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Testing the Interpersonal Theory of Suicide in Community - Residing Older Adults

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Abstract & Keywords

Suicide rates among older adults are high in Canada and around the world. Evidence-informed and theory-driven research on late life suicide may help to devise effective interventions to reduce suicide rates among older adults. In this thesis, I tested the Interpersonal Theory of Suicide (IPTS: Joiner, 2005; Van Orden et al, 2010) using data collected from a community-based sample of older adults recruited for a larger study designed to assess risk and resiliency factors for late life suicide (Dr. Marnin Heisel, PI). According to the IPTS, (Hypothesis 1) the interpersonal constructs of perceived burdensomeness (PB) and thwarted belongingness (TB) can each lead to passive thoughts of suicide (i.e. death ideation [DI]), and (Hypothesis 2) the combination of PB, TB and hopelessness leads to active thoughts of suicide (i.e. suicide ideation [SI]). A sample of 124 older adults ($M_{age} = 74.6, SD = 6.0$) completed measures of PB, TB, SI, DI, social hopelessness (SH), and depression symptom severity. Cross-sectional results indicate that after controlling for age, sex, depression symptoms, (1) TB was significantly positively associated with death ideation, (2) PB was significantly positively associated with suicide ideation, and (3) the two-way interaction of PB and TB was significantly positively associated with death ideation. Contrary to expectations, PB was not associated with death ideation after controlling for the covariates, and social hopelessness was not associated with suicide ideation after controlling for the covariates, PB and TB. Overall, the findings in this thesis suggest that interpersonal constructs may be associated with thoughts of suicide among community-dwelling older adults. Future research may investigate interpersonal processes in clinical intervention studies, or whether public health interventions targeting perceived burdensomeness and thwarted belongingness have an impact on the prevention of suicide.

Keywords: older adults, suicide ideation, Interpersonal Theory of Suicidal Behavior, IPTS, GSIS, INQ
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Table of Contents

Abstract ........................................................................................................................................... ii
Acknowledgements ........................................................................................................................... iii
Table of Contents ............................................................................................................................ iv
List of Tables ..................................................................................................................................... vii
List of Figures .................................................................................................................................... viii
List of Appendices ........................................................................................................................... ix
List of Abbreviations ........................................................................................................................ x
Key Terms and Definitions ............................................................................................................... xi
Chapter 1: Introduction .................................................................................................................. 1
  1.1 Epidemiology of Suicide ........................................................................................................... 2
  1.2 Theory and Concepts in Suicide Research ............................................................................. 5
  1.2.1. Defining Suicide ............................................................................................................... 7
  1.2.2. Hypotheses of The Interpersonal Theory of Suicide ......................................................... 8
  1.2.3. The Constructs of the Interpersonal Theory of Suicide ..................................................... 11
  1.3 Study Rationale and Objectives ............................................................................................ 14
Chapter 2: Literature Review ......................................................................................................... 16
  2.1 Overview of Search Results .................................................................................................... 17
  2.2 Associations Between Perceived Burden and Suicide-Related Behaviours ......................... 17
  2.3 Associations Between Thwarted Belonging and Suicidal-Related Behaviours ................. 23
  2.4 Joint Associations of Perceived Burden, Thwarted Belonging and Hopelessness on Suicide Ideation ................................................................................................................................................ 26
  2.5 Gaps in the Late Life Suicide Literature Regarding the Interpersonal Theory of Suicide .................................................................................................................................................. 29
2.6 Proposed Study ........................................................................................................... 31

Chapter 3: Materials and Methods ...................................................................................... 34

3.1 Procedure and Participant Sample .................................................................................. 34

3.2 Measures .......................................................................................................................... 36
   3.2.1. Geriatric Suicide Ideation Scale (GSIS) ................................................................. 36
   3.2.2. Interpersonal Needs Questionnaire (INQ) .............................................................. 37
   3.2.3. Social Hopelessness Questionnaire (SHQ) ............................................................. 38
   3.2.4. Geriatric Depression Scale (GDS) ......................................................................... 39

3.3 Statistical Analyses ........................................................................................................... 40
   3.3.1. Testing the Associations of Perceived Burdensomeness and Thwarted
           Belongingness on Death Ideation (IPTS Hypothesis 1) ............................................. 41
   3.3.2. Testing the Combined Associations of Perceived Burdensomeness, Thwarted
           Belongingness and Social Hopelessness on Suicide Ideation
           (IPTS Hypothesis 2) ..................................................................................................... 43

Chapter 4: Results .................................................................................................................. 46

4.1 Descriptive Statistics ....................................................................................................... 46

4.2 Testing the Association of Perceived Burdensomeness and Thwarted
   Belongingness on Death Ideation (IPTS Hypothesis 1) ................................................. 48

4.3 Testing the Association of Perceived Burdensomeness and Thwarted
   Belongingness on Suicide Ideation (Post-hoc Analyses) ................................................. 54

4.4 Testing the Combined Association of Perceived Burdensomeness, Thwarted
   Belongingness and Social Hopelessness on Suicide Ideation
   (IPTS Hypothesis 2) ........................................................................................................... 57

