible that the presence or absence of acquired capability for suicide determines whether the risk for suicidal desire conferred by high neuroticism, will correspond to an increase in suicidal behaviour. For example, studies which found a positive association between
neuroticism and suicide attempts included a hospital population of suicide attempters (Nordstrom et al., 1995), a group of depressed adults aged 50 and over (Useda et al., 2004) and adolescents with varying exposure to trauma, family dysfunction and psychiatric problems (Fergusson et al., 2000). The interpersonal theory proposes that older adults, and individuals who have experienced violence, pain or provocation, will likely have higher levels of acquired capability for suicide (Joiner, 2005). Thus, these studies that found that higher neuroticism was associated with suicide attempts may have utilised samples with higher levels of acquired capability for suicide (i.e., their samples had histories of suicide attempts; were older and depressed; or had been exposed to trauma). In contrast, studies did not find an association when they accounted for potential confounds including socio-demographic factors related to increased risk for suicide attempt such as female gender, marital breakup, younger cohorts, and lower education level (Cox et al., 2004), and depressive symptoms (Batterham & Christensen, 2012; Fergusson et al., 2000; Pisetsky et al., 2015; Useda et al., 2004). The identification of the moderating influence of acquired capability on the relationship between neuroticism and suicidal action (Study 3) has implications for identifying those individuals who may be at risk. Individuals with high levels of neuroticism, who have also been exposed to the factors associated with increased acquired capability for suicide, such as previous suicide attempts, NSSI, military or medical backgrounds, violence, self-injecting drug use, prostitution or abuse may be at increased risk for progressing from suicidal ideation to suicidal action.

Further, Study 2 and 3 clarify the role of neuroticism in conferring risk for suicidal desire and suicidal action. We found that neuroticism confers risk for ideation, and acquired capability facilitates progression to suicidal action. These findings suggest that the factors which predispose an individual to experiencing suicidal ideation or
desire may be different from those which influence whether an individual progresses from suicidal ideation to suicidal action. This is valuable since it is critical to identify those individuals at imminent risk for making a suicidal act. Future research should consider other established risk factors for suicide as they relate to both suicidal desire and the progression from desire to action. For example, previous research identifies a large number of diverse factors which increase the risk for suicide broadly defined. However, it is unclear whether these factors influence the development of a desire for suicide, the likelihood of acting upon this desire, or the likelihood that such acts will be lethal. More nuanced appraisal of whether these factors confer risk for suicidal ideation, the transition from ideation to lethal action, or both will improve theoretical and clinical utility. Further, there is need for further research which adopts a consistent nomenclature, and makes use of measures which appropriately differentiate between all suicidal thoughts and behaviours; ranging from ideation to attempts and completions.

**Overcoming Methodological Limitations in Suicide Research**

Suicide research has been restricted by its reliance on correlational or cross-sectional evidence which is limited in the extent to which it can support conclusions about causation. Studies 1, 2 and 4 used the Interpersonal Persistence Task (Collins et al, 2016) to facilitate the safe manipulation of the interpersonal risk factors thought to be proximal and causal antecedents to suicidal desire, in order to observe the effect on the desire to escape this adversity. Consistent with previous research using this task, we found reliable and large effects of PB-TB condition on participants’ desire to escape from this interpersonal adversity. Although the interpersonal distress is of course milder and only fleeting in the experimental context, the task provides an opportunity to test the theoretical predictions about how interpersonal adversity operates. Escape theory proposes that these psychological processes will behave similarly to those underlying
intolerable psychological pain and self-awareness and thus increase the risk of contemplating suicide as a means to escape this pain (Baumeister, 1990). Likewise, the successful experimental induction of feelings of failure to contribute meaningfully to a collective goal, and the perception that one’s efforts are futile and unappreciated by the team, is similar to the perception of defeat and entrapment. These feelings of defeat and entrapment are hypothesised by the integrated motivational-volitional model of suicidal behaviour (O’Connor, 2011) to be a key pathway to increased suicide risk.

