

Understanding the Motivation for Suicide

by

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BCom, GradDip Psych (Hons)



This thesis is presented to The University of Western Australia to fulfil the requirements for the degree of Doctor of Philosophy and in partial fulfilment of the requirements for the degree of Master of Psychology (Clinical).

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Thesis Declaration

I, Julia Denise Brown, certify that:

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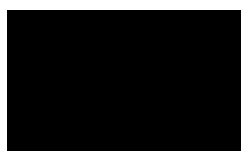
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This thesis contains published work and/or work prepared for publication, some of which has been co-authored.



Julia D Brown

Date: 17 January 2020

Abstract

The present thesis employs correlational, longitudinal, and experimental studies to rigorously test how suicidal ideation and intent arise, based on constructs and predictions proposed by the motivational phase of the Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour (O'Connor, 2011; O'Connor & Kirtley, 2018). The motivational phase of the IMV model posits that defeat and humiliation lead to feelings of entrapment, and that this association is moderated by rumination. The desire to escape feelings of entrapment then leads to the formation of suicidal ideation and intent. However, consistent evidence suggests that defeat and entrapment are synonymous (Griffiths et al., 2015; Taylor, Wood, Gooding, Johnson, & Tarrier, 2009), and suicidal ideation and suicidal intent may be distinct constructs with possibly separate antecedent pathways (O'Connor & Kirtley, 2018). Therefore, in the present thesis, rather than being a moderator, rumination was tested as a direct antecedent of entrapment, and rather than co-occurring in the same step, suicidal ideation and suicidal intent were examined as separate steps within the motivational phase.

A limitation of existing measures of rumination is that they do not capture content specific to the development of suicidal ideation. Therefore, in Chapter 2, (Study 1a, $N = 598$), we developed the Ruminations about Antecedents of Suicide Scale (RASS) to specifically assess how much someone ruminates about the three factors posited by the Interpersonal Theory of Suicide to be causally and proximally related to suicide (Joiner, 2005). Confirmatory factor analyses and model-based reliability estimates demonstrated that despite some multidimensionality, it is appropriate to calculate and interpret the RASS as a unidimensional instrument. Chapter 2 (Study 1b, $N = 639$) further demonstrated that scores on the RASS were approximately a three times stronger predictor of suicidal ideation than scores on the

Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, & Joiner, 2012), the measure that was specifically developed to assess the desire for suicide as posited by the Interpersonal Theory of Suicide. Moreover, scores on the RASS mediated the relationship between scores on the INQ and suicidal ideation, and brooding rumination did not explain any additional variance in suicidal ideation over and above scores on the RASS. With a reliable, valid, and theoretically grounded measure of suicide-related rumination, the primary aim of testing temporal relationships between rumination, entrapment, suicidal ideation, and suicidal intent could begin.

In Study 2 ($N = 230$), longitudinal data and autoregressive cross-lagged panel analyses suggested the existence of a feedback loop between rumination and entrapment, such that rumination predicts subsequent entrapment and entrapment predicts subsequent rumination. Results further indicated that rumination predicts subsequent suicidal ideation, and that both rumination and entrapment predict subsequent suicide intent. However, contrary to the IMV model, the hypothesis that entrapment predicts subsequent suicidal ideation was not supported. These findings raise the potential that there are several feedback loops within the motivational phase that have not previously been considered.

Finally, in Study 3 ($N = 123$), we used a computer-based paradigm to experimentally test the novel hypothesis based on the newly suggested feedback loop suggested by the longitudinal data in Study 2 that entrapment causes subsequent rumination. Results supported the hypothesis that entrapment causes subsequent rumination. Therefore the relationship between rumination and entrapment is likely to be bi-directional.

The findings from the present thesis indicate that ruminating about the interpersonal antecedents of suicidal desire and one's capacity for self-harm induces

pernicious feedback loops where someone feels so hopelessly trapped they believe the only solution for escape is suicide. Similar to the recently proposed feedback loop between the motivational and volitional phases of the IMV model (O'Connor & Kirtley, 2018), the IMV model should consider a more dynamic and cyclical rather than linear approach within the motivational path to suicidal ideation and suicidal intent.

The results offer advancement for clinical practice by identifying how ruminations about antecedents of suicide can have deleterious effects on perpetuating suicidal ideation and intent, particularly when combined with a sense of entrapment. On the evidence of this thesis, combatting ruminative thinking would appear to be key in offering an alternative to suicide, when someone is desperately trying to escape from a ruminative prison inside his or her head.

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Acknowledgements

So many people have walked beside me on this PhD journey. There are also some people who have pushed me, and some who have pulled me. I needed you all.

This research was supported by an Australian Government Research Training Program Scholarship, awarded by the University of Western Australia, as well as funds awarded from the School of Psychology. I am very grateful to the University of Western Australia and the Graduate Research School for the opportunity and guidance in completing this qualification. I would especially like to express my appreciation to my research supervisors, Dr Werner Stritzke and Professor Andrew Page. Werner, your genuine passion, and dedication to research, teaching, and mentorship is truly inspiring. Your attention to detail and help in riding the highs and lows of PhD life has been invaluable. Andrew, thank you for always guiding me back to Occam's razor when I started to veer off track, and thanks for the cryptic and often humorous comments to help me solve problems on my own.

My maternity leave during my candidature meant that I had the privilege of studying with two amazing cohorts. Thank you to both the "Class of 2024" and to the "B Winkler Fan Club". It truly has been blood, sweat, and tears, but a whole lot of laughs too. Thank you to my office buddies, Erica, Gabstar and Pru Pru. Erica, you are truly a wonderful woman with a kind heart, albeit with the memory of a goldfish. You make me laugh to no end. Gaby, you are a wonderful woman. You seem to do everything with ease and with so much integrity. Thank you for all the chats. Prue, I think you are the one who got us all working. I was always inspired by your dedication and focus, but also with your down to earth attitude. Elise, thank you for the walks, laughs, and shared understanding. I would also like to give a special thanks to Caroline for our Hackett writing rendezvous, hikes, and for looking after my girls when I needed some time out. You are such a kind soul.

Thank you “Aunty Di” for always being there for me, and my girls. Thank you for sharing many a yoga class, a coffee, and/or a chat. Thank you “Aunty Soybean”, for being my sanity. You have kept me afloat more than you will ever know, and introduced me to the joys of highlighters. Thank you “Aunty Suzy” and “Aunty Chris”. Your unconditional love has supported me and given me the energy to see this through to the end. I am forever indebted. “Aunty Weez”, my wonderful sister, thank you for being my biggest cheerleader. You have always taken an interest in my work and it was so helpful having you read my whole thesis.

Finally, thank you to my ever-supportive partner, James. Without you, this would never have been possible. You have seen the best and worst of me, but you stayed beside me through it all. I will always be grateful. Through this journey, you have also given me the two biggest joys in my life, our girls. Raya (now age 4), I taught you a word when you were 2.5 years old that I thought would help *you* in life. However when I was ready to give up on my research you turned to me and said “*just persevere mummy, like you taught me*”. It is because of you, Raya, that I persevered, thank you. Elbi (now aged 2), your easy-go nature has given me so much perspective. When things felt too stressful, you always seemed there to bring me back to being present, thank you. I hope that I have made both you girls and daddy proud, as you make me everyday. This thesis is for you.

First Author Works Arising from this Thesis

First Author Manuscripts Prepared for Publication

Chapter 2

Brown, J. D., Page, A. C., Stritzke, W. G. K., & Wylde, T. J. (2019a). Ruminations about Antecedents of Suicide: Scale Development and Validation.

Chapter 3

Brown, J. D., Stritzke, W. G. K., Page, A. C., & Wylde, T. J. (2019b). Motivation for Suicide: A Prospective Cross-Lagged Analysis of Rumination, Entrapment, Suicidal Ideation, and Suicidal Intent.

Chapter 4

Brown, J. D., Stritzke, W. G. K., Page, A. C., & Giles, J. J. (2019). An Experimental Test of the Motivational Phase of the Integrated Motivational-Volitional Model of Suicidal Behaviour: Is there a Feedback Loop from Entrapment to Rumination?

First Author Presentations Relating to This Thesis

Brown, J. D. (2019). Motivation for Suicide: A Prospective Cross-Lagged Analysis of Rumination, Entrapment, Suicidal Ideation, and Suicidal Intent.

To be presented at the World Mental Health Conference (November 5th – 8th 2019), in Buenos Aires, Argentina.

Co-authored Works Completed During Candidature

Blades, C. A., Stritzke, W. G., Page, A. C., & Brown, J. D. (2018). The benefits and risks of asking research participants about suicide: A meta-analysis of the impact of exposure to suicide-related content. *Clinical Psychology Review*.
<https://doi.org/10.1016/j.cpr.2018.07.001>

Collins, K. R., Stritzke, W. G., Page, A. C., Brown, J. D., & Wylde, T. J. (2018). Mind full of life: Does mindfulness confer resilience to suicide by increasing zest for life? *Journal of Affective Disorders*, 226, 100-107.
<https://doi.org/10.1016/j.jad.2017.09.043>

George, S. E., Stritzke, W. G. K., Page, A. C., Brown, J. D., & Wylde, T. J. (2019). *Zest for life: An antidote to suicide?* To appear in A. C. Page & W. G. K. Stritzke (Eds.), *Alternatives to Suicide: Beyond Risk and Toward a Life Worth Living*. City, State: Elsevier.

Authorship Declaration

The idea to investigate the temporal association of constructs within the Integrated Motivational-Volitional Model of Suicidal Behaviour (O'Connor, 2011) was initially raised by the candidate. The candidate played the major role in the study design, preparation of study materials, data collection, analysis, interpretation, writing, and revisions for all studies reported within this thesis under the guidance and supervisory input from Werner Stritzke and Andrew Page. Data for the studies presented in Chapter 2 and Chapter 3 were collected as part of a university-wide longitudinal study developed and administered through a collaboration between the School of Psychological Science and the UWA Health Promotion Unit, led by Tricia Wylde, aimed at “*taking the pulse of student’s well-being, resilience, and psychological distress*”. Separate to this thesis, the candidate presented other pertinent findings to a UWA stakeholder committee, the results of which also helped inform the published meta-analysis of the impact of exposure to suicide-related content (see co-authored works above). Professor Andrew Page designed and programmed the original Interpersonal Persistence Task that was used in Chapter 4 and linked the online survey to the experimental task for ease of data collection. Jamilla Giles assisted the candidate with testing participants.

The candidate has the permission of all contributors to include the work in this thesis.

Candidate signature:


Julia D Brown

Date: 17 January 2020

I, Andrew Page, certify that the candidate’s statements regarding her contribution to the works presented in this thesis are correct.

Supervisor signature:


Date: 17 January 2020

Preamble to the Thesis

Consistent with the University of Western Australia's guidelines for PhD submission, this thesis is presented as a series of manuscripts. Studies 1a, 1b, 2, and 3 (Chapters 2, 3, and 4) have been prepared for publication (see page xxi for details). The presentation of this thesis as a series of papers may lead to some repetition. The general introductory chapter (Chapter 1) and general discussion (Chapter 5) have not been submitted for publication. Figures and tables have been inserted into the text to facilitate reading.

Chapter 1

General Introduction

“My thoughts were so unbearable that I could not endure them any longer”

(Skogman & Öjehagen, 2003)

1.1 Overview

Suicide is a tragic cause of death. More than 800,000 deaths worldwide annually are attributed to suicide, making it the second leading cause of death by injury (World Health Organization, 2017). Additionally, for every person who dies by suicide, it is estimated that more than 20 others will make a suicide attempt (World Health Organization, 2018a). According to a global epidemiological study of 84,850 adults across 17 countries, approximately 3% of the world’s population will attempt suicide at some point across the lifespan (Nock et al., 2008). Unfortunately, despite decades of research behind us, our current ability to predict who will attempt or die by suicide is still only marginally better than chance (Franklin et al., 2017).

Understanding why people die by suicide remains one of the most complex and least understood human phenomena. However, informed by decades of research, three current, or ‘second generation’, theories of suicide have all adopted the notion that an ‘ideation-to-action’ framework governs the pathway to suicide (Joiner, 2005; Klonsky & May, 2014, 2015b; O’Connor, 2011; O’Connor & Kirtley, 2018; Van Orden et al., 2010). That is, the development of suicidal ideation is a separate and distinct stage in the pathway to suicide from the transition between suicidal ideation to suicidal behaviour. Whilst there is a strong appeal for suicide prevention researchers to focus on observable suicidal behaviours such as suicide attempts, due to their potential proximity to death by suicide, the morbidity of suicidal ideation should not be underestimated (Jobes & Joiner, 2019). Suicidal ideation is a necessary, albeit not sufficient, antecedent of suicidal behaviour (Taylor, Dal Grande, Gill, Fisher, & Goldney, 2007). This is because it is not conceivable that

someone could intentionally cause their own death without any thoughts or awareness that their actions could result in death. To make a suicide attempt, or to cause death by suicide, involves conscious processes (Michel & Valach, 2001) - “to die by suicide, one must think about suicide, make a plan, and then carry it out” (Millner, Lee, & Nock, 2017, p. 353). Therefore, to better understand suicidal behaviour, we need to better understand the cognitive mechanisms that cause someone to think about suicide as an option to begin with (Nock, Kessler, & Franklin, 2016). The question of what *motivates* someone to think about suicide is the focus of the present thesis.

When studying what motivates someone to think about suicide, it is imperative that we look beyond mere correlates of suicidal ideation, of which there is a plethora. The presence of an association between two constructs provides very little help in identifying potential points of intervention. At best, correlates may inform of potential risk factors that can predict the future development of suicidal ideation. However, to gain a better understanding of the motivation for suicide, we must also go beyond identifying risk factors, or predictors, of suicidal ideation. Not only is the identification of risk factors in isolation of little use for targeted intervention, longitudinal *prediction* is not the same as *cause*. A risk factor may simply be shown to predict an outcome merely because it is correlated with a true cause of the outcome (Franklin et al., 2017; Kraemer et al., 1997). Even if a temporal association is established between a risk factor and suicidal ideation, a recent meta-analysis coalescing 50 years of research from 365 longitudinal studies (3,248 total risk factors) was unable to show that a single risk factor (distal indicator) or warning sign (proximal indicator) could predict future suicidal thoughts or behaviour any more accurately than mere chance (Franklin et al., 2017). However, several limitations to this meta-analysis are of particular relevance to the present thesis, not least of which

the many risk factors and warning signs proposed by the included studies were derived from numerous different sources, not all of which are theoretically-driven or suicide-specific.

First, the meta-analysis splits age into three categories, adolescents (≤ 18 years old), adults (> 18 years old), and mixed (studies that included participants across the age spectrum). However, suicidal ideation is more likely to occur in adolescence and young adulthood than any other life period (Nock et al., 2008), and death by suicide is the second most common cause of death for people aged 15 and 29 (World Health Organization, 2018b). As such, young adults are a particularly critical group for examining what drives and exacerbates suicidal thinking.

Secondly, the average length for follow-up in the included studies was nearly 10 years (median 5 years), with less than 1% having follow-ups of one month or less. Early detection of suicidal ideation is critical because approximately 60% of suicide attempters will die on their first attempt (Bostwick, Pabbati, Geske, & McKean, 2016). Moreover, the odds ratio of making a first suicide plan or attempt within 12 months following onset of suicidal ideation is extremely elevated (OR=117.4 - 123.1), and decreases substantially thereafter (OR=1.5 - 4.4) (Nock et al., 2008). Additionally, any suicide attempt not resulting in death can still result in other deleterious effects. Outcomes such as physical injury and long-term disability are common, and there is almost always psychological distress experienced following a suicide attempt, not only for the individual who made the attempt but also amongst their family and friends (Borges et al., 2010). As most longitudinal studies focus on more distal risk factors for suicidal behaviour, and very few focus on more proximal warning signs of suicidal ideation, this is problematic for clinicians who are tasked with assessing acute suicide risk. Therefore, there is a need for more longitudinal studies to incorporate shorter follow-up periods (Franklin et al., 2017).

Another limitation of particular relevance to the current thesis is that whilst the meta-analysis included measures of brooding rumination and/or depressive rumination more broadly, it did not provide insights on ruminations about *suicide-specific constructs*, or about the state of entrapment that is thought to be a causal antecedent of suicidal ideation (O'Connor, 2011; O'Connor & Kirtley, 2018). Rumination and entrapment are two self-harming cognitions that are hypothesised to lead to suicidal ideation in theoretical models of suicide such as the 'cry of pain' model of suicide (Williams & Williams, 2002) and the 'integrated motivational-volitional (IMV) model of suicidal behaviour' (O'Connor, 2011; O'Connor & Kirtley, 2018). Therefore it is important that these constructs are properly scrutinised. As Chamberlain et al. (2009) point out, it is necessary to first diminish self-harming cognitions before any underlying cause of suicidal behaviour can be addressed. However, to diminish self-harming cognitions first requires an understanding of what those cognitions are. Therefore, whilst the identification of risk factors can provide us with "a stepping-stone to the construction of ecological models" (Van Orden et al., 2010, p. 576), to identify risk factors that are causal, and to inform the development of effective, targeted interventions, requires experimental studies.

The present thesis rigorously tests the pathway to suicidal ideation and intent proposed by the motivational phase in the 'Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour' (O'Connor, 2011; O'Connor & Kirtley, 2018). The authors acknowledge that the IMV model is still in relative infancy and have called for more prospective and experimental studies to address, in particular, the gap in understanding issues of temporality and causation (Tucker, O'Connor, & Wingate, 2016). The current thesis aims to fill this knowledge gap by employing longitudinal, and experimental designs to test the predictions pertaining to the motivational phase of the IMV model.

The remainder of this chapter provides a more in-depth explanation of the conceptual and theoretical rationale underpinning the three-phase IMV model, and reviews the current state of empirical evidence for the model's predictions. Whilst there is currently much support for the IMV model, some aspects of the model have either not yet been explored, or there are inconsistent findings with regards to some of the model's predictions. This chapter highlights these concerns, particularly as they pertain to the central motivational phase of the model, the focus of the current thesis. Finally, this chapter provides the rationale for testing a modified version of the IMV framework, outlines the aims for this entire program of work, and provides an orientation to the structure of the remaining chapters.

1.2 The Integrated Motivational-Volitional Model of Suicidal Behaviour

Grounded within the ideation-to-action framework, the Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour (O'Connor, 2011; O'Connor & Kirtley, 2018) amalgamates extant evidence and theoretical perspectives of the complex interplay of biopsychosocial risk and protective factors into a three-phase pathway to suicide (Figure 1.1). Briefly, the first phase of the IMV model describes the biopsychosocial context in which a pre-disposition for suicidal ideation and behaviour emerges (pre-motivational phase). The second phase describes the pathway from defeat and humiliation to entrapment, leading to the development of suicidal ideation and intent (motivational phase). The third phase describes key mechanisms needed for suicidal ideation and intent to transition to the enactment of a suicide attempt, or death by suicide (volitional phase). Crucially, specific moderators are posited to either facilitate or impede the transitions between defeat/humiliation and entrapment (threat to self moderators), entrapment and suicidal ideation/intent (motivational moderators), and suicidal ideation/intent and suicidal behaviour (volitional moderators) (O'Connor, 2011; O'Connor & Kirtley, 2018).

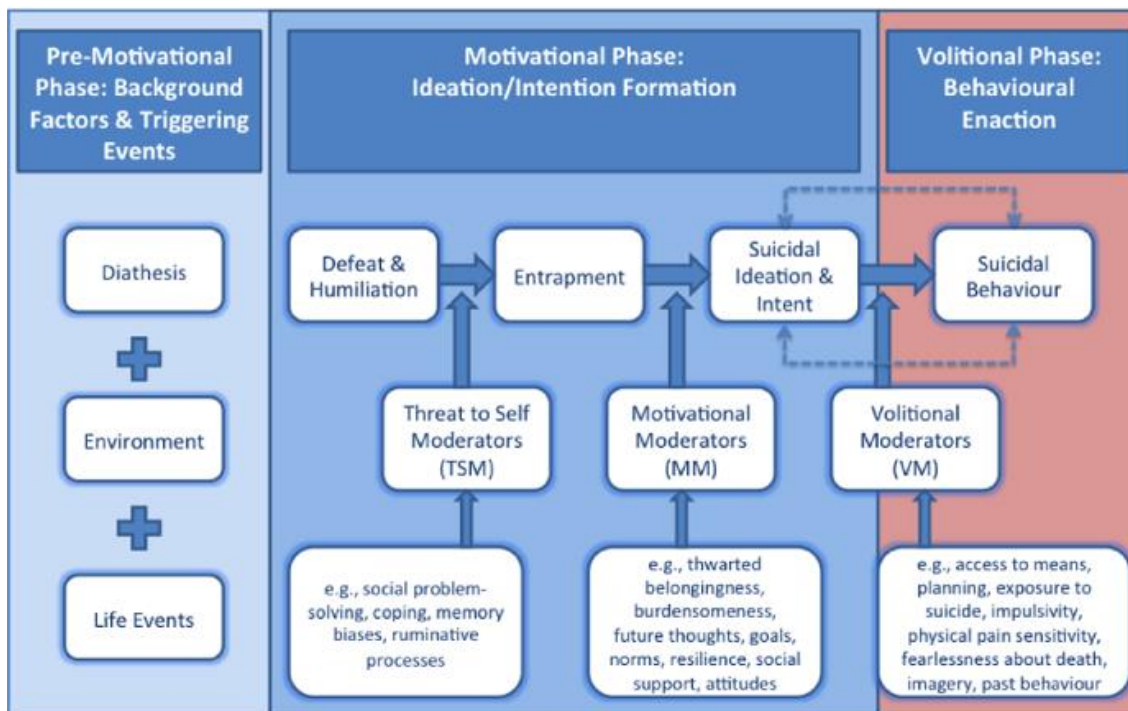


Figure 1.1. The Integrated Motivational-Volitional Model of Suicidal Behaviour (O'Connor & Kirtley, 2018)¹.

1.2.1 Phase 1: Pre-motivation

The first ‘pre-motivational’ phase in the IMV model of suicidal behaviour is informed from the ‘diathesis-stress model’, which posits that individual biological, cognitive, and environmental vulnerabilities confer an elevated risk for suicidal ideation and behaviour when combined with acute or chronic life stressors (Schotte & Clum, 1987). That is, suicidal behaviour results from a complex interaction of nature and nurture. Some biopsychosocial vulnerabilities for suicide that have been identified in the literature include decreased serotonergic neurotransmission, psychiatric illness, high impulsivity, high socially prescribed perfectionism, lack of social problem-solving skills, cognitive distortions, socioeconomic deprivation, and early life adversity (e.g., Brezo, Paris, & Turecki, 2006; Ellis & Rutherford, 2008; Jager-Hyman et al., 2014; Mann et al., 2005; O'Connor, O'Connor, & Marshall, 2007; Smith et al., 2018; Turecki, 2014; Turecki & Brent, 2016). According to the

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IMV model, a predisposition to one or more such vulnerabilities increases suicide risk only when they impact upon the stress-related constructs identified in the subsequent phases of the IMV model – the motivational and volitional phases.

1.2.2 Phase 2: Motivation

The key variables within the second, two-step ‘motivational’ phase of the IMV model are adopted from Williams’ ‘cry of pain’ model of suicide (2002). That is, failed attempts to escape painful feelings of defeat and humiliation² results in feelings of entrapment. Consequently, according to the ‘escape theory of suicide’ (Baumeister, 1990), without hope for the situation to improve (no rescue), suicide arises as the only salient option to escape the pain (Figure 1.1).

Defeat/humiliation to Entrapment. The first step in the motivational phase of the IMV model is the proposed pathway from defeat to entrapment. This step has its origins in ‘social rank theory’ within animal research (Price, 1972), and the concept of ‘arrested flight’ within evolutionary psychology (Gilbert & Allan, 1998). That is, animals who lose social ranking due to being defeated over any meaningful resource, for example: territory, sexual partner, or in making alliances; and who want, but are unable to escape, suffer involuntary subordination (humiliation) and can exhibit depressive characteristics. Williams (2002) extended this rationale to the suicidal individual, arguing that the risk for suicide becomes elevated when feelings of being brought down (defeated/humiliated) lead to a sense of inescapability with no perceived prospect of rescue (entrapment). The IMV model further extends the arrested flight conceptualisation, and William’s (2002) cry of pain model, by identifying specific ‘threat to self’ moderators that make the transition between

² Although humiliation forms part of the cry of pain model, and is therefore included alongside defeat in the motivational phase of the IMV model, little substantive attention has been given to its lone contribution to suicide relative to defeat and entrapment.

defeat/humiliation and entrapment more or less likely.

One of these threat to self moderators is the ability to problem-solve, a critical skill in being able to find a way to escape feeling trapped in a painful situation. Therefore, the IMV model identifies four inter-related variables associated with problem resolution that may attenuate or strengthen the relationship between defeat/humiliation and entrapment. First, social problem solving is implicated as a moderator because it is activated when an attempt is made to overcome a defeating/humiliating situation (Arie, Apter, Orbach, Yefet, & Zalzman, 2008; Chu, Walker, et al., 2017; Pollock & Williams, 2001). Second, whilst less researched, coping is also included as a moderator because of its conceptual overlap with social problem-solving (Gooding et al., 2015). Third, an over-general autobiographical memory bias is another potential threat to self moderator. As we rely on memories to solve interpersonal problems, memories that are incomplete, or lack specific detail, impair our ability to problem solve. (Pollock & Williams, 2001; Richard-Devantoy, Berlim, & Jollant, 2015; Williams & Broadbent, 1986).

Finally, rumination is included as a threat to self moderator. Whilst rumination has an established relationship with depression, the relationship between rumination and suicidal ideation and behaviours has only been explored more recently (Morrison & O'Connor, 2008a). Brooding rumination, defined as 'the passive comparison of one's current situation with some unachieved standard' (Treyner, Gonzalez, & Nolen-Hoeksema, 2003, p. 256) is selected as a threat to self moderator in the IMV model. Although adopted from the depression literature, it has more established links to the suicidal process than reflective rumination and other more general depressive rumination styles (Dhingra, Boduszek, & O'Connor, 2016; Morrison & O'Connor, 2008a; Rogers & Joiner, 2017). In addition, when thoughts are consumed with the causes of one's distress, autobiographical memory is

impacted and the ability for social problem-solving impaired (Watkins & Baracaia, 2002; Watkins, Teasdale, & Williams, 2000). Therefore, engagement with ruminative processes can stunt the ability to find an appropriate solution for escaping adversity.

Entrapment to Suicidal Ideation and Intent. The second step in the motivational phase of the IMV model is influenced by the ‘theory of planned behaviour’, which posits that the *intention* to engage in any behaviour is the most proximal predictor of that behaviour (Ajzen, 1991). Furthermore, intent formation (motivation) is a separate and distinct process from behavioural engagement (volition). Interestingly, the IMV model does not currently split the development of suicidal ideation and the development of suicidal intent as being separate steps in the IMV model. Whilst the authors acknowledge that suicidal ideation and suicidal intent are potentially distinct constructs, they argue that there is currently insufficient evidence to justify adding another step in the motivational phase of the IMV model (O'Connor & Kirtley, 2018).

Therefore, as the IMV model currently stands, suicidal ideation and intent are the collective result of entrapment - when attempts to escape ongoing stressful life events are blocked or when individuals perceive their circumstances as uncontrollable, unremitting, and inescapable (Taylor, Gooding, Wood, & Tarrier, 2011). Entrapment can be internal in nature, which refers to the desire to escape from painful thoughts and feelings, or external, which refers to the desire to escape from painful events or experiences in the outside world. This conceptualisation of entrapment is based on the two most common motives given for an attempted suicide; a desire to escape an unacceptable or unbearable situation, and a desire to escape unbearable thoughts (Skogman & Öjehagen, 2003). However, similar to the ‘threat to self’ moderators between defeat/humiliation to entrapment, the IMV model

identifies specific ‘motivational’ moderators that make the transition between entrapment and suicidal ideation and intent more or less likely.

Positive future thinking is hypothesised to moderate the relationship between entrapment and suicidal ideation and intent because it can buffer against getting stuck in the ‘tunnel vision’ of perceiving suicide as the only escape route away from pain (O'Connor & Kirtley, 2018). Entrapment is said to occur when there is impaired positive future thinking (no rescue), and is distinct from hopelessness (Qiu, Klonsky, & Klein, 2017), which is a cognitive style marked by negative attributions and a pervasive sense of pessimism about the future (Beck, Steer, Kovacs, & Garrison, 1985). In a 4-year longitudinal study ($N = 70$ patients hospitalised for a suicide attempt), entrapment, but not hopelessness, predicted repeat suicidal behaviour (O'Connor, Smyth, Ferguson, Ryan, & Williams, 2013). When a trapped individual is able to engage with attainable positive future thinking (MacLeod, Pankhania, Lee, & Mitchell, 1997; O'Connor, Smyth, & Williams, 2015; Rasmussen et al., 2010), two other associated motivational moderators become possible; adaptive goal pursuit (O'Connor, Fraser, Whyte, MacHale, & Masterton, 2009) and reasons for living (Linehan, Goodstein, Nielsen, & Chiles, 1983). In a sample of 144 repeat self-harm patients, impaired positive future thinking, but not hopelessness, predicted suicidal ideation at a 2.5 months follow-up (O'Connor, Fraser, Whyte, MacHale, & Masterton, 2008). Conversely, some factors are hypothesised to increase the risk that an individual will increasingly view suicide as the only salient option left for them to pursue. This is particularly the case when an individual perceives, or indeed has, little or no social support (Chang, Chan, & Yip, 2017), and they becomes depleted of resilience (Johnson, Gooding, Wood, & Tarrier, 2010).

The two final motivational moderators derive from the interpersonal states identified by the established Interpersonal Theory of Suicide as being the most

proximal causal antecedents of suicidal ideation (Joiner, 2005; Van Orden et al., 2010). Here, suicidal ideation is said to emerge when the fundamental human need to belong is not being met (thwarted belongingness), combined with the fact that the individual perceives they have nothing to contribute and are a burden on others (perceived burdensomeness). There is substantial evidence in support of the joint influence of thwarted belongingness and perceived burdensomeness in predicting suicidal ideation (e.g., Chu, Buchman-Schmitt, et al., 2017; Chu, Walker, et al., 2017; Cox et al., 2011; Joiner et al., 2009; Testa et al., 2017; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). However, recent reviews have identified inconsistencies across studies and samples in the magnitude of effect sizes for each construct, as well as the interaction between them (Chu, Buchman-Schmitt, et al., 2017; Ma, Batterham, Calear, & Han, 2016). These inconsistencies suggest that further exploration and refinement is needed to specifically explore *how* thwarted belongingness and perceived burdensomeness influence the suicidal process.

1.2.3 Phase 3: Volition

The final phase of the IMV model is volition for suicide, which manifests as engaging in suicidal behaviour, defined as the enactment of a suicidal attempt or death by suicide. However, the transition from suicidal ideation and intent to suicide behaviour is not inevitable, nor is it automatic. The IMV model proposes that several ‘volitional’ moderators are vital to determining the conditions and situations in which an individual will act on their thoughts and intent for suicide.

Volitional moderators can be environmental, social, psychological and physiological in nature. Having ready access to the means by which the suicidal individual intends to kill him or her self is an established environmental risk factor for suicide (Chu et al., 2015; Hawton, Saunders, & O'Connor, 2012; Stanley & Brown, 2012). Social volitional moderators include the amount of exposure a

suicidal individual has had to the suicidal behaviour of others. This may include exposure to the suicide behaviour of family and friends, and the desire to want to imitate them, or exposure to traditional and social media portrayals of suicidal behaviour that can include glamorising the act or increases the salience of suicide as an option when the suicidal individual is looking for an escape from their pain (Andriessen, Rahman, Draper, Dudley, & Mitchell, 2017). From a psychological aspect, the IMV model predicts that the suicidal individual who has a detailed plan of their suicide attempt is more likely to die by suicide than those without a plan (O'Connor & Kirtley, 2018). How impulsivity fits with this planned approach remains uncertain, but the relationship between impulsivity and suicide is well established (Gvion, 2018). It may be that impulsivity relates to the suicidal act as opposed to impulsivity as a personality trait (Klonsky & May, 2015a).

The remaining volitional moderators derive from Joiner's Interpersonal Theory of Suicide (Joiner, 2005; Van Orden et al., 2010). Here, the desire to enact lethal self-injury (developed from a combined sense of thwarted belongingness and perceived burdensomeness within the motivational phase) can only be acted upon once an individual has acquired the capability to do so. Acquired capability is developed when an individual becomes psychologically and physiologically desensitized, via exposure and habituation, to physical pain and fear of death. Recently, mental imagery has started to demonstrate a strong influence on acquiring the capability for self-harm, as suicidal individuals imagine themselves dead or dying, and/or they engage in mental rehearsals of their suicide plan in the lead up to making a suicide attempt (George, Page, Hooke, & Stritzke, 2016; Hales, Deepro, Goodwin, & Holmes, 2011; Holaday & Brausch, 2015; Van Orden et al., 2010).