Chapter 5: Discussion and Conclusion .................................................................................. 60
5.1 Tests of the IPTS's Main Hypotheses

5.5.1. Associations between Perceived Burdensomeness, Thwarted Belongingness
       and Death Ideation

5.5.2. The Role of Hopelessness in Suicide Ideation

5.2 Strengths of this Thesis

5.3 Potential Limitations of this Thesis

5.4 Implications of this Thesis

5.5 Conclusion

References

Appendix A

Curriculum Vitae
List of Tables

Table 2.1 Search terms and results ........................................................................................................ 16

Table 4.1 Descriptive characteristics of participants at Time 3 (n=124) ............................................ 47

Table 4.2 Bivariate correlations of measures used in analyses ......................................................... 49

Table 4.3 Linear regression analyses testing the association of thwarted belongingness on death ideation (GSIS-DI) ........................................................................................................ 50

Table 4.4 Linear regression analyses testing the association of perceived burdensomeness on death ideation (GSIS-DI) ........................................................................................................ 50

Table 4.5 Linear regression analysis testing interaction of perceived burdensomeness and thwarted belongingness on death ideation (GSIS-DI) ................................................................. 53

Table 4.6 Linear regression analyses testing the association of thwarted belongingness on suicide ideation (GSIS-SI) ........................................................................................................ 56

Table 4.7 Linear regression analyses testing the association of perceived burdensomeness on suicide ideation (GSIS-SI) ........................................................................................................ 56

Table 4.8 Linear regression analysis testing the combined association of perceived burdensomeness, thwarted belongingness and social hopelessness on suicide ideation (GSIS-SI) ........................................................................................................ 59
List of Figures

Figure 1. Annual suicide rate by sex in Canada, 2007-2011

(Statistics Canada, 2014) ................................................................. 4

Figure 2. Suicide rate by age and sex in Canada (Statistics Canada, 2014) ................. 5

Figure 3. Venn Diagram depicting key constructs and assumptions of the
Interpersonal Theory of Suicide.............................................................. 10

Figure 4. Theoretical constructs and observable variables associated with
Thwarted Belongingness. Adapted from Van Orden et al. (2010) ...................... 12

Figure 5. Theoretical constructs and observable variables associated with
Perceived Burdensomeness. Adapted from Van Orden et al. (2010) .................. 12

Figure 6. Theoretical constructs and observable variables associated with
Acquired Capability. Adapted from Van Orden et al. (2010) ....................... 14

Figure 7. Moderating effect of perceived burdensomeness on the association
between thwarted belongingness and death ideation (GSIS-DI) (n=124)............. 54
List of Appendices

Appendix A. Summary of studies testing elements of the Interpersonal Theory of Suicide using older adult participants................................................................. 89
**List of Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Acquired Capability for Suicide</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control</td>
</tr>
<tr>
<td>DI</td>
<td>Death Ideation</td>
</tr>
<tr>
<td>GDS</td>
<td>Geriatric Depression Scale</td>
</tr>
<tr>
<td>GSIS</td>
<td>Geriatric Suicide Ideation Scale</td>
</tr>
<tr>
<td>IPT</td>
<td>Interpersonal Psychotherapy</td>
</tr>
<tr>
<td>IPTS</td>
<td>Interpersonal Theory of Suicide</td>
</tr>
<tr>
<td>M</td>
<td>Mean</td>
</tr>
<tr>
<td>MMSE</td>
<td>Mini Mental State Examination</td>
</tr>
<tr>
<td>PB</td>
<td>Perceived Burdensomeness</td>
</tr>
<tr>
<td>SD</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>SHQ</td>
<td>Social Hopelessness Questionnaire</td>
</tr>
<tr>
<td>SI</td>
<td>Suicide Ideation</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
</tr>
<tr>
<td>TB</td>
<td>Thwarted Belongingness</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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</table>
Key Terms and Definitions

Active suicide ideation: refers to an active desire to end one’s life, and may involve thoughts about specific ways to take one’s life, and plans to end one’s life (Bartels et al., 2002). According to the Interpersonal Theory of Suicide (Van Orden et al., 2010), active suicide ideation arises from the simultaneous presence of perceived burdensomeness, thwarted belongingness, and hopelessness about these states. In the Suicidology literature, active suicide ideation is also referred to as ‘active thoughts of suicide,’ ‘suicide ideation,’ and ‘active desire for suicide.’

Death ideation: refers to thoughts about ending one’s life and “a wish to die without the intent to kill oneself” (Nazem et al., 2008). ‘Death ideation’ and ‘passive suicide ideation’ are used interchangeably. In this thesis, Death Ideation also refers to a subscale of the Geriatric Suicide Ideation Scale (GSIS) that measures passive suicide ideation through items such as, “I often wish that I would pass away in my sleep” and “I welcome the thought of drifting off to sleep and never waking up.”

Older adult: An individual who is 65 years or older.