Thus, while the desire to escape from the task is clearly not equivalent to the desire for suicide, a decline in persistence is conceptually equivalent to the desire to escape that is an antecedent of various self-defeating behaviours (Deci & Ryan, 2000) including suicide (Van Orden et al., 2010). Consistent with the notion that the reduced persistence in the task is conceptually similar to the desire to escape from life associated with suicide, desire to drop out of the task was positively correlated with measures of suicidal thoughts, intent, readiness, and psychological distress across each of the studies using this task (Studies 1, 2 and 4). These results are encouraging and suggest that this experimental paradigm could continue to be useful for further examining how individual differences in personality may interact with more proximal interpersonal risk factors to confer risk or resilience for suicide. Our findings extend current scientific literature by testing the theoretical predictions of the ITS in an experimental setting. For instance, the present findings compliment literature which found that a decline in persistence is as a potential antecedent of various self-defeating behaviours (Deci & Ryan, 2000) including suicide (Van Orden et al., 2010).

**Theoretical Implications.**

The current research program adds to the growing evidence base for the Interpersonal Theory of Suicide (Chu et al., 2017; Joiner, 2005; Ma et al., 2016; Ribeiro
& Joiner, 2009; Van Orden et al., 2010). The predictions of the ITS were supported using both experimental and cross-sectional methods. Importantly, previous research investigating the ITS has been limited in that it finds support for only some of the theory’s components, and fails to consider the interrelations among all components simultaneously (Barzilay & Apter, 2014; Ma et al., 2016). The current research sought to overcome this limitation by considering each component of the ITS as well as testing several core ITS predictions. Firstly, the ITS proposes that thwarted belongingness and perceived burdensomeness will contribute to suicidal desire (Van Orden et al., 2010). Our experimental task provided causal evidence supporting the theory that a combination of thwarted belongingness and perceived burdensomeness contribute to a desire to escape. This offers experimental evidence for the causal relationship between thwarted belongingness and perceived burdensomeness on the one hand and diminished desire to persist with a goal-directed on the other. Thus, the findings of Studies 1, 2 and 4 indicate that suicide risk assessments should be consistently assessing for the presence of thwarted belongingness and perceived burdensomeness.

Secondly, the ITS proposes that suicidal desire is distinct from the capacity to act upon this desire (Van Orden et al., 2010). Similarly, the motivational volitional theory of suicide (Dhingra et al., 2015; O’Connor, 2011) and the three-step theory of suicide (Klonsky & May, 2015) distinguish those who desire suicide, from those who will act upon that desire. The current work aimed to test the distinction between suicidal desire and acquired capability, and found that in an experimental task high levels of acquired capability was not associated with the desire to persist or escape from interpersonal adversity. This suggests that the interpersonal antecedents for suicidal desire are not impacted upon by acquired capability, and acquired capability does not influence an individual’s desire to persist, at least in the context of a controlled
laboratory setting. Given the desire to persist is more conceptually similar to suicidal desire, it is perhaps unsurprising that persistence in the task is unrelated to the acquired capability for suicide, since the ITS (Joiner, 2005), as well as the motivational volitional theory (O’Connor, 2011) and the 3-step theory (Klonsky, 2015) propose that suicidal desire and the capacity to act upon this desire are distinct processes. The findings of Study 2 indicate that neuroticism confers vulnerability for the interpersonal precursors for suicidal desire, irrespective of acquired capability. Thus, Study 3 sought to clarify the nature of the relationship between neuroticism and acquired capability for measures more proximal to suicidal action. Study 3 identified that while neuroticism alone is sufficient to increase suicidal desire, it is the addition of the acquired capability for suicide which increases risk for suicidal behaviours. This is consistent with the core prediction of the ITS which states that it is the simultaneous presence of both desire and acquired capability which will result in an increased probability of lethal suicidal behaviour.