1.2.4 A Feedback Loop between Suicidal ideation/intent and Behaviour

A very recent addition to the IMV model is the recognition that the transition

from suicidal ideation and intent to suicidal behaviour is not always linear (O'Connor & Kirtley, 2018). If a person does not die by suicide following an attempt, they are statistically more likely to make another attempt (Hawton et al., 2012). Therefore the individual who has attempted but does not die by suicide returns once again to the process of thinking about suicide and building the intent (motivation) to make a second, or other subsequent suicide attempt. This feedback loop is explained by the IMV model through the lens of the 'differential activation model' of suicide (Teasdale & Dent, 1987; Williams, Barnhofer, Crane, & Beck, 2005; Williams, Crane, Barnhofer, & Duggan, 2005), which posits that associations made when an individual experiences a low mood will likely be triggered again when the individual encounters similar mood states. Over time, the neural pathways linking these associations with a particular mood are formed quicker and are felt more intensely. Within the context of suicide risk, an individual who thinks about suicide as an option when they experience a low mood will most likely arrive at suicide as a solution to their problems at a much faster rate and with more intensity when faced again with a similar low mood (Williams, Barnhofer, et al., 2005; Williams, Crane, et al., 2005). The IMV model now reflects this dynamic and sometimes cyclical relationship by including a feedback loop between suicidal ideation and intent in the motivational phase and suicidal behaviour in the volitional phase (Figure 1.1)

1.3 The Problems with the Motivational Phase

The focus of the present thesis is on testing the relationships between constructs hypothesised to mark the transition through the motivational phase of the IMV model. However, prior to performing any temporal analyses, a review of the literature highlights several concerns regarding the potential overlap of defeat and entrapment, and the simplicity of the hypothesised *linear* progression from feelings of defeat/humiliation to entrapment and from entrapment to a combined construct of

suicidal ideation and intent.

1.3.1 Defeat and Entrapment - A Single Construct?

There are several inconsistencies in the literature regarding the distinctiveness, and therefore the ability to separate, the constructs of defeat and entrapment. First, at a conceptual level, entrapment is defined in terms of appraisals of, or experience of defeat –“the IMV model posits that the experience of defeat/humiliation from which there is no escape, *that is, entrapment*, is the key driver of suicidal ideation” (O’Connor & Portzky, 2018, p. 15). That is, the two constructs are confounded in that one (entrapment) is defined in terms of the other (defeat). Second, numerous studies investigating the constructs of defeat and entrapment have consistently found them to correlate very highly, ranging from .73 to .91 (Dhingra et al., 2016; Griffiths, Wood, Maltby, Taylor, & Tai, 2014; O’Connor et al., 2013; Owen, Dempsey, Jones, & Gooding, 2018; Panagioti, Gooding, & Tarrier, 2012; Rasmussen et al., 2010; Tarsafi, Kalantarkousheh, & Lester, 2015; Taylor, Gooding, et al., 2010; Taylor, Gooding, Wood, Johnson, & Tarrier, 2011; Taylor, Wood, Gooding, & Tarrier, 2010; Tucker et al., 2016; Wetherall, Robb, & O’Connor, 2018). This strongly suggests that they are measuring a single construct. Third, the conceptual and correlational overlap of defeat and entrapment is supported by several exploratory and confirmatory factor analyses. When responses to Gilbert and Allan’s (1998) 16-item defeat scale and 16-item entrapment scale were analysed, a single factor construct was consistently evidenced across cross-sectional and longitudinal study designs, and with good test-retest reliability (Griffiths et al., 2015). These results are consistent across different samples including students (Sturman, 2011; Taylor et al., 2009), economically deprived adults (Griffiths et al., 2014), people with post-traumatic stress disorder, people with psychosis, care home employees, and people from community settings (Griffiths et al., 2015). Therefore

the justification to separate the constructs of defeat and entrapment in a hypothesised temporal sequence is largely unsupported by the evidence. One recent study using network analysis argues that defeat and entrapment should be viewed as distinct constructs. However, the authors go on to note that defeat and entrapment remain highly associated (Forkmann, Teismann, Stenzel, Glaesmer, & De Beurs, 2018).

1.3.2 Defeat as a Predictor of Entrapment.

There is currently a dearth of studies that test the defeat to entrapment pathway, and certainly a lack of any strong empirical evidence to support this relationship. Recently, Wetherall (2018) claimed that entrapment mediated the relationship between defeat and suicidal ideation in a sample of 422 community adult participants who completed an online survey. However, as the data were cross-sectional, no claims of temporality can be made. Prospectively, in a sample of 80 adult participants who had a primary diagnosis of bipolar disorder (I or II) and a self-reported history of suicidal ideation and/or suicide attempt, Owen et al. (2018) did not find that defeat at baseline predicted entrapment at 4-month follow-up ($p = .08$), and only found partial evidence that the relationship between defeat at baseline and suicidal ideation at follow-up was mediated by entrapment at follow-up. Combined with the evidence that defeat and entrapment overlap to the extent that they are better conceptualised as a single construct, the hypothesis that defeat necessitates the onset of entrapment is not well supported.

1.3.3 Entrapment as a Predictor of Suicidal Ideation and Suicidal Intent

In the second step of the motivational phase, there is inconsistent evidence that entrapment leads to suicidal ideation and no known studies that have investigated a direct pathway from entrapment to suicidal intent. Whilst several cross-sectional claim an association between entrapment and suicidal ideation (De

Beurs et al., 2018; Forkmann & Teismann, 2017; Li et al., 2018; Rasmussen et al., 2010; Shelef, Levi-Belz, Fruchter, Santo, & Dahan, 2016; Siddaway, Taylor, Wood, & Schulz, 2015; Teismann & Forkmann, 2015; Wetherall et al., 2018), others did not (Gooding et al., 2017; Tucker et al., 2016). Moreover, the lack of prospective designs in each of these studies precludes inferences about temporality. Instead of, or as well as entrapment leading to suicidal ideation, De Beurs et al. (2018) hypothesise that suicidal ideation may predict entrapment. That is, there may be a feedback loop between entrapment and suicidal ideation. Prospectively, contrary to the hypothesised pathway within the IMV model, entrapment did not predict suicidal ideation at 12-month follow-up (Taylor, Gooding, Wood, Johnson, et al., 2011). Neither did the authors find evidence for a reverse association where suicidal ideation predicted entrapment. They suggest that the study may have lacked the required power to detect any prospective association. Therefore, it remains to be established if there is a temporal association between entrapment and suicidal ideation/intent, and if only one predicts the other, or if both predict each other reciprocally. Finally, no studies to date have examined the pathway to suicidal ideation as being distinct from the pathway to suicidal intent within the hypothesised framework of the IMV model. This gap warrants further exploration.

1.4 Proposing a Modified Motivational Framework to the IMV Model

As described above, the current literature has raised several issues with the hypothesised framework of the motivational phase of the IMV model. In sum, (a) evidence suggest that defeat and entrapment are better conceptualised as a single construct, (b) there is a lack of evidence demonstrating the temporal progression from defeat to entrapment and from entrapment to suicidal ideation, and (c) no studies have examined if the pathway to suicidal ideation is separate to the formation of suicidal intent within the framework of the IMV model. The current thesis

proposes two modifications to the motivational phase prior to testing the temporal associations between the proposed key constructs. Firstly, rather than moderating the relationship between defeat and entrapment rumination is elevated to a direct and proximal predictor of entrapment and, secondly, that the development of suicidal ideation be considered separately from the development of suicidal intent (Figure 1.2).

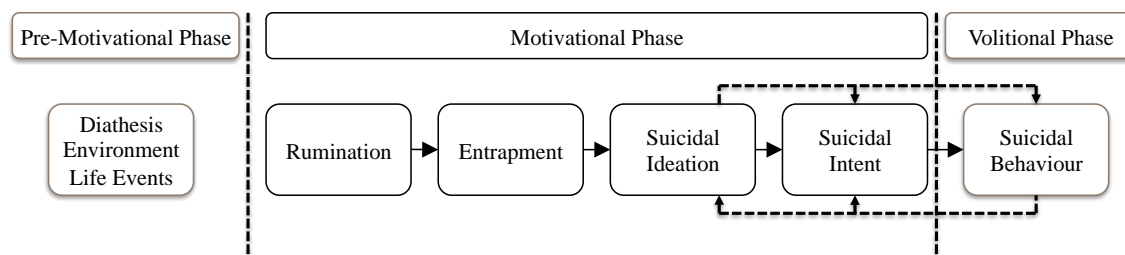


Figure 1.2. Hypothesised modified motivational framework of the IMV model.

Note: This modified model depicts a direct relationship from rumination to entrapment and the development of suicidal ideation and suicidal intent as separate and sequential.

1.4.1 Rumination as an Antecedent to Entrapment

Whilst the IMV model currently posits that defeat leads to entrapment, O'Connor et al. (2013) notes that how entrapment develops is actually poorly understood. Rumination, defined as the focused attention on the symptoms and possible causes and consequences of one's distress (Nolen-Hoeksema, 1991), may not just be a threat to self moderator, but may be integral to the development of suicidal ideation, via its antecedent and direct relationship with entrapment (O'Connor & Portzky, 2018). Moreover, similar to the feedback loop between the motivational and volitional phases of the IMV model, and the hypothesised feedback loop between entrapment and suicidal ideation (De Beurs et al., 2018), Li et al. (2018) hypothesised that the relationship between rumination and entrapment may also be dynamic and cyclical.

To date, there is only preliminary evidence to support a relationship from

rumination to entrapment. In one study of 1,809 healthy university students who completed anonymous self-report surveys, latent variable modeling techniques were performed on the IMV model's constructs to reveal evidence for a direct association between brooding rumination and entrapment (Dhingra et al., 2016). Additionally, in both an online community sample ($n = 142$) and in an outpatient sample ($n = 226$), self-report levels of entrapment mediated the relationship between self-report levels of rumination, as measured by the perseverative thinking questionnaire, and suicidal ideation (Teismann & Forkmann, 2015). Similarly, in another study of adult psychiatric patients who had been hospitalised for suicidal ideation or a suicide attempt ($N = 200$), entrapment fully mediated the relationship between 'ruminative flooding', defined as perseverative thinking involving continual thoughts about the causes, meaning, and consequences of one's negative mood, and suicidal ideation (Li et al., 2018). Conversely, neither of these latter two studies found that rumination mediated the relationship between entrapment and suicidal ideation, and therefore the reciprocal relationship from entrapment to rumination hypothesised by Li et al. (2018) was not supported. However, as all the above studies employed cross-sectional designs, no temporal or causal inferences can be made. From a theoretical viewpoint, a temporal relationship from entrapment to rumination is plausible. If entrapment is experienced as intense negative affect, one would expect based on the emotional cascade model (Selby, Anestis, Bender, & Joiner Jr, 2009) that entrapment increases attention to the emotional stimuli which prompt and sustain ruminative suicidal thoughts (e.g., perceptions of burdensomeness and thwarted belongingness). That is, entrapment can further increase ruminations. Such a reciprocal relationship between entrapment and ruminations about the factors underlying suicidal desire would result in a pernicious bi-directional feedback loop (cf., Selby et al., 2009). Therefore, there is a need for longitudinal data to determine if there is indeed a

feedback loop between rumination and entrapment, and for experimental studies to further determine the nature of causality.

1.4.2 Rumination about Suicide-Specific Constructs

A limitation of existing studies that investigate the role of rumination in suicide risk, is that the rumination scales employed are predominately derived from the depressive literature and are not grounded in any specific theoretical models of suicide (see Morrison & O'Connor, 2008a, for a review). Brooding rumination is the style of rumination hypothesised by the IMV model as being a threat to self moderator. Brooding rumination also derives from the depression literature, specifically, response style theory (Nolen-Hoeksema, 1987). However, the five items that comprise the brooding rumination sub-scale were selected from the ruminative response scale (Nolen-Hoeksema, 1991) as being items unconfounded by depressive content (Treyner et al., 2003). Still, the items appear to only assess the frequency (never, sometimes, often, always) of negative thoughts about the role of self in regards to external situations/experiences, when feeling sad, down or depressed (“think what am I doing to deserve this”, “think why do I always react this way”, “think about a recent situation wishing it had gone better”, “think why do I have problems other people don’t have”, and “think why can’t I handle things better”). As such, these items are argued to overlap with self-criticism (Treyner et al., 2003) and self-blame (Roberts, Gilboa, & Gotlib, 1998). Therefore, the brooding rumination scale does not assess cognitions specific to suicide-related constructs. Consequently, there is a consistent call for the development of a rumination scale that can assess suicide-specific constructs (Johnson, Tarrier, & Gooding, 2008; Kerkhof & van Spijker, 2011; Morrison & O'Connor, 2008a; Rogers & Joiner, 2017; Teismann & Forkmann, 2015). Moreover, such a scale would be of greater value if it were not only reliable, but theoretically-driven, brief, and did not include leading or

confronting questions (Chamberlain et al., 2009).

As a first response to addressing this need, the recent Suicide Rumination Scale (Rogers et al., under review) was developed to assess the “repetitive mental fixation on one’s suicidal thoughts, intentions and plans” (Rogers & Joiner, 2018b, p. 78). Conceptually therefore, the suicide rumination scale assesses ruminations that occur *following* the onset of suicidal ideation. Half the items appear to capture broadly the repetitive, inescapable nature of suicide-related thoughts without reference to specific content (e.g., when I have thoughts of suicide “I cannot ‘turn off’ / ‘escape’ these thoughts”), and the other half refer to only one specific content of ruminative thoughts (i.e., methods to die; e.g., when I have thoughts of suicide “I think about how I want to kill myself” / “imagine what killing myself with different methods would be like”). If the onset of these suicide-specific ruminations is predicted to occur post suicidal ideation, it is reasonable to hypothesize that they would occur more proximally to suicidal behaviour. Two studies indeed support this hypothesis. First, responses to the suicide rumination scale have been found to be associated with a retrospective lifetime suicide attempt over and above other suicide risk factors including general rumination and suicidal ideation, in both undergraduate students ($N = 300$) and a community sample ($N = 209$) who reported a lifetime history of suicidal ideation (Rogers & Joiner, 2018b). In a subsequent study of the same undergraduate students ($N = 300$), it was further discovered that after controlling for depressive rumination, the indirect effect of suicide-specific rumination on lifetime suicide attempts was only significant through suicidal intent and not through social alienation, self alienation, or over arousal, the other symptoms of acute suicidal affective disturbance (Rogers & Joiner, 2018a). These two studies are based on cross-sectional/retrospective designs and therefore the temporal and causal dynamics between suicide-specific ruminations and suicidal thoughts and

behaviours remains untested. Nonetheless, these preliminary findings suggest that the suicide rumination scale is measuring ruminations at the latter step of the motivational phase of the IMV model. That is, *post* the onset of suicidal ideations but *prior* to suicidal intent. Thus, the scale is not suitable for assessing ruminations about constructs that precede and are thought to cause suicidal ideations. Therefore, the present thesis offers a different conceptualization of suicidal rumination to that of brooding rumination, which is specified by the IMV, and that is different to rumination that can occur post onset of suicidal ideation, as measured by the Suicide Rumination Scale (Rogers et al., under review). Instead, the current thesis suggests a measure of rumination about constructs known to be antecedents of suicide.

It is plausible and likely that ruminative processes would also have a role in the earlier stage of the motivational phase. That is, ruminative processes *lead* to suicidal ideation in the first place. Further, if suicide-specific rumination is a mechanism that intervenes between suicidal ideation and suicidal intent (Rogers & Joiner, 2018a), then it is also plausible and likely that suicidal ideation and suicidal intent are two separate steps in the pathway to suicidal behaviour. This potential separation warrants further research with longitudinal studies to examine temporal directionality (see also, Sharaf, Lachine, & Thompson, 2018).

1.5 Outline of Research Program

The primary aims of the present thesis were to a) rigorously test the temporal pathway to suicidal ideation and intent using constructs proposed by the motivational phase of the integrated motivational-volitional model of suicidal behaviour (O'Connor, 2011; O'Connor & Kirtley, 2018), and b) based on the emotional cascade model (Selby et al., 2009), test for feedback loops within the motivational phase.

As described in detail above, the conceptual and empirical overlap between defeat and entrapment means the first step in the motivational phase of the IMV

model warrants modification. That is, rather than defeat leading to entrapment, we test the possibility that rumination leads directly to entrapment. However, whilst one recent suicide-specific rumination scale measures ruminations *post* suicidal ideation (Rogers & Joiner, 2018b), there are currently no rumination scales based on suicide-specific theory that measure ruminations *leading* to suicidal ideation.

Therefore, in **Chapter 2**, a novel rumination scale based specifically on the three factors posited by the Interpersonal Theory of Suicide (Joiner, 2005) to be causally and proximally related to suicidal ideation and behaviour is developed and tested for reliability and validity. The Ruminations about Antecedents of Suicide Scale (RASS) assesses how *ruminative* an individual's thoughts are regarding the feelings of loneliness and of not belonging, ruminating about being a burden on others, and ruminating about fear of death and pain and the strategies for overcoming those fears. In the second study of Chapter 2, we further test the incremental validity of the RASS scale over and above the interpersonal needs questionnaire (INQ; Van Orden et al., 2012), and brooding rumination. The INQ is currently used to provide a state-based assessment of the interpersonal constructs, and brooding rumination is the specific style of rumination posited by the IMV model as a threat to self moderator (Treyner et al., 2003). Armed with a rumination scale that captures the constructs known to be specifically antecedent to suicide, the primary aim of rigorously testing a modified version of the motivational phase of the IMV model can begin.

In **Chapter 3**, longitudinal data from a two-month follow-up assessment was used to test the temporality between constructs proposed by the motivational phase of the IMV model, in a modified framework. That is, autoregressive cross-lagged panel analyses were used to test all temporal relationships between rumination (as measured by the newly developed rumination about antecedents of suicide scale),

entrapment, suicidal ideation, and suicidal intent. Of particular interest is if the temporal relationship between rumination and entrapment, as hypothesised by Li et al. (2018), is reciprocal when using prospective data and being able to further elucidate the inconsistent data surrounding the temporal relationship between entrapment and suicidal ideation. To date, there are no studies that have directly explored suicidal ideation and suicidal intent as potentially separate steps in the motivational pathway (O'Connor & Kirtley, 2018). However it is important, timely, and warranted to determine if there is evidence to justify the formation of suicidal ideation as being a distinct, albeit perhaps overlapping, process to the formation of suicidal intent. Recent evidence suggests that this may be the case with one style of suicide-specific ruminations being found to occur post suicidal ideation but prior to suicidal intent (Rogers & Joiner, 2018a, 2018b).

A university student sample was chosen for this chapter's study for several reasons. Across the lifespan, the prevalence of suicidal ideation is highest in adolescence and young adulthood (Nock et al., 2008), and suicide accounts for over one-third (36%) of deaths amongst 15-24 year olds. University students not only predominately capture this life period, but rates of suicidal ideation (44% - 51%) and past suicide attempts (13% - 16%) are consistently higher in university students (Collins, Stebbing, Stritzke, & Page, 2017; Collins, Stritzke, Page, Brown, & Wylde, 2018; George, Collins, Cao, Stritzke, & Page, 2017; George et al., 2016) than in the general population, where estimated global rates of suicidal ideation are 9.2% and suicide attempts are 2.7% (Nock et al., 2008). Therefore university students are a particularly relevant sample for exploring the motivational path to suicidal ideation and suicidal intent. In addition, a short time frame of two-months was chosen for the follow-up in this prospective study because early detection of suicidal ideation is critical given the extremely elevated risk of making a suicide attempt within 12

months following onset of suicidal ideation (Nock et al., 2008).

In **Chapter 4**, the temporal relationship from entrapment to rumination established in chapter 3 is further tested to determine causality. To do this, a modified version of an existing experimental analogue paradigm – the interpersonal persistence task (Collins, Best, Stritzke, & Page, 2016), is employed and the construct of entrapment is manipulated. Participants are recruited on the basis of being either high or low ruminators to begin with and randomly allocated to the experimental conditions. Subsequently, the frequency and intensity of post task ruminations that participants experience is captured by both behavioural and self-report measures. A result showing that entrapment causes rumination would be a novel contribution to the suicide literature and have both theoretical and clinical implications.

Finally, the general discussion in **Chapter 5** summarises the findings from the previous empirical chapters and reviews how the results can advance both theory and clinical practice. The knowledge gained from this research program demonstrates that the challenge for current theories of suicide is to stop viewing the 'pathway' to suicide as linear and to start accounting for potentially dynamic and reciprocal influences of the putative causal factors along and between both the motivational and volitional phases. Ruminating about the interpersonal antecedents of suicidal desire and one's capacity for self-harm may induce pernicious feedback loops, which, without intervention, may eventually create a 'cognitive suicidal prison'. That is, where someone feels so hopelessly trapped that he or she believes the only salient solution for escape is suicide.

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Chapter 2 Ruminations about Antecedents of Suicide: Scale Development and Validation

2.1 Abstract

Most existing measures of rumination are focused on factors proposed within the depressive literature, or focus on general ruminations more broadly. The aim of the present two studies was to develop and validate a reliable measure of rumination that can assess for factors posited to be causally and proximally related to suicide. The Interpersonal Theory of Suicide (Joiner, 2005) posits that a desire for suicide arises due to feelings of thwarted belongingness and perceived burdensomeness, and that suicide behaviour may ensue if acquired capability is also present. Therefore, based on these three factors, the present study developed the Ruminations about Antecedents of Suicide Scale (RASS). In study 1a, 598 university students completed an online version of the RASS. The RASS showed good reliability ($\alpha = .95$), and had concurrent validity with several related constructs including positive correlations with suicidal ideation, hopelessness, distress, entrapment, and negative correlations with zest for life, flourishing, and mindfulness. Confirmatory factor analytic models and model-based reliability estimates demonstrated that despite some multidimensionality, it is appropriate to calculate and interpret the RASS as a unidimensional instrument.

Study 1b used an independent sample ($N=63$), to further demonstrate that the RASS has incremental validity in explaining suicidal ideation over and above the Interpersonal Needs Questionnaire (INQ) and brooding rumination. Moreover, ruminations about antecedents of suicide mediated the relationship between the INQ and suicidal ideation. The RASS may be useful for testing theoretically models of why people suicide and for assessing the potential onset of suicidal ideation.

2.2 Introduction

More than 800,000 deaths each year are attributed to suicide which makes suicide the second leading cause of death by injury worldwide (WHO, 2017). For every person who dies by suicide approximately 20 more will make a suicide attempt (World Health Organization, 2014). Additionally, lifetime suicidal ideation is even greater, at an estimated global rate of 9.2% (Nock et al., 2008). As suicidal ideation is a necessary, albeit not sufficient, mechanism for future suicide behaviour (Taylor et al., 2007), it is imperative that we understand what mechanisms lead to the development of suicidal ideation if we are to find early points of targeted intervention to prevent future suicidal behaviours.

Moreover, early detection of suicidal ideation is crucial. The odds ratio of making a suicide attempt is extremely elevated within the first 12 months following onset of suicidal ideation (OR=117.4 - 123.1), and decreases substantially thereafter (OR=1.5 - 4.4) (Nock et al., 2008). Additionally, a suicide attempt that does not result in death will often result in other deleterious effects such as physical injury, long-term disability, or serious psychological distress; which is likely to extend to the individual's family and friends (Borges et al., 2010). Therefore, focusing on early identifying, measuring, and inhibiting, the self-harming cognitions that lead to the onset of suicidal ideation may be key to preventing the escalation of suicide risk (Cohen, Mannarino, & Deblinger, 2016).

Rumination (i.e., focused attention on the symptoms and possible causes and consequences of one's distress) has been shown by longitudinal evidence to consistently precipitate suicidal ideation (Batterham & Christensen, 2012; Krajniak, Miranda, & Wheeler, 2013; Miranda & Nolen-Hoeksema, 2007; Morrison & O'Connor, 2008b; O'Connor et al., 2007; O'Connor & Noyce, 2008; Smith, Alloy, & Abramson, 2006). However, most previous studies focus on depression-based

rumination, or measures of general rumination more broadly, not on suicide-related ruminations that are based on theoretical models of suicide (see Morrison & O'Connor, 2008a, for a review). Consequently, several authors have highlighted the need for a measure that can assess ruminations about suicide-specific constructs (Johnson, Tarrier, et al., 2008; Kerkhof & van Spijker, 2011; Morrison & O'Connor, 2008a; Rogers & Joiner, 2017; Teismann & Forkmann, 2015).

The recent Suicide Rumination Scale (SRS; Rogers & Joiner, 2018b) assesses for suicide-specific rumination, which the authors define as a current “repetitive mental fixation on one’s suicidal thoughts, intentions and plans” (Rogers & Joiner, 2018b, p. 78). The SRS items broadly capture either the repetitive, inescapable nature of suicide-related thoughts without reference to specific content (e.g., “cannot ‘turn off’ these thoughts”), or one specific type of content of ruminative thoughts (i.e., methods to die; e.g., “think about how I want to kill myself”). Therefore, the SRS assesses for ruminations about suicide that *follow* the onset of suicidal ideation.

The SRS does not appear to assess ruminative thoughts that *lead to* suicidal ideation. Certainly, thinking about different methods of self-harm contributes to acquiring capability for acting on the desire to die and facilitates the transition from suicidal ideation to action (George et al., 2016; Joiner, 2005). However, it would be equally important to assess ruminations about the interpersonal factors thought to causally and proximally contribute to suicidal ideation.

The Present Studies

We developed and validated a suicide-specific rumination scale based on the three factors posited by the Interpersonal Theory of Suicide to be antecedent to suicide (Joiner, 2005). According to the Interpersonal Theory of Suicide, a desire for suicide occurs when one’s need to belong has not been met (thwarted belongingness), together with a perception that one has become a burden on others

(perceived burdensomeness). The theory further posits that the desire for suicide can only be acted upon once an individual has desensitised to physical pain and fear of death (acquired capability).

We therefore constructed the Ruminations about Antecedents of Suicide Scale (RASS) to measure how ruminative an individual's thoughts are regarding the three core constructs from the Interpersonal Theory of Suicide. That is, ruminating about feelings of loneliness and of not belonging, ruminating about being a burden on others, and ruminating about strategies for overcoming fear of pain and death. Items pertaining to thoughts about thwarted belongingness and perceived burdensomeness were adapted from the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012), and items pertaining to acquired capability were adapted from the Acquired Capability With Rehearsal for Suicide Scale (ACWRSS; George et al., 2016).

Confirmatory factor analyses (CFA) were used to determine what internal structure for the RASS was best supported by the data. CFA is appropriate because the RASS is based on existing theory, item wording is based on existing scales measuring thwarted belongingness, and perceived burdensomeness (INQ), and acquired capability (ACWRSS), and because existing empirical research has consistently shown these three constructs to be proximally related to suicide (Chu, Buchman-Schmitt, et al., 2017). Therefore, we hypothesised that a three-factor model representing ruminations about thwarted belongingness, perceived burdensomeness, and acquired capability would offer the best fit. However, given that perceived burdensomeness and thwarted belongingness have consistently been observed to highly correlate, (e.g., .70, Anestis, Bender, Selby, Ribeiro, & Joiner, 2011; Tucker et al., 2013), bifactor analysis with model-based reliability estimates were used to determine if it is permissible to interpret the RASS as a unidimensional measure,

despite the presence of some multidimensionality (Reise, Scheines, Widaman, & Haviland, 2013).

Independent samples were then used to test the RASS for two types of validity. The first sample was used to test for concurrent validity, which would be evidenced by positive associations between the RASS and other suicide risk factors such as suicidal ideation (Millner et al., 2017), hopelessness (David Klonsky, Kotov, Bakst, Rabinowitz, & Bromet, 2012; Kuo, Gallo, & Eaton, 2004), psychological distress (Anestis, Pennings, Lavender, Tull, & Gratz, 2013; Martin, Thomas, Andrews, Hasking, & Scott, 2015; Tang, Byrne, & Qin, 2018), and entrapment (Dhingra et al., 2016; Ehring et al., 2011; Li et al., 2018). Entrapment is theorised by the Integrated Motivational-Volition Model of Suicidal Behaviour to be associated with rumination because rumination is posited to moderate the relationship between defeat and entrapment (O'Connor, 2011; O'Connor & Kirtley, 2018). Concurrent validity would further be evidenced by negative correlations with life-sustaining constructs such as zest for life (Collins et al., 2016; Collins et al., 2018; George, Stritzke, Page, Brown, & Wylde, 2019), flourishing (Huppert & So, 2013) and mindfulness (Chesin & Jeglic, 2016; Chesin et al., 2015; Collins et al., 2017).

The second sample was used to test for incremental validity. As there is likely to be a significant correlation between the RASS and the INQ because of the shared wording on these two scales, it is important to demonstrate that *ruminating* about thwarted interpersonal needs predicts suicidal ideation over and above a state-based feeling of not belonging and of being a burden. Additionally, as previous suicide-related studies have used measures of more general ruminations such as brooding, it is also important to show that the RASS can predict variance in suicidal ideation over and above brooding rumination. To test incremental validity, hierarchical regression analyses were performed.

2.3 Confirmatory Factor Analysis and Psychometric Properties of the RASS.

2.4 Method

Participants

Participants comprised 598 university students. Most identified as female (69%); two people reported their gender as 'other'. Participants ranged in age from 17 to 74 ($M = 25.14$, $SD = 9.90$). Self-reported ethnicity included Australian / New Zealand (49%), European (25%), Asian (17%), Other (9%). Average psychological distress ($M = 22.37$, $SD = 8.43$) fell just within the 'high distress' range, which is comparable with other university cohorts (Australian Bureau of Statistics, 2018; Stallman, 2010). Nearly half (49.8%) reported suicidal ideation in the past year, and 20.4% were thinking about suicide at least monthly. Further, 13.2% had made at least one suicide attempt in their lifetime, and 5.9% had made multiple attempts.

Materials

Ruminations about Antecedents of Suicide Scale (RASS). According to the Interpersonal Theory of Suicide (Joiner, 2005) suicidal ideation arises from feelings of thwarted belongingness and perceived burdensomeness. Joiner further suggests that acquired capability is required in order to transition from suicidal ideation to suicide behaviour (Joiner, 2005). As suicidal ideation and suicide attempts are highly correlated (Law, Jin, & Anestis, 2018), and the most recent edition of the IMV model hypothesises a feedback loop from suicide behaviour to suicidal ideation (O'Connor & Kirtley, 2018), any measure of rumination about antecedents of suicidal ideation needs to also account for constructs that are antecedent to suicidal ideation *following* a suicide attempt. Therefore, the construct of acquired capability warrants inclusion in such a measure. The 18-item RASS assesses the frequency in which someone engages with thoughts of loneliness and of not belonging (thwarted belongingness), thoughts about being a burden on others

(perceived burdensomeness), and thoughts about strategies for overcoming fear of pain and death (acquired capability). The extent to which a particular thought would stay in a participant's head is measured on a 7-point scale from 0 (*Just fleeting*) to 6 (*All consuming*). Fifteen items were adapted from the Interpersonal Needs Questionnaire (Van Orden et al., 2012) pertaining to thoughts about thwarted belongingness (nine items) and perceived burdensomeness (six items). The three items used to assess rumination about facets of acquired capability were adapted from the facets of the Acquired Capability With Rehearsal for Suicide Scale: fearlessness of death, pain tolerance, and mental rehearsal for self-harm (George et al., 2016). Higher scores indicate higher ruminations about the antecedents of suicide being experienced at this time in the individual's life.

Interpersonal Needs Questionnaire (INQ-15; Van Orden et al., 2012)¹. The 15-item INQ measures thwarted belongingness and perceived burdensomeness using a 7-point scale from 1 (*Not true at all for me*) to 7 (*Very true for me*) with higher scores indicating higher levels of the construct. The INQ-15 has good convergent and predictive validity (Van Orden et al., 2012) and, along with the 10-item INQ, demonstrates the best, most consistent model fit in confirmatory analyses (Hill et al., 2015). Internal consistency in the current sample was good for both burdensomeness ($\alpha = .92$) and belongingness ($\alpha = .91$).

Acquired Capability With Rehearsal for Suicide Scale (ACWRSS; George et al., 2016). The 7-item ACWRSS measures three facets: fearlessness about causing one's own death (e.g., "*Picturing my own death is a very scary thing for me*"), pain tolerance (e.g., "*I can tolerate pain much more than I used to*"), and preparation for suicide (e.g., "*I have gone through in my mind what it would be like to die*").