Passive suicide ideation: “Passive suicidal ideation, more accurately termed death ideation, is characterized by a recurrent wish to die, thoughts of death by passive means (e.g., current wish to die while sleeping), or by patients who would avoid steps necessary to save or maintain life” (Bartels et al., 2002, p. 418). According to the Interpersonal Theory of Suicide (Van Orden et al., 2010), passive suicide ideation arises from either perceived burdensomeness or thwarted belongingness. In the Suicidology literature, passive suicide ideation is also referred to as ‘passive thoughts of suicide’ and ‘death ideation.’

Perceived burdensomeness: refers to feelings that one is a burden on others and that others would be better off if one were gone. According to the Interpersonal Theory of Suicide (Van Orden et al., 2010), perceived burdensomeness is a multidimensional construct comprised of a liability factor (a belief that one is so flawed that one’s life is not worth as much as others) and self-hate.

Suicide ideation: “Any self-reported thoughts of engaging in suicide-related behaviour” (O’Carroll, Berman, Maris, Moscicki, Tanney, & Silverman, 1996, p. 247). In this thesis,
‘suicide ideation’ and ‘active suicide ideation’ are used interchangeably. In this thesis, Suicide Ideation also refers to a subscale of the Geriatric Suicide Ideation Scale (GSIS) that measures active suicide ideation using items such as, “I want to end my life” and “I have recently been thinking a great deal about specific ways of killing myself.”

**Suicide-related behaviour:** According to the nomenclature of Silverman, Berman, Sanddal, O’Carroll and Joiner (2007a,b), suicide-related behaviour is a potentially self-injurious behaviour resulting in a death or near-death. These authors distinguish between (1) suicide-related ideation (thoughts), (2) suicide-related communications (suicide threats and plans), and (3) suicide-related behaviours (self-harm, suicide attempts and suicide). The Interpersonal Theory of Suicide (Van Orden et. al., 2010) is primarily concerned with ‘suicidal behaviour’ resulting in death or near-death. The theory describes a causal chain from passive suicide thoughts to active suicide thoughts to suicidal behaviour.

**Thwarted belongingness:** refers to the absence of a sense of belonging, or a sense of social disconnection. According to the Interpersonal Theory of Suicide (Van Orden et al., 2010), thwarted belongingness is a multidimensional construct comprised of loneliness and the absence of reciprocally-caring relationships (i.e. one in which an individual feels cared for and also shows caring). This conceptualization borrows from Baumeister and Leary (1995) in defining thwarted belongingness as a state that arises from an “unmet need to belong.”
Chapter 1:

Introduction

Suicide claims an estimated 800,000 lives per year, or 1.4% of global annual deaths (World Health Organization [WHO], 2014). Suicide affects all age groups (Bertolote, 2001; Pritchard & Hansen, 2005), but suicide rates rise toward later adulthood (Langlois & Morrison, 2002; Navanaleen, 2012). Although the rate of suicide has been gradually decreasing among Canadians of all ages over the last several decades (Langlois & Morrison, 2002; Navanaleen, 2012), the demographic shift toward a larger, older population in Canada (Bohnert, Chagnon & Dion, 2014) and around the world (Lloyd-Sherlock, 2000), combined with the aging Baby Boomer generation, could lead toward an increase in the number of suicides among older adults. The World Health Organization has called for more research to understand the pathology and epidemiology of suicide, and to form effective and targeted interventions (WHO, 2014). Given the impending rise in suicides among older adults there is a need for research to elucidate the mechanisms underlying suicide. Specifically, additional research is needed to identify new risk factors and consolidate the known risk factors into a framework that will help to influence intervention strategies with potential clinical and public health implications (Conwell, Van Orden, & Caine, 2011).

Suicide is a multidimensional phenomenon. In most cases of suicide, more than one risk factor is present before suicide occurs (Maris, Berman, & Maltzberger, 1992). Risk factors work in combination with each other, and no single risk factor is sufficiently strong to independently lead to suicide. Suicide is not a single disorder or single action,
but is better thought of as the final action in a process whereby a variety of bio-psycho-social risk factors contribute to its onset (Heisel, 2006). Although much is known about risk factors for suicide among older adults (e.g., reviews by Conwell, Duberstein, & Caine, 2002; Fassberg et al., 2012; Heisel, 2006), a challenge remains to understand how these risk factors interact to promote suicidal behaviour. A predictive theoretical framework for suicide, the Interpersonal Theory of Suicide (IPTS), has been recently proposed by Joiner and colleagues (Joiner, 2005; Van Orden et al., 2010) that describes how a set of interpersonal risk factors interact to cause suicidal behaviour. Although the IPTS has been tested heavily among younger and middle-age adults – and many of these studies have lent support to the theory - much less work has done using older adult samples. In this thesis, I focus on the latter.