The finding that acquired capability for suicide is unrelated to the desire to quit the interpersonal persistence task may have implications for further investigating the distinction between wanting to quit and actually quitting. Studies 2 and 3 identified that acquired capability for suicide is unrelated to antecedents for suicidal desire, but positively associated with suicidal action. As the interpersonal persistence task measures desire to quit, rather than the process of quitting, this task may not be best suited to assessing the acquired capability component of the ITS. Future research may wish to adapt the Interpersonal Persistence Task to include an option to actually quit the task in order to assess whether the act of quitting is more proximal to acquired capability than simply wanting to quit.
Further, the current research identifies a limitation of the ITS. The theory does not account for individual differences and how these may influence the impact of its proposed causal risk factors. This research program demonstrates that neuroticism and fearful-avoidant attachment and may indeed represent a predispositional vulnerability for suicide. Thus, the interaction of individual characteristics with the theory’s proposed causal mechanisms, will influence whether an individual will experience suicidal thoughts and behaviours. As such, suicide theory needs to take a person-situation approach which considers both the dispositional characteristics of the individual, and how these might interact with situational triggers to confer vulnerability. The current research supports the ITS assertion that proximal risk factors are important for determining the causal pathway to suicidal ideation and action. In addition the current studies highlight that distal and proximal risk factors should be considered in tandem, since distal vulnerabilities influence reactivity to the proximal factors proposed by the ITS. Consistent with this, Marušič and Farmer (2001) proposed that all stages of suicidal behaviours, as well as transitions between these stages, are influenced by individual characteristics, environmental influences, and their reciprocal interactions. Thus, the interpersonal theory of suicide could be enhanced by considering individual characteristics and how these may interact with temporal triggers at all stages of suicidal progression from thoughts, intent, planning and behaviours. For example, Studies 1, 2 and 3 demonstrate that neuroticism increases vulnerability for experiencing thwarted belongingness, perceived burdensomeness, suicidal ideation and non-specific psychological distress. However, studies 2 and 3 clarify that this vulnerability for suicidal desire appears to only translate into increased risk for suicidal intent, preparation and attempts when paired with high acquired capability for suicide.
Neuroticism and Attachment

Alongside examining neuroticism, the current research has implications for understanding adult attachment theory and how it relates to suicidality. Firstly, we identified that a fearful avoidant attachment style, but not a dismissive avoidant attachment style, will confer vulnerability for experiencing the ITS precursors for suicidal desire. Thus, we have identified that all insecure attachment styles may not be equally problematic, with a dismissive-avoidant attachment style conferring resilience at an equivalent level to secure attachment. Since both insecure attachment styles share the characteristic of elevated avoidance, it is likely that the different levels of risk associated with each style are attributable to variations on the anxiety dimension of attachment. Fearful-avoidant attachment is associated with high anxiety, such that these individuals experience poor self-worth and anticipate rejection from others. In contrast dismissive-avoidant individuals have low anxiety, and are characterised by a high opinion of themselves and a preference for autonomy. Therefore, research which considers attachment must always consider the specific styles, and how these vary across both the anxiety and avoidance dimensions as there is compelling evidence for distinctions between attachment styles as they vary on these dimensions.

Additionally, while attachment has been demonstrated to contribute to the formation of personality, with individuals experiencing insecure attachment being more likely to develop a personality characterised by high neuroticism, neuroticism and insecure attachment are not synonymous (Shaver & Brennan, 1992). A study conducted by Shaver and Brennan (1992) identified that while neuroticism was higher among both insecure attachment styles compared to the secure attachment style, variations in neuroticism score where not sufficient to predict an individual’s attachment style. The authors suggest that measures of personality are intentionally broad, and intended to
capture generalised response tendencies, whereas attachment measures are relationship-specific. They conclude that attachment styles are meaningfully associated with neuroticism, but that they are not simply redundant with them.

The studies in this dissertation investigated the impact of neuroticism and adult attachment style on suicidal desire separately, and did not account for the overlap between these characteristics. Neuroticism has a moderate positive correlation with scores on the anxiety dimension of the adult attachment scale and a small-moderate correlation with scores on the avoidance scale. For this reason, future research may wish to clarify the relationship between specific facets of neuroticism and attachment. The fact that avoidance alone is protective, while anxiety and avoidance is deleterious suggests that there may be specific facets of neuroticism that are the most problematic. For example, elevations on the anxiety dimension, but not the avoidance dimension are associated with higher scores on the neuroticism facets of impulsivity and negative affect, so these traits may be particularly detrimental for suicide risk (Scott, Levy, & Pincus, 2009).

**Clinical Implications**

The current research identified a robust relationship between neuroticism and risk for suicidal desire. This was replicated using both experimental and cross-sectional designs. As such, the development of clinical interventions to mitigate the impact of neuroticism on suicide risk should be a priority. Personality traits tend to represent a stable, enduring set of characteristics that influence how a person perceives, interprets and reacts across their lifespan (Conley, 1985; Roberts & DelVecchio, 2000). Nevertheless, there have been studies demonstrating that they are responsive to clinical interventions (Glinski & Page, 2010; Jorm, 1989). In particular, Jorm (1989) found that
while all investigated modes of therapy achieved a reduction in neuroticism, rational-emotive therapy appears to be the most promising option, achieving the largest reduction in neuroticism (approximately 1.25 standard deviations).