¹ The 15 item INQ version used here and a 10 item version both demonstrate the best most consistent model fit in confirmatory factor analyses (Hill et al., 2015).

Responses range from 0 (*Not at all*) to 8 (*Very strongly*) with higher scores indicating higher acquired capability for suicide. Internal consistency (α) across different samples range from .74-.91, and test–retest reliability is high ($r = .85$) (George et al., 2016). Internal consistency in the current sample was good ($\alpha = .77$).

Suicidal Ideation (SITBI) (Nock, Holmberg, Photos, & Michel, 2007).

Frequency of past year suicidal ideation was assessed using the single item from the SITBI. Responses ranged from 1 (*Never*) to 6 (*Almost every day*). The SITBI is suitable for non-clinical samples and in a self-report format (Latimer, Meade, & Tennant, 2013). It has good inter-rater reliability, good test-retest reliability, and construct validity has been established using measures of suicide risk (Nock et al., 2007).

Beck Hopelessness Scale (short version BHS) (Forintos, Rózsa, Pilling, & Kopp, 2013). The 4-item short version BHS measures an individual’s thoughts about the future using a 4-point scale from 0 (*Not typical*) to 3 (*Very typical*). An example is “*My future seems dark to me*”. Higher scores indicate higher feelings of hopelessness (Forintos et al., 2013). Internal consistency in the current sample was good ($\alpha = .89$).

The Kessler Psychological Distress Scale (K10; Kessler et al., 2002). The 10-item K10 measures emotional states in the past four weeks using a scale from *none of the time* (1) to *all of the time* (5). High scores indicate heightened psychological distress and probability of mental health diagnoses (Andrews & Slade, 2001). Commonly used 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). Internal consistency in the current sample was good ($\alpha = .92$).

Entrapment Scale (Gilbert & Allan, 1998). The 16-item Entrapment Scale

measures situational entrapment, defined as the perception of things in the outside world that induce escape motivation (10 items; e.g., “*I am in a relationship I can’t get out of*”), and emotional/cognitive entrapment defined as escape motivation triggered by internal feelings and thoughts (6 items; e.g., “*I want to get away from myself*”), on a 5-point scale from 0 (*Not at all like me*) to 4 (*Extremely like me*). Higher scores indicate a higher sense of entrapment. Internal consistency in the current sample was good ($\alpha = .96$).

Zest for Life Scale (George et al., 2019). The 12-item ZLS measures engagement with life, a positive future outlook, and recent depletions of enthusiasm and vigor for life (e.g., “*I am embracing life*”; “*I look forward to each new day*”; “*I feel less alive than I used to*”) on a 9-point scale from 0 (*Agree not at all*) to 8 (*Agree very strongly*). Higher scores indicate greater zest for life. The scale has good psychometric properties (Collins et al., 2016) and internal consistency in the current sample was good ($\alpha = .95$).

Flourishing Scale (Huppert & So, 2013). Flourishing is a combination of feeling good and functioning effectively. The 10-item flourishing scale measures competence, emotional stability, engagement, meaning, optimism, positive emotion, positive relationships, resilience, self-esteem, and vitality. Items are rated on a 5-point scale from 0 (*Strongly disagree*) to 4 (*Strongly agree*), except the two items measuring emotional stability and vitality are rated on a 4-point scale from 0 (*None or almost none of the time*) to 3 (*All or almost all of the time*), and the item measuring positive emotion is rated on a 10-point scale from 0 (*Extremely unhappy*) to 9 (“*Extremely happy*”). Higher scores indicate higher levels of flourishing. Internal consistency in the current sample was good ($\alpha = .91$).

The Mindful Attention Awareness Scale (short version MAAS) (Van Dam, Earleywine, & Borders, 2010). The 5-item MAAS measures dispositional

mindfulness on a 6-point scale from 1 (*Almost never*) to 6 (*Almost always*). An example is “*I find myself doing things without paying attention*”. All items are reverse scored, so that higher scores indicate higher levels of mindfulness. Internal consistency in the current sample was good ($\alpha = .89$).

Procedure

All students at one university ($N = 24,498$) were invited by email to complete an anonymous online version of the Ruminations about Antecedents of Suicide Scale (RASS). This formed part of the University’s Health Promotion Unit survey aimed at “*taking the pulse of student’s well-being, resilience, and psychological distress*”. The survey remained open for two weeks. At any time during the survey, participants could select an option to discontinue and view a list of free campus and community-based mental health resources, which were also shown at the end of the survey. The university’s Human Research Ethics Office approved all procedures and all participants provided informed consent.

Data Analysis

Four competing confirmatory measurement models (unidimensional, three-factor oblique, second-order, and bifactor) were performed to test the internal factor structure of the 18-item RASS. Several fit-indices were used in conjunction with the chi-square to determine model fit (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999; Kline, 2005). The sample size of 598 participants was ample for the current analysis, based on 10 participants per estimated parameter (Schreiber, Nora, Stage, Barlow, & King, 2006). Using box plots and Mahalanobis distance, there were no univariate or multivariate outliers. Responses online were force-choice, meaning participants could not skip any item. Therefore, there were no missing data.

2.5 Results

Descriptive Statistics.

Internal consistency for total RASS in this sample was good ($\alpha = .95$), and there was good internal consistency and composite reliability for each factor, respectively - thwarted belongingness ($\alpha = .94, .91$), perceived burdensomeness ($\alpha = .94, .85$), and acquired capability ($\alpha = .87, .85$).

Evidence of Internal Structure of the RASS

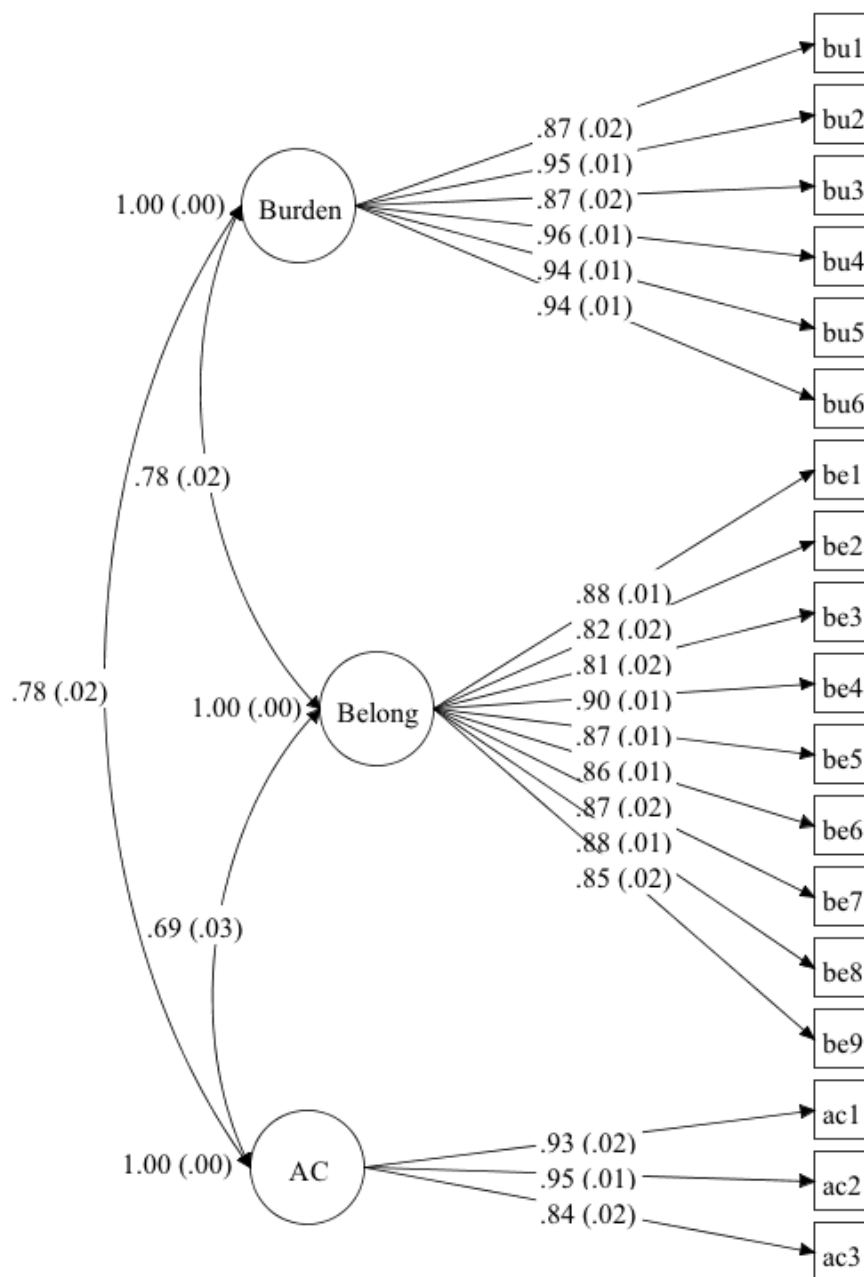
The internal structure of the RASS was tested using a series of confirmatory factor analyses with *Mplus* (Muthén & Muthén, 1998 - 2012). Specifically, unidimensional, three-factor oblique, second-order and bifactor models were all examined, with the three former models being nested in the bifactor model. Model fit was evaluated with several commonly used fit indices. In addition to the chi-square test of model fit and difference testing, the following fit criteria were used and determined acceptable if: Root Mean Square Error of Approximation (RMSEA) $\leq .06$, Comparative Fit Index (CFI) $\geq .95$, Tucker-Lewis Index (TLI) $\geq .95$, and Standard Root Mean Square (SRMR) $< .08$ (Schreiber et al., 2006). The fit statistics for all measurement models are presented in Table 2.1.

The predicted three-factor model representing ruminations about perceived burdensomeness ($M = 3.28, SD = 6.13$), thwarted belongingness ($M = 13.28, SD = 12.74$), and acquired capability ($M = 1.90, SD = 3.44$), provided a good fit, $\chi^2(132) = 536.76, p < .001$. The second-order model revealed an identical structure. Conversely, the one-factor model ($M = 18.46, SD = 19.55$) provided a poor fit, $\chi^2(135) = 1789.99$. Table 2.1 summarises the goodness of fit statistics for all tested models. A chi-square difference test confirmed that the three-factor model provided a significantly better fit than the one-factor model, $\chi^2(3) = 296.22, p < .001$. Figure 2.1 illustrates the CFA for the three-factor model along with a list of the scale items.

Table 2.1. Goodness of Fit Statistics for All Tested Measurement Models of the RASS

Model	<i>Df</i>	χ^2	RMSEA [90% CI]	CFI	TLI	SRMR
Unidimensional	13 5	1789.99	.143 [.137-.149]	.944	.937	.105
3-Factor Oblique	13 2	536.76	.072 [.065-.078]	.986	.984	.041
Second Order	13 2	536.76	.072 [.065-.078]	.986	.984	.041
Bifactor	11 7	574.74	.081 [.074-.088]	.985	.980	.037

Note. All models were statistically significant at the $p < .001$ level. Statistics are based on WLSMV estimation. RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standard root mean square residual.



Item	
bu1	The people in my life would be better off if I were gone
bu2	The people in my life wish they could be rid of me
bu3	The people in my life would be happier without me
bu4	My death would be a relief to the people in my life
bu5	I make things worse for people in my life
bu6	I am a burden on society
be1	I am disconnected from other people
be2	I don't belong
be3	Often I am an outsider in social gatherings
be4	I don't have any caring and supportive friends
be5	I don't experience any satisfying interactions
be6	There isn't anyone whom I could turn to in times of need
be7	The people I interact with rarely care about me
be8	There is no one I am close to
be9	No one cares about me

ac1	How easy it would be to kill myself
ac2	About the steps I would need to take to end my own life
ac3	I can overcome the fear of causing my own death

Figure 2.1. Confirmatory factor analysis of the three-factor Rumination about Antecedents of Suicide Scale, including standardised coefficients and associated scale items.

However, the bifactor model was also determined to be a good fit. Moreover, a chi-square difference test demonstrated that the RASS conforms better to a bifactor structure than the three-factor model $\chi^2(15) = 55.10, p < .001$, and several ancillary bifactor measures also support this conclusion. Specifically, an index of unidimensionality known as the Explained Common Variance (ECV; Reise, Moore, & Haviland, 2010) was calculated at .76 for the general factor, the Percent of Uncontaminated Correlations (PUC), which represents the percentage of covariance terms that only reflect variance from the general dimensions was calculated at .65, and the Coefficient Omega Hierarchical (ωH), which “reflects the percentage of unit-weighted (raw) total scores that can be attributable to the individual differences on the general factor” (Stucky & Edelen, 2014, p.224), was calculated at .87. When PUC values are $< .80$, then general ECV values $> .60$ and (ωH) values $> .70$ suggest that the presence of multidimensionality is not severe enough to disqualify the interpretation of the measure as primarily unidimensional (Reise et al., 2013, p. 22). Moreover, 100% of the 18 items had Individual Explained Common Variance (IECV) coefficients above .50, indicating all items are better measures of the general factor than their respective group factor. Therefore, the RASS may be calculated and interpreted as a unidimensional construct. Table 2.2 summarises the factor loadings for the unidimensional and bifactor solutions for the RASS.

Table 2.2. Confirmatory Factor Analysis Standardized Loadings for the RASS

Group Factor	Uni	Bifactor			AC	IECV
		Gen	Bur	Bel		

Burdensomeness				
i1Bu	0.820	0.769	0.485	0.715
i2Bu	0.918	0.861	0.431	0.800
i3Bu	0.816	0.832	0.223	0.933
i4Bu	0.939	0.911	0.304	0.900
i5Bu	0.917	0.924	0.181	0.963
i6Bu	0.911	0.907	0.242	0.934
Belongingness				
i1Be	0.858	0.740	0.470	0.713
i2Be	0.781	0.669	0.473	0.667
i3Be	0.777	0.670	0.463	0.677
i4Be	0.881	0.717	0.556	0.624
i5Be	0.841	0.703	0.514	0.652
i6Be	0.827	0.711	0.482	0.685
i7Be	0.815	0.774	0.350	0.830
i8Be	0.860	0.735	0.478	0.703
i9Be	0.823	0.683	0.522	0.631
Acquired Capability				
i1AC	0.828	0.767	0.535	0.673
i2AC	0.850	0.782	0.541	0.676
i3AC	0.713	0.704	0.423	0.735

Note. Uni = unidimensional model; Gen = general factor; Bur = perceived burdensomeness group factor; Bel = thwarted belongingness group factor; AC = acquired capability group factor; IECV = individual explained common variance. Loadings are based on WLSMV estimation.

Model-Based Reliability Estimates of the RASS Total and Subscale Scores

Given that the RASS conformed to a bifactor structure, it is necessary to provide model-based reliability evidence to demonstrate that the total and subscale scores truly represent the target constructs of interest. Coefficient Omega (ω) measures true score variance, excluding error variance, and can be adapted to measure the proportion of subscale score variance attributable to all common factors. Coefficient Omega Hierarchical (ω_H) measures the proportion of total score variance attributable to a single general factor after controlling for subscale (group) factors, and Coefficient Omega Subscale (ω_S) measures the proportion of subscale score variance that is uniquely attributable to the subscale (group) factor after accounting for the general factor. It is suggested that when a ω_H is high ($> .80$), total scores can be considered essentially unidimensional, despite the presence of

multidimensionality across items (Reise et al., 2013). It is further suggested that when ω_S subscale scores are $< .50$ then the majority of the subscale's variance is due to the general factor, with negligible unique variance attributable to the group factor (Reise et al., 2013). Table 2.3 summarises the coefficients for ω , ω_H , ω_S , reliability of ω , as well as the explained common variance for the bifactor solution. Results show that ω_H is $> .75$ and all ω_S subscale scores are $< .50$. Therefore, the total score RASS is a sufficiently reliable and appropriate measure of the general construct of ruminations about constructs antecedent to suicide. Moreover, to interpret the subscales as capturing something unique could be misleading.

Table 2.3. Explained Common Variance and Model-Based Reliability Estimates for the RASS

Variance	Gen	Bur	Bel	AC
Omega	.983	.974	.962	.931
Omega hierarchical	.873			
Omega subscale		.111	.300	.286
Reliability of Omega	.888	.114	.312	.307
Explained Common Variance	.755	.126	.314	.309

Note. Gen = general factor; Bur = perceived burdensomeness group factor; Bel = thwarted belongingness group factor; AC = acquired capability group factor.

Concurrent Validity

Concurrent validity was evidenced by significant positive relationships between the RASS and the Interpersonal Needs Questionnaire (.85), acquired capability (.47), suicidal ideation (.60), general psychological distress (.75), hopelessness (.77) and entrapment (.80), and by significant negative relationships with zest for life (-.68), mindful attention awareness (-.46), and flourishing (-.75).

2.6 Discussion

The hypothesised three-factor structure of the Ruminations about Antecedents of Suicide Scale (RASS) was confirmed, reflecting ruminations about perceived burdensomeness, thwarted belongingness, and acquired capability. A strong correlation was found between the RASS and entrapment (.80), which was much stronger than the correlation found between the RASS and suicidal ideation (.60). This is consistent with the Integrated Motivational-Volitional Model of Suicidal Behaviour, which proposes a moderating role for rumination to develop entrapment. Further, the strong correlation between rumination and entrapment suggests that, rather than just being a moderator of variables leading to entrapment as proposed by the integrated motivational-volitional model of suicide, there is a potentially more direct role for rumination; that is, from rumination to entrapment along the motivational pathway toward suicidal ideation and intent.

There was also a strong correlation between total scores on the RASS and the Interpersonal Needs Questionnaire (.83), where the INQ-specific items of the RASS correlating with the Interpersonal Needs Questionnaire at .84 and the AC-specific items of the RASS correlating with the ACWRSS scale at .57. However, this was not unexpected given the shared method variance due to retaining similar wording on the interpersonal needs items. Similar wording was important because the focus was on assessing *how* one experiences specific thoughts about perceived burdensomeness and thwarted belongingness. Nonetheless, it is important to demonstrate that *ruminating* about this content accounts for variance in suicidal ideation above and beyond that already explained by scores on the Interpersonal Needs Questionnaire. It is also important to demonstrate that ruminating about the antecedents of suicide can account for variance in suicidal ideation over and above brooding rumination, a measure of rumination that is not suicide-specific.

Thus, using an independent sample, we tested the incremental validity of the RASS in predicting variance in suicidal ideation over and above that already explained by the Interpersonal Needs Questionnaire and the Brooding Rumination Scale.

2.7 Incremental Validity of the RASS over the INQ and Brooding Rumination.

2.8 Method

Participants

Participants comprised 848 first year university students (547 females, 4 other; $M_{\text{age}} = 19.94$, $SD = 4.98$). Nearly half (46.9%) of the 729 participants who responded to the suicide-related question endorsed experiencing some suicidal ideation in the past year, with 21% saying they were thinking about suicide at least monthly. Furthermore, 8.1% had made at least one suicide attempt in their lifetime and 5.6% had made multiple attempts.

Materials

In addition to the Ruminations about Antecedents of Suicide Scale (RASS), the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012), and the two items from the Self Injurious Thoughts and Behaviours Inventory (Nock et al., 2007), assessing frequency of suicidal ideation in the past year and the number of lifetime suicide attempts, the following rumination scale which is *not specific to suicide* was administered.

Brooding Rumination. (Treyner et al., 2003). The 5-item brooding rumination scale assesses ‘moody pondering’ – “*to think anxiously or gloomily*” (Treyner et al., 2003, p. 251). Participants rate how frequently they think in a particular way from 1 (*Almost Never*) to 4 (*Almost Always*). Example items include “*what am I doing to deserve this?*” and “*why do I always react this way?*” Internal

consistency in the current sample was adequate ($\alpha = .79$).

Procedure

First year university students were invited to complete a range of screening questionnaires in an introductory psychology lab class for recruitment into research projects. Participation was voluntary and all participants were provided with a list of free campus and community-based mental health resources as part of their participation. The university's Human Research Ethics Office approved all procedures and all participants provided informed consent.

Data Analysis

A three-step hierarchical regression analysis was performed to determine if ruminations about the antecedents of suicide explain additional variance in suicidal ideation above and beyond that explained by the INQ and brooding ruminations. A second, hierarchical regression was then performed to determine if brooding rumination explains additional variance in suicidal ideation above and beyond that explained by the INQ and ruminations about the antecedents of suicide. If suggestive of mediation, this will further be tested using PROCESS 2.16.3 (Hayes, 2013; Hayes & Rockwood, 2017).

2.9 Results

Descriptive statistics and correlations for all questionnaires are shown in Table 2.2. Although there was a high correlation between the INQ and the RASS, multicollinearity was not problematic; VIF < 10 (average = 2.78) and tolerance > 0.2 (Field, 2009).

Table 2.2. Descriptive Statistics and Correlations between Variables

	M	SD	1	2	3
1. Suicidal Ideation	1.79	1.06			
2. INQ	34.40	14.25	.53***		
3. Brooding Rumination	11.88	3.46	.38***	.55***	
4. RASS	20.96	18.94	.58***	.83***	.56***

Note: $N = 635$; $*p < .05$, $**p < .01$, $***p < .001$. INQ = Interpersonal Needs Questionnaire; RASS = Interpersonal Suicide-Specific Rumination Scale

The results of the hierarchical regression used to test the contributions of responses on the ruminations about antecedents of suicide scale, the INQ and the brooding rumination scale are depicted in Table 2.3. At Step 1, the INQ explained 28.3% of the variance in suicidal ideation, $F(1, 633) = 250.13$, $p < .001$. At Step 2, brooding rumination explained a significant but small amount (1.2%) of additional variance in ideation, $\Delta F(1, 632) = 11.02$, $p = .001$, but the INQ was a much stronger predictor ($\beta = .46$) than brooding rumination ($\beta = .13$). At Step 3, the addition of ruminations about the antecedents of suicide explained an additional 5.2% of variance, $\Delta F(1, 631) = 50.66$, $p < .001$. Importantly, when ruminations about the antecedents of suicide were accounted for in the model, brooding rumination was no longer a significant predictor of suicidal ideation ($p = .07$). Moreover, ruminations about the antecedents of suicide was a three times stronger predictor of suicidal ideation than the INQ ($\beta = .43$ versus $\beta = .14$).

Table 2.3. Scores on the Ruminations about Antecedents of Suicide Scale as a predictor of Suicidal Ideation over and above Scores on the Interpersonal Needs Questionnaire and the Brooding Rumination Scale.

Variable	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
<i>Step 1</i>				.28***	
Constant	.43	.09			
INQ	.59	.04	.53***		
<i>Step 2</i>				.30***	.01**

Constant	.14	.13		
INQ	.51	.04	.46 ^{***}	
Brooding Rumination	.20	.06	.13 ^{***}	
<i>Step 3</i>				
				.35 ^{***} .05 ^{***}
Constant	.68	.15		
INQ	.15	.07	.14 [*]	
Brooding Rumination	.11	.06	.07	
RASS	.43	.06	.43 ^{***}	

Note: $N = 635$; $*p < .05$, $**p < .01$, $***p < .001$. INQ = Interpersonal Needs Questionnaire; RASS = Ruminations about Antecedents of Suicide Scale

Similarly, Table 2.4 shows when the two rumination variables are entered in reverse order, with ruminations about the antecedents of suicide entered first at Step 2 and then brooding rumination at Step 3, brooding rumination does not explain any significant additional variance, $\Delta F(1, 631) = 3.24$, $p = .07$. Because the predictive strength of the INQ is greatly reduced from $\beta = .53$ at Step 1 to $\beta = .16$ at Step 2 once ruminations about the antecedents of suicide are in the model, this suggests that the association between the INQ and suicidal ideation is partly mediated by ruminations about the antecedents of suicide.

Table 2.4. Scores on the Brooding Rumination Scale as a predictor of Suicidal Ideation over and above Scores on the Interpersonal Needs Questionnaire and the Ruminations about Antecedents of Suicide Scale.

Variable	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
<i>Step 1</i>				.28 ^{***}	
Constant	.43	.09			
INQ	.59	.04	.53 ^{***}		
<i>Step 2</i>				.35 ^{***}	.06 ^{***}
Constant	.86	.11			
INQ	.17	.07	.16 [*]		
RASS	.45	.06	.45 ^{***}		
<i>Step 3</i>				.35	.00

Constant	.68	.15	
INQ	.15	.07	.14*
RASS	.43	.06	.43***
Brooding Rumination	.11	.06	.07

Note: $N = 635$; * $p < .05$, ** $p < .01$, *** $p < .001$. SI = Suicidal Ideation; INQ = Interpersonal Needs Questionnaire; RASS = Ruminations about Antecedents of Suicide Scale

A mediation analysis using PROCESS 2.16.3 (Hayes, 2013; Hayes & Rockwood, 2017) confirmed that there is a significant indirect effect between the INQ and suicidal ideation via ruminations about the antecedents of suicide (see Table 2.5 and Figure 2.2). The higher individuals score on the INQ, the more ruminations about the antecedents of suicide they report, which in turn are associated with greater levels of suicidal ideation.

Table 2.5. Total, direct and indirect effects, and 95% bootstrapped confidence intervals, of the Interpersonal Needs Questionnaire on suicidal ideation mediated by interpersonal suicide-specific ruminations.

	Effect	SE	CI _{low}	CI _{Up}
Indirect effect of INQ on Suicidal Ideation mediated by RASS	0.42	0.07	0.29	0.57
Direct effect of INQ on Suicidal Ideation	0.17	0.07	0.04	0.30
Total effect of INQ on Suicidal Ideation	0.59	0.04	0.52	0.66

Note: N=637; INQ = Interpersonal Needs Questionnaire; RASS = Ruminations about Antecedents of Suicide Scale

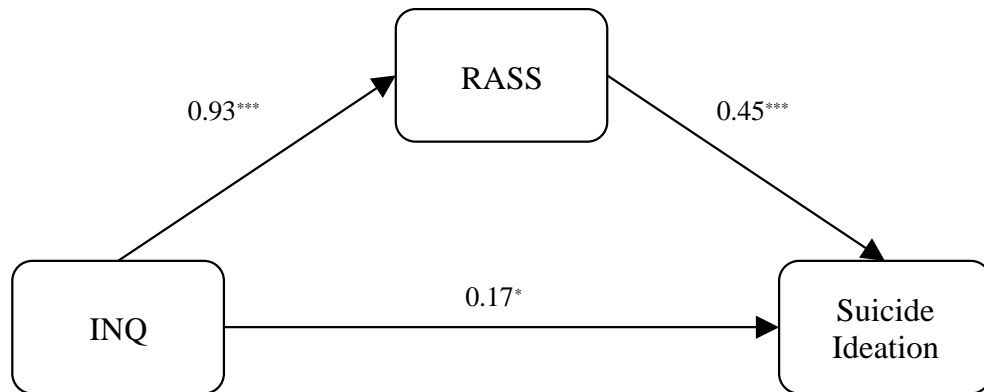


Figure 2.2. Simple mediation model showing the unstandardised path coefficients of scores on the Interpersonal Needs Questionnaire predicting suicidal ideation, mediated by scores on the Ruminations about Antecedents of Suicide Scale.

Note: Estimated using ordinary least square regression; INQ = Interpersonal Needs Questionnaire; RASS = Ruminations about Antecedents of Suicide Scale N = 637; *p < .05, ***p < .001.

2.10 General Discussion

Our primary aim was to develop and validate a theoretically informed suicide rumination scale. Thus, the Ruminations about Antecedents of Suicide Scale (RASS) was based on three factors antecedent to suicide, according to the Interpersonal Theory of Suicide (Joiner, 2005). Our hypothesis that a three-factor model would offer the best fit was supported by confirmatory factor analysis. One factor comprises

ruminations about feelings of loneliness and of not belonging (ruminating about thwarted belongingness). A second factor comprises ruminating about being a burden on others (ruminating about perceived burdensomeness). The third factor comprises ruminating about strategies for overcoming fear of pain and death (ruminating about acquired capability). Additionally, we established that the scale has good internal consistency reliability, and concurrent validity was evidenced by positive correlations with suicidal ideation, hopelessness, psychological distress, and entrapment, and by negative correlations with zest for life, flourishing, and mindfulness.

Ruminations about antecedents of suicide accounted for suicidal ideation over and above feelings of thwarted belongingness and perceived burdensomeness, as measured by the Interpersonal Needs Questionnaire. Additionally, brooding rumination did not account for additional variance in suicidal ideation once ruminations about antecedents of suicide were included in the model. This is consistent with a recent study using the Suicide Rumination Scale, which suggests that suicide-specific ruminations may be more pernicious than ruminations about distress more generally (Rogers & Joiner, 2018). Finally, ruminations about antecedents of suicide mediated the relationship between scores on the INQ and suicidal ideation.

Depressive and general ruminations have historically had a strong association with suicidal ideation and behaviour (Morrison & O'Connor, 2008a). However, because of its incremental ability in predicting suicidal ideation, the RASS may be more useful in future research to test theories of why people attempt suicide. In clinical settings, asking suicidal patients about how much they are *ruminating* about their sense of belongingness, perceived burdensomeness, and their capacity for self-harm may incrementally assist in determining suicide risk. Therefore, inhibiting or

eradicating ruminative processes could prevent a transition towards suicide. One intervention that has shown effectiveness in reducing ruminative behaviour is mindfulness. For example, mindfulness-based cognitive therapy (Segal, Teasdale, & Williams, 2004) reduces depressive rumination in both non-suicidal (Piet & Hougaard, 2011; Segal, Williams, & Teasdale, 2002; Teasdale et al., 2000) and suicidal individuals (Barnhofer et al., 2015; Crane et al., 2008; Kenny & Williams, 2007).

Limitations and Future Directions

Meeting the need for a rumination scale that is theoretically derived, and suicide-specific, is the strength of the present study. However a couple of limitations deserve comment. First, the Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour suggests a predominately linear pathway to suicide (O'Connor, 2011; O'Connor & Kirtley, 2018) with brooding rumination *moderating* the development of entrapment, which in turn leads to suicidal ideation. In the present study, the RASS strongly correlated with entrapment and offered incremental validity in predicting suicidal ideation over and above brooding rumination. Therefore, unlike brooding rumination, ruminations about antecedents of suicide may offer more than just a moderating role in the development of entrapment. Instead, ruminations about antecedents of suicide may play a more direct and central role within the motivational phase of the IMV model, including the potential to directly predict both entrapment and suicidal ideation. However, the present study relied on cross-sectional data. Therefore, temporal inferences are not possible. As such, it would be important that future studies employ longitudinal and experimental designs when investigating the temporal and causal role of ruminations about antecedents of suicide within the IMV framework.

Second, the Ruminations about Antecedents of Suicide Scale (RASS) has not

yet been compared to the recent Suicide Rumination Scale (SRS; Rogers & Joiner, 2018b). However, the item content of the SRS suggest that the SRS captures ruminative processes that *follow* the onset of ideation. Therefore, these rumination processes would occur at a latter stage along the pathway to suicide proposed by the IMV model. Conversely, the RASS offers the first suicide-specific rumination scale that is focused on ruminations about constructs *leading* to suicidal ideation. Therefore, these rumination processes would occur also earlier during the motivational phase in the IMV model's pathway to suicide. Future studies may investigate the predictive ability of both these suicide-specific rumination scales across various phases within the IMV model of suicidal behaviour.

Third, the generalisability of the results is limited to the enlisted sample population. In the present study, the sample population comprised university students. The majority were female (69%) and described their ethnicity as being Australian / New Zealand (49%) or European (25%), with the next largest ethnic group being Asian (17%). In developing the RASS, the students used for the confirmatory factor analysis were enrolled across all schools within the university. The students used for the incremental validity analyses were limited to first year psychology students. Research shows that university students experience higher levels of suicidal thoughts and behaviours and higher levels of psychological distress than other populations (Eskin et al., 2016; Rickwood, Telford, O'Sullivan, Crisp, & Magyar, 2016; Stallman, 2010). Whilst university students are not classified as a clinical population, the psychological distress levels were at the low end of the 'high distress' range, and coupled with the high levels of suicidal thoughts and behaviours, indicate the probability of mental health diagnoses (Andrews & Slade, 2001; Australian Bureau of Statistics, 2012). Nonetheless, it would be of benefit to test the results in clinical settings.

Finally, suicidal ideation was assessed using a single item measure. Single item measures can compromise comprehensiveness and be more sensitive to measurement error (Sloan et al., 2002). However, single item measures have consistently demonstrated good test-retest and inter-rater reliability, and strong associations with other measures of suicide risk such as past suicidal behaviours (Nock et al., 2007; Zimmerman et al., 2006).