1.1 Epidemiology of Suicide

According to Statistics Canada (2014), suicide claims approximately 4000 lives across Canada each year. Suicide was ranked as the ninth leading cause of death in Canada in 2011 (Statistics Canada, 2014), and the tenth leading cause of death in the United States in 2009 (Kochanek, Xu, Murphy, Minino, & Kung, 2011). The annual incidence of suicide among women and men of all ages in Canada was relatively stable between 2007 and 2011 (Fig. 1). In Canada in 2011, the suicide rate for men of all ages was 16.3 deaths per 100,000 population members, considerably higher than the suicide rate in the general population of 10.8 deaths per 100,000 population members, and higher than the rate of suicide among women of all ages of 5.4 deaths per 100,000 population members. In Canada, the proportion of suicide deaths among adults 65 years and older has risen slightly from 12.1% in 2007 to 13.9% in 2011 (Statistics Canada, 2014).
adults consistently show a high suicide rate compared to the general population (Centers for Disease Control [CDC], 2013; Statistics Canada, 2014). As in other countries, Canada is likely to see an increase in the number of suicides, and potentially also in the suicide rate, among older adults due a growing baby boomer population (Statistics Canada, 2011).

A well-known fact in suicide epidemiology is the difference in suicide rates between men and women. In Canada and the United States, suicide rates are three to four times higher among men than among women (CDC, 2010; Navaneelan, 2012). Suicide deaths among men have outnumbered suicide deaths among women for over 60 years in Canada (Statistics Canada, 2014). Despite the lower incidence of suicide among women compared to men, women are three to four times more likely to engage in suicide behaviour, and are more likely to be hospitalized after engaging in suicide behaviour compared to men (Langlois & Morrison, 2002). The “gender paradox of suicide” refers to the observation that women more frequently engage in suicide behaviour, yet men more frequently die by suicide (Canetto & Sakinofsky, 1998). One potential underlying reason for this observation is that men are more likely to use lethal means to end their lives than women, and hence suicidal behaviour is more likely to end in death (Juurlink, Herrmann, Szalai, Kopp, & Redelmeier, 2004; Quan & Arboleda-Florez, 1999). The gender paradox occurs across all age groups, but is greater toward late adulthood. Older adults are also likely to use violent means in their attempts, and typically have a high intent to die (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002).
Suicide rates also vary greatly across age categories for both men and women (Fig. 2; Statistics Canada, 2014). Suicide claims more lives among adult men than among women of any age group (Moscicki, 2001; Shah, Bhat, Zarate-Escudero, DeLeo, & Erlangsen, 2015). In Canada, the suicide rate is greatest among middle-age and older adults, but adult men and women have starkly different suicide rates. Although the rate of suicide in late life decreases for women in Canada and the United States, the rate of suicide tends to rise among men in late life. In both Canada and the United States, men 75 years and older bear a considerably greater likelihood for suicide than the general population (Statistics Canada, 2014; CDC, 2010). The increase in suicide risk toward late life leads to a greater overall incidence of suicide among older adults compared to the general population and suggests that older adults are particularly vulnerable to suicide.
1.2 Theory and Concepts in Suicide Research

Research investigating risk factors for suicide has revealed a plethora of findings (e.g., see reviews by Fassberg et al., 2012; Van Orden et al., 2010). For example, suicide ideation, past suicide attempts, and some mental disorders such as depression are among the strongest predictors of suicide (Van Orden et al., 2010). Many models of suicide have also been proposed in recent decades (e.g., see reviews by Barzilay & Apter (2014), and Stanley, Hom, Rogers, Hagan, & Joiner (2015)), but few have been tested empirically among older adults (Stanley, Hom, Rogers, Hagan & Joiner, 2015). Despite the wealth of knowledge concerning risk factors for suicide and advances in suicide theory, some authors have noted that this body of work has resulted in few effective interventions for older adults (Hawton & van Heeringen, 2009; Lapierre et al., 2011). Challenges of
translating theory into practice include the absence of clearly defined hypotheses (for some theories) and the feasibility of running large enough clinical trials to capture rare outcomes such as suicide attempts. However, a theory-driven approach in suicide research may enhance understanding of the causal pathways that lead individuals to begin thinking about suicide, and then plan and engage in suicidal behaviour. A theory designed to predict suicide and the precursors of suicidal behaviour, such as thoughts of suicide, may also help to explain its root cause(s), and could therefore help to identify points of intervention that can be used to inform clinical practice or public health.

There are methodological and conceptual challenges to developing and testing a predictive theory of suicide. Methodological challenges arise from the low base-rate of suicide in the general population, difficulties in identifying and recruiting suicide-prone individuals for studies (Conwell et al., 2000; Rudd, Joiner, & Rajab, 2001), difficulties in studying psychological precursors after death, and challenges in defining suicide and related behaviours (Andriessen, 2006; Silverman, 2006). Other limitations of many theories of suicide concern how well they describe suicidal behaviours, in their ability to predict suicidal behaviour, in the extent to which they aid in understanding the causal role of individual level risk factors, and in accounting for the interaction between psychological states and environmental influences (Prinstein, 2008). By identifying proximal risk factors that are shown to be causally (i.e. temporally and non-spuriously) associated with suicidal behaviours, an etiological model may be built that potentially predicts the outcomes of suicide thoughts, non-lethal suicide attempts and suicide deaths in individuals. While progress is being made toward this end, a recent theory that has
gained a great deal of attention in the Suicidology literature, the Interpersonal Theory of Suicide (IPTS: Joiner, 2005; Van Orden et al., 2010), may be a step in this direction.