More recent studies also demonstrate that strategies can be implemented to reduce the impact of elevated neuroticism on functioning. For example, mindfulness has been proposed as a potential approach to targeting the increased negative reactivity associated with high neuroticism. Mindfulness is defined as a quality of consciousness requiring present-moment awareness of the inner and external world, characterised by interest, acceptance and unbiased receptivity (McWilliams, 2014). Drake, Morris, and Davis (2017) have found that mindfulness moderates the relationship between neuroticism and non-specific psychological distress, with large effect size. Similarly, studies have demonstrated that mindfulness mitigates the relationship between high neuroticism and negative emotional outcomes (Feltman et al., 2009; Fetterman et al., 2010). Furthermore, studies utilising the interpersonal persistence task have found that a brief mindfulness intervention enhances persistence in the face of thwarted belongingness and perceived burdensomeness (Collins et al., 2016; 2017). These findings suggest an encouraging opportunity to identify and ameliorate the vulnerability to interpersonal stressors associated with suicidal desire conferred by neuroticism (Chesin & Jeglic, 2016; Forkmann et al., 2014).

Similarly, fearful-avoidant adult attachment was demonstrated to confer vulnerability for suicide. Encouragingly, there is evidence that adult attachment styles represent a pattern of relationships and interactions that are flexible and amenable to clinical intervention. Even without intervention, research suggests that approximately 30% of adult participants will spontaneously change their self-reported attachment style if re-assessed at a later point in time (Baldwin & Fehr, 1995; Davila et al., 1997;
Ruvolo et al., 2001). This demonstrates the importance of considering, and continually re-evaluating attachment in the context of risk assessment in clinical practice. Should a fearful-avoidant attachment style be identified, therapies designed specifically to address attachment related dysfunction in adults are available in individual (Fosha, 2000; Obegi & Berant, 2010) and group formats (Marmarosh et al., 2013). In particular, Johnson (2009) has shown that emotion-focussed therapy (EFT) can help individuals with insecure attachment styles to develop a more secure attachment style. Thus, it may be possible to therapeutically ameliorate the dispositional risk conferred by fearful-avoidant attachment style using interventions to facilitate secure attachment. These interventions may be particularly beneficial for reducing suicide risk for fearful-avoidant individuals, and perhaps less so for individuals with a dismissive-avoidant attachment style, since dismissive-avoidant attachment appears to confer resilience to the ITS triggers for suicidal ideation.

The current research also supports the interpersonal theory’s assumption that thwarted belongingness and perceived burdensomeness represent proximal causal triggers for the experience of suicidal ideation. Both thwarted belongingness and perceived burdensomeness represent cognitive-affective states arising from distorted beliefs about one’s significance and value within a valued social network. Joiner (2005) suggests that in a crisis-intervention situation, targeting these distortions may provide therapeutic means to short-circuit suicidal impulses by diminishing distress and shifting focus away from reasons for desiring suicide. Further, cognitive restructuring techniques may encourage clients to review past experiences of feeling valued, useful, connected and accepted, thus diminishing their belief that they are a burden to others or that they are not well connected. Further, Stellrecht et al. (2006) suggests that encouraging clients to imagine the impact of their suicide on others, or identify ways in
which they are needed by others may also lessen the intensity of suicidal urges. In this way, therapeutic interventions which reduce the proximal triggers of perceived burdensomeness and thwarted belongingness will likely reduce suicidal desire. This is consistent with the results of Studies 1 and 2, which demonstrated that when thwarted belongingness and perceived burdensomeness were low, desire to escape from the Interpersonal Persistence Task was lower for both high and low neuroticism groups. Similarly, Study 4 found that desire to escape the Interpersonal Persistence Task was low for all attachment styles when thwarted belongingness and perceived burdensomeness were low. In this way, the deleterious impact of high neuroticism and insecure attachment may be minimised by targeting the proximal interpersonal triggers which bring about suicidal desire.