2.11 Conclusion

The three-factor Rumination about Antecedents of Suicide Scale (RASS) provides the first theoretically grounded, reliable, and valid measure of ruminations about antecedents of suicide. Consistent with previous research, there was an association between rumination and entrapment and between rumination and suicidal ideation. However, the present study showed that ruminations about unmet interpersonal needs underlying suicidal desire, and the processes posited to enhance acquired capability for suicide, are more strongly associated with suicidal ideation than state-based feelings of unmet interpersonal needs, and general brooding rumination. The findings in the present study have the potential to advance contemporary theories and models of suicide. Specifically, future studies should investigate the predictive ability of ruminations about antecedents of suicide, instead of brooding rumination, within the motivational phase of the Integrated Motivational-Volitional Model of Suicidal Behaviour. However, to understand the predictive ability of the RASS requires the use of prospective data. Therefore, future studies should employ a longitudinal design.

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Chapter 3

Motivation for Suicide: A Prospective Cross-Lagged Panel Analysis of Rumination, Entrapment, Suicidal Ideation, and Suicidal Intent

3.1 Abstract

According to the integrated motivational-volitional model of suicidal behaviour (IMV; O'Connor, 2011; O'Connor & Kirtley, 2018), cognitive mechanisms during the motivational phase lead to a sense of entrapment and subsequent suicidal ideation and intention formation. The aim was to test this hypothesised temporal progression using autoregressive cross-lagged panel analyses. University students ($N = 230$) completed two online surveys two months apart. Results showed that rumination about antecedents of suicide predicted subsequent entrapment, and entrapment predicted subsequent rumination about antecedents of suicide. Moreover, entrapment predicted future suicidal intent and also moderated prospective reciprocal associations between suicidal ideation and intent. Contrary to the IMV model, entrapment did not predict subsequent suicidal ideation. Rather, suicidal ideation predicted subsequent entrapment. Thus, longitudinal evidence suggests that the hypothesised temporal progression during the motivational phase is likely to be dynamic and includes pernicious feedback loops involving ruminations and entrapment, and the interplay of suicidal ideation and intent. The challenge for current theories of suicide is to better account for the potentially dynamic and reciprocal influences of the putative causal factors along the path from suicidal ideation to action. Preventing these processes from escalating would be an important intervention target.

3.2 Introduction

Young people are at an increased risk for suicidal thoughts and behaviours. Globally, suicide is the second most common cause of death for people aged between 15 and 29 (World Health Organization, 2018b). In Australia, the rate of death by suicide increased 11.7 to 12.6 deaths per 100,000 over a recent period of two years, and accounts for over one-third of deaths (36%) among people 15-24 years of age (Australian Bureau of Statistics [ABS], 2017). Moreover, the onset of suicidal ideation is significantly more likely to occur during adolescence and young adulthood than during any other life period (Nock et al., 2008).

University students commonly experience suicidal thoughts and behaviours. In a 12-nation study of 5,572 university students, 29% reported a lifetime history of suicidal ideation and 7% reported a lifetime suicide attempt (Eskin et al., 2016). Similarly, in an Australian-wide study of 3,303 tertiary students from 70 institutions, more than one-third (35.4%) reported thoughts of self-harm or suicide (Rickwood et al., 2016). Several recent studies consistently found high rates of suicidal ideation (44% - 51%) and past suicide attempts (13% - 16%) among university students (Collins et al., 2017; Collins et al., 2018; George et al., 2017; George et al., 2016). Overall, these rates are higher compared to the general population where global lifetime suicidal ideation is estimated at 9.2% and suicide attempts at 2.7% (Nock et al., 2008). Thus, university students are a particularly relevant group for examining what motivates young people to consider suicide.

The integrated motivational-volitional (IMV) model of suicidal behaviour (IMV; O'Connor, 2011; O'Connor & Kirtley, 2018) coalesces extant evidence and theoretical perspectives about the complex pathway to suicide into a comprehensive tri-partite model (Figure 3.1), grounded in an ideation-to-action framework (Klonsky, Qiu, & Saffer, 2017). First, the 'pre-motivational' phase is guided by the

diathesis-stress model (Schotte & Clum, 1987), where individual biopsychosocial vulnerabilities confer elevated risk for suicidal behaviour when triggered by subsequent stressors. Second, the ‘motivational’ phase is initiated when one feels defeated and humiliated in response to such stressors and sees no prospect of escape or rescue. This leads to a sense of entrapment and the desire to escape this entrapment leads to suicidal ideation. Subsequently, suicidal ideation leads to the formation of suicidal intent, which according to the IMV model, is the strongest immediate predictor of suicidal behaviour (O’Connor & Kirtley, 2018). During the third ‘volitional’ phase, motivation for suicide transitions to enactment. The aim of the present study was to test the temporal relationships within the ‘motivational’ phase of the IMV model of suicidal behaviour.

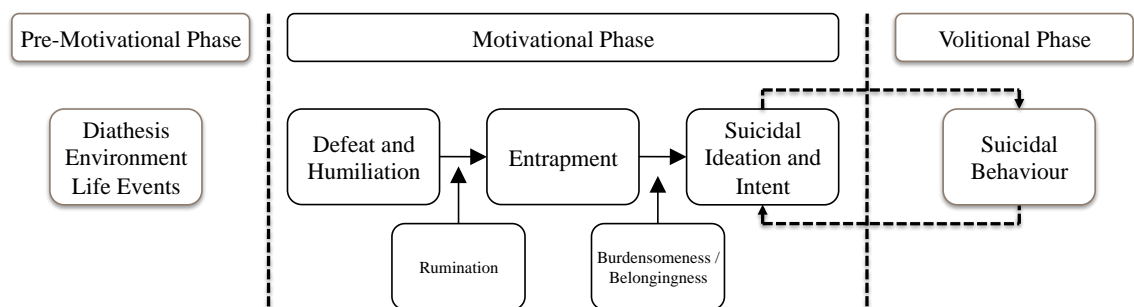


Figure 3.1. Hypothesised linear pathway of the tri-partite IMV model of suicidal behaviour, highlighting the motivational phase and relevant moderators that are the focus of the present chapter, including the recently proposed reciprocal feedback loop between the motivational and volitional phases of the model (adapted from O’Connor & Kirtley, 2018).

The IMV model of suicidal behaviour hypothesises that during the motivational phase of the tripartite model, ‘threat to self moderators’ facilitate or impede the transition from appraisals of defeat and humiliation to a sense of entrapment. Rumination is one proposed threat to self moderator that is of particular interest because it is increasingly suggested as a direct, rather than moderating, precipitant in the pathway to entrapment and suicidal ideation (Batterham & Christensen, 2012; Chan, Miranda, & Surrence, 2009; Krajniak et al., 2013;

Morrison & O'Connor, 2008a; Rogers & Joiner, 2017; Surrence, Miranda, Marroquin, & Chan, 2009; Tucker et al., 2013). Additionally, 'motivational moderators' are hypothesised to influence the transition from entrapment to suicidal ideation and intent (O'Connor & Kirtley, 2018). These include, for example, the antecedents of suicidal ideation proposed by the interpersonal theory of suicide; perceived burdensomeness and thwarted belongingness (Joiner, 2005; Van Orden et al., 2010). Finally, 'volitional moderators' influence the transition from suicidal ideation and intent to suicidal behaviour. Joiner's (2005) acquired capability constructs, physical pain sensitivity and fearlessness about death are included as volitional moderators, and mental imagery has also been recently added as a volitional moderator because it increases capability via cognitive rehearsal for suicidal behaviour (George et al., 2016; Ng, Di Simplicio, McManus, Kennerley, & Holmes, 2016).

A central premise of the motivational phase of the IMV model of suicidal behaviour has been the *linear* progression from defeat and humiliation to entrapment to suicidal ideation (Figure 3.1), with the progression from ideation to intent marking the transition to the volitional phase of behavioural enactment. However, recent refinements to the model have introduced the possibility of reciprocal feedback loops in the latter phases, between motivation and volition, suggesting that the relationship between suicidal ideation and intent and repeat suicide attempts may be dynamic and cyclical (O'Connor & Kirtley, 2018). Similarly, reciprocal feedback loops may also operate throughout the motivational phase. For example, ruminations may not only increase the likelihood of perceptions of entrapment, but entrapment may lead to a cognitive search for escape routes resulting in rumination, which may directly trigger suicidal ideation (Li et al., 2018). Additionally, whilst the IMV model suggests that entrapment leads to suicidal ideation and intent, experiencing suicidal ideation may

be in itself an entrapping experience (De Beurs et al., 2018; Taylor, Gooding, Wood, Johnson, et al., 2011). Therefore, in their recent review of the IMV model, O'Connor and Kirtley (2018) concluded that investigating the temporality and complexity of variable interactions within the model is a priority. To draw any conclusions about temporal directions and reciprocal feedback loops requires longitudinal or experimental designs.

3.2.1 Relationship between Defeat and Humiliation and Entrapment

Whilst the IMV model of suicidal behaviour says that defeat and humiliation lead to entrapment, little is known about the development of entrapment (O'Connor et al., 2013). There are two problems with the proposition that defeat and humiliation are antecedent and distinct from entrapment. First, the conceptual distinction is unclear, as the definition of 'entrapment' is defined in terms of appraisals of, or experience of, defeat and humiliation – "the IMV model posits that the experience of defeat/humiliation from which there is no escape, *that is, entrapment*, is the key driver of suicidal ideation" (O'Connor & Portzky, 2018, p. 15). Hence, in the schematic appraisal model of suicide, defeat and entrapment are interchangeable in portraying a biased appraisal towards an aversive situation and a perceived lack of capacity to escape (Johnson, Gooding, & Tarrrier, 2008). Second, cross-sectional evidence suggests that defeat and entrapment overlap to the extent that they are better conceptualised as a single construct. That is, factor analyses show that only a single factor emerges when combining the items from Gilbert and Allan's (1998) 16-item defeat scale and 16-item entrapment scale (Griffiths et al., 2015; Griffiths et al., 2014; Sturman, 2011; Taylor et al., 2009). Further, defeat and entrapment are consistently highly associated, with correlations ranging from .73 to .91 (e.g., Dhingra et al., 2016; Griffiths et al., 2014; O'Connor et al., 2013; Taylor, Wood, et al., 2010; Tucker et al., 2016). Recent research further confirms that the correlations

between defeat and entrapment are consistently so high (Owen et al., 2018, $r = .81$; Wetherall et al., 2018, $r = .82$) that they are likely to represent a single underlying construct. In one prospective study of individuals with bipolar disorder, Owen et al. (2018) found that defeat at baseline did not significantly predict entrapment at follow-up ($p = .08$), although there was some partial evidence that the association between defeat at baseline and suicidal ideation at four-month follow-up was mediated by entrapment. Therefore, the separation of defeat and humiliation from entrapment, in a hypothesised causal sequence, with the experience of defeat necessary to trigger feelings of entrapment is not well supported. What then precedes entrapment, if not defeat?

3.2.2 Relationship between Rumination and Entrapment

What leads to the development of entrapment is as yet poorly understood (O'Connor et al., 2013). One possibility is that rumination, rather than being a moderator, may be a direct precipitant of entrapment. That is, rumination may contribute to suicide risk via its relationship with entrapment (O'Connor & Portzky, 2018). Importantly, as hypothesised by Li et al. (2018), this first link in the motivational phase may also be cyclical, with rumination increasing entrapment, and entrapment increasing rumination. If entrapment is experienced as intense negative affect, attention to the emotional stimuli which prompt and sustain ruminative suicidal thoughts increases, resulting in a pernicious bi-directional feedback loop (cf., Selby et al., 2009).

Empirically, Dhingra and colleagues (2016) found a direct association between brooding rumination and entrapment in a large cohort of university students. Additionally, in both an online community sample and outpatients, entrapment mediated the relationship between rumination, as measured by the perseverative thinking questionnaire (Ehring et al., 2011), and suicidal ideation, but rumination did

not mediate the relationship between entrapment and suicidal ideation (Teismann & Forkmann, 2015). Similarly, Li et al. (2018) found that entrapment mediated the relationship between ruminative flooding (uncontrollable perseverative thinking about one's negative mood) and suicidal ideation, but ruminative flooding did not mediate the relationship between entrapment and suicidal ideation. Although these mediation results are not consistent with a reciprocal relationship between rumination and entrapment, they are cross-sectional, thus limiting temporal inferences. In addition, as described in Chapter 1 sub-section 1.4.2, existing studies have been limited by the use of rumination scales derived predominately from the depressive literature and therefore are not grounded in any specific theoretical models of suicide (see Morrison & O'Connor, 2008a, for a review). This is the first study to employ a rumination scale that is based on ruminations specifically about constructs known to be antecedent to suicide.

3.2.3 Relationship between Entrapment and Suicidal Ideation and Intent

Whilst several studies support an association between entrapment and suicidal ideation (De Beurs et al., 2018; Forkmann & Teismann, 2017; Li et al., 2018; Rasmussen et al., 2010; Shelef et al., 2016; Siddaway et al., 2015; Teismann & Forkmann, 2015; Wetherall et al., 2018), others fail to find evidence for this association (Gooding et al., 2017; Tucker et al., 2016). However, the cross-sectional designs preclude temporal inferences. In the only known longitudinal study, entrapment did *not* predict suicidal ideation at 12-month follow-up (Taylor, Gooding, Wood, Johnson, et al., 2011), which is contrary to the hypothesised progression from entrapment to ideation in the latter part of the motivational phase in the IMV model of suicidal behaviour. It is possible then that suicidal ideation precedes entrapment, rather than, or as well as, entrapment leading to ideation (De Beurs et al., 2018). That

is, frequent thoughts about suicide as the only available option for escaping a life perceived as unbearable could lead to a sense of entrapment. Although Taylor et al. (2011) did not find suicidal ideation led to subsequent entrapment, they note that their study may not have had sufficient power to detect any prospective association over the 12-month follow-up period. Consequently, a temporal association between entrapment and suicidal ideation is yet to be established.

To date, no studies have examined suicidal intent independent of suicidal ideation within the framework of the IMV model of suicidal behaviour. In a recent refinement to the model, O'Connor and Kirtley (2018) noted that the distinction between suicidal ideation and intent is blurred and argued that there is not enough evidence to delineate the precise movement from ideation, at the end of the motivational phase, to intent at the crossing into the volitional phase of behavioural enactment. If the relationship between ideation/intent and behaviour is dynamic and cyclical, as hypothesised by O'Connor and Kirtley (2018), this might suggest not only that the transition between the two phases can be fluid (cf. Rudd, 2006a), but also that entrapment may enhance both ideation and intent, and the reciprocal relationship between them.

The Present Study

The aim of the present study was to test the temporal relationships between constructs identified within the 'motivational' phase of the IMV model of suicidal behaviour (O'Connor & Portzky, 2018). We tested the following hypotheses:

1. Rumination about antecedents of suicide predicts subsequent entrapment. If the relationship between rumination and entrapment is cyclical as hypothesised by Li et al. (2018) then entrapment should also predict subsequent ruminations about antecedents of suicide.

2. Entrapment predicts subsequent suicidal ideation. Alternatively, as hypothesised by De Beurs et al. (2018), suicidal ideation may instead, or as well as, predict entrapment.
3. In addition to testing the predictions that rumination about antecedents of suicide can be both an antecedent and consequence of entrapment, it is possible that rumination about antecedents of suicide prospectively predicts suicidal ideation not only indirectly via entrapment but also directly. Similarly, if rumination is critical in initiating and exacerbating the motivational phase of the IMV model of suicidal behaviour, rumination about antecedents of suicide may also directly influence the transition into the volitional phase by prospectively predicting suicidal intent.
4. If the relationship between suicidal ideation/intent and behaviour is dynamic and cyclical (O'Connor & Kirtley, 2018), it follows that entrapment may not only predict ideation, as originally proposed by the model, but may also predict intent.
5. If entrapment is a central motivational process facilitating progress toward the volitional phase, it may also moderate the reciprocal relationship between suicidal ideation and intent at the fluid threshold between the two phases. That is, the prospective association between suicidal ideation and intent, and vice-versa, would be strongest at high levels of entrapment.

3.3 Method

Participants

Participants comprised 598 university students, of whom, 456 consented to being contacted at 2-month follow-up. This resulted in 230 who completed both surveys in full (female = 71%; $M_{\text{age}} = 25.98$, range = 17 to 74; $SD = 10.47$). Self-reported ethnicity included Australian / New Zealand (53.9%), European (23.4%),

Asian (14.4%), and other (8.3%). As measured by the K10, average psychological distress ($M = 21.43$, $SD = 7.94$) fell just outside the ‘high distress’ range (range 22-29) (ABS, 2018) and is comparable with other university cohorts (Stallman, 2010). Half (50.9%) reported suicidal ideation in the past year, with 21.2% thinking about suicide at least monthly. Further, 14.8% had made at least one suicide attempt in their lifetime and 1.7% had made multiple attempts.

Materials

Ruminations about Antecedents of Suicide Scale. The 18-item RASS (Brown, Page, Stritzke, & Wylde, 2019) assesses, at this time in the participant’s life, the extent to which particular thoughts would stay in the participant’s head, from 0 (*Just fleeting*) to 6 (*All consuming*). Fifteen items were adapted from the Interpersonal Needs Questionnaire (Van Orden et al., 2012) pertaining to thoughts about thwarted belongingness (nine items) and perceived burdensomeness (six items). Three items were adapted from the facets of the Acquired Capability With Rehearsal for Suicide Scale: fearlessness of death, pain tolerance, and mental rehearsal for self-harm (George et al., 2016). Higher scores indicate higher ruminations specifically about those constructs thought to be proximal and causal antecedents of suicidal thoughts and behaviours (Joiner, 2005). The RASS has good psychometric properties and has incremental validity in assessing suicidal ideation over and above the Interpersonal Needs Questionnaire (Van Orden et al., 2012) and the Brooding Rumination Scale (Treyner et al., 2003). Internal consistency in this sample was good ($\alpha = .95$).

Self-Injurious Thoughts and Behaviours Inventory (SITBI) (Nock et al., 2007). Two items from the SITBI were used to assess frequency of suicidal ideation and suicide attempts. Participants were asked, “*how many times in the last year have you thought about suicide*” measured from 1 (*Never*) to 6 (*Almost every day*), and

“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?” measured from 1 (*Never*) to 5 (*Five or more times*). In the follow-up survey suicidal ideation was assessed during the *past four weeks*, measured from 1 (*Never*) to 5 (*Almost every day*), and participants indicated (yes / no) if they had made a suicide attempt in *the past four weeks*. These assessment timeframes were intended to capture the stressful period leading up to exams, and to remain consistent with the timeframe used by the psychological distress measure (K10). The SITBI is suitable for non-clinical samples and a self-report format (Latimer et al., 2013). It has good inter-rater reliability, good test-retest reliability, and construct validity has been established using measures of suicide risk (Nock et al., 2007).

Suicidal Intent was assessed using a single item “*I have no intention of killing myself in the near future*” measured from 0 (*Not at all*) to 8 (*Very strongly*). Items were reversed scored such that higher scores indicated greater risk for suicidal behaviour.

Entrapment Scale (Gilbert & Allan, 1998). The 16-item Entrapment Scale measures situational entrapment, defined as the perception of things in the outside world that induce escape motivation (10 items; e.g., “*I am in a relationship I can’t get out of*”), and emotional/cognitive entrapment defined as escape motivation triggered by internal feelings and thoughts (6 items; e.g., “*I want to get away from myself*”), on a 5-point scale from 0 (*Not at all like me*) to 4 (*Extremely like me*). Higher scores indicate a higher sense of entrapment. Internal consistency in the current sample was good ($\alpha = .96$).

The Kessler Psychological Distress Scale (K10; Kessler et al., 2002). The 10-item K10 measures emotional states in the past four weeks using a scale from *none of the time* (1) to *all of the time* (5). High scores indicate heightened

psychological distress and probability of mental health diagnoses (Andrews & Slade, 2001). Commonly used 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 et al., 2012). Internal consistency in the current sample was good ($\alpha = .92$).

Procedure

All students at one university were invited by email to complete an anonymous online survey, as part of the University's Health Promotion Unit survey aimed at "*taking the pulse of student's well-being, resilience, and psychological distress*". The survey remained open for two weeks and those who consented were contacted again for a 2-month follow-up. A short two-month follow-up period was chosen because this coincided with a particularly stress period in the lead up to exams and, more importantly, that the odds ratio of making a first suicide plan or attempt within 12 months following onset of suicidal ideation is extremely elevated (OR=117.4 - 123.1), and decreases substantially thereafter (OR=1.5 - 4.4) (Nock et al., 2008). In addition, approximately 60% of suicide attempters will die on their first attempt (Bostwick et al., 2016). Therefore, early detection of suicidal ideation is critical.

The responses to the questions online were force-choice, meaning participants could not skip any items. However, at any time during the survey, participants could opt to discontinue the survey and view a list of free campus and community-based mental health resources. These resources were also displayed at the end of the survey. The university's Human Research Ethics Office approved all procedures. All participants provided informed consent.

Data Analysis

MPLUS was used to test the temporal sequencing proposed in the

motivational phase of the IMV model of suicidal behaviour. Autoregressive cross-lagged panel analyses (Bollen & Curran, 2006) was performed on six, two-wave, two-variable models (see Figure 3.2). Prospective cross-lagged panel analyses are especially suited for testing the present hypotheses because they simultaneously control for the longitudinal correlations of the same construct, as well as the contemporaneous correlations between constructs.

3.4 Results

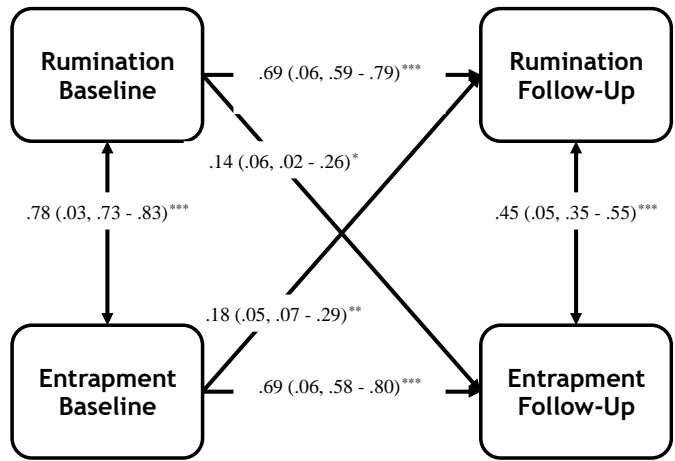
Sample Characteristics

The demographic and social characteristics of the 230 participants who responded at both time points did not substantially deviate from those who responded at baseline only ($N = 368$). However, participants who responded at both time points were significantly higher on psychological distress; $M = 22.96$, ($SD = 8.68$) versus $M = 21.43$ ($SD = 7.96$), $F(1, 597) = 330.11$, $p = .031$. At baseline, 50.9% of the 230 participants reported having experienced suicidal ideation in the past year. At follow-up 27.8% reported experiencing suicidal ideation in the past four weeks. At both time points, 1.7% reported experiencing suicidal ideation almost daily. Moreover, at baseline, 14.8% of the 230 participants reported having made a suicide attempt sometime during their lifetime, and 4% had made multiple suicide attempts. At follow-up, one person reported making a suicide attempt within the past four weeks.

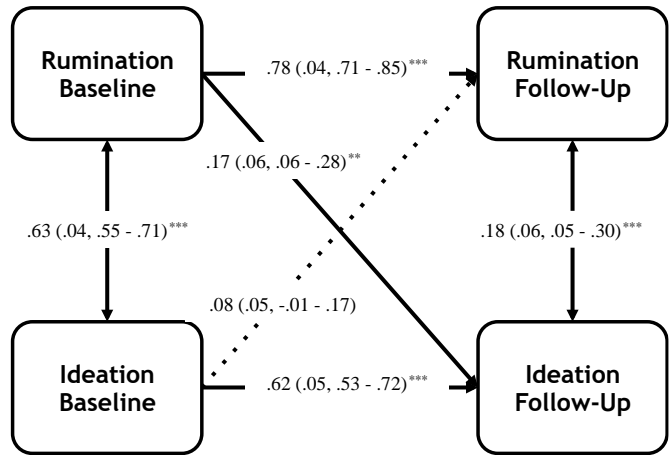
3.4.1 Autoregressive Cross-Lagged Panel Analyses

Figure 3.2 shows the standardised estimates and standard errors for each of the two-wave, two-variable, autoregressive cross-lagged panel analyses. In each model, the autoregressive effects were statistically significant, indicating that the constructs remained relatively stable between time points. As hypothesised, rumination about antecedents of suicide at baseline predicted entrapment at follow-up, and entrapment at baseline also predicted rumination about constructs antecedent

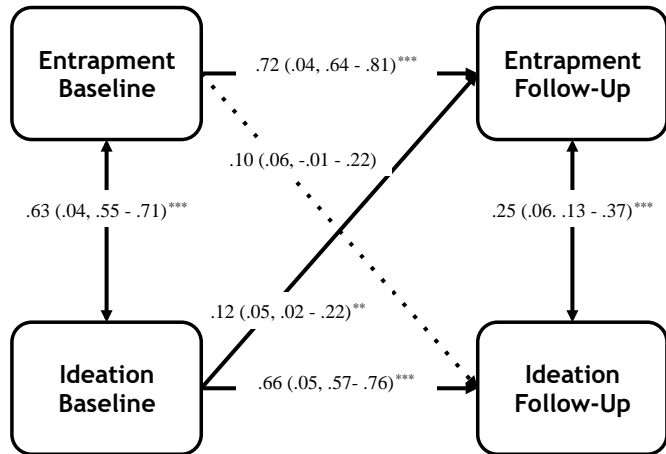
to suicide at follow-up (Figure 3.2a). Additionally, our hypothesis that rumination about antecedents of suicide at baseline would predict subsequent suicidal ideation was also supported. Moreover, suicidal ideation at baseline did not predict rumination about constructs antecedent to suicide at follow-up (Figure 3.2b). Contrary to the IMV model, entrapment at baseline did not predict suicidal ideation at follow-up. Instead, suicidal ideation at baseline predicted entrapment at follow-up (Figure 3.2c). Whilst no hypotheses were made regarding suicidal intent, results showed that rumination about antecedents of suicide at baseline predicted suicidal intent at follow-up, but suicidal intent at baseline did not predict rumination about constructs antecedent to suicide at follow-up (Figure 3.2d). Entrapment at baseline also predicted suicidal intent at follow-up, but suicidal intent at baseline did not predict entrapment at follow-up (Figure 3.2e). Finally, suicidal ideation at baseline predicted suicidal intent at follow-up, and suicidal intent at baseline also predicted suicidal ideation at follow-up (Figure 3.2f).



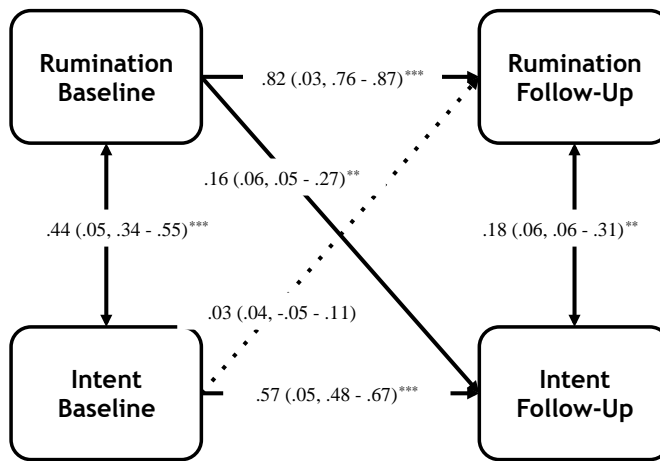
a) Rumination at baseline as a predictor of Entrapment at follow-up



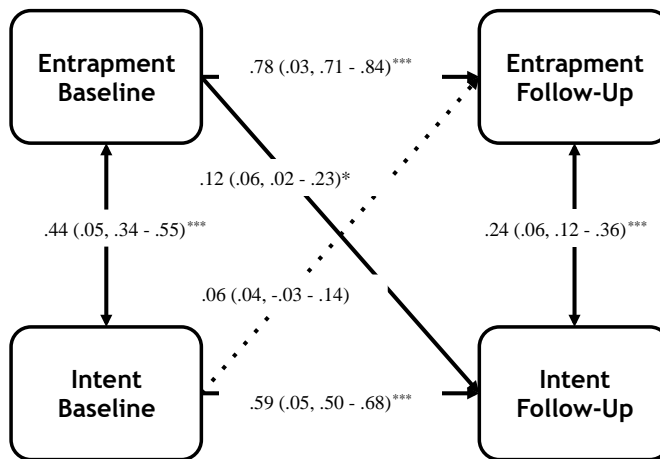
b) Rumination at baseline as a predictor of Suicidal Ideation at follow-up



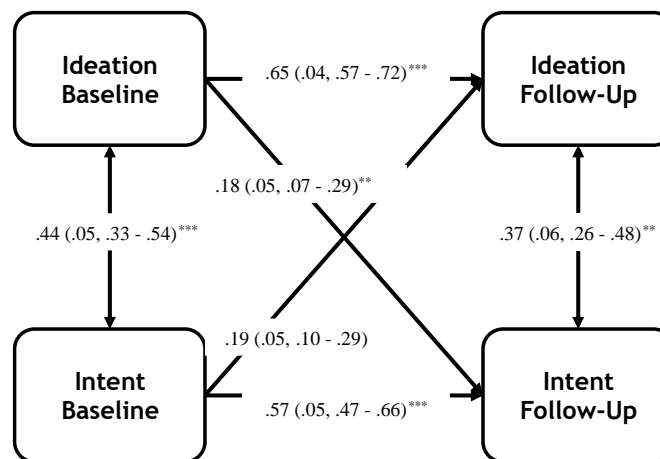
c) Entrapment at baseline as a predictor of Suicidal Ideation at follow-up



d) Rumination at baseline as a predictor of Suicidal Intent at follow-up



e) Entrapment at baseline as a predictor of Suicidal Intent at follow-up



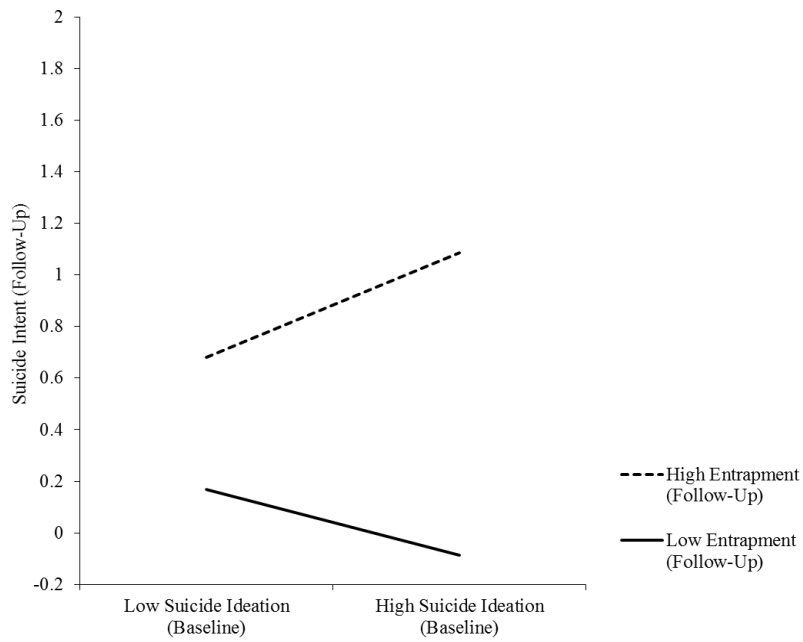
f) Suicidal ideation at baseline as a predictor of Suicidal Intent at follow-up

Figure 3.2(a-f). Standardised estimates (standard errors and 95% confidence intervals in parentheses) for each hypothesised two-wave, two-variable autoregressive cross-lagged panel analysis.

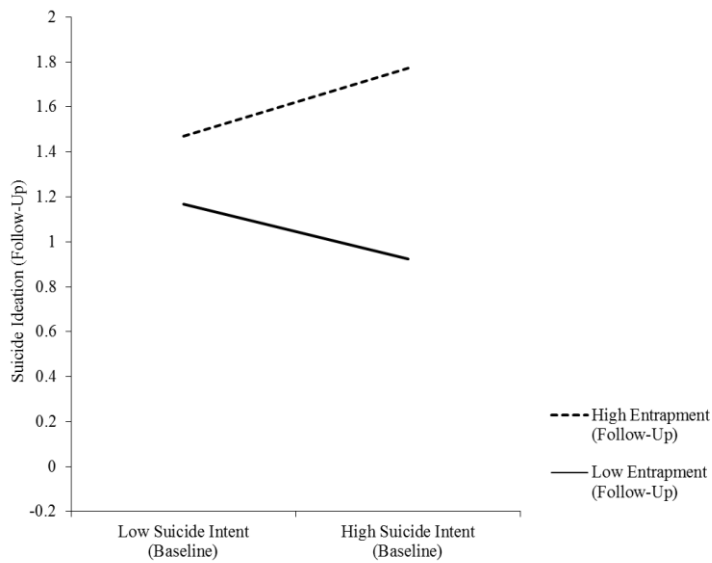
Note: Dotted lines = non-significant pathways; *p < .05, **p < .01, ***p < .001; N = 230.