1.2.1. Defining Suicide

One of the challenges of suicide research has been defining suicide-related behaviours in a precise way to allow consistent measurement and standardized use across an array of study designs and between disciplines. A commonly cited nomenclature for suicide behaviour is that of Silverman and colleagues (Silverman, Berman, Sanddal, O’Carroll, & Joiner, 2007a,b), and is used in this thesis. These authors distinguish between (1) suicide-related ideation (thoughts), (2) suicide-related communications (suicide threats and plans), and (3) suicide-related behaviours (self-harm, suicide attempts and suicide). According to this nomenclature, all suicide thoughts, communications and behaviours are self-initiated and vary in terms of the presence or absence of intent to die, and in the presence or absence of physical self-injury. The IPTS is specifically concerned with suicide attempts with intent to die (i.e. not self-injury, in which there is no intent to die), including near-lethal suicide attempts (i.e. resulting in self-injury, but not in death) and lethal suicide attempts (deaths). A suicide attempt is characterized as self-initiated, potentially self-injurious, and having intent to die.

The IPTS proposes that suicide ideation precedes suicide behaviour. The theory distinguishes between two types of suicide thoughts, passive suicide ideation and active suicide ideation. Examples of passive suicide ideations include viewing life as not worth living, thoughts that others would be better off if one were gone, and thoughts about going to sleep and not waking up. These may be regarded as less severe than active
suicide ideation, which include specific thoughts about harming oneself and plans of taking one’s life. Studies assessing thoughts of suicide among adults have tended to use this conceptualization of passive and active thoughts of suicide (e.g., Baca-Garcia et al., 2011; Raue, Meyers, Rowe, Heo, & Bruce, 2007; Schulberg et al., 2005). Despite the effort to standardize these terms, research has not yet universally conformed to these definitions, complicating the generalizability of results from various studies.

1.2.2. Hypotheses of the Interpersonal Theory of Suicide

The IPTS was developed to explain the processes underlying lethal and near-lethal suicide attempts. The theory proposes that these processes occur in a series of causally related steps, which result in the progression from passive suicide ideation to active suicide ideation, to suicide intent, and finally to a suicide attempt, which may or may not result in death. Research testing the IPTS began after its initial conceptualization by Joiner in 2005. However, the precepts of the theory had not been fully described at that time, leading to concerns that it was not falsifiable, and hence not able to be disproved. In the current version of the theory, each step along the pathway has a specific prediction (see Van Orden et al., 2010), lending to an empirically testable and potentially falsifiable theory. The IPTS is concerned with a narrow set of interpersonal factors that are considered by the authors to be the most consistently associated with suicidal behaviour, based on their literature review.

The central tenet of the IPTS is that suicidal behaviour occurs when individuals both want to die (have a desire to do so) and have the ability to end their lives (have acquired the capability to overcome the basic instinct of survival). According to this
theory, a *desire for suicide* arises when individuals experience both **Perceived Burdensomeness** (a feeling that one is a burden on others, and that others would be better off if the individual was gone) and **Thwarted Belongingness** (a combination of loneliness and lack of social support). According to this theory, suicide ideation precedes suicidal behaviour, and suicide ideation exists in active and passive forms. Passive suicide ideation ensues in the presence of either perceived burdensomeness or thwarted belongingness (**IPTS Hypothesis 1**). The presence of both perceived burdensomeness and thwarted belongingness, as well as a sense of hopelessness (i.e. persistent, pessimistic thought about one’s future interpersonal connections), may lead to active suicide ideation (**IPTS Hypothesis 2**). The IPTS also proposes that suicide ideation is not sufficient in and of itself to enact suicidal behaviour. Whether individuals attempt suicide depends on a third construct of the theory, the **Acquired Capability for Suicide**, which arises when individuals have (1) a lowered fear of death and (2) a heightened pain tolerance. The acquired capability for suicide is engendered through repeated exposure to painful or provocative life events, such as a family history of violence and childhood maltreatment. These experiences habituate individuals to pain, thereby enabling the infliction of self-harm with the intention to end one’s life. The theory proposes that *suicide intent* arises when an individual possesses both an *active suicide desire* (i.e. active suicide ideation) and a lowered fear of death (**IPTS Hypothesis 3**). That is, suicide intent arises from the combination of active suicide ideation and lowered fear of death. Finally, the combination of suicide intent and increased pain tolerance leads to suicidal behaviour (**IPTS Hypothesis 4**). These hypotheses and constructs are depicted in the path model in
Figure 3. As discussed in Chapter 3, only the first two IPTS hypotheses are tested in this thesis.

**Figure 3.** Model depicting key constructs and assumptions of the Interpersonal Theory of Suicide.

![Model depicting key constructs and assumptions of the Interpersonal Theory of Suicide.](image)

**Notes:** According to theory, passive suicide ideation arises separately from either perceived burdensomeness or from thwarted belongingness. Active suicide ideation, i.e. desire for suicide, arises from the combination of perceived burdensomeness, thwarted belongingness, and hopelessness. The combination of suicide desire and acquired capability (lowered fear of death plus increased pain tolerance) leads to a lethal or a near-lethal suicide attempt.