In addition to crisis-interventions, longer-term psychotherapy could also prioritise restructuring thoughts relating to perceptions of burdensomeness and diminished belongingness to prevent the emergence of suicidal ideation (Stellrecht et al., 2006). The authors suggest that these thoughts likely arise due to misinterpretation of interpersonal interactions and negative thoughts about oneself. Research has shown that cognitive therapy targeting unhelpful beliefs about one’s belonging and worth to others, has demonstrated efficacy in reducing suicidal desire (Rudd, Joiner, & Rajab, 2001). Thus, restructuring cognitive distortions, misinterpretations and negative thought patterns about one’s value to others and capacity for meaningful contribution will likely reduce the risk of suicide.

In addition to addressing the proximal causal triggers for the experience of suicidal ideation as a means to reduce risk, therapeutic interventions may also wish to prevent the transition from suicidal ideation to suicide attempts. The ITS proposes that the acquired capability for suicide is what differentiates those individuals who will
experience suicidal desire from those who will go on to make a lethal attempt. The current research program found that elevated neuroticism increased thwarted belongingness, perceived burdensomeness, and suicidal ideation regardless of acquired capability for suicide. However, elevated neuroticism was only associated with increased suicide readiness, intention, and attempts when acquired capability for suicide was also high. Thus, acquired capability appears to moderate the association between neuroticism and life-threatening suicidal behaviours. The interpersonal theory proposes that acquired capability for suicide is developed over time via direct (i.e., non-suicidal self-injury and previous suicide attempts) and indirect (i.e., exposure to violence, abuse, substance use and injury) means, and is resistant to change. The implication for risk assessment is that clients with a high acquired capability (evidenced by previous attempts or indicated situational risk factors) who also exhibit high neuroticism may be at particularly high risk, especially when confronted by acute interpersonal stressors which evoke feelings of burdensomeness and diminished belongingness. Clinicians should routinely consider their clients acquired capability for suicide (Rimkeviciene et al., 2016) by collecting information about their exposure to pain, fear, provocation, and previous suicide attempts, and use this information to inform assessment of suicide risk. Clinicians could consider using a formal measure of acquired capability such as the Acquired Capability with Rehearsal for Suicide Scale (George et al., 2016). If a high level of acquired capability for suicide is identified, clinicians should consider how temperamental factors like neuroticism, as well as temporal triggers for thwarted belongingness and perceived burdensomeness such as relationship breakdown, unemployment, interpersonal conflict, financial difficulties, role transitions or illness may act to further increase risk for suicide attempt.
Moreover, developing interventions to arrest the acquisition of a capability for suicide, or to ameliorate its impact on suicide risk once attained are imperative. A twin-study identified that genetic factors play a large role in determining an individual’s acquired capability for suicide, while environmental factors are more closely associated with thwarted belongingness and perceived burdensomeness (Smith et al., 2012). The authors conclude that thwarted belongingness and perceived burdensomeness may be more amenable to change, and thus more appropriate targets for intervention than acquired capability. However, for individuals who experience suicidal ideation, limiting opportunities for the development of an acquired capability may prevent transition to suicide attempts and completions. While the genetic component of acquired capability is difficult to address, therapeutic interventions which target problematic behaviours such as NSSI, violence, drug use and risk taking behaviours may minimise the development of a capability for suicide. The interpersonal theory identifies that restricting access to lethal means (such as firearms, medications, alcohol and vehicles) may reduce the acquired capability in suicidal individuals and potentially prevent death by suicide (Van Orden et al., 2010). Consistent with this, regular exposure to a firearm (i.e. having one in the home) is associated with a 4.8-fold increase in risk for suicide attempts (Kellermann & Reay 1986). Further, one study has shown that differences in overall suicide rates between cities, regions and states in the United States are better explained by the availability of firearms than by differences in mental health, suicide ideation, or even suicide attempts (Grinshteyn & Hemenway, 2016).