3.4.2 Moderation Analyses

To test the hypothesis that entrapment has a moderating role in the reciprocal relationship between suicidal ideation and suicidal intent, two moderation analyses were performed in PROCESS 2.16.3 using the mean centre for the construction of products, heteroscedasticity-consistent standard-errors (HC3), and 5,000 bootstrapped samples (Hayes, 2013; Hayes & Rockwood, 2017). Results confirm that the relationship between suicidal ideation at baseline and suicidal intent at follow-up was moderated by entrapment at follow-up after controlling for entrapment and suicidal intent at baseline; $F(5, 224) = 17.97$ (HC3), $p < .001$, $R^2 = .49$ (Figure 3.3a). Moreover, the addition of the suicidal ideation by entrapment interaction creates a significant change to the model, $F(1, 224) = 4.60$ (HC3), $p = .03$, R^2 change = .02. Using the Johnson-Neyman procedure showed that when the entrapment score is equal to or greater than 21.68 (12.2% of the sample) then entrapment has a significant moderating impact on the temporal relationship between suicidal ideation and suicidal intent but below this point there is no significant moderating effect. Additionally, entrapment at follow-up also moderates the reverse relationship between suicidal intent at baseline and suicidal ideation at follow-up after controlling for suicidal ideation and entrapment at baseline; $F(5, 224) = 28.70$ (HC3), $p < .001$, $R^2 = .64$ (Figure 3.3b). The addition of the suicidal intent by entrapment interaction creates a significant change to the model, $F(1, 224) = 7.01$ (HC3), $p = .009$, R^2 change = .05. Using the Johnson-Neyman procedure showed that when the entrapment score is equal to or greater than 9.70 (26.5% of the sample) then entrapment has a significant moderating impact on the temporal relationship between suicidal intent and suicidal ideation but below this point there is no significant moderating effect.



- a. Moderation of the effect of suicidal ideation (baseline) on suicidal intent (follow-up) at values of the moderator entrapment (follow-up), controlling for suicidal intent and entrapment at baseline.



- b. Moderation of the effect of suicidal intent (baseline) on suicide ideation (follow-up) at values of the moderator entrapment (follow-up), controlling for suicidal ideation and entrapment at baseline.

Figure 3.3(a-b). Moderating influence of entrapment on the reciprocal pathways between suicidal ideation and suicidal intent.

3.5 Discussion

The present study used longitudinal data to test the temporal sequencing of key constructs in the motivational phase of the IMV model of suicidal behaviour (O'Connor, 2011). In addition, the prospective cross-lagged panel approach allowed for the examination of recently proposed possible feedback loops both in the early and middle stages of the motivational phase (De Beurs et al., 2018; Li et al., 2018), as well as later when the interplay of suicidal ideation and intent may signal a fluid transition period from the motivational to the volitional phase of the model (O'Connor & Kirtley, 2018). As summarised in Figure 3.4, results were consistent with a temporal progression from rumination about constructs antecedent to suicide to entrapment, and from entrapment to suicidal intent. There were also direct prospective associations from rumination about constructs antecedent to suicide to both suicidal ideation that has been experienced in the past 4-weeks and intent for suicide in the near future.

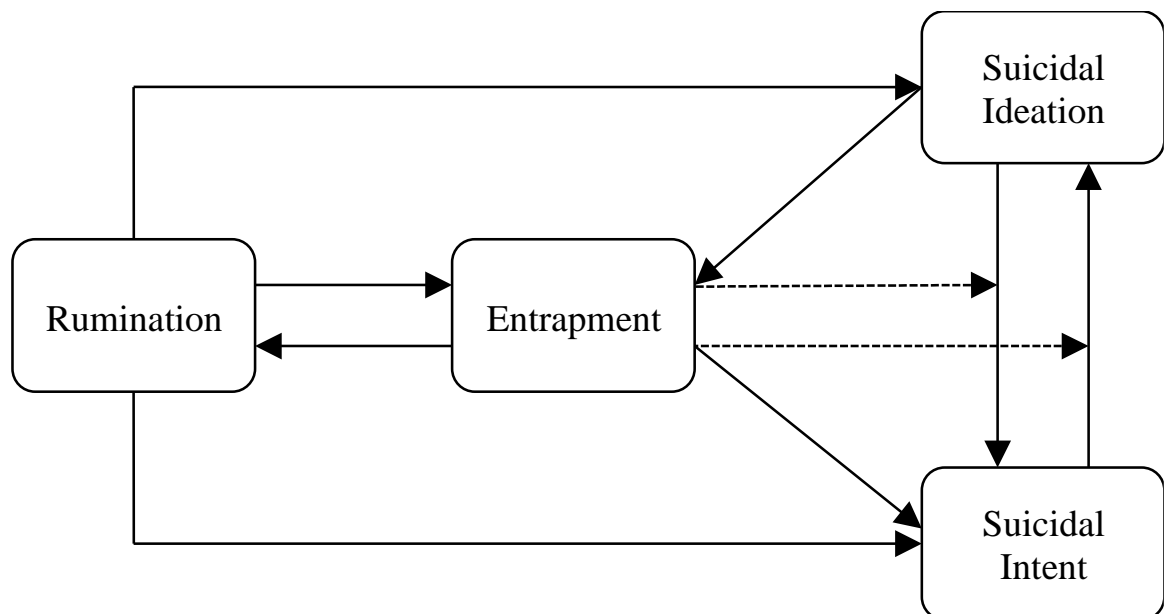


Figure 3.4. Summary of significant prospective associations between key variables in the motivational phase of the IMV model of suicidal behaviour.

Note: dotted lines represent moderation effects of entrapment.

Although the IMV model considers rumination as a moderator of a progression from feelings of defeat/humiliation to entrapment, the present results support a more parsimonious account of the early stage of the motivational phase of the IMV model. That is, if defeat and humiliation can be subsumed under the construct of entrapment (Taylor et al., 2009), then rumination is a cognitive mechanism that directly and prospectively contributes to entrapment (cf., O'Connor & Portzky, 2018). Moreover, the current study provides the first longitudinal evidence that the relationship between rumination about constructs antecedent to suicide and entrapment is likely to be bi-directional, supporting the hypothesis by Li et al. (2018) that rumination and entrapment have a reciprocal feedback loop. Thus, our findings suggest that ruminations about constructs antecedent to suicide have a more central role in the motivational phase in the pathway to suicide. First, via their reciprocal relationship with entrapment, ruminations about constructs antecedent to suicide further intensify the negative emotional state of entrapment. Second, ruminations about the antecedents of suicide also prospectively increase suicidal ideation and intent. The latter direct influence of rumination about constructs antecedent to suicide on both subsequent suicidal ideation and intent is consistent with previous longitudinal studies investigating the relationship between rumination and suicidal ideation (see Morrison & O'Connor, 2008a for a review), and with recent cross-sectional evidence of an association between rumination and suicidal intent (Sharaf et al., 2018).

Contrary to the IMV model of suicidal behaviour (O'Connor, 2011; O'Connor & Kirtley, 2018), entrapment did not lead to subsequent suicidal ideation, although it did lead to subsequent suicidal intent (see Figure 3.4). Our lack of support for a prospective association from entrapment to suicidal ideation replicates the null finding from the only other longitudinal study investigating the temporal

relationships between these constructs (Taylor, Gooding, Wood, Johnson, et al., 2011). Conversely, past year suicidal ideation led to subsequent entrapment. This novel result was first raised as a possibility by Taylor et al. (2011) but was not supported by their study, perhaps due to insufficient power, but was raised again more recently by De Beurs et al. (2018). Thus, the current findings support the notion that thinking of suicide as the only available option to escape from a life perceived as unbearable can in itself be experienced as exacerbating a sense of entrapment, which in turn prospectively predicted higher suicidal intent (see Figure 3.4).

In addition to entrapment enhancing future suicidal intent, entrapment may be pivotal in strengthening the reciprocal relationship between suicidal ideation and suicidal intent. Our results showed that entrapment moderated the relationship between suicidal ideation and subsequent suicidal intent as well as the relationship between suicidal intent and subsequent suicidal ideation. That is, the cyclical nature of the intention formation process via its repeated feedback loop between suicidal ideation and intent is most pernicious at high levels of entrapment. This provides the strongest evidence yet for the “centrality of entrapment within the suicidal process” as conceptualised by the IMV model (O'Connor & Kirtley, 2018, p. 8).

Theoretical and Clinical Implications

The current findings have important theoretical implications. Like other contemporary models of suicide (Joiner, 2005; Klonsky & May, 2015b), the original IMV model (O'Connor, 2011) presents a linear account of the suicidal process from ideation and intention formation to behavioural enactment. However, a recently updated version of the model explicitly acknowledges the likely cyclical nature of the ideation-attempts-ideation relationship (O'Connor & Kirtley, 2018). The authors also speculated that it might be useful to add another phase to the model to specifically capture the movement from ideation to intent. However, rather than an

additional phase at the transition point from ideation to intent, the emerging evidence for reciprocal feedback loops between ideation and intent, ‘turbocharged’ by high levels of entrapment, suggests that the boundary between the motivational and volitional phase is fluid. Intention formation may take time to solidify, and if the sense of entrapment abates, may not progress toward the volitional phase. Hence, understanding temporality and complexity of variable interactions within the model, including non-linear feedback loops, is more likely to advance theoretical understanding than considering additional linear phases within the ideation-to-action pathway. As noted by O’Connor and Kirtley (2018), there is still a dearth of longitudinal studies, and more prospective studies are needed to further test non-linear accounts of the ideation-to-action pathway to suicide.

In addition to accounting for potential reciprocal feedback loops at the intersection of the motivational and volitional phases of the IMV model, our findings suggest that cyclical relationships between drivers of the motivation for suicide may also occur early in the motivational phase. This prospective evidence suggests a more central role for ruminations, in that they not only predicted future ideation and intent, but also predicted subsequent entrapment. Moreover, given that entrapment also predicted higher subsequent rumination, this again suggest that the linear structure of the IMV model needs refinement to better account for possible cyclical processes at different points of its pathway to suicidal behaviour.

The current findings also have important clinical implications. The prospective, cross-lagged evidence suggests that both rumination and entrapment together are critical cognitive mechanisms in motivating someone towards volition for suicide. Therefore, preventing these processes from escalating would be an important intervention target. For example, a susceptibility to ruminative thinking is thought to create an over-general autobiographical memory, which in turn leads to

poor problem-solving abilities (Williams et al., 2007). That is, in the face of ruminative thinking, the ability to access past problem-solving capabilities to resolve current problems is unavailable, and the focus narrows to a perceived lack of capacity to escape leading to a sense of entrapment (Pollock & Williams, 1998; Williams & Pollock, 2001). One promising approach that may widen access to cognitive and behavioural repertoires is the Broad-Minded Affective Coping Procedure (Johnson, Gooding, Wood, Fair, & Tarrier, 2013; Tarrier, 2010). This procedure uses guided-imagery techniques centred on past positive experiences to evoke associated positive affects, thereby creating a sense of greater optimism and flexible thinking. Broad-Minded Affective Coping Procedure could therefore be used to help challenge the perception that someone is trapped, with suicide the only escape option. Additionally, mindfulness-based cognitive therapy (Segal et al., 2004) has been effective in reducing depressive rumination in both non-suicidal (Piet & Hougaard, 2011; Segal et al., 2002; Teasdale et al., 2000) and suicidal individuals (Barnhofer et al., 2015; Crane et al., 2008; Kenny & Williams, 2007). If the relationship between rumination and entrapment is dynamic and cyclical, as the current results suggest, then inhibiting ruminations could help to break the cycle, thereby slowing the escalation of entrapment as well.

Limitations and Future Directions

Although the advantages of the prospective, cross-lagged design of the present study allowed for a more comprehensive test of the temporal and potentially reciprocal relationships between variables during the motivational phase of the IMV model, there are some limitations that need to be considered when interpreting the results. First, the prospective design was limited to two time points. That is, inferences about possible pernicious feedback loops within the motivational phase of the IMV model are speculative. To confirm for example that rumination leads to

entrapment, and that the experience of entrapment *in turn* can further increase subsequent ruminations, requires at least three time points of assessment. Hence, to fully examine the dynamic nature of potentially reciprocal exacerbation of ruminations, feelings of entrapment, and suicidal ideation, future research should incorporate three or more assessment points. Second, although autoregressive cross-lagged panel models offer an advantage over other multivariate approaches in that they control for the longitudinal correlations of the same construct, as well as the contemporaneous correlations between constructs, a claim of causality would require the unlikely controlling of *all* possible confounders in the model. Thus, while the current longitudinal evidence is consistent with some of the hypothesised causal pathways in the IMV model, and suggests potential reciprocal causal pathways, these could be tested in future studies using experimental designs. For example, one could use tasks that manipulate and simulate a sense of entrapment in the face of the interpersonal adversity implicated in suicide risk, where entrapment is operationalised as the desire to escape that adversity (e.g., Collins et al., 2016; Collins et al., 2017; George et al., 2017), and then use a behavioural measure of post-entrapment ruminations (cf., Davies & Clark, 1998). Such experimental evidence could complement the longitudinal designs and test the causal direction suggested by the current novel findings of a prospective association from entrapment to rumination.

3.6 Conclusion

Ruminating about interpersonal antecedents of suicidal desire and one's capacity for self-harm can enhance future feelings of entrapment, as well as suicidal ideation and intent. Entrapment can also fuel further ruminative processes, providing initial evidence for potential reciprocal feedback loops between some key processes of the motivational phase of the IMV model. Additionally, thoughts of suicide can

lead to subsequent feelings of entrapment, while a higher sense of entrapment not only enhances future suicidal intent directly, but also moderates prospective reciprocal associations between suicidal ideation and intent. These pernicious feedback loops involving ruminations and entrapment, and the interplay of suicidal ideation and intent, may exacerbate a suicidal person's sense of being stuck in a 'cognitive suicidal prison', activating a suicidal mode (Rudd, 2000; Rudd et al., 2006). The challenge for current theories of suicide is to better account for the potentially dynamic and reciprocal influences of the putative causal factors along the path from suicidal ideation to action.

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Chapter 4 An Experimental Test of the Motivational Phase of the IMV Model of Suicidal Behaviour: Is There a Feedback Loop from Entrapment to Rumination?

4.1 Abstract

The Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour suggests that rumination moderates the relationship between defeat and entrapment in a linear pathway to suicidal ideation (O'Connor, 2011; O'Connor & Kirtley, 2018). However, recent longitudinal evidence suggests that rather than being a moderator, rumination directly predicts entrapment, and also that entrapment predicts rumination. This suggests a feedback loop. In the present study, we used a computer-based experimental paradigm to causally test the hypothesis of a feedback loop from entrapment to rumination. According to the IMV model, entrapment is operationalised as a desire to escape interpersonal adversity, specifically, joint feelings of burdensomeness and of thwarted belongingness. By inducing feelings of perceived burdensomeness and thwarted belongingness, we manipulated a sense of interpersonal adversity and the desire to escape this interpersonal adversity was used as a measure of entrapment. Results support previous suggestions that a feedback loop exists between rumination and entrapment. Theoretical implications for current models of why people suicide, and potential points of early intervention are discussed.

4.2 Introduction

Suicide results in approximately 800,000 deaths worldwide annually. However, it is estimated that at least twenty times this number of people will make a suicide attempt (World Health Organization, 2014), and many more will experience suicidal ideation (Borges et al., 2010). Suicidal ideation is a necessary risk factor for later suicide attempts (Klonsky & May, 2014; Millner et al., 2017; Taylor et al., 2007), and many psychological theories seek to explain what mechanisms lead to suicidal ideation.

One such psychological theory is the tri-partite integrated motivational-volitional (IMV) model of suicidal behaviour (O'Connor, 2011; O'Connor & Kirtley, 2018). A premise of the temporal sequence of events in the central 'motivational' phase is that defeat leads to entrapment, which in turn leads to suicidal ideation and intent (Figure 4.1). The model further posits that rumination (the extent to which individuals passively focus on the reasons for their distress) moderates the relationship between defeat and entrapment. However, defeat and entrapment are difficult to separate and have been argued to represent the same underlying construct (Griffiths et al., 2015; Taylor, Gooding, Wood, & Tarrier, 2011; Taylor et al., 2009). As such, entrapment includes an element of defeat and is defined as "perceptions of being powerless or lacking the capacity to effect change in order to move on from an aversive status or role" (Taylor, Gooding, Wood, & Tarrier, 2011, p. 394).

Therefore, if defeat and entrapment are synonymous, Brown and colleagues (2019) hypothesised that, rather than being a moderator of the association between defeat and entrapment, rumination is a direct precipitant of entrapment. Prospective evidence confirmed that rumination about constructs antecedent to suicide predicted future entrapment, however, the reverse was also found (Brown, Stritzke, et al., 2019). Entrapment led to greater levels of future rumination about constructs

antecedent to suicide. This suggested that there is a potential feedback loop between rumination and entrapment. That is, ruminating about the interpersonal antecedents of suicidal ideation induces feelings of entrapment. Subsequently, once feelings of entrapment arise, attention to emotional stimuli that prompt and sustain ruminative suicidal thoughts increases, which can trigger an emotional cascade where individuals get stuck in a suicidal mode (Rudd, 2006a; Rudd, 2000; Selby et al., 2009). To the suicidal individual, this is akin to being trapped in a “cognitive prison”.

In sum, in addition to a prospective link from rumination to entrapment, there was prospective evidence for the reverse link from entrapment to rumination. As the IMV model of suicidal behaviour does not predict reciprocal feedback loops along the motivational phase of the tri-partite model, the aim of the present study was to use an experimental analog design to rigorously test the potential causal link from entrapment to rumination as suggested by the novel prospective findings.

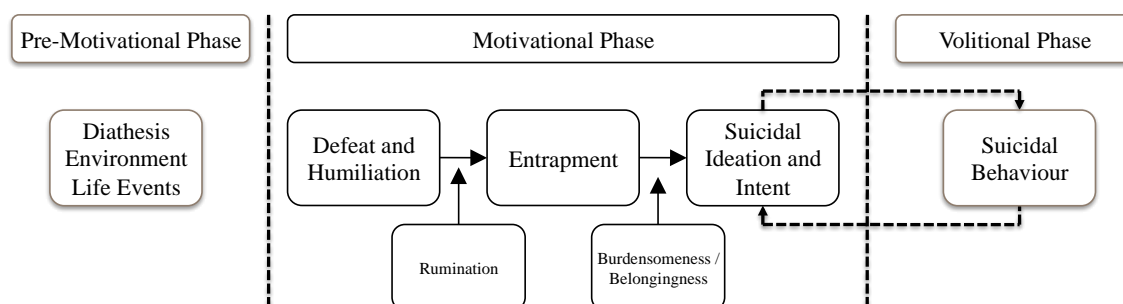


Figure 4.1. Hypothesised linear pathway of the tri-partite IMV model of suicidal behaviour, highlighting the motivational phase and relevant moderators that are the focus of the present chapter, including the recently proposed reciprocal feedback loop between the motivational and volitional phases of the model (adapted from O’Connor & Kirtley, 2018).

The Present Study

In the present study we manipulate a sense of entrapment using a computer-based, team-player paradigm; the ‘Interpersonal Persistence Task’ (Collins et al., 2016). The frequency and intensity of post-task rumination is assessed using a behavioural task, based on a trauma film paradigm (Davies & Clark, 1998), and two

self-report measures.

Entrapment is operationalised by the IMV model in terms of a desire to escape specific adverse events or experiences, and is distinct from hopelessness, which is a pervasive sense of pessimism for the future (O'Connor & Kirtley, 2018). This conceptualization of entrapment is supported by the two most common motives given by suicide attempters for their suicide attempt; a desire to escape an unacceptable or unbearable situation, and a desire to escape unbearable thoughts (Skogman & Öjehagen, 2003). As entrapment beliefs get stronger, so does the desire to escape the event or experience that is causing the painful feelings of entrapment (O'Connor et al., 2013). If the state of entrapment persists, suicide is perceived as the only option to escape the feelings of entrapment. Therefore, an increased desire to escape from an adverse event or experience may be used as a proxy for an increased sense of entrapment.

The Interpersonal Theory of Suicide (Joiner, 2005) posits that it is interpersonal adversity that leads to a desire for suicide. Specifically, the theory states that feelings of being a burden on others (perceived burdensomeness: PB) and feelings of not belonging (thwarted belongingness: TB) create a desire to escape from such interpersonal adversity. According to the IMV model, this desire to escape arises from a sense of entrapment, and entrapment is more likely to be experienced by people who are exposed to the joint influence of high PB and high TB, rather than either of these variables alone (O'Connor & Kirtley, 2018).

Therefore, we use the interpersonal persistence task to simultaneously induce feelings of perceived burdensomeness and thwarted belongingness, and participants are asked to report on their desire to escape. In the high PB-TB condition, participants are induced to feel like a burden and that they don't belong on the team. In the low PB-TB condition, they are induced to feel like an asset and part of the

team. Previous studies consistently show that participants in the high PB-TB condition report a greater desire to escape from the task than participants in the low PB-TB condition (e.g., Collins et al., 2016; Collins et al., 2017; George et al., 2017; Hartley, Stritzke, Page, Blades, & Parentich, 2018). That is, the high PB-TB and low PB-TB experimental conditions will manipulate entrapment, and the success of this will be evident in higher or lower levels of desire to escape, respectively.

Our primary aim in the present study is to test the causal relationship from entrapment to rumination. Because the level of pre-existing ruminations about the thwarting of the interpersonal needs of contributing and belonging may influence the effect of the entrapment induction, or the level of ruminations experienced following the induction, these were incorporated in the design. For example, the IMV model predicts that individuals who are more sensitive to interpersonal judgments by others are more likely to experience feelings of entrapment (O'Connor & Kirtley, 2018). That is, we hypothesise that high ruminators, who frequently have thoughts about the interpersonal antecedents of suicidal desire such as perceived burdensomeness and thwarted belongingness, will be more sensitive to an interpersonal entrapment manipulation, and/or will be prone to report more post-task ruminations than low ruminators, regardless of task condition. Therefore, both high and low ruminators were recruited and randomly allocated to either a high or low PB-TB experimental condition.

Finally, we hypothesise that a successful manipulation of entrapment, operationalised as an increased desire to escape the task-induced interpersonal adversity in the high PB-TB condition compared to the low PB-TB condition, will cause individuals in the high PB-TB condition to experience greater frequency and intensity of post-task ruminations than those in the low PB-TB condition.

4.3 Method

Participants

Students ($N = 123$, 80 female, 42 male, 1 other; $M_{\text{age}} = 20.33$, $SD = 5.53$, range: 17-54) were recruited from the lower (≤ 9) and higher (≥ 26) terciles on responses to the Ruminations about Antecedents of Suicide Scale. Participants ($N = 63$) scoring at the lower end of the lower tercile (“low ruminators”, $M = 2.98$, $SD = 2.37$) and participants ($N = 60$) scoring at the higher end of the upper tercile (“high ruminators”, $M = 59.47$, $SD = 9.24$) were randomly allocated to a high or low perceived burdensomeness / thwarted belongingness (PB-TB) experimental condition in the Interpersonal Persistence Task. As expected, based on the recruitment criteria there was a significant difference in scores on the RASS between the low and high ruminator groups, $F(1,121) = 2201.81$, $p < .001$, $\eta^2 = .95$ (see Table 3.1). The University’s Human Research Ethics Committee approved the study. All participants provided informed consent and received course credit.

Participant Characteristics by Group and Condition. Descriptive statistics of participant characteristics by ruminator (RASS) group and PB-TB experimental condition are shown in Table 4.1. As expected, based on the recruitment criteria, there was a significant difference in scores on the RASS between the low and high ruminator groups, $F(1,121) = 2201.81$, $p < .001$, $\eta^2 = .95$ (see Table 4.1). High ruminators scored significantly higher than low ruminators on measures of suicidal ideation, suicidal behaviours, suicidal intent, and readiness for suicide, as well as psychological distress. In the high ruminator group, 88.3% had experienced at least one thought of suicide in the past year, with 35% reporting thoughts of suicide on a weekly basis; 3.3% daily. This compares to the low ruminator group where only 27% reported having experienced a suicidal thought once or twice in the past year, with the remaining 73% reporting never having experienced a thought about suicide. In

addition, 33.4% of the high ruminators had a lifetime history of suicide attempts; 15% reported having made one suicide attempt, and an additional 18.4% reported multiple suicide attempts with 1.7% reporting five or more lifetime attempts. In comparison, one suicide attempt was made by 6.3% of the low ruminator group and none reported multiple attempts. In regards to suicide intent, 21.7% of the high ruminators strongly agreed with the statement “I have no intention of killing myself in the near future”, however 5% did not at all agree with this statement (45% rated this statement higher than the mean). Conversely, 74.6% of low ruminators very strongly agreed with the statement, but 19% reported they did not at all agree with the statement. Similarly, 3.3% of high ruminators strongly agreed that if they wanted to kill themselves they felt ready to do so (33.3% rating higher than the mean). This compares to 84.1% of low ruminators endorsing that they don’t at all agree with the statement, and none strongly, or even slightly, agreed. High ruminators scored at the low end of the ‘very high distress’ range (30-50) and low ruminators scored in the ‘moderate distress range’ (16-21). In addition, high ruminators were significantly lower on trait mindfulness, supporting previous research showing that low levels of rumination is needed to allow for mindfulness (Svendsen, Kvernenes, Wiker, & Dundas, 2017). Finally, there were no significant differences between high and low ruminators on responses to level of interest and effort in the experimental task (Table 4.1).

Table 4.1. Descriptive Statistics split by Experimental Condition and Ruminator group.

	Low Ruminator Group (<i>N</i> = 63)		High Ruminator Group (<i>N</i> = 60)		Group Effect <i>F</i>
	Low PB-TB (31)	High PB-TB (32)	Low PB-TB (30)	High PB-TB (30)	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Screen Rumination	3.26 (2.32)	2.72 (2.41)	58.90 (7.79)	60.03 (10.60)	2201.81***
Ideation (Yr)	0.32 (0.48)	0.22 (0.42)	1.93 (1.46)	2.13 (0.97)	111.85***
Attempt (Life)	0.06 (0.25)	0.06 (0.25)	0.53 (0.94)	0.67 (1.06)	17.01***
Suicide Gesture (Life)	0.29 (0.64)	0.31 (0.64)	1.03 (1.1)	1.30 (1.42)	24.00***
Thoughts Injury (Yr)	0.35 (0.55)	0.25 (0.44)	1.73 (1.39)	1.60 (1.38)	53.94***
Self Injury (Life)	0.48 (1.03)	0.50 (0.80)	2.33 (1.67)	2.07 (1.78)	47.57***
Suicide Intent [^]	2.84 (3.83)	0.75 (2.27)	2.73 (2.68)	3.03 (2.48)	4.39**
Suicide Readiness	0.26 (0.77)	0.19 (0.47)	2.37 (2.37)	3.07 (2.74)	56.07***
Distress (K10)	18.5 (6.09)	19.09 (4.91)	31.47 (8.11)	30.37 (7.48)	99.09***
Mindfulness (FMI)	2.77 (0.51)	2.84 (0.44)	2.40 (0.49)	2.35 (0.46)	25.18***
Interest	3.77 (1.73)	3.31 (1.66)	3.53 (1.87)	3.13 (1.74)	0.44
Effort	5.55 (0.81)	4.72 (1.53)	4.73 (1.74)	4.73 (1.41)	2.46

Note: *df* = 1, 119.

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

There were no main effects of condition or group x condition interactions, except for intent.

[^] = Group x condition interaction; $F(1,119) = 5.29, p = .02, \eta^2_p = .04$.

Materials and Procedure

Ruminations about Antecedents of Suicide Scale (RASS; Brown, Page, et al., 2019). The 18-item RASS was administered to screen 845 university students. The RASS assesses how much a person ruminates about the suicide risk factors identified in the interpersonal theory of suicide (Joiner, 2005). Items pertaining to ruminations about thwarted belongingness (9) and perceived burdensomeness (6), are adapted from the Interpersonal Needs Questionnaire (Van Orden et al., 2008). Three items pertaining to ruminations about acquired capability are adapted from a scale measuring fearlessness of death, pain tolerance, and mental rehearsal for self-harm (George et al., 2016). Participants rate how much a particular thought stays in their head, from 0 (*Just fleeting*) to 6 (*All-consuming*). Higher scores indicate higher

ruminations. The RASS has good psychometric properties and has incremental validity over and above the Interpersonal Needs Questionnaire (Van Orden et al., 2012) and the Brooding Rumination Scale (Treyner et al., 2003) in assessing suicidal ideation (Brown, Stritzke, et al., 2019). Internal consistency in the present sample was good ($\alpha = .97$).

The Interpersonal Persistence Task (Collins et al., 2016). The Interpersonal Persistence Task is a three-player, team-based computer task with six blocks, each consisting of three rounds of five trials, or 90 trials in total. Participants are provided with an information sheet that discloses that they may be playing with computer-generated or real players. The experimenter provides an initial briefing. Then, specific instructions on how to play are provided on-screen. Each participant is individually tasked with identifying if two blue symbols appearing in random locations on a black screen match, or not. Points are won or lost on the basis of both accuracy and speed, and the team's goal is to beat a target score. A four-trial practice round is played first.

Several steps are taken to increase task plausibility. First, to increase the belief that the participant's team members are real people, two participants are tested concurrently in separate rooms but within initial viewing of each other. Doors are closed during actual testing. When no second participant is available, a confederate is used. Second, participants are informed that the third team member is playing in a laboratory down the hall, and after the initial briefing the experimenter briefly leaves to double-check that the third participant has been briefed. Third, following the practice round, the statement "waiting for other players to finish practice..." is displayed, reinforcing the perception that the other players are real. Finally, the pre-generated comments from the other 'players' include colloquialisms and spelling and grammatical errors, as appropriate for a student population; for example "*OMG what*

are you even doing?" (high PB-TB condition) and “*#winning*” (low PB-TB condition).

Perceived burdensomeness manipulation. Perceived burdensomeness is continually and cumulatively induced using performance feedback (Collins et al., 2016; Collins et al., 2017; George et al., 2017). After each block of trials, a summary of each participant’s points (won and lost), the team total, and the target score, is displayed. In reality all scores are unreflective of actual performance and have been manipulated based on predetermined odds. Participants in the high PB-TB condition consistently score lower than their team members, averaging 40% correct, and the team target is consistently displayed as higher than the team’s actual performance. Conversely, participants in the low PB-TB condition consistently score higher than their team members, averaging 60% correct, and the team target score is displayed as being around the team’s actual performance. After viewing the scores, participants rate how much they currently feel like a burden on the team (*perceived burdensomeness*) from 0 (*a burden on the team*) to 6 (*an asset to the team*). Consequently, over time, participants perceive themselves more as either a burden or an asset to the team. To aid interpretability, perceived burdensomeness is reversed scored so that a higher score reflects higher perceived burdensomeness.

Thwarted belongingness manipulation. Thwarted belongingness is continually and cumulatively induced using interpersonal feedback (Collins et al., 2016; Collins et al., 2017; George et al., 2017). After each block of trials, participants provide and receive comments from their team players. In reality, the received comments are pre-generated. Participants in the high PB-TB condition receive increasingly critical and impatient comments. Conversely, participants in the low PB-TB condition receive encouraging and positive comments. After reading the comments from their team players, participants rate how much they currently feel

like they belong in the team (*belongingness*) from 0 (*like an outsider*) to 6 (*like I belong in the team*). Consequently participants feel less or more like they belong within the team.

Participant entrapment ratings. Entrapment is measured as the desire to escape from the task. Therefore, at the end of each block of trials, participants rate how much they want to drop out of the task from 0 (*not at all true for me*) to 6 (*very true for me*).

Post-task ruminations - behavioural measure. The frequency of post-task ruminations is first measured using an adaptation of Davies and Clark's (1998) trauma film paradigm. Participants spend four-minutes reading aloud randomly generated, two-digit numbers displayed briefly on the screen. They are instructed to press the space bar whenever any unpleasant thoughts or images relating to the recently completed team task comes to mind, even if the same thought keeps coming back, and not to make any special effort to either think or not think about the team task. The number reading task is designed to be a low cognitively loaded distraction from the real purpose of recording the number of times the space bar is pressed, which is assumed to represent the frequency of task-specific rumination.