The authors of the IPTS (Van Orden et al., 2010) state that the theory could potentially be falsified if certain tests of its hypotheses do not support predictions.

- **Hypothesis 1:** The theory could potentially be falsified if studies do not show an independent association between thwarted belongingness and passive suicide ideation, or between perceived burdensomeness and passive suicide ideation. Alternatively, studies could potentially falsify the theory if they fail to show the presence of passive suicide ideation among all individuals with complete thwarted belongingness or among all individuals with complete perceived burdensomeness.

- **Hypothesis 2:** The theory could potentially be falsified if studies do not show an association between thwarted belongingness, perceived burdensomeness,
hopelessness and active suicide ideation. Alternatively, the theory could be falsified if studies show that individuals who express perceived burdensomeness, thwarted belongingness, and hopelessness are more likely to report passive suicide ideation than active suicide ideation.

- **Hypothesis 3**: The theory could potentially be falsified if studies show no association between fear of death and suicide intent among individuals with suicide desire. Another test could examine whether all individuals who have suicide intent also have a lowered fear of death.

- **Hypothesis 4**: The theory could potentially be falsified if non-lethal suicide attempters demonstrated greater perceived burdensomeness, thwarted belongingness, hopelessness, fear of suicide or increased pain tolerance than lethal suicide attempters. (Note: the presence or severity of interpersonal risk factors among deceased individuals could be established in some cases through qualitative analyses of suicide notes (e.g., Foster, 2003).)

### 1.2.3. The Constructs of the Interpersonal Theory of Suicide

According to the IPTS, each of the main interpersonal constructs comprises several components (Fig. 4 and Fig. 5). Each construct is in turn associated with certain observable behaviours. These behaviours can be quantified and used to test the theory. The theory assumes that the interpersonal constructs cause these observable behaviours. For example, according to the IPTS, thwarted belongingness causes the absence of reciprocal care, which then causes family conflicts.
**Figure 4.** Theoretical constructs and observable variables associated with Thwarted Belongingness. Adapted from Van Orden et al. (2010).

- **Thwarted Belongingness**
  - *I am alone*

  **Loneliness**
  *(I feel disconnected from others)*

  **Observable Behaviour**
  - Self report loneliness (+)
  - Pulling together (-)
  - Caring letters (-)
  - Seasonal variation (+)
  - Marriage, # children & friends (-)
  - Living alone, few social supports; non-intact family (+)

  **(Absence of) Reciprocal Care**
  *(I have no one to turn to & I don’t support others)*

  **Observable Behaviour**
  - Social withdrawal (+)
  - Single jail cell (+)
  - Domestic violence (+)
  - Loss through death/divorce (+)
  - Childhood abuse (+)
  - Family conflict (+)

**Notes:** Observable behaviours are those reported in Van Orden et al. (2010). The direction of causality between interpersonal constructs and observable variables follows from left to right. The (+) and (-) symbols indicate how each observable variable is associated with the corresponding latent construct, either positively (+) or negatively (-).

**Figure 5.** Theoretical constructs and observable variables associated with Perceived Burdensomeness. Adapted from Van Orden et al. (2010).

- **Perceived Burdensomeness**
  - *I am a burden*

  **Liability**
  *(My death is worth more than my life to others)*

  **Observable Variables**
  - Distress from homelessness (+)
  - Distress from incarceration (+)
  - Distress from unemployment (+)
  - Distress from physical illness (+)
  - Expendability, unwanted (+)
  - Belief that one is a burden on family (+)

  **Self-Hate**
  *(I hate myself)*

  **Observable Variables**
  - Low self-esteem (+)
  - Self-blame, shame (+)
  - Agitation (+)

**Notes:** Observable behaviours are those reported in Van Orden et al. (2010). The direction of causality between interpersonal constructs and observable variables follows from left to right. The (+) and (-) symbols indicate how each observable variable is associated with the corresponding latent construct, either positively (+) or negatively (-).
One of the main features of the Interpersonal Theory that distinguishes it from other theories of suicide is the construct of acquired capability (Fig. 6). In order to die by suicide an individual must be mentally prepared to experience a potentially life-threatening event, such as self-injury, but this is in strong conflict with the evolutionary instinct for self-preservation. Theories of learning offer a solution to resolve this problem by suggesting that individuals may acquire the capability for suicide through habituation and opponent-processes (Opponent Process Theory: Solomon & Corbit, 1974), both of which can act to lower one’s fear of death and can enhance pain tolerance. When applied to suicide, Opponent Process Theory states that the ‘primary emotional effects’ of behaviours that result in suicide are fear and pain, and the ‘opponent emotional effects’ are relief and analgesia (Van Orden et. al., 2010). The IPTS proposes that through repeated exposures to painful and provocative experiences (i.e. observable behaviours in Fig. 6), such as past suicide attempts, childhood maltreatment, and combat, the opponent emotional effects of relief and analgesia can become amplified and eventually overcome the pain and fear associated with these experiences. Thus, individuals can acquire the capability to engage in suicidal behaviour through practice. Personality traits that can make the experience of self-harm more likely, such as impulsivity, as well as direct exposure to methods of self-harm, such as easy access to firearms, can also facilitate acquired capability.
Figure 6. Theoretical constructs and observable variables associated with Acquired Capability. Adapted from Van Orden et al. (2010).