Limitations

Future research may wish to extend the current research program by using a more comprehensive measure of neuroticism which permits examination of the more specific personality traits, and allows identification of those traits that are most
associated with vulnerability. Studies 1, 2 and 3 used a brief screening measure of neuroticism (The Eysenck Personality Questionnaire- Brief Version; Sato, 2005), which produces a single score intended to reflect an individual’s level of neuroticism broadly defined. However, some literature has identified that individual facets of neuroticism are more or less associated with risk. For example DeShong et al. (2015) has identified that the neuroticism facets of depressiveness, self-consciousness, and vulnerability were significantly associated with perceived burdensomeness, but only depressiveness and self-consciousness were associated with thwarted belongingness. Thus, while the EPQ-BV has sound psychometric properties (Sato, 2005), longer measures of neuroticism, such as the NEO-PI-3 (McCrae & Costa, 2010) are considered the gold standard for personality assessment, and would permit thorough examination of the individual contribution of each of the facets of neuroticism. As such, while the current research program identified that neuroticism generally, was associated with vulnerability, we recommend that future studies investigate individual facets of neuroticism alongside thwarted belongingness and perceived burdensomeness in an experimental setting to ascertain whether these findings are replicated in a causal manner.

Similarly, these individual facets of neuroticism should be considered to further investigate the moderating influence of acquired capability for suicide on the relationship between neuroticism and suicidal behaviour. It is possible that the neuroticism facets of angry hostility and impulsiveness may confer vulnerability for acquiring a capability for suicide in that they facilitate behaviours (i.e., aggression, risk taking) and coping strategies (i.e., NSSI, substance use) which permit habituation to pain, a sense of fearlessness about death, and increase the likelihood of impulsive suicidal action (Cramer et al., 2012). Other characteristics of neuroticism, such as emotional dysregulation, low distress tolerance and high negative urgency (Anestis,
Bagge, et al., (2011), higher harm avoidance (De Fruyt, Van De Wiele, & Van Heeringen, 2000), and increased sensitivity to physiological pain (Goubert, Crombez, & Van Damme, 2004) may prevent desensitization to pain and fear. Thus, these facets of neuroticism may protect against the acquisition of a capability for suicidal action. In this way, while we have identified that neuroticism confers risk for suicidal desire, and acquired capability permits transition from desire to action, it is not yet known specifically how neuroticism, or particular facets of neuroticism may influence the likelihood of acquiring a capability for suicide. For this reason, further investigations of the relationship between the individual facets of neuroticism, and all three components of the ITS would further clarify the role of neuroticism in conferring vulnerability for suicidal desire and the transition to imminent and lethal suicidal behaviour.

Further, the use of a more comprehensive personality inventory in subsequent studies would also provide the opportunity to account for the potential moderating effects of the remaining Big Five Factors (i.e., extraversion, openness to experience, agreeableness, and conscientiousness) on vulnerability and resilience to the interpersonal risk factors underlying suicidal desire. Meta-analysis has shown that the combination of high neuroticism and low extraversion is especially pernicious for suicide risk (Brezo et al., 2006). Consistent with this, studies 1 and 2 found that neuroticism increased sensitivity to the precursors for suicidal ideation. However, as these studies did not account for variations in extraversion we are unable to comment on whether high extraversion has a buffering effect, or whether the deleterious impact of neuroticism is stronger when paired with concurrently low extraversion.

Similarly, traits which are related to neuroticism have also been investigated as potential risk factors for suicide. Neuroticism is positively associated with emotional dysregulation (Paulus, Vanwoerden, Norton, & Sharp, 2016), distress intolerance
General Discussion

(Sandin, Simons, Valiente, Simons, & Chorot, 2017), negative urgency (Kaiser, Milich, Lynam, & Charnigo, 2012), rumination (Muris, Roelofs, Rassin, Franken, & Mayer, 2005), impulsivity, psychological inflexibility (Paulus et al., 2016) and negatively associated with optimism (Sharpe, Martin, & Roth, 2011). Similarly, these characteristics have been identified to mediate the relationship between neuroticism and a range of negative outcomes including substance abuse (Kaiser et al., 2012), depression and anxiety (Muris et al., 2005). Thus, it may be that the relationship between neuroticism and suicidal ideation can be more specifically explained by a mediation relationship with these psychological characteristics. Further investigation of these specific psychological traits, as they relate to the interpersonal theory may permit more specific identification of those individuals whose characteristics predispose them to increased dispositional vulnerability for suicidal desire. Further, while the personality trait of neuroticism is considered relatively stable and resistant to intervention, there are evidence-based interventions which have demonstrated efficacy in improving emotional regulation (Kovacs et al., 2006), psychological flexibility (Arch et al., 2012), distress tolerance (Linehan et al., 1983), optimism (Malouf & Schutte, 2017) and ruminative coping styles (Watkins et al., 2011). Therefore, if these characteristics are identified as mediators of the relationship between neuroticism and suicidal desire, they present promising targets for clinical interventions to mitigate risk.