Following the completion of the experimental task and behavioural measure of post-task ruminations participants complete a battery of computer-delivered questionnaires.

Interest and effort. The level of interest participants have in doing the task, and the level of effort they give during the task could potentially affect their performance. Therefore, in between completing the behavioural measure of post-task ruminations and self-reporting the frequency and intensity of experienced ruminations, participants are asked to indicate how much they agree with the statements *I found the task interesting* and *I made an effort to do well on the task*,

using a scale from 0 (*not at all true*) to 6 (very true).

Post-task ruminations – self-report measures.

Self-report frequency. Participants rate how frequently they experienced unpleasant thoughts during the team task using a 5-point scale from 0 (*not at all*) to 4 (*I could barely think of anything else*).

Self-report intensity. Participants rate how intense any unpleasant thoughts experienced during the team task were, using a 5-point scale from 0 (*just fleeting*) to 6 (*all consuming*).

Intent and readiness for suicide. Two items assess current suicide intent (“*I have no intention of killing myself in the near future*”) and readiness for suicide (“*If I wanted to kill myself, I feel ready to do so*”). Participants rate how much they agree with each statement from 0 (*not at all*) to 8 (*very strongly*). To aid interpretability, intention is reverse scored such that higher scores indicate greater intent, and readiness for suicide, respectively.

Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock et al., 2007). The SITBI is appropriate for administration in a self-report format (Latimer et al., 2013). Five items from the SITBI were used to assess frequency of past year suicidal ideation and thoughts of self-injury on a 6-point scale from 0 (*never*) to 5 (*almost every day*). Frequency of lifetime suicidal gestures, previous attempts, and engagement in self-injury are measured on a 5-point scale from 0 (*never*) to 4 (*five or more times*).

Kessler Psychological Distress Scale (K10; Kessler et al., 2002). The ten-item K10 measures emotional states in non-clinical populations, based on the past 4 weeks. Items are rated using a 5-point scale from 1 (*none of the time*) to 5 (*all of the time*). Higher scores indicate heightened psychological distress and probability of mental health diagnoses. Common Australian normative bands are: low (10–15),

moderate (16–21), high (22–29), and very high distress (30–50) (Coombs, 2005).

Internal consistency in the current sample was good ($\alpha = .94$).

Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006). Mindfulness is a protective factor for suicide risk (Anastasiades, Kapoor, Wootten, & Lamis, 2017; Chesin & Jeglic, 2016), and can be used specifically to treat ruminative thinking in suicidal individuals (Barnhofer et al., 2015). Mindfulness can also attenuate the desire to escape from the interpersonal persistence task used in the present study (Collins et al., 2017), and hence was included as a potential covariate. The 14-item FMI assesses present moment awareness and acceptance of thoughts, emotions, and body sensations. Items are rated on a 4-point scale from 1 (*rarely*) to 4 (*almost always*). The FMI is appropriate for populations with no prior mindfulness meditation experience (Kohls, Sauer, & Walach, 2009). Internal consistency in the current sample was good ($\alpha = .87$).

Suspicion probes. Prior to being debriefed, participants are asked to answer three, pen and paper questions. First, participants are asked to make any general comments they wish about the experiment. The second and third questions are administered at the same time and specifically ask participants if they found anything unusual about the task and to report on what they thought was being assessed. Any other relevant verbal comments made to the researcher prior to being debriefed are also logged.

Debrief. Participants are informed that they had been allocated to either a harder or easier condition than the other players (as appropriate), and that the other players were in fact computer-generated. All participants are provided with information about free support services.

Data Analysis

Power Analysis. A power analysis was performed using G*Power (Faul,

Erdfelder, Lang, & Buchner, 2007) for a repeated measures ANOVA comprising two between subjects factors, each with two levels. The required sample size to reliably detect a significant interaction between ruminator group and task condition, based on a power of 0.80, an alpha level of 0.05, and a medium to large effect size, was estimated at between 52 and 128. Thus, the current sample size of 123 provided sufficient statistical power for a medium to large effect.

Analysis Strategy. Suspicious participants were assessed for inclusion suitability. Data were screened for outliers and tested for normality. Manipulation checks for successful entrapment induction were conducted using mixed model ANOVAs. This required a significant main effect of condition such that participants in the high PB-TB condition reported higher levels of burdensomeness and lower levels of belongingness than those in the low PB-TB condition. Importantly, a higher sense of entrapment could be inferred if there is also a main effect of condition on the desire to escape the task, such that participants in the high PB-TB condition report a higher desire to drop out of the task than participants in the low PB-TB condition. Then, the key hypothesis that task-induced entrapment predicts a higher level of post-task rumination was tested using three 2 (group) x 2 (condition) ANOVAs, one for each measure of rumination.

4.4 Results

4.4.1 Suspicion and Screening Checks

Two experimenters independently assessed participant responses to three suspicion probes, and any verbal comments made by the participant to the experimenter prior to debriefing. In addition, the online comments made to other 'players' during the task were assessed if they were indicative of the participant being suspicious or not. Nine suspicious cases were identified (inter-rater reliability = 95%), seven from the high TB-PB condition and 2 from the low TB-PB condition.

Disagreements between raters were referred to a third independent rater for resolution. However, there were no significant differences ($p > .05$) between suspicious and non-suspicious participants on mean scores of any of the experimental task or post-task measures. This is consistent with previous evidence that similar experimentally induced psychological effects are experienced regardless of whether participants are explicitly told the other ‘players’ are computer generated and scripted, or real people (Zadro, Williams, & Richardson, 2004). Therefore, all data was deemed suitable for further analysis.

Data screening revealed three univariate outliers on the behavioural measure of post-task rumination exceeding the critical value ($z = |3.29|$, $p < .001$). However, as the associated participants responded within normal range on all other measures, they were re-allocated a score equivalent to three standard deviations above the variable mean (Field, 2009). There were no multivariate outliers and no violations of normality (skew $<|2|$; Field, 2009).

4.4.2 Experimental Induction of Interpersonal Adversity¹

The assumptions of homogeneity and sphericity were tested and rejected. Therefore, the Huynh Feldt adjusted F-test statistics are reported to keep the type 1 error rate close to .05 (Keselman, Algina, & Kowalchuk, 2001).

Perceived Burdensomeness. A 2 (rumination group) x 2 (PB-TB condition) x 6 (time) mixed-model ANOVA was performed to assess the effects of PB-TB condition and ruminator group across time on self-reported levels of burdensomeness. As expected, there was a main effect of condition. Participants in the high PB-TB condition reported significantly higher levels of burdensomeness

¹ There were no significant differences in the level of interest or effort between high and low PB-TB condition or between high and low ruminator groups. Therefore these variables were not controlled for in the following analyses.

than participants in the low PB-TB condition; $F(1, 119) = 289.27, p < .001, \eta^2_p = .71$ (Figure 4.2). There was also a significant condition by time interaction; $F(3.10, 368.52) = 3.01, p = .029, \eta^2_p = .03$, such that there was a significant linear decrease in feelings of burdensomeness over time in the low PB-TB condition, $F(2.29, 134.83) = 32.98, p = .047, \eta^2_p = .05$, but not in the high PB-TB condition, $F(3.44, 206.18) = 1.06, p = .37, \eta^2_p = .02$, where perceived burdensomeness was consistently high. There were no main or interaction effects involving group.

Thwarted Belongingness. A 2 (rumination group) \times 2 (PB-TB condition) \times 6 (time) mixed-model ANOVA was performed to assess the effects of PB-TB condition and ruminator group across time on self-reported levels of belongingness. As expected, there was a main effect of condition. Participants in the high PB-TB condition reported significantly lower levels of belongingness than participants in the low PB-TB condition, $F(1, 119) = 354.30, p < .001, \eta^2_p = .75$ (Figure 4.3). There was also a significant condition by time interaction, $F(3.94, 469.35) = 13.15, p < .001, \eta^2_p = .10$, such that belongingness significantly decreased over time for participants in the high PB-TB condition, $F(4.08, 244.88) = 6.23, p < .001, \eta^2_p = .10$, but increased over time for participants in the low PB-TB condition, $F(3.11, 183.59) = 11.70, p < .001, \eta^2_p = .02$. Additionally, there was a significant main effect of ruminator group on belongingness ratings, $F(1, 119) = 6.47, p = .01, \eta^2_p = .05$, but no group by condition interaction, $F(1, 119) = .57, p = .45, \eta^2_p = .01$. That is, regardless of experimental condition, high ruminators reported lower levels of belongingness ($M=3.25, SE=.13$) than low ruminators ($M=3.71, SE=.13$).

In sum, the experimental induction of interpersonal adversity by increasing levels of perceived burdensomeness and by decreasing levels of belongingness was successful with large effect sizes, and remained strong throughout the team task.

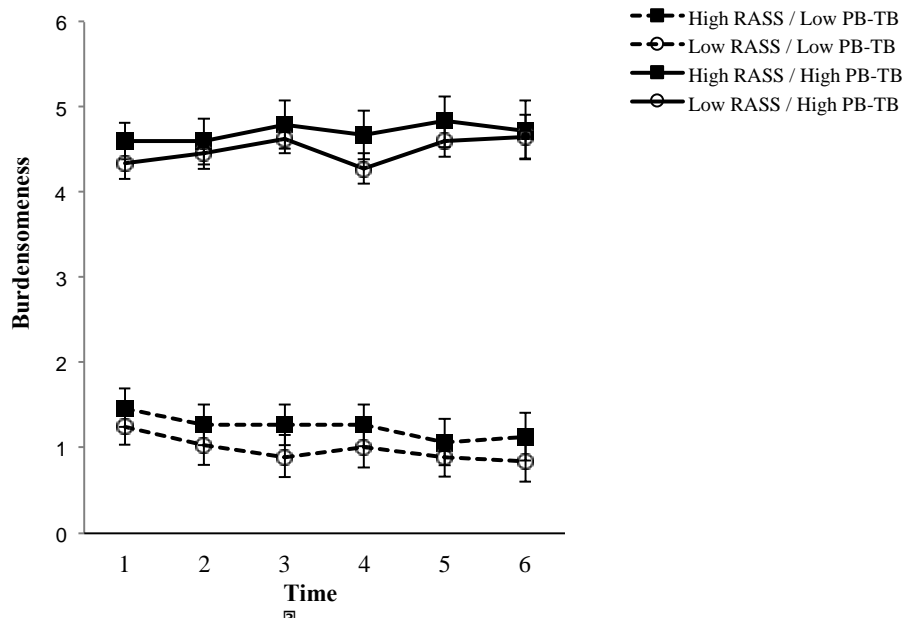


Figure 4.2. Mean burdensomeness ratings after each block. Error bars represent standard error.

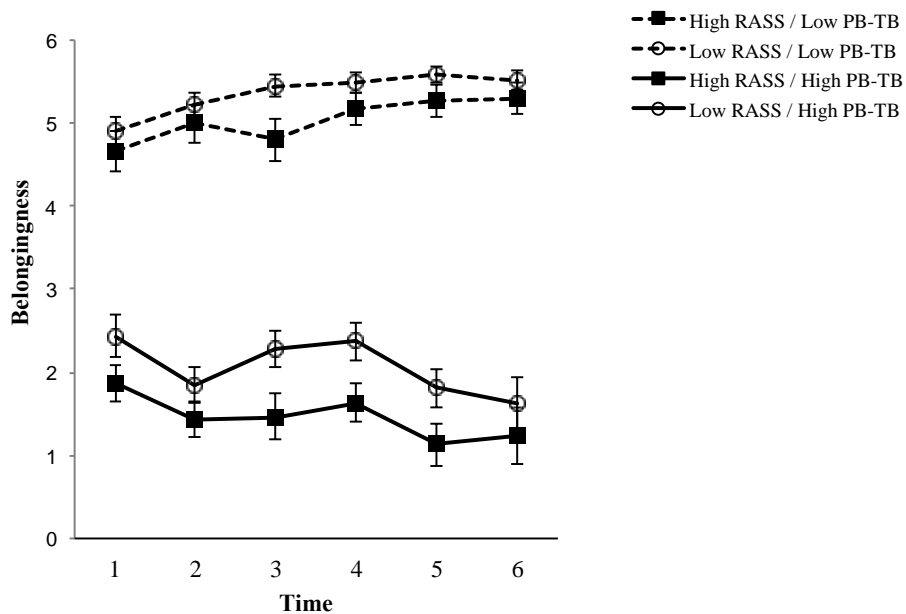


Figure 4.3. Mean belongingness ratings after each block. Error bars represent standard error.

4.4.3 Experimental Induction of Entrapment: Desire to Drop Out.

A 2 (ruminator group) x 2 (PB-TB condition) x 6 (time) mixed-model ANOVA was performed to assess the effects of PB-TB condition and ruminator

group across time on self-reported levels of desire to drop out of the task. As expected, there was a main effect of condition. Participants in the high PB-TB condition reported significantly higher levels of the desire to drop out of the task than participants in the low PB-TB condition; $F(1, 119) = 65.48, p < .001, \eta^2_p = .36$ (Figure 4.4). There was also a significant condition by time interaction, $F(3.56, 423.18) = 11.47, p < .001, \eta^2_p = .01$, such that the desire to drop out of the task increased over time for participants in the high PB-TB condition, $F(3.80, 228.27) = 8.95, p < .001, \eta^2_p = .13$, but decreased over time for participants in the low PB-TB condition, $F(2.39, 140.81) = 2.93, p = .05, \eta^2_p = .05$.

Additionally, there was a significant main effect of ruminator group on desire to drop out, $F(1, 119) = 5.78, p = .02, \eta^2_p = .05$. Regardless of experimental condition, high ruminators reported higher levels of the desire to drop out of the task ($M = 2.11, SE = .18$) than low ruminators ($M = 1.50, SE = .18$). Inspection of Figure 4 and a follow-up analysis suggests that this group difference was stronger in terms of effect sizes in the high TB-PB condition, $F(1, 60) = 4.40, p = .04, \eta^2_p = .07$, than in the low PB-TB condition, $F(1, 59) = 1.43, p = .24, \eta^2_p = .02$. However, this trend towards an interaction was not significant, $F(1, 119) = 1.30, p = .26, \eta^2_p = .01$. In sum, participants in the high PB-TB condition experienced a greater level of desire to drop out than participants in the low PB-TB condition.

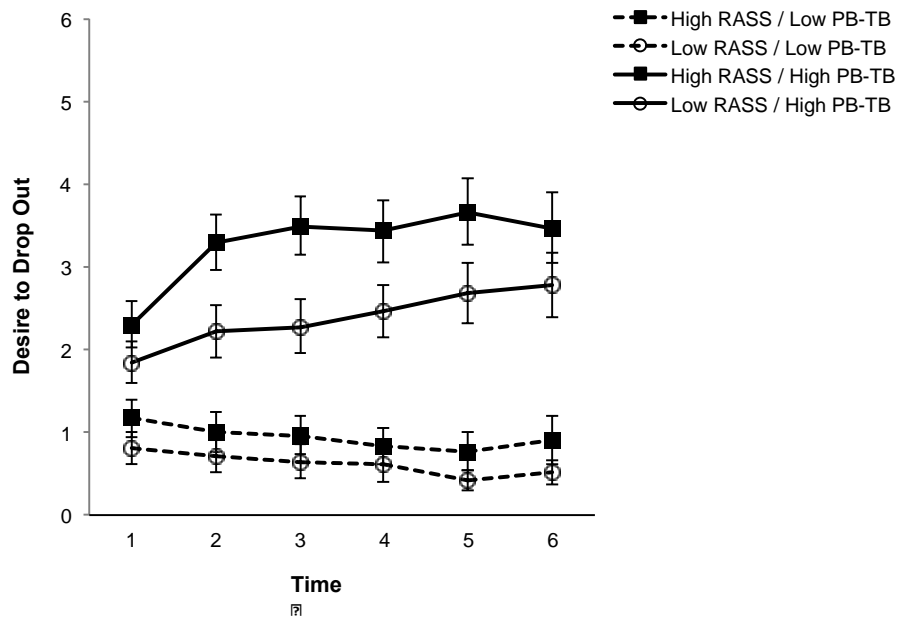


Figure 4.4. Mean desire to drop out ratings after each block. Error bars represent standard error.

4.4.4 Does Higher Entrapment Cause Higher Ruminations?²

To test the primary hypothesis that a higher sense of entrapment would cause higher subsequent ruminations, three 2 (group) x 2 (condition) ANOVAs were performed.

Behavioural Task Measuring Frequency of Post-Task Ruminations.

There was a significant main effect for condition; $F(1, 119) = 24.05, p < .001, \eta^2_p = .17$. As predicted, participants in the high PB-TB condition ($M = 6.65, SD = 6.41$) pressed the space bar to indicate they were experiencing unpleasant thoughts about the task significantly more often than participants in the low PB-TB condition ($M = 2.23, SD = 2.93$) (Figure 4.5). There was no main effect of ruminator group; $F(1, 119) = 2.19, p = .14, \eta^2_p = .02$, or ruminator group by PB-TB condition interaction, $F(1, 119) = .51, p = .48, \eta^2_p = .004$. Thus, higher levels of task-induced desire to escape the task led to more rumination about the task, and this effect was strong for

² When controlling for individual difference in distress and mindfulness, the hypothesised effect of condition remained unchanged.

both high and low ruminator groups.

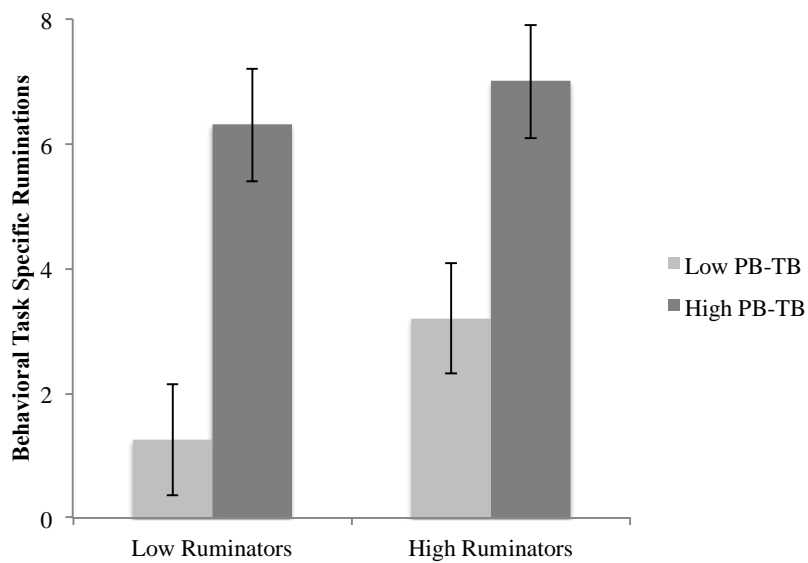


Figure 4.5. Mean behavioural task-specific ruminations by high and low PB-TB condition and high and low ruminator group. Error bars represent standard error.

Self-Report Frequency and Intensity of Post-Task Ruminations.

Replicating the findings from the behavioural measure of rumination, the main effect of condition in a 2 (group) x 2 (condition) ANOVA was significant for both frequency of self-reported ruminations, $F(1, 119) = 67.36, p < .001, \eta^2_p = .36$ (Figure 4.6) and intensity, $F(1, 119) = 45.98, p < .001, \eta^2_p = .28$ (Figure 4.7). There were no condition by group interactions for either frequency, $F(1, 119) = 0.91, p = .34, \eta^2_p = .01$, or intensity of self-report rumination $F(1, 119) = 1.63, p = .20, \eta^2_p = .01$. Finally, there was convergent validity between the behavioural task and self-report measures of ruminative frequency. The behavioural measure significantly correlated with self-report rumination frequency ($r = .47, p < .001$), and self-report rumination intensity ($r = .39, p < .001$).

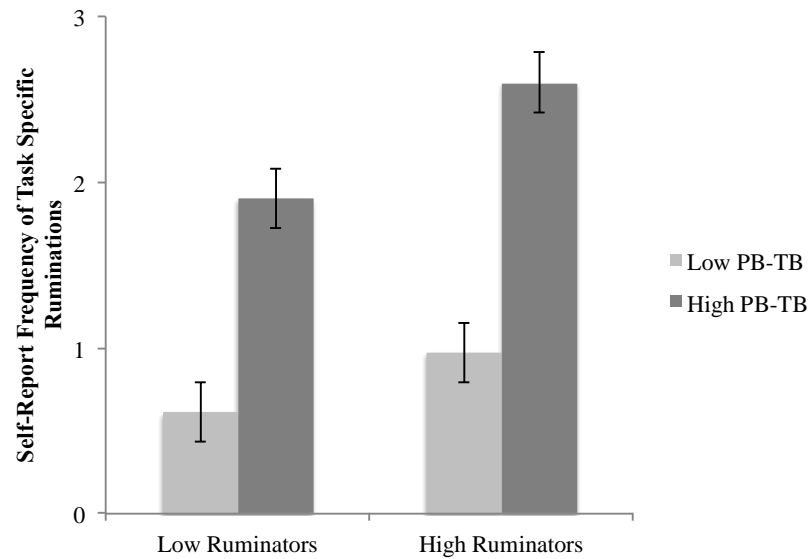


Figure 4.6. Mean self-report frequency of task-specific ruminations by high and low PB-TB condition and high and low ruminator group. Error bars represent standard error.

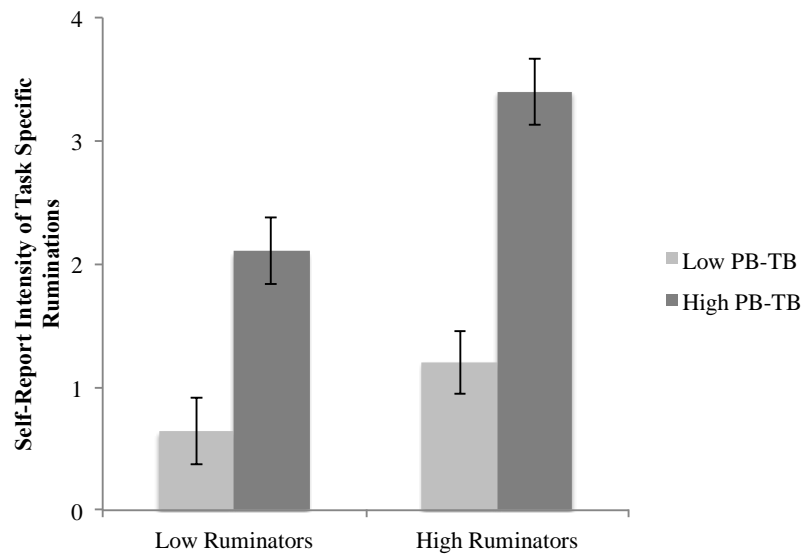


Figure 4.7. Mean self-report intensity of task-specific ruminations by high and low PB-TB condition and high and low ruminator group. Error bars represent standard error.

4.5 Discussion

The IMV model of suicidal behaviour states that rumination has a moderating role in amplifying entrapment. Previous longitudinal evidence confirmed a more direct path from rumination to entrapment (Brown, Stritzke, et al., 2019). However,

there was also evidence for the reverse relationship, entrapment leading to rumination. This suggested that there is a feedback loop within the motivational phase of the model. Therefore, the aim of the present study was to experimentally test the previously found longitudinal association from entrapment to rumination. Specifically we hypothesised that, participants who experience higher levels of entrapment will subsequently experience more frequent and intense ruminations than participants who experience lower levels of entrapment. Results confirmed that participants exposed to higher interpersonal adversity experienced a greater sense of entrapment as evidenced by their greater desire to escape this adversity, compared to participants exposed to low interpersonal adversity and hence a low sense of entrapment. As predicted, participants in the high entrapment condition ruminated more about the task than participants in the low entrapment condition.

To our knowledge, this is the first experimental evidence suggestive of a causal relationship between a desire to quit a task because of interpersonal adversity, and rumination. Together with the earlier longitudinal evidence for prospective associations from rumination to entrapment, as well as the reverse direction from entrapment to rumination, the present results suggest that the IMV model needs refinement to account for at least one feedback loop during the motivational phase of the pathway to suicidal ideation and action.

Trapped in a Ruminative Suicidal Mode?

Previous longitudinal studies have shown that entrapment does not predict suicidal ideation as hypothesised by the IMV model (Brown, Stritzke, et al., 2019; Taylor, Gooding, Wood, Johnson, et al., 2011), but rather, it is rumination that prospectively predicts suicidal ideation (Brown, Stritzke, et al., 2019). The present findings further suggest that rumination is particularly pernicious by creating and perpetuating an emotional cascade via a feedback loop with feelings of entrapment

such that an individual eventually becomes stuck in a suicidal mode (Rudd, 2006a; Rudd, 2000; Selby et al., 2009).

The present experimental evidence has important theoretical and clinical implications. The findings suggest a causal feedback loop from entrapment to rumination. The possibility of a feedback loop, while not previously predicted *within* the motivational phase of the IMV model, was recently proposed to occur between the motivational and volitional phase of the IMV model (O'Connor & Kirtley, 2018) (see Figure 1.1). That is, suicidal ideation and suicidal behaviour reciprocally enhance each other. The present results similarly suggest that a more fluid and not strictly sequential pathway also exists *within* the motivational phase. Thus, ruminations have a more central pernicious role in the motivational phase, as opposed to only a moderating role, via a reciprocal link with entrapment, one that further intensifies the prospective effects of rumination on suicidal ideation (Brown, Stritzke, et al., 2019).

If entrapment has a causal role in exacerbating ruminative thoughts about the antecedents of suicidal ideation then clinicians assessing for suicide risk should include a measure of entrapment (e.g., Gilbert & Allan, 1998). As entrapment leads someone to perceive their situation as inescapable, clinical interventions that help individuals reframe negative perceptions and feel more in control over their situation are worthy of further investigation. One promising intervention is the Broad-Minded Affective Coping Procedure (Johnson et al., 2013; Tarrier, 2010). Broad-minded affective coping involves guided reimagining of past positive experiences to evoke a positive affect. It is believed that a positive affect can broaden cognitive scope (Taylor, Gooding, Wood, & Tarrier, 2011). That is, positive affect can provide access to more open, creative, and flexible thinking, which is therapeutically imperative when exploring alternatives to suicide as a means of escape.

In the present study, the significant differences in past suicide attempts between high and low ruminators is consistent with the finding that rumination is associated with lifetime suicide attempts above and beyond other commonly cited risk factors (Rogers & Joiner, 2018b). Therefore, it would also be of benefit for clinicians assessing suicide risk to ask how much a client is *currently* ruminating about being a burden on others, not belonging, and their capability for inflicting their own death.

Moreover, high ruminators reported significantly lower scores of mindfulness than low ruminators. This aligns with recent research showing that low levels of rumination is needed to allow for mindfulness (Svendsen et al., 2017), as well as experimental research demonstrating that a mindfulness intervention attenuates the impact of the interpersonal adversity induced during the interpersonal persistence task (Collins et al., 2017). Mindfulness-based cognitive therapy (Segal et al., 2004; Segal et al., 2002) has been successful in treating depressive ruminative thinking in suicidal individuals (e.g., Barnhofer et al., 2015), and reducing suicidal ideation (Forkmann et al., 2014). Therefore, mindfulness-based cognitive therapy adapted for treating ruminations about suicide-specific constructs, and perceptions of entrapment, is worthy of further investigation (O'Connor & Portzky, 2018; Teismann & Forkmann, 2015).

Limitations and Future Directions

The experimental design offers a novel approach to testing the motivational pathway of the integrated motivational-volitional model of suicide, and is a strength of the present study. However, the results should be interpreted with some limitations in mind. First, participants comprised a non-clinical sample of university students rather than clinical populations. However, the high ruminators rated their mean psychological distress in the 'very high distress' range (range 30-50) placing them as

likely to be experiencing severe distress consistent with a diagnosis of a major depressive or anxiety disorder (Coombs, 2005). Therefore, it is likely that a significant proportion in the current sample would meet criteria for a mental disorder. Nevertheless, future studies could benefit from examining the outcomes in a clinical setting.

Second, whilst post-task rumination frequency was assessed using both behavioural and self-report measures, these were captured immediately following the completion of the interpersonal persistence task. The original trauma film paradigm task (Davies & Clark, 1998) also included two, correlated, longer-term measures of intrusions. Participants kept a diary for seven days and recorded the total number of intrusions, and the number of days on which intrusions were present. Future studies could similarly explore the longer-term impact of the experimental manipulation on rumination to see for how long the effect of entrapment on rumination frequency and intensity persists. If entrapment has a causal role in exacerbating ruminative thoughts then it is plausible that, once participants are informed that the scores and team players are computer generated and not real, their experience of entrapment will subside and ruminations will decrease. However, there is some evidence to suggest that psychological effects can persist even when participants are aware of the study design (Zadro et al., 2004). Therefore, future studies may benefit from assessing residual ruminations (frequency and intensity) at one-hour, 24 hours, and seven days post debrief. In addition, if the relationship between entrapment and rumination is reciprocal, and ruminations do persist or increase post debrief, it would be important to assess for subsequent increases in feelings of entrapment. This could be assessed using a self-report measure such as Gilbert and Allan's (1998) entrapment scale.

4.6 Conclusion

The present study provides the first experimental evidence for a causal

feedback loop from entrapment to rumination within the motivational phase of the integrated-motivational volitional model of suicidal behaviour. Together with previous longitudinal evidence (Brown, Stritzke, et al., 2019), there is now emerging evidence for a feedback loop in the early part of the motivational phase. This is consistent with a recent refinement of the model by O'Connor and Kirtley (2018), which proposed a reciprocal feedback loop along the transition from suicidal ideation and intention formation during the latter part of the motivational phase, to suicidal behaviour during the volitional phase of the model. Thus, theoretical models of the pathway to suicide must take into account that the progression from ideation to action is dynamic and fluctuating rather than sequential (Bryan, 2019; Bryan, Rudd, Peterson, Young-McCaughan, & Wertenberger, 2016; Rudd, 2006b). Encouragingly, the vicious cycle of reciprocal enhancement between ruminations and feelings of entrapment can be broken by existing evidence-based treatments.

4.7 References

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Suicidal ideation is a gateway to suicidal behaviour. Therefore, to advance our understanding of why people attempt or die by suicide we need to better understand why some people develop thoughts about suicide as an option in the first place. The current research program used a multi-method approach to rigorously test the temporal sequencing of specific constructs proposed by the motivational phase in the Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour (O'Connor, 2011; O'Connor & Kirtley, 2018), and considered an expanded theoretical account of the motivational phase based on the emotional cascade model that incorporates the possibility of reciprocal feedback loops (Selby et al., 2009). Specifically, it was hypothesised that (i) rather than moderating the relationship between defeat and entrapment, rumination directly predicts subsequent entrapment, (ii) there is a feedback loop between rumination and entrapment where rumination not only predicts subsequent entrapment, but entrapment also predicts subsequent rumination, and (iii) suicidal ideation and suicidal intent are separate but interconnected steps within the motivational phase, each with differing pathways to and from their development. However prior to testing these hypotheses, a novel measure of rumination that could capture ruminations relevant to suicidal thoughts and behaviours was developed. The findings from the longitudinal and experimental studies comprising the present thesis are discussed through a lens that views the motivation for suicide as arising from a sense of being stuck in a cognitive suicidal mode (Rudd, 2006a; Rudd, 2000), akin to a cognitive prison from which suicide promises a possible means of escape.

Figure 5.1 depicts a modified theoretical account of the motivation for suicide based on the synthesised evidence from the present findings. The resultant model highlights several potential feedback loops not previously captured within the

motivational phase of the IMV model.

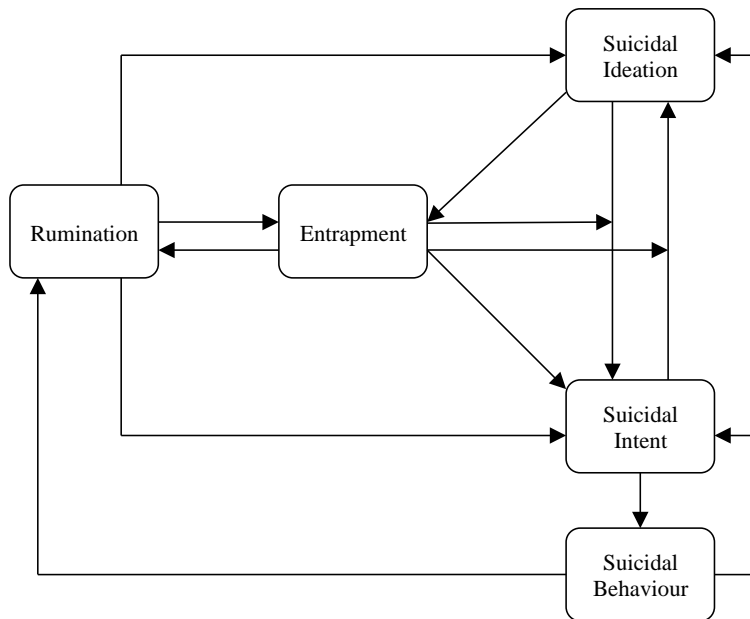


Figure 5.1. A cognitive prison model of suicidal motivation: a modified framework of the motivation for suicide based on the present body of work.