Notes: The direction of causality is from Acquired Capability for Suicide to Lowered Fear of Death and to the Elevated Physical Pain Tolerance latent constructs. The dashed line indicates that the observable variables affect the Acquired Capability for Suicide construct through habituation and strengthening of opponent processes.

1.3 Study Rationale and Objectives

The IPTS has drawn much attention in the field of suicidology in recent years, and continues to inspire even more research. Despite this, the literature testing the IPTS among older adults, in particular, community-residing older adults, is limited. While some authors have noted that more research is needed to understand how interpersonal risk factors for suicide interact to confer risk among older adults, additional tests of the IPTS could help to identify points of intervention for clinical practice, and to advise public health prevention strategies. A theory that accurately predicts the onset of key risk factors for suicide, such as suicide ideation (Heisel, 2006; Links, Heisel, & Quastel, 2005; Rowe, Bruce, & Conwell, 2006), is particularly valuable for informing public health, which focuses on prevention. The IPTS is hailed as one such theory. This thesis uses existing data from a sample of community-based older adults that were recruited as part of a larger study assessing risk and resiliency factors for late life suicide (Heisel & Flett, 2014) to test the IPTS. The first objective of this thesis is to review the literature.
testing the IPTS among older adults. A second objective of this thesis is to test the first two hypotheses of the IPTS using the available data. The final objective of this thesis is to discuss the potential implications of this work for clinical practice or public health.
Chapter 2:

Literature Review

A literature review was conducted to identify studies testing the Interpersonal Theory of Suicide (IPTS: Joiner, 2005; Van Orden et al., 2010) among older adults. Published literature was searched in PubMed/Medline, PsycINFO, Web of Science and EMBASE databases using the following broad search terms: interpersonal theory, older adult, late life and suicide (see Table 2.1 for search results). Abstracts and titles were scanned for these keywords. Studies were included in this review if they contained references to Joiner’s (2005) theory, or to Van Orden et al.’s (2010) paper, if they contained results from tests of the theory’s constructs or its predictions, and if the sample consisted of older adults. I also conducted a search of the references/bibliographies of articles included in this review. The time frame for these searches was until May 2015.

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2.1 Overview of Search Results

This search resulted in a total of eight articles that have tested some component of the IPTS among older adults. These articles have been summarized in the table of Appendix A. Among these studies, all eight tested theory-driven hypotheses concerning perceived burdensomeness, and three tested hypotheses concerning thwarted belongingness. These studies varied in methodologies, making results difficult to compare. In the following sections of this chapter, findings from these studies are critically evaluated. In this review, the Perceived Burdensomeness construct is referred to as ‘perceived burden,’ and the Thwarted Belongingness construct as ‘thwarted belonging,’ in order to avoid confusion arising from the different definitions adopted across studies, and because these constructs were measured using different scales across the studies. In addition, this review will refer to ‘active suicide ideation’ as suicide ideation, and will refer to ‘passive suicide ideation’ as death ideation. Although passive suicide ideation and active suicide ideation are the terms used in Van Orden et al. (2010), all studies reviewed here replace these terms with death ideation and suicide ideation, respectively. Suicide ideation and death ideation were also measured using different scales across studies.

2.2 Associations Between Perceived Burden and Suicide-Related Behaviours

Feelings of perceived burden are common among older adults (Cahill, Lewis, Barg and Bogner, 2009; Foster, 2003; Gunn, Lester, Haines, & Williams, 2012). For instance, a study of the experiences of adults 65 years and older who were recruited from primary care clinics found that nearly half (46%) reported feelings of being a burden on
their families (Cahill, Lewis, Barg and Bogner, 2009). Feelings of being a burden on others may be perceived in relation to many interpersonal sources, including most familial and non-familial relationships (Jahn & Cukrowicz, 2011; Jahn, Van Orden, & Cukrowicz, 2013). Jahn, Van Orden and Cukrowicz (2013) found that among 70 older adults recruited from a medical center 76% reported feeling like a burden on their spouses, and 64% reported feeling they were a burden on a child. Older adults receiving care for medical issues can experience burden in different ways, such as worrying about the time taken out of their children’s lives to care for them, guilt associated with the impact of their health problems on others, and by being a source of worry for their adult children (Cahill, Lewis, Barg, & Bogner, 2009). A study of suicide notes in which perceived burden was identified through thematic analysis found that 40% of older adults who died by suicide had experienced burden (Foster, 2003).