In addition, studies 1, 2, and 4 used an experimental paradigm (The Interpersonal Persistence Task, Collins et al., 2016) to examine neuroticism, insecure adult attachment, and the key predictions of the interpersonal theory. While the use of an experimental paradigm allows strong internal validity, this is usually at the expense of high external validity. Future research may wish to generate converging evidence using more naturalistic designs to maximise external validity. For example, longitudinal
studies could investigate the interaction between dispositional traits (i.e., neuroticism and fearful-avoidant attachment style) and the proximal triggers for suicide proposed by the ITS on suicide attempts and completions over the course of several years.

Finally, the current studies utilised university undergraduate student samples, primarily comprised of young, Caucasian and Asian females. Thus, although university students are identified as an important target for suicide prevention efforts (Cukrowicz et al., 2011) the generalisability of the current findings may be limited to this population. Furthermore, the interpersonal theory proposes that the same cognitive-affective states and mental processes underlie suicide, regardless of the population being investigated (Van Orden et al., 2012). Thus, it is likely that the results of the current studies are applicable to the more general population.

Nevertheless, future research should attempt to replicate these findings among high risk groups such as forensic samples, Indigenous Australians, inpatient psychiatric samples, and the LGBTQI population. Studies have shown that criminal offenders are at increased risk for acquiring a capability for suicide due to their increased exposure to painful and provocative experiences (Cramer et al., 2012). Psychiatric samples report higher levels of suicidal ideation than the general population (Van Orden et al., 2012). In particular a diagnosis of depressive disorders, bipolar disorders or borderline personality disorder is associated with higher levels of perceived burdensomeness and thwarted belongingness, while a diagnosis of post-traumatic stress disorder is associated with higher acquired capability for suicide (Silva et al., 2015). LGBTQI individuals may be particularly vulnerable to interpersonal adversity due to the experience of social stressors including prejudice, discrimination, and alienation (Hershberger, Pilkington, & D'Augelli, 1997; Meyer, 2003).
Similarly, rates of suicide among Indigenous peoples across Canada, the United States, Australia, and New Zealand are significantly higher than their non-Indigenous counterparts (Hunter & Harvey, 2002). Qualitative research investigating an Indigenous Canadian population identified experiences such as separation from families, as contributing to increased thwarted belongingness; exposure to domestic violence, resulting in increased perceptions of burdensomeness; and family history of suicidal behaviour and violence, facilitating the acquisition capacity to enact lethal self-harm (Elliott-Groves, 2017). Given these at-risk populations appear to be over-exposed to the ITS proximal triggers for suicidal thoughts and behaviours, preventative efforts may wish to i) target factors likely to cause feelings of thwarted belongingness and perceived burdensomeness (prejudice, social isolation, unemployment, domestic violence, family breakdown etc.), ii) limit exposure to factors likely to facilitate the acquisition of a capability for lethal suicidal behaviour (violence, NSSI, substance abuse, incarceration etc.) and iii) consider interventions to target dispositional vulnerabilities including neuroticism and fearful-avoidant attachment which may further amplify risk amongst these populations.

Conclusions

The current research program has theoretical implications for understanding suicide in that it demonstrates the importance of considering both dispositional risk factors, proximal triggers, and the interaction between the two in bringing about suicidal ideation and behaviour. We have shown that neuroticism and fearful-avoidant attachment styles represent underlying vulnerabilities which confer increased reactivity to proximal triggers of thwarted belongingness and perceived burdensomeness, corresponding to diminished persistence. Further, the current work supports the distinction between suicidal desire and suicidal action, in line with theories which
conceptualise suicide on an ideation-to-action continuum. We have shown that neuroticism is sufficient to increase desire for suicide, and that the transition from suicidal desire to suicidal action is triggered by the acquisition of a capability for suicide. In sum, there is much to be gained from incorporating individual differences into the interpersonal theory of suicide. Doing so will permit greater specificity of risk assessment, and the targeted application of appropriate interventions.
Chapter 10.

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