First, consistent with the IMV model of suicide the modified framework depicts rumination as antecedent to the development of entrapment. However, instead of *moderating* the relationship between defeat and entrapment, the hypothesis that rumination *directly* and prospectively predicts entrapment was supported. Importantly, rumination in the modified framework refers to a novel theoretically derived measure of rumination that is based on constructs that are causally and proximally related to suicidal ideation. Second, the hypothesis that there is a feedback loop between rumination and entrapment was also supported and is therefore incorporated into the modified framework. That is, not only does rumination predict subsequent entrapment but entrapment also predicts subsequent rumination. This finding deviates slightly from the IMV model, which recently included a feedback loop *between* the motivational and volitional phases of the IMV model, but does not currently include any feedback loops *within* the motivational phase. Third, whilst the IMV model currently depicts suicidal ideation and suicidal intent as co-occurring, evidence from the current thesis, together with evidence from

existing experimental and cross-sectional studies, support the hypothesis that these constructs warrant separation. Moreover, based on the theory of planned behaviour (Ajzen, 1991), which posits that intention to engage in any behaviour is the most proximal predictor of that behaviour, suicidal intent is represented in the modified framework as the most proximal predictor of suicidal behaviour.

In addition, rumination predicted subsequent suicidal ideation as well as subsequent suicidal intent, but contrary to the IMV model, entrapment did not predict subsequent suicidal ideation in the present research. Rather, the only relationship found between entrapment and suicidal ideation was via a unidirectional path from suicidal ideation to subsequent entrapment. However, entrapment predicted subsequent suicidal intent, adding support to the hypothesis that suicidal ideation and suicidal intent have distinct developmental pathways. Therefore, it is possible that once entrapment is experienced as a consequence of ruminative thinking about suicide, this would put a person further along the pathway towards suicidal intent, not just suicidal ideation, because the intent to escape would be motivated by the sense of entrapment. Furthermore, whilst ruminating about constructs related to suicide may directly influence suicidal ideation, the influence of rumination on suicidal intent may be greater or less depending on if entrapment is also experienced. In addition, the present findings suggest that there is another feedback loop within the motivational phase, between suicidal ideation and suicidal intent. Moreover, entrapment moderated this bidirectional path. That is, suicidal ideation predicted subsequent suicidal intent, moderated by entrapment, and suicidal intent predicted subsequent suicidal ideation, also moderated by entrapment. Consistent with the IMV model, these consolidated findings support a key central role of entrapment in the motivational phase. However, as shown in the modified motivational framework, the influence of entrapment is not just a linear pathway. Rather, entrapment

influences both rumination and suicidal intent, and also ‘turbocharges’ the bi-directional relationship between suicidal ideation and suicidal intent. The modified framework reflects these novel results and depicts the development of suicidal ideation and suicidal intent as cyclical processes.

The current research program did not directly test two additional paths depicted in the modified framework but they offer direction for future testing based on existing theory and evidence to date. The first path is based on evidence that past suicidal behaviour predicts future rumination (Krajniak et al., 2013). Whilst O’Connor and Kirtley’s (2018) recent revision to the IMV model posits that there is a feedback loop from suicidal behaviour back to suicidal ideation and intent formation, it is possible that suicidal behaviour may also link back in to the motivational phase via rumination. The second path proposed for further exploration is based on the recent version of the IMV model that describes a potential cyclical relationship from suicidal ideation/intent to attempts, and from attempts to ideation/intent (O’Connor & Kirtley, 2018).

A more detailed account for how the findings from the current thesis support each step in the modified motivational framework is discussed in the following subsections.

5.1 Rumination about Antecedents of Suicide

The first novel contribution that the present thesis makes to the literature is to address the identified need for a measure of rumination that is specific to constructs related to suicidal ideation, rather than rely on measures of depression-based rumination or rumination more generally (Johnson, Tarrrier, et al., 2008; Kerkhof & van Spijker, 2011; Morrison & O’Connor, 2008a; Rogers & Joiner, 2017; Teismann & Forkmann, 2015). The first two steps in the motivational phase of the IMV model, defeat and entrapment, have been shown to overlap at conceptual (O’Connor &

Portzky, 2018), correlational (e.g., Owen et al., 2018; Tarsafi et al., 2015; Taylor, Wood, et al., 2010; Tucker et al., 2016; Wetherall et al., 2018), and factorial (Griffiths et al., 2015) levels. Therefore, instead of defeat, the present thesis investigated the direct role of rumination leading to entrapment. Currently, the IMV model posits that ‘brooding rumination’ can increase or decrease the likelihood that a sense of defeat will lead to a sense of entrapment (O'Connor, 2011; O'Connor & Kirtley, 2018). However, brooding rumination is based on a global measure of depressive rumination (i.e., the Ruminative Responses Scale; Treynor et al., 2003) rather than on rumination specific to suicide. Therefore, Chapter 2 reported the development and validation of the Ruminations about Antecedents of Suicide Scale (RASS). The RASS is based on the three constructs proposed by the Interpersonal Theory of Suicide (Joiner, 2005) to be key in identifying why people suicide. That is, ruminating about feeling lonely and of not belonging, ruminating about being a burden on others, and ruminating about fear of death and pain and the strategies for overcoming those fears. Confirmatory factor analysis demonstrated that the hypothesised three-factor model provided good fit, reflecting ruminations about thwarted belongingness, perceived burdensomeness, and acquired capability, respectively. Additionally, as expected, the RASS had significant positive relationships between the interpersonal needs questionnaire, acquired capability, suicidal ideation, general psychological distress, hopelessness and entrapment, and significant negative relationships with zest for life, mindfulness, and flourishing. The directions of these relationships provide good concurrent validity to the scale.

The results from the hierarchical regression analyses (reported in Chapter 2) further provided evidence that scores on the RASS explained a significant amount of variance in suicidal ideation over and above the interpersonal needs questionnaire (INQ; Van Orden et al., 2012) which measures more state-based feelings of thwarted

belongingness and perceived burdensomeness. Moreover, scores on the brooding rumination scale did not account for any additional variance in suicidal ideation once the scores from the RASS were included in the model. Finally, scores on the RASS mediated the relationship between the INQ and suicidal ideation. Thus, there is additional benefit in using the RASS over the brooding rumination scale and/or the INQ when assessing if someone is at risk for developing suicidal ideations. Internal consistency for the RASS was consistently good (0.95 – 0.97) across all studies using the measure (Chapters 2, 3, and 4).

These findings using the RASS are consistent with the only other rumination scale that considers suicide specific items, the Suicide Rumination Scale (SRS). Scores on the SRS were also found to be associated with an increased odds ratio of a retrospective lifetime suicide attempt over and above the INQ and brooding rumination (Rogers & Joiner, 2018b). However, whilst the SRS assesses ruminations specific to suicide-related constructs, these constructs are defined as “suicidal thoughts, intentions and plans” (Rogers & Joiner, 2018b, p. 78). Therefore the SRS assesses ruminations that occur *subsequent* to the onset of suicidal ideation but, as preliminary evidence suggests, prior to suicidal intent (Rogers & Joiner, 2018a). Conversely, the RASS was specifically designed to assess ruminations that *precede* the onset of suicidal ideation. This suggests that the SRS may be more appropriate for testing the transition point from the motivational phase to the volitional phase, whilst the RASS is more appropriate for testing temporal sequencing of the constructs specific to the motivational phase of the IMV model. However, given the contemporaneous development of both scales, there are currently no studies that have compared the utility of each scale in assessing suicide-specific ruminations during different phases of the integrated-motivational pathway to suicidal behaviour.

In sum, the RASS provides a theoretically grounded, reliable, and valid

measure of rumination about constructs related to suicide. However, whilst the findings in Chapter 2 suggest that rumination about antecedents of suicide may be of benefit in predicting entrapment and suicidal ideation, the cross-sectional design of the studies precludes any temporal inference. Such conclusions require prospective data. Importantly, the finding by Rogers and Joiner (2018a) that suicide-specific rumination occurs post suicidal ideation but before suicidal intent provides evidence that suicidal ideation and suicidal intent may be separate steps in the motivational pathway. Therefore, the study in Chapter 3 is the first study that has tested all temporal relationships between rumination, entrapment, and suicidal ideation, as well as suicidal intent.

5.2 A Causal Feedback Loop between Rumination and Entrapment?

A second novel outcome from the present thesis is robust evidence of a feedback loop between rumination and entrapment (Figure 5.2). Whilst the IMV model identifies rumination as a threat to self moderator, thereby acknowledging that rumination has a role in *influencing* entrapment, existing studies to date have only examined the relationship between rumination and entrapment with study designs that measure these constructs contemporaneously (Dhingra et al., 2016; Li et al., 2018; Teismann & Forkmann, 2015). Therefore, previous evidence cannot attest to the *temporal* relationship between rumination and entrapment.

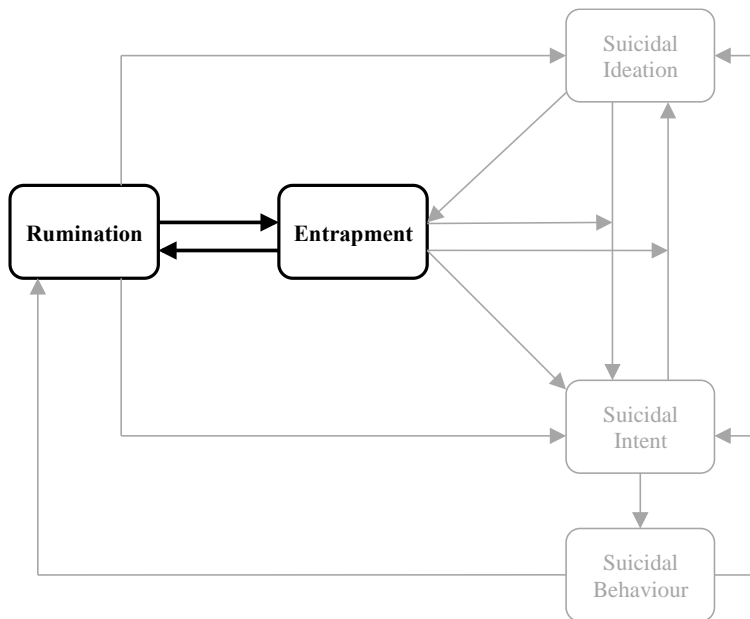


Figure 5.2. The feedback loop between rumination and entrapment in the modified motivational framework (in bold).

The prospective study design in Chapter 3 provided the opportunity to test the temporal sequencing between rumination and entrapment. Results from autoregressive cross-lagged panel analyses support the IMV model’s hypothesis that rumination predicts subsequent entrapment. Rumination in the current context was measured using the Rumination about Antecedents of Suicide Scale (RASS) developed in Chapter 2, and not brooding rumination or any other depressive-based or general measures of rumination because, as described in Chapter 2 and summarised above, the RASS measures rumination specifically about constructs posited to be causally and proximally related to suicidal ideation and behaviour. Moreover, the RASS offers incremental validity over and above brooding rumination in accounting for suicidal ideation.

Importantly, a novel result that the pattern of cross-lagged prospective effects revealed is that a sense of entrapment also predicts subsequent rumination, supporting the hypothesis by Li et al (2018) that the relationship between rumination and entrapment is bi-directional. That is, the ruminative tendency to repetitively think about the interpersonal causes of one’s suicidal desire, and ways to overcome

barriers to act on that desire, constrains contemplation of possible alternative solutions (Arie et al., 2008; Chu, Walker, et al., 2017; Pollock & Williams, 2001; Sharaf et al., 2018), and results in a sense of entrapment. Then, consistent with an ‘emotional cascade’, the experience of feeling trapped creates a positive feedback loop of intense ruminations and negative emotion culminating in an emotional state that is extremely aversive, painful, and difficult to tolerate (Selby et al., 2009). Consequently, maladaptive coping mechanisms such as self-harm are used in an attempt to distract from the painful experience of ruminating (Selby, Connell, & Joiner, 2010). This is why *ruminating* about fear of death and pain and the strategies for overcoming those fears is a particularly pernicious cognitive facet and was included in the rumination about antecedents of suicide scale developed in Chapter 2. Once stuck in this part of the cognitive prison it becomes harder to divert attention away from any perceived negative interpersonal experience, thereby creating a heightened sensitivity to emotional stimuli that continue to increase and intensify the sense of entrapment and ruminative thinking. Ultimately, the more time an individual spends thinking about their perceived lack of belongingness, burdensomeness, and ease in which they could inflict self-harm, the more likely they are to become cognitively trapped, and hence stuck in a suicidal mode (Rudd, 2006a; Rudd, 2000).

The result of a reciprocal relationship between rumination and entrapment provides greater insight into the complex and dynamic *predictive* relationships between the constructs within the motivational phase of the IMV model. However, one question is whether entrapment *causes* rumination, or if the relationship from entrapment to rumination is due merely because entrapment is correlated with another variable that is a true cause of rumination. Experimental study designs are necessary to make such causal inferences (Franklin, Huang, Fox, & Ribeiro, 2018). Therefore, Chapter 4 used an existing computer-based, team-player, experimental

paradigm; the ‘Interpersonal Persistence Task’ (Collins et al., 2016) to test the causal relationship from entrapment to rumination. The hypothesis that experimentally induced entrapment *causes* rumination was supported.

According to the IMV model, entrapment is operationalised as a desire to escape adverse events or experiences (O'Connor & Kirtley, 2018), especially unbearable thoughts (Skogman & Öjehagen, 2003). According to the Interpersonal Theory of Suicide (Joiner, 2005), it is specifically the combined experience of *interpersonal* adversity (feeling like a burden on others and of not belonging) that causes a desire to escape life; a desire for suicide. The experimental paradigm used in Chapter 4 manipulated a high or low sense of entrapment (desire to escape the task) by inducing high or low interpersonal adversity (manipulating performance and interpersonal commentary to make one think they are a burden on the team players and that they do not belong in the team). The frequency and intensity at which players ruminated about these interpersonal constructs after the experimental task was captured using both self-report measures, and a behavioural task similar to the trauma film paradigm (Davies & Clark, 1998). Importantly, because evidence established in Chapter 3 suggests that existing levels of ruminations about interpersonal adversity leads to subsequent entrapment, participants who scored within the top and bottom terciles on the RASS were recruited and randomly allocated to the high or low experimental condition. Results in the experimental study in Chapter 4 confirmed a significant association between rumination and entrapment. Moreover, regardless of experimental condition, participants who had a pre-existing tendency to ruminate about antecedents of suicide (higher scores on the RASS) had a greater desire to escape from the task than those who scored at the lower end on the RASS.

As predicted, participants in the condition of high interpersonal adversity

experienced a greater sense of entrapment than those in the condition of low interpersonal adversity. This finding replicates the consistently large effect sizes found by several previous studies employing the same experimental task (e.g., Collins et al., 2016; Collins et al., 2017; George et al., 2017; Hartley et al., 2018). Importantly, on all measures of post-task rumination (self report frequency and intensity, as well as frequency measured behaviourally), participants who experienced a greater sense of entrapment reported significantly more frequent and intense ruminations about the task than participants who did not experience a greater sense of entrapment. Therefore, the current thesis provides both longitudinal and experimental evidence consistent with a *causal* feedback loop from entrapment to rumination.

5.3 Disentangling Suicidal Ideation from Suicidal Intent

A third novel contribution to the literature is evidence supporting the hypothesis that suicidal ideation and suicidal intent are distinct enough from each other to warrant being separate steps in the IMV model's pathway to suicidal behaviour. In the most recent revision to the IMV model, suicidal ideation and suicidal intent are discussed as being blurred but arguably distinct constructs (O'Connor & Kirtley, 2018). However, the authors refer to the lack of sufficient evidence to justify them being separate steps in the development of the motivation for suicide. Therefore, the motivational phase of the IMV model is currently depicted with suicidal ideation and suicidal intent being concurrent consequences arising from feelings of entrapment.

Relatedly, the nomenclature surrounding suicide has long been debated. A clearly defined and consistent terminology is critical for effective research and for offering a universal, unambiguous understanding of suicide (Chappell et al., 2017; Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). Of particular relevance to

the present issue, as to whether suicidal ideation and suicidal intent are distinct enough to warrant separation, some argue that the definition of suicidal ideation “...thoughts of engaging in suicide-related behaviour” (Crosby, Ortega, & Melanson, 2011, p. 90), is broad enough to “include specific plans to die and explicit *intent* to die imminently” (Jobes & Joiner, 2019, p. 227). If we accept this inclusive definition of suicidal ideation then combining suicidal ideation and suicidal intent in the same step within the motivational phase would make sense. However, it should be noted that a separate definition of suicidal intent is offered in the same document by Crosby et al., (2011). That is, suicide intent is established when “there is evidence (explicit and/or implicit) that at the time of injury the individual intended to kill him or herself or wished to die and that the individual understood the probable consequences of his or her actions” (Crosby et al., 2011, p. 90). Moreover, intent appears to associate more with the definition of suicide attempt, which is a “non-fatal self-directed potentially injurious behaviour with any intent to die as a result of the behaviour” (Crosby et al., 2011, p. 90). According to these definitions, suicidal ideation and suicidal intent are separate constructs. Certainly it is possible to have thoughts about suicide but never make a suicide plan, and/or have any intent to enact on those thoughts (Rudd & Roberts, 2019). However, it is not logical to have a suicide plan in mind or have the intent to cause one’s own death without having engaged in thoughts about suicide, to begin with (Millner et al., 2017).

The debate of whether to define and conceptualize suicidal ideation and suicidal intent as distinct constructs provided the impetus to test the pathways to and from suicidal ideation and suicidal intent separately in Chapter 3. Results showed that there are temporal pathways from rumination to suicidal ideation, rumination to suicidal intent, suicidal ideation to entrapment and entrapment to suicidal intent, as well as a feedback loop between suicidal ideation and suicidal intent, with

entrapment moderating the bi-directional path between suicidal ideation and suicidal intent. Therefore, this prospective evidence suggests that there is value in the separation of suicidal ideation and suicidal intent in the motivational phase of the IMV model. Each of these findings is discussed in detail below, along with evidence from existing studies that support or contradict these findings.

5.3.1 A Temporal Pathway from Rumination to Suicidal Ideation

As the motivational phase of the IMV model currently stands, rumination is depicted as a threat to self moderator that operates to strengthen or diminish the relationship between defeat and entrapment (O'Connor & Kirtley, 2018). However, the present thesis argues that rumination has a much more pervasive and pernicious role in creating, maintaining, and perpetuating motivation for suicide. Not only do the results from the present thesis provide evidence that rumination is a direct predictor of subsequent entrapment (as discussed above), but the results from the longitudinal study in Chapter 3 also demonstrate a temporal and unidirectional relationship from rumination to suicidal ideation (Figure 5.3).

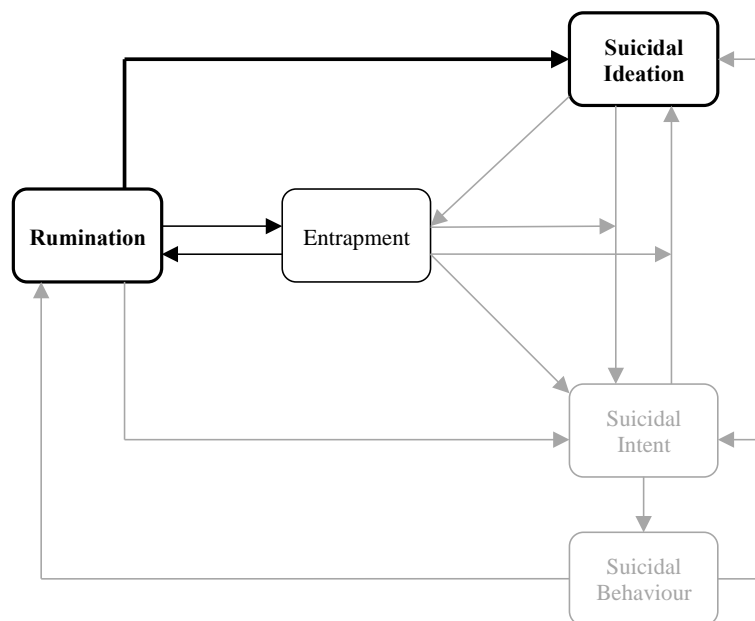


Figure 5.3. The temporal relationship from rumination to suicidal ideation in the modified motivational framework (in bold).

The result that rumination predicts subsequent suicidal ideation is consistent with several existing longitudinal studies. For example, in one study of 6,656 population-based adults between the ages of 20 and 64, decision tree analyses determined that rumination, as measured by the depressive-based ruminative response style questionnaire (Nolen-Hoeksema & Morrow, 1991), was one of the strongest predictors of a 12-month history of suicidal ideation at a 4-year follow-up (Batterham & Christensen, 2012). In another study, rumination that was again measured using the ruminative response style questionnaire (Nolen-Hoeksema & Morrow, 1991) predicted the presence and duration of suicidal ideation during a 2.5-year follow-up period among a sample of 127 undergraduate students, and this relationship was mediated by hopelessness (Smith et al., 2006). Miranda and Nolen-Hoeksema (2007) found evidence that both brooding and reflection styles of rumination from the response style questionnaire (Nolen-Hoeksema & Morrow, 1991) predicted suicidal ideation at 1-year follow-up in a community sample of 1,134 adults, with depression mediating the relationship between brooding rumination and suicidal ideation. Similar results were also found in studies employing shorter follow-up periods. One study recruited 232 healthy adults and used a 3-months follow-up period (O'Connor & Noyce, 2008), and another study recruited 151 college students and used an 8-week follow-up period (O'Connor et al., 2007).

Only one longitudinal study has tested the relationship between self-report brooding rumination and suicidal ideation in a clinical setting of 226 psychiatric patients aged between 13-25 years old who had predominately presented with suicidal thoughts and / or behaviours (Horwitz, Czyz, Berona, & King, 2018). In contrast to the above studies, the associations between brooding and reflection with suicidal ideation at 4-month follow-up were not statistically significant. The authors

surmise that the dichotomous coding of suicidal ideation at follow-up may have contributed to a smaller effect size, but conclude that brooding and reflection may not robustly predict future suicidal ideation in high risk clinical samples (Horwitz et al., 2018). It may also be that brooding and reflection are depression-based rumination measures and are not specific to constructs related to suicide. As such, the specificity of rumination content may be of particular importance in clinical populations. Therefore, the RASS (Chapter 2) may offer further insight into the temporal relationship between rumination and suicidal ideation in future studies in a clinical setting. The longitudinal evidence to date for a relationship between rumination and suicidal ideation is supported by a meta-analysis of 29 cross-sectional studies, several of which included psychiatric inpatient and outpatient samples (Rogers & Joiner, 2017). Results from this meta-analysis found significant relationships between suicidal ideation and brooding rumination (Hedges $g = .63$, $p = .002$), reflection (Hedges $g = .38$, $p < .001$), and global rumination (Hedges $g = .74$, $p < .001$).

5.3.2 A Temporal Pathway from Rumination to Suicidal Intent

The study in Chapter 3 is the first study to employ a longitudinal design and a novel measure of rumination about antecedents of suicide (RASS) to test the temporal sequence between rumination and suicidal intent. Results showed that scores on the RASS prospectively predict suicidal intent, separate from its ability to predict suicidal ideation as discussed above (Figure 5.4).

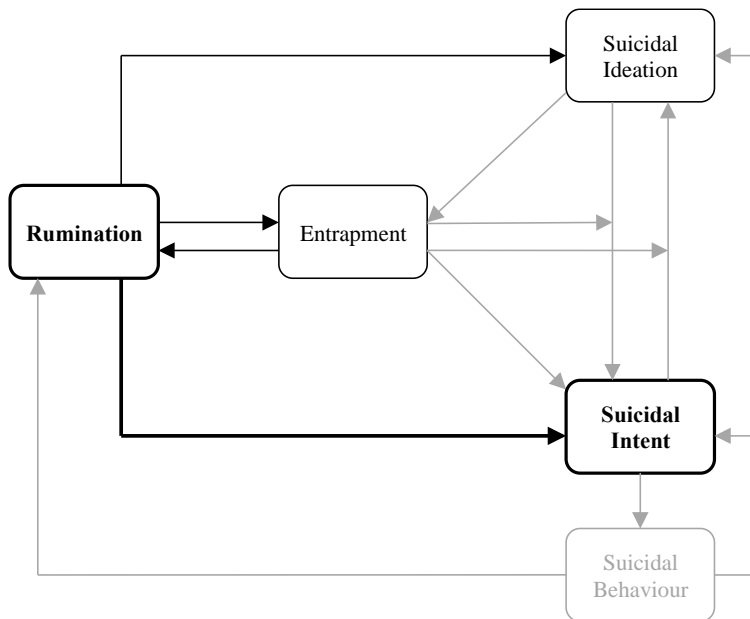


Figure 5.4. The temporal relationship from rumination to suicidal intent in the modified motivational framework (in bold).

In the current IMV model, rumination precedes suicidal intent, but only via its relationship with entrapment, and only because suicidal intent is depicted as occurring simultaneously with suicidal ideation. As such, few studies have investigated the direct relationship between rumination and suicidal intent. The results in the current thesis provide longitudinal support for two previous cross-sectional studies that have tested this hypothesis in student and patient samples. First, Rogers and Joiner (2018a) tested 300 undergraduate students, aged between 18 and 43 years, who had all reported a lifetime history of suicidal ideation. They found that rumination, as measured using the recent suicide rumination scale, was positively associated with suicidal intent ($\beta = 0.62, p < .001$). Moreover, suicidal intent moderated the relationship between suicide-specific rumination and lifetime past suicide attempts even after accounting for depressive rumination (Rogers & Joiner, 2018a). In the other study, Sharaf et al., (2018) tested 186 patients aged between 13 and 45 years, who had been hospitalised for a recent suicide attempt. They similarly found that brooding rumination was associated with suicidal intent ($\beta = 0.23, t = 3.15, p = 0.002$) and explained 5% of the variance in suicide intent ($F [1,184] = 9.92,$

$p = 0.002$). Although social problem solving mediated the relationship between brooding rumination and suicidal intent, the protective effect was attenuated after controlling for depression ($\beta = -0.10$, $t = 1.26$, $p = 0.21$). That is, in the presence of depression, neither brooding rumination nor social problem solving influenced suicidal intent (Sharaf et al., 2018). The authors hypothesised that rumination and/or low social problem solving skills may therefore confer vulnerability to depression. Accounting for depression as part of testing the temporal sequence along the motivational pathway may therefore benefit future studies. In sum, whilst these two studies are consistent with a relationship from rumination to suicidal intent, only the current study provides evidence for a *temporal* association from rumination to suicidal intent.

In synthesizing the evidence for a temporal relationship between rumination and entrapment, rumination and suicidal ideation, and rumination and suicidal intent, it can be concluded that rumination, rather than a moderator, is a prospective, direct predictor in the pathway to suicidal behaviour. Overall, there is sufficient evidence to conclude that rumination has a strong role in the development of entrapment, suicidal ideation, and suicidal intent and therefore may be a target for intervention in the prevention of both suicidal thoughts and potential suicidal behaviour.

5.3.3 A Temporal Pathway from Suicidal Ideation to Entrapment

Contrary to the IMV model, the longitudinal study in Chapter 3 does not support the hypothesis that entrapment predicts suicidal ideation. This lack of temporal evidence is consistent with the null finding from the only other longitudinal study investigating the temporal relationship between entrapment and suicidal ideation (Taylor, Gooding, Wood, Johnson, et al., 2011). Instead, suicidal ideation predicted subsequent entrapment (Figure 5.5). However this result aligns with the hypothesis raised by De Beurs et al., (2018).

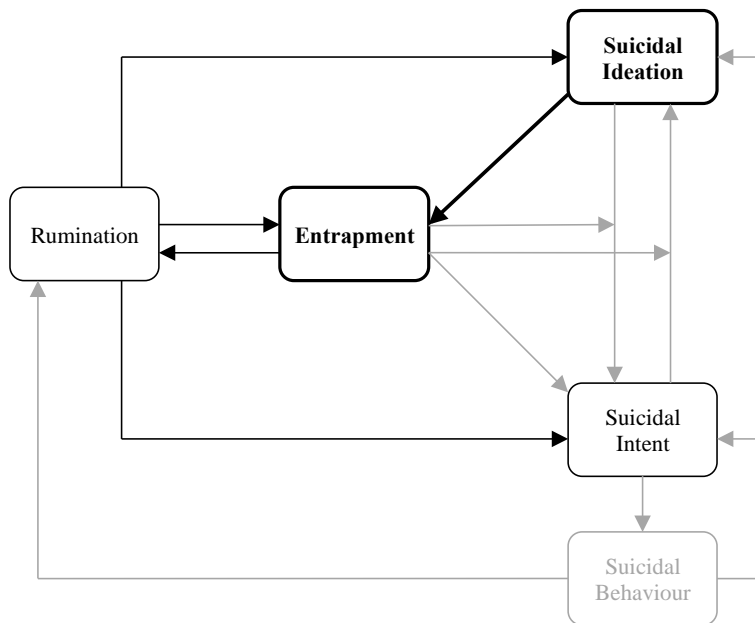


Figure 5.5. The temporal relationship from suicidal ideation to entrapment in the modified motivational framework (in bold).

The finding that suicidal ideation predicts subsequent entrapment is contrary to several studies that have tested the association contemporaneously (De Beurs et al., 2018; Forkmann & Teismann, 2017; Li et al., 2018; Rasmussen et al., 2010; Shelef et al., 2016; Siddaway et al., 2015; Teismann & Forkmann, 2015; Wetherall et al., 2018), but is consistent with two other cross-sectional studies (Gooding et al., 2017; Tucker et al., 2016). However as no temporal inferences can be drawn from any of these studies the present thesis provides the strongest evidence to date of a temporal association from suicidal ideation to entrapment. The results suggests that when thinking about suicide as the only seemingly available option to escape from a life perceived as unbearable, this might increase a sense of entrapment because no other options appear left.

5.3.4 A Temporal Pathway from Entrapment to Suicidal Intent

The longitudinal study in Chapter 3 not only found rumination to predict subsequent suicidal intent but entrapment also predicted subsequent suicidal intent (Figure 5.6).

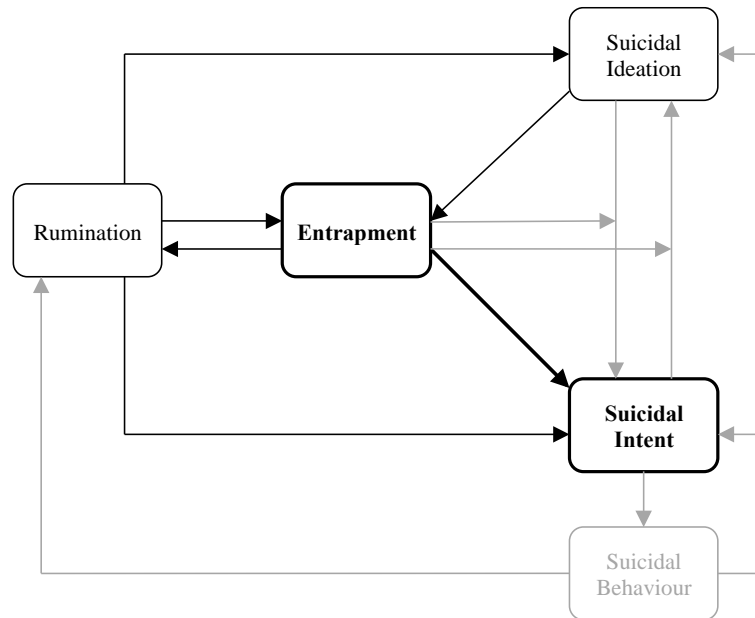


Figure 5.6. The temporal relationship from entrapment to suicidal intent in the modified motivational framework (in bold).