Within the context of the IPTS, several studies have found evidence to suggest that perceived burden is associated with suicide-related behaviours among older adults. All eight studies included in this review showed that perceived burden is significantly associated with suicide ideation (Christensen, Batterham, Soubelet, & Mackinnon, 2013; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013; Cukrowicz, Cheavens, Van Orden, Ragain, & Cook, 2011; Jahn, Cukrowicz, Linton, & Prabhu, 2011; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). For instance, Christensen, Batterham, Soubelet and Mackinnon (2013) tested the IPTS in a large population-based sample (6133 individuals recruited for electoral rolls in Canberra and Queanbeyan, Australia) and found a significant association between perceived burden and suicide ideation in the whole sample, as well as in the subsample of individuals who were in their 60s (1973
individuals). In this study, the association between perceived burden and suicide ideation was significant even after controlling for thwarted belonging, hopelessness, the two-way interactions of perceived burden/thwarted belonging, hopelessness/perceived burden, and hopelessness/thwarted belonging, and the three-way interaction of hopelessness/perceived burden/thwarted belonging. Cukrowicz, Cheavens, Van Orden, Ragain and Cook (2011) also showed that perceived burden was associated with suicide ideation in a smaller community-based sample consisting of 57 individuals who were 55 years and over, even controlling for age, sex, depression symptoms, hopelessness, loneliness, and participant’s perception of overall physical and emotional health. On the contrary, Cukrowicz, Jahn, Graham, Poindexter and Williams (2013) failed to find an association between perceived burden and both suicide ideation and death ideation, after controlling for depression, hopelessness and thwarted belonging, among older adults recruited from medical centers. The mixed results in these studies indicate a need for additional work investigating the association between perceptions of burdening others on thoughts of suicide among older adults.

The authors of the studies reviewed in this thesis used various measures to assess perceived burden. Perceived burden was assessed with the Interpersonal Needs Questionnaire (INQ: Van Orden, Witte, Gordon, Bender, & Joiner, 2008), the ‘golden standard’ measure that was developed and validated to assess two of the main constructs the IPTS, in four of the eight studies. However, these studies used different versions of the INQ. The 12-item (Van Orden, Witte, Gordon, Bender, & Joiner, 2008) and 15-item versions (Van Orden, Cukrowicz, Witte, & Joiner, 2012) were used most commonly, of which only the 15-item version has been validated among older adults who were
recruited from clinical centers (Van Orden, Cukrowicz, Witte, & Joiner, 2012). The other four studies used various measures of perceived burden that may be conceptually similar to the perceived burden subscale of the INQ, but have not been validated among older adults. For instance, Van Orden, Wiktorsson, Duberstein, Berg, Fassberg, and Waern (2014) identified perceived burden thematically among participants’ responses to the question, “Why did you attempt suicide?”; Christensen, Batterham, Soubelet and Mackinnon (2013) used items from several scales that were administered in a population survey to create proxy measures for perceived burden and thwarted belonging; and Jahn, Cukrowicz, Linton and Prabhu (2011) used two items from the Suicide Cognition Scale (SCS) to create a subscale to measure perceived burden. Although the seminal paper by Van Orden and colleagues (2010) does not specify which measure of perceived burden (and thwarted belonging) is most appropriate for testing their theory, the broader literature testing the IPTS would suggest that the INQ is the predominant measure for these constructs. Although all four existing versions of the INQ measure the same two constructs, this diversity raises the question of which version of the INQ should be used among samples of older adults. The answer is not yet clear, as each version of the INQ appears to have merit.

Whereas most studies included in this review have focused on suicide ideation as the main outcome, a few have explored other suicidal behaviours, such as suicide plans, attempts and deaths. In Christensen, Batterham, Soubelet and Mackinnon (2013), measures of perceived burden (e.g., “Feeling bad about yourself – that you are a failure or have let yourself or your family down”), thwarted belonging (e.g., “How often do friends make you feel cared for?”), hopelessness (e.g., “I often feel helpless in dealing with the
problems of life”), suicide ideation (e.g., “In the last year, have you ever thought that you really would be better off dead”) and suicidal behaviour (e.g., “In the last year, have you ever made plans to take your own life?” and “In the last year, have you attempted to take your own life?”) were created using items available from scales administered in the community survey. In cross-sectional analyses these authors found that perceived burden was significantly associated with suicide plans and attempts in the past year among adults 48 to 52 years of age, but they were not able to assess history of suicide plans and attempts among the oldest participants who were in their 60s. On the contrary, a longitudinal study of adults 70 years and older who were recruited from emergency rooms after attempting suicide found that individuals who reported perceived burden were not more likely to engage in suicidal behavior during a 1-year follow-up than those who did not report perceived burden (Van Orden, Wiktorsson, Duberstein, Berg, Fassberg, & Waern, 2014). Given these mixed findings, it is not yet clear whether perceived burden is associated with suicide plans and behaviours among older adults. Some challenges for future studies assessing suicide plans and attempts will be recruiting large enough sample sizes to capture these rare outcomes, and also identifying individuals who have survived suicide attempts.

The finding in this review that authors have employed various measures of perceived burden has also been noted in a recent literature review. Hill and Pettit (2014) reported overall support for the IPTS’s first hypothesis in their review of studies linking perceived burden and suicide-related behaviours including suicide ideation. The 27 studies in their review varied greatly in sample characteristics, including both clinical and non-clinical samples of all ages, and in methodologies, with various measures used to
assess the construct of perceived burden. These studies consistently showed significant cross-sectional associations between perceived burden and suicide ideation, and between perceived burden and suicide attempts. However, the lack of consistency in measures used to assess perceived burden potentially weakens the conclusion, as it