As this is the first time that suicidal ideation and suicidal intent have been tested as separate constructs within the framework of the IMV model, there are currently no other studies that have specifically tested the temporal relationship from entrapment to suicide intent. There is however some evidence of an association between entrapment and suicidal intent, derived from experimental studies. The IMV model operationalizes entrapment as a desire to escape specific adverse events or experiences (O'Connor & Kirtley, 2018), and the Interpersonal Theory of Suicide posits that such specific events or experiences are grounded in interpersonal adversity (Joiner, 2005). In the experimental interpersonal persistence task that was used in the study in Chapter 4, entrapment was manipulated, operationalised as being the desire to escape task-induced interpersonal adversity. In one previous study

employing the interpersonal persistence task (Collins et al., 2017), desire to escape the task was significantly associated with higher intent for suicide ($r = .35, p = .002$) although in another study (Collins et al., 2016) the association was just shy of significance ($r = .24, p = .052$). The correlation between the desire to escape the task and suicidal intent in the present experimental study in Chapter 4 was not significant. Therefore, the association between a manipulated sense of entrapment and self-report suicidal intent is inconsistent amongst experimental studies employing the same experimental task. However, a desire to escape a computer task is obviously very different from wanting to override an innate sense of survival and escape life itself. Although conceptually similar, with both desiring an escape from adversity and recruiting similar psychological processes (Joiner, 2005), the only study to date that can provide evidence for a direct temporal association between entrapment and suicidal intent is that which is presented by Chapter 3 in the current thesis.

5.3.5 A Feedback Loop between Suicidal Ideation and Suicidal Intent

Results from the autoregressive cross-lagged panel analyses in Chapter 3 show that not only does suicidal ideation at baseline predict subsequent suicidal intent, but suicidal intent at baseline also predicts subsequent suicidal ideation (Figure 5.7).

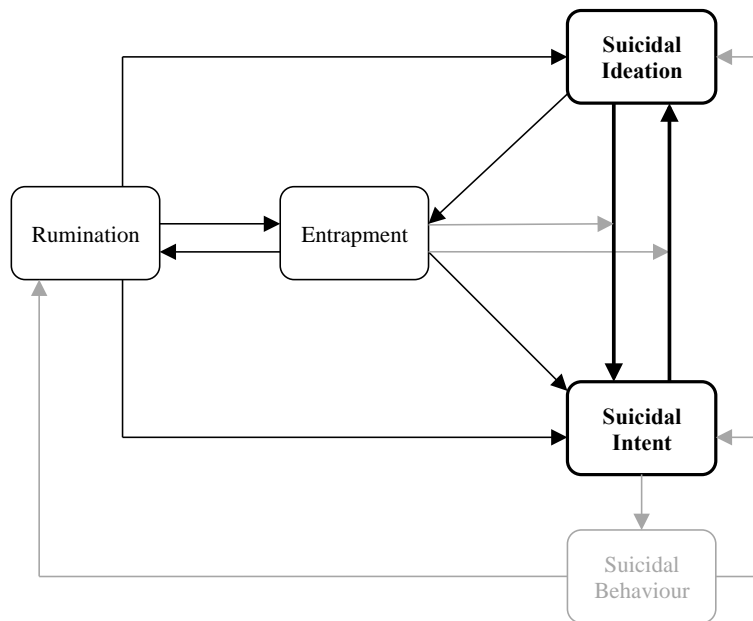


Figure 5.7. The feedback loop between suicidal ideation and suicidal intent in the modified motivational framework (in bold).

This positive association between suicidal ideation and suicidal intent is consistent with the cross-sectional evidence found in the experimental study in Chapter 4 of the current thesis ($r = .19, p = .04$), as well as in two previous longitudinal studies ($r = .44, p < .001$) (Collins et al., 2018) and ($r = .44, p < .001$) (George et al., 2016). As previously mentioned, although it is possible to have thoughts of suicide without engaging in making a suicide plan and/or having intent to act on those thoughts (Rudd & Roberts, 2019), suicidal ideation can lead to suicidal intent, and suicidal intent is more proximal to suicidal behaviour than suicidal ideation (Ajzen, 1991). Once suicidal intent is developed, engaging in additional thoughts of suicide serves to maintain and exacerbate intent, leading to suicide planning and eventual enactment of a suicide attempt or death by suicide.

5.3.6 Entrapment Moderates the Suicidal Ideation / Suicidal Intent Feedback Loop

The final novel contribution that enhances our understanding of the temporal associations between constructs proposed in the motivational phase of the IMV

model, is the finding that each path in the feedback loop between suicidal ideation and suicidal intent is more likely to occur at higher levels of entrapment (Figure 5.8).

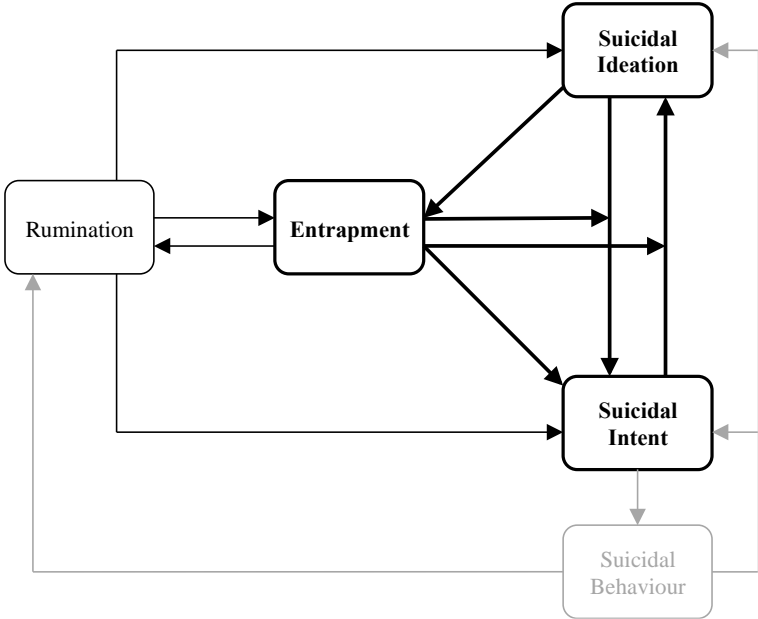


Figure 5.8. The bidirectional paths between suicidal ideation and suicidal intent in the modified motivational framework are moderated by entrapment (in bold).

That is, the pathway from thinking about suicide to developing intent to lethal self-harm, and the pathway from having intent to lethal self-harm to thinking more about suicide is stronger at higher levels of the desire to escape specific interpersonal adverse events or experiences. In other words, entrapment moderates the reciprocal pathways from suicidal ideation to suicidal intent *and* from suicidal intent to suicidal ideation.

5.4 Summary of the Proposed Modified Motivational Framework

In sum, the modified framework that has arisen from the present research program provides a novel insight into the non-linear and complex processes for how the motivation (thoughts and intent) for suicide arises, and identifies potential points for targeted intervention. With additional support from previous empirical studies, the present research provides sufficient evidence and a strong rationale that i) rumination is a direct rather than moderating predictor of entrapment in the

motivational pathway to suicidal behaviour, ii) a measure of rumination about constructs antecedent to suicide offers incremental validity in explaining suicidal ideation over and above brooding and other general depressive rumination, iii) there are positive feedback loops between rumination and entrapment and between suicidal ideation and suicidal intent, iv) suicidal ideation and suicidal intent are separate steps in the motivational pathway to suicidal behaviour, v) there is a temporal relationship from suicidal ideation to entrapment but not from entrapment to suicidal ideation, and vi) there are temporal relationships from rumination to suicidal ideation, from rumination to suicidal intent, and from entrapment to suicidal intent. Finally, consistent with the most recent version of the IMV model (O'Connor & Kirtley, 2018), the present modified motivational framework includes a feedback loop between the motivational and volitional phases of the model. However, rather than linking suicidal behaviour back into a single step comprising suicidal ideation and suicidal intent, the present thesis suggests that the connection is from suicidal behaviour to both suicidal intent and suicidal ideation separately, as well as to rumination. The modified motivational framework proposed by the current research therefore better accounts for the complex, dynamic, and sometimes cyclical relationships between the cognitive processes of rumination, entrapment, suicidal ideation, and suicidal intent, as well as the link into and from suicidal behaviours.

5.5 Limitations

Some caution is required in interpreting results from the present thesis. First, the longitudinal study design in Chapter 3 that was used to test the temporal predictive associations between rumination, entrapment, suicidal ideation and suicidal intent is limited to self-report measures. Frequency of rumination was measured using the novel self-report rumination about antecedents of suicide scale, entrapment was measured using the self-report entrapment scale, suicidal ideation

was measured using a single item asking about the frequency of suicidal thoughts experienced over the past 12-months at baseline and over the past 4-weeks at follow-up, and suicidal intent was measured via a single item asking how much someone endorses their intent to kill themselves in the near future. Single item self-report measures in particular can be more sensitive to measurement error and can compromise comprehensiveness (Sloan et al., 2002). However, consistent good test-retest and inter-rater reliability have been found with these single-item measures, as well as demonstrating strong associations with other suicide risk factors (Nock et al., 2007; Zimmerman et al., 2006). Further, the inconsistent timeframe for assessing suicidal ideation at baseline (past year) and follow-up (“the past 4-weeks”) is a limitation in that it means that the follow-up measure is not sensitive to capturing suicidal ideation experienced in the first four weeks post baseline. However, this 4-week timeframe was intended to capture the stressful period leading up to exams and to be consistent with the K10, measuring psychological distress.

Second, there were only two time points from which to analyse the data in the study in Chapter 3. To confirm the temporal relationships using such analyses would ideally use at least three assessment time points given that there are three temporal tiers in the motivational phase of the model as tested here (i.e., ruminations, entrapment, ideation/intent).

Third, the ecological validity of the experimental design also requires further exploration. That is, how much does a self-reported desire to escape interpersonal adversity induced via a computer-based experimental task within a laboratory generalize to a desire to escape interpersonal adversity, and therefore life, in the real world? Given that a real-world outcome could ultimately be death by suicide, there is always going to be a need to strike an ethically sensible balance between manipulating putative causal variables of suicide and recording an outcome

that is conceptually and theoretically analogous to a desire to escape life. As such, the fear of not being able to achieve this balance has made many shy away from conducting experimental research in the field of suicide (Kleiman et al., 2017). The experimental paradigm used in Chapter 4 however, strikes this balance. Certainly, the correlations between average scores on desire to escape the task and average scores on both levels of belongingness ($r = -.72, p < .01$) and burdensomeness ($r = .60, p < .01$) provides reassurance that the experimental paradigm offers enough external validity to be confident in the outcome arising from its use. Moreover, these results support the longitudinal evidence found in Chapter 3.

Finally, all studies in the present thesis were conducted with university student samples. Whilst this can often be an issue with generalizability in many subject areas, university student samples may actually provide a particularly beneficial and relevant group from which to study suicide. First, based on the premise that the same mental processes underlie all forms of suicidal behaviour regardless of the presence of other mental disorders (Van Orden et al., 2010), including clinical samples is desirable but not critical. Many people die by suicide who are not in treatment or meet diagnostic criteria for mental disorders. Second, university students are consistently found to experience higher rates of suicidal ideation and behaviours (Collins et al., 2017; Collins et al., 2018; Eskin et al., 2016; George et al., 2017; George et al., 2016; Rickwood et al., 2016) than the general population (Nock et al., 2008). Third, university students experience such high rates of psychological distress (Stallman, 2010) that many are likely to have a mental health diagnosis (Coombs, 2005) even if they are not formally presenting in clinical samples. Nonetheless, it would still be of benefit to compare the results in clinical settings to affirm or dispute the premise that the same mental processes underlie suicidal behaviour across different populations.

5.6 Implications of a Modified Motivational Framework in the IMV Model

The synthesised results from the present thesis indicate that there are important theoretical implications for the current IMV model of suicidal behaviour, specifically in regards to the motivational phase. The IMV model presents the motivational phase as a linear progression to suicidal behaviour. From all the consolidated evidence discussed above, it is clear that the path is far from linear. Understanding the complexity of non-linear feedback loops within the motivational phase is more likely to advance our understanding of the ideation-to-action pathway, and helps identify reliable points of targeted intervention, than just viewing the path as linear. Figure 5.1 visually depicts the modified pathways within the motivational phase proposed by the current thesis. Specifically, in addition to the feedback loop between the motivational and volitional phases that has recently been added to the IMV model (O'Connor & Kirtley, 2018), the present thesis provides evidence for feedback loops between rumination and entrapment and between suicidal ideation and suicidal intent, with the latter relationship 'turbocharged' by entrapment.

Suicidal intent is defined as being the strongest immediate predictor of suicidal behaviour (Ajzen, 1991; O'Connor & Kirtley, 2018). Based on the evidence to date, rumination, entrapment, and suicidal ideation are all key constructs in the development of suicidal intent. Interestingly, in three of the contemporary ideation-to-action frameworks in suicide research (the interpersonal theory, the 3 stage theory, and the IMV model), suicide ideation is viewed as the most proximal predictor of suicidal behaviour (Joiner, 2005; Klonsky & May, 2014, 2015b; O'Connor, 2011; O'Connor & Kirtley, 2018; Van Orden et al., 2010). However, in a previous four-year prospective study of 70 inpatients hospitalised following a suicide attempt, entrapment was found to add incremental predictive validity for suicidal behaviours over and above suicidal ideation, as well as depression and hopelessness (O'Connor

et al., 2013). Similarly, in a prospective study of 201 inpatients hospitalised following a suicide attempt, entrapment was also found to be the strongest individual predictor of suicidal behaviour over and above suicidal ideation at 4-week to 8-week post hospital discharge (Galynker et al., 2017). These findings suggest that entrapment is more pernicious in leading to suicidal behaviours than suicidal ideation.

Given entrapment is central to both the existing motivational, and the proposed modified motivational phase of the IMV model, entrapment is an obvious place to intervene (O'Connor & Portzky, 2018). As the experience of entrapment is associated with negative thoughts and emotions that serve to narrow cognitions and actions, focusing on increasing positive emotions could help broaden cognitions and behaviours (Fredrickson, 2001) and optimize treatment (Seligman, Steen, Park, & Peterson, 2005; Wood & Tarrier, 2010). To this end, one intervention that may hold promise in targeting the treatment of entrapment as an adjunct to psychological therapy is the Broad-Minded Affective Coping (BMAC) procedure (Johnson et al., 2013; Tarrier, 2010). BMAC is a mood induction technique that involves engaging autobiographical memories using cued recall and guided imagery to relive personal positive memories as vividly and in as much detail as possible. It is thought that engagement with BMAC acts as a behavioural activation intervention and that benefits may include helping balance negative memories with positive ones, increased awareness of and improvement with emotion regulation and attentional control, and engagement with adaptive coping strategies (Tarrier, 2010). Consequently, access to positive memories creates positive affect, and a positive affect allows flexibility of thinking and access to problem-solving abilities that were previously closed off when the viewpoint was one of entrapment. Although promising, the use of BMAC to escape from a sense of entrapment has not yet been

empirically tested (Johnson et al., 2013). Moreover, there is currently no evidence-based treatments known to reduce entrapment (O'Connor & Kirtley, 2018).

Whilst what leads to the development of entrapment has previously been poorly understood (O'Connor et al., 2013), the present thesis provides evidence that rumination has a big role to play. Moreover, rumination not only has a reciprocal relationship with entrapment, it also has a direct relationship with both suicidal ideation and suicidal intent. The identification of rumination as a point of intervention is of clinical importance. As discussed, the modified motivational model posits that incessantly ruminating about interpersonal adversity arising from feelings of not belonging, being a burden on others, and ruminating about strategies for overcoming fear of pain and death, eventually leads to thoughts of suicide. When these thoughts become too unbearable, the desire to escape from the interpersonal adversity increases and a sense of entrapment ensues. In turn, this leads to more frequent and intense ruminations, exacerbating the sense of entrapment, leading to intent formation, where the only salient option to escape such unbearable pain is perceived as suicide.

As such, clinicians may not be able to identify where in the cycle a suicidal individual is. Just because a person endorses current suicidal ideation, does not mean they are at imminent risk of suicide. It would be important to obtain several additional pieces of information such as if they are also experiencing ruminations related to interpersonal adversity, if this is the first time they have experienced this type of thinking, if they currently have, or have previously had intent to engage in lethal self-harm, and if they feel entrapped by these cognitions. Paying greater attention to ruminations and the degree of felt entrapment may be instrumental in preventing escalation in the motivation for suicide and intention formation.

As the current thesis has shown, rumination is a key mechanism in the

development of entrapment. Moreover, in addition to predicting entrapment, rumination has a long associated history with suicidal ideation (Rogers & Joiner, 2017). Numerous studies, including the current study in Chapter 3, have found rumination to predict subsequent suicidal ideation at both long (4-year) and short (8-week) follow-up periods (Batterham & Christensen, 2012; Miranda & Nolen-Hoeksema, 2007; O'Connor et al., 2007; O'Connor & Noyce, 2008; Smith et al., 2006). Combatting rumination therefore appears to be a prime target to curtail the escalation of distress (and for some, maladaptive comfort) that comes with thoughts of inflicting one's own death, leading to feeling trapped in this cognitive pain. To this end, there are several existing evidence-based interventions that have been shown to reduce ruminative thinking.

One construct that is antithetical to rumination is mindfulness, defined as “paying attention in a particular way: on purpose, in the present moment and non-judgmentally” (Kabat-Zinn, 1994, p. 4). Mindfulness has also been shown to be inversely related to both rumination (Keune, Bostanov, Kotchoubey, & Hautzinger, 2012) and the severity of suicidal ideation (Chesin & Jeglic, 2016). Therefore, interventions that are grounded in mindfulness are of particular interest in combatting rumination. Even a brief mindfulness intervention of focused breathing (Arch & Craske, 2006) has been shown to have positive outcomes on attenuating a manipulated sense of entrapment (Collins et al., 2017), as well as preventing a sense of entrapment from developing in the first place (Collins et al., 2016).

One notable mindfulness-based psychological therapy that has shown good results in reducing depressive rumination in both non-suicidal (Michalak, Hölz, & Teismann, 2011; Piet & Hougaard, 2011; Segal et al., 2002; Teasdale et al., 2000) and suicidal individuals (Barnhofer et al., 2015; Chesin et al., 2015; Crane et al., 2008; Kenny & Williams, 2007) is Mindfulness-Based Cognitive Therapy (MBCT),

developed by Segal, Williams, and Teasdale (2002). At its core, MBCT teaches “to recognize and to disengage from mind states characterised by self-perpetuating patterns of ruminative, negative thought” (Segal et al., 2002, p. 75), and instead to take an open, curious, self-compassionate, and accepting stance of one’s present-moment experience. In doing so, the individual shifts from the “doing” mode of self-focused and analytical cognitive processes that perpetuate depressive states, to a “being” mode where suicidal thoughts and fantasies are viewed simply as mental events and not as facts (Barnhofer & Crane, 2009).

5.7 Recommendations for Future Directions

The current research program tested temporal relationships between rumination, entrapment, suicidal ideation, and suicidal intent, and uncovered several feedback loops not previously identified within the motivational phase of the IMV model, as discussed above. Whilst the most recent version to the IMV model now includes the possibility of a feedback loop between the motivational phase and the volitional phase, specifically between suicidal ideation and intent (as co-occurring constructs) in the motivational phase and suicidal behaviours in the volitional phase (O'Connor & Kirtley, 2018), this hypothesis has not yet been empirically tested. However, in light of the current evidence showing that suicidal ideation and suicidal intent warrant being separate constructs within the motivational phase, each with their own pathways to and from their development, the hypothesised transitional feedback loop between the motivational and volitional phases should be further investigated. That is, how exactly do suicidal behaviours reinforce or re-enter the motivational sphere? To address this, at least two hypotheses warrant testing. A brief rationale for these hypotheses are discussed below.

5.7.1 A Temporal Pathway from Suicidal Behaviour to Suicidal

Ideation and Suicidal Intent

A recent addition to the IMV model has been the potential cyclical nature of the association between suicidal ideation/intent and attempts to account for repeat suicidal behaviour (O'Connor & Kirtley, 2018). Based on the 'differential activation model' (Teasdale & Dent, 1987; Williams, Barnhofer, et al., 2005; Williams, Crane, et al., 2005), O'Connor and Kirtley (2018) suggest that it is unlikely that the exact same processes are followed for repeat suicide attempts as to what occurs on a first episode attempt. In particular, they hypothesise that following an initial suicide attempt associations are made between low mood and suicidal thoughts and intent. Consequently, for each repeat suicide attempt there is an increased intensity, but a shortening of time in which the process from suicidal thoughts and intent formation to enactment are experienced (Williams, Barnhofer, et al., 2005; Williams, Crane, et al., 2005). The modified framework therefore depicts the potential temporal relationship from initial suicidal behaviours to suicidal ideation. If the level at which the post-attempt suicidal ideation is high enough to recreate a sense of entrapment then this may again lead to intent to cause lethal self-harm and a subsequent suicide attempt may occur. This is one possibility for how someone arrives back to building motivation for a subsequent suicide attempt (Figure 5.9).

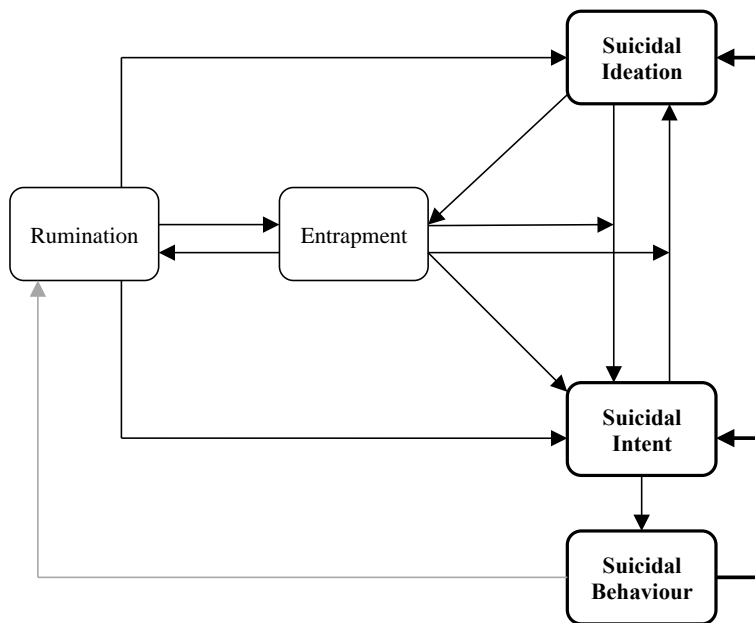


Figure 5.9. Hypothesised temporal relationship from suicidal behaviour in the volitional phase to suicidal ideation and suicidal intent in the motivational phase of the IMV model of suicidal behaviour (in bold)

5.7.2 A Temporal Pathway from Suicidal Behaviours To Rumination?

Another manner in which suicidal behaviour in the volitional phase may link back into once again creating the motivation for repeat suicidal behaviour is via rumination. The same ‘differential activation’ rationale may also be applied here. That is, following a suicide attempt that does not result in death, an individual may still be left with some of the same thoughts of not belonging and of being a burden, and with potentially even stronger and more readily accessible strategies for overcoming fear of pain and death given they have already had to overcome these fears to make the first attempt. These thoughts may lessen or become dormant over time as the individual receives support and is able to take a different perspective, accounting for why many people never make a subsequent attempt. However, if the same low mood experienced prior to the first suicide attempt is encountered again then the dormant thoughts may be reactivated and turn to ruminations. If the ruminations then lead to thoughts of suicide at a level that results in a sense of

entrapment, then intent to cause lethal self-harm may develop and a subsequent suicide attempt may occur. (Figure 5.10).

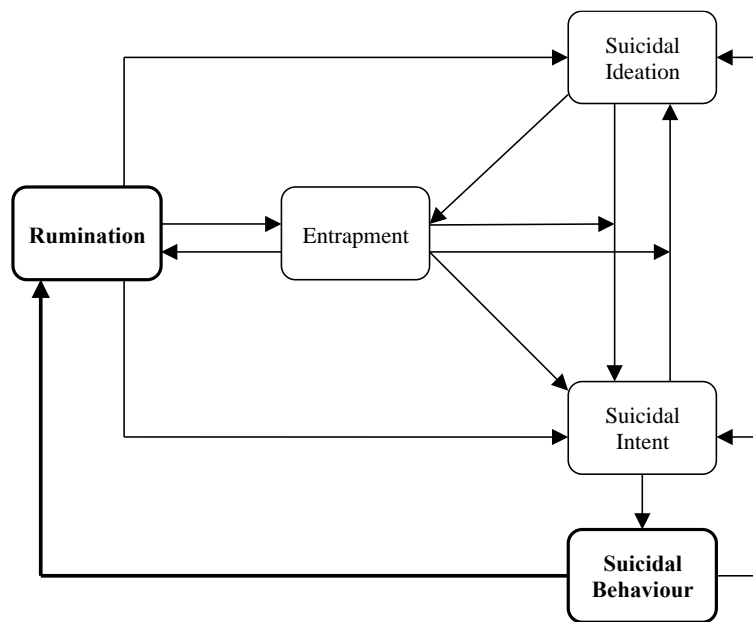


Figure 5.10. Hypothesised temporal relationship from suicidal behaviour in the volitional phase to rumination in the motivational phase of the IMV model of suicidal behaviour (in bold).

In one prospective study comprising 32 undergraduate students aged between 18 and 25 who had a lifetime suicide attempt history, the relationship between lifetime suicidal attempt at baseline and suicidal ideation at 2-3 year follow-up was mediated by rumination at follow-up (Krajniak et al., 2013). The authors suggest that previous suicide attempters may be more vulnerable to responding to negative experiences by ruminating, thereby leading to a sense of entrapment because of the inescapability from perceived unwanted outcomes, or because of the inability to attain desired outcomes (Krajniak et al., 2013). Whilst the results are promising, there were a low number of participants in this prospective study and suicide attempt was assessed using a single question that was not defined for the participants and was not confirmed by interview. Further research in this area is warranted.

5.7.3 Testing the Causal Pathway from Ruminations to Entrapment

Another suggestion for future research could be to experimentally test the

path from rumination to entrapment. The experimental study in Chapter 4 suggested a causal pathway from entrapment to rumination, where high levels of experimentally induced entrapment led to greater levels of ruminations compared to a condition where there were low levels of experimentally induced entrapment. Whilst the study in Chapter 3 found a temporal relationship from rumination to subsequent entrapment, no experimental studies have tested the causality of this relationship. One potential paradigm to address this gap could be to use the same interpersonal persistent task explained in Chapter 4 and assign participants to either a rumination or distraction condition which are then compared on how much participants rate their desire to escape from the task (entrapment). One way to manipulate rumination and distraction could be to borrow from procedures developed by Nolen-Hoeksema and Morrow (1993), and later adapted by Lavender and Watkins (2004) and Morrison and O'Connor (Morrison & O'Connor, 2008b). Here participants are asked to spend 8 minutes in a self-paced task that involved visualizing, focusing, and concentrating on a series of 45 items. In the rumination condition these items center around thoughts about symptoms, emotions or self (e.g., think “what your feelings may mean”, “the possible consequences of the way you feel”). In the distraction condition, participants are asked to pay attention to things that are external to self and not directly related to feelings or symptoms (“the layout of the local shopping centre”, “two birds sitting on a tree branch”). The rumination manipulation could be modified further such that the items specifically address the constructs antecedent to suicide to mirror the rumination about antecedents of suicide scale developed in Chapter 1. That is, items related to feelings of being a burden, of not belonging and of feeling fearlessness about quitting the task if they wanted to. If ruminating about antecedents of suicide causes a sense of entrapment, then by using constructs that are conceptually and theoretically analogous to the putative causes of

suicide we would expect participants in the rumination condition would feel a greater sense of entrapment than those in the distraction condition.

5.7.4 Lived Experience - Expert by Experience (EBE) Involvement

The topic of lived experiences of experts-by-experience has recently been highlighted as an area of growing importance by several authors (Gooding & Harris, 2019; Jones et al., 2018; Lezine, 2016; Suomi, Freeman, & Banfield, 2016). Gooding and Harris make clear that experts by experience should be involved in all research investigating psychological resilience to suicide, Levine has written a commentary on the vital work of suicide prevention through personal experience (2016) and recently, Jones et al., (2018) also demonstrated how involving people with lived experience benefited the development of a suicide prevention training program. However the authors also caution that the inclusion of a person with lived experience must be appropriate and safe. Further information can be gained on how to engage with, and the benefits of, involving people with lived experience in the review and report prepared for the LifeSpan suicide prevention project titled 'Framework for the engagement of people with a lived experience in program implementation and research' that was published in Australia (Suomi et al., 2016). Future research should take heed of the importance of including people with lived experience during all stages of a research program such as identifying appropriate research questions, research methodologies, item inclusion in suicide-related measures, the ecological validity of experimental designs and targeted prevention programs and intervention treatments. Therefore, future research may further benefit from including qualitative analyses that consider a more humanistic approach to understanding suicide.

5.7.5 The Diversity of Suicidal Experiences

The present thesis focused predominately on ruminations about known antecedents of suicide, as well as suicidal thoughts more generally, and suicidal

intent. However, these are only some cognitive constructs that have been linked to suicidal behaviours in the literature. Future research should widen the cognitive net to consider how other suicidal cognitions such as suicide urges (Eynan et al., 2014; Interian et al., 2019), compulsions (Fernández de la Cruz et al., 2017; Kerkhof & van Spijker, 2011), flooding (Li et al., 2018), and suicidal schema (Panagioti, Gooding, Pratt, & Tarrrier, 2015) are linked, if at all, to suicidal rumination. Further, it would be beneficial to understand how these other suicide cognitions impact upon the hypothesized modified framework of the IMV model that depicts a more cyclical motivational phase. According to fluid vulnerability theory (Rudd, 2006a), suicidal episodes are time limited and everyone differs in their baseline level of risk for suicide, or threshold value in which the suicidal mode is activated. Therefore, this suggests that the cyclical patterns within the modified motivational phase would vary in line with baseline level of risk for suicide.

As rumination is the central cognition in the present thesis, it would be important for future studies to further unpack the composition of rumination outside of the hypothesized domains of perceived burdensomeness, thwarted belongingness and acquired capability. For example, there are several other biopsychosocial vulnerabilities listed in the pre-motivational phase at section 1.2.1 that may be relevant to the development of suicidal rumination. These include lack of inhibitory control, high impulsivity, high socially prescribed perfectionism, lack of problem-solving skills, cognitive distortions, decreased serotonergic neurotransmission, psychiatric illness, socioeconomic deprivation, and early life adversity (e.g., Brezo et al., 2006; Ellis & Rutherford, 2008; Jager-Hyman et al., 2014; Mann et al., 2005; O'Connor et al., 2007; Smith et al., 2018; Turecki, 2014; Turecki & Brent, 2016).

In addition, based on Gilbert and Allan's (1998) arrested flight model of suicide and Williams' cry of pain model of suicide, the IMV model has adopted the

premise that when an individual feel they have been defeated over any meaningful resource and they are unable to escape, they suffer involuntary subordination, or humiliation. To date, the construct of humiliation has been paid little substantive attention in the field of suicide research. Understanding the definition of humiliation and the impact it has on the suicidal individual warrants more in-depth consideration in future studies (Svindseth & Crawford, 2019).

5.8 General Conclusion

Most contemporary theories of suicide view the pathway to suicide as being linear, through an ideation-to-action framework (Joiner, 2005; Klonsky & May, 2014, 2015b; O'Connor, 2011; O'Connor & Kirtley, 2018; Van Orden et al., 2010). The present thesis focused specifically on the motivational phase of the Integrated Motivation-Volitional (IMV) Model of Suicidal Behaviour (O'Connor, 2011; O'Connor & Kirtley, 2018) and provides evidence that the motivation for suicide likely involves complex and non-linear pathways. As such, these findings have implications for both theory and clinical practice.

The synthesised results from the correlational, longitudinal, and experimental studies suggest several modifications to the motivational phase of the IMV model. First, consistent with the IMV model, rumination predicts suicidal ideation and suicidal intent, but the intermediate step of passing through entrapment only occurs when suicidal intent is the outcome variable, separate from suicidal ideation. Second, consistent with the IMV model, rumination predicts subsequent entrapment, but entrapment was also shown to lead to subsequent rumination, demonstrating for the first time that this relationship is bidirectional. Third, suicidal ideation predicts suicidal intent and suicidal intent predicts suicidal ideation, suggesting a second feedback loop within the motivational phase. Fourth, entrapment moderates the bidirectional paths between suicidal ideation and suicidal intent.

Together these points raise the possibility of several pernicious feedback loops in the motivational phase of the IMV model. These make it increasingly difficult for a suicidal individual to break free from this cognitive prison and engage with alternative solution-focused thoughts. The positive news is that interventions that target flexibility of thinking and access to problem-solving abilities such as the Broad-Minded Affective Coping (BMAC) procedure (Johnson et al., 2013; Tarrier, 2010) hold promise for being able to tackle entrapment. Similarly, interventions grounded in mindfulness practices such as mindfulness-based cognitive therapy (Segal et al., 2002) have shown promise in combatting rumination.

5.9 References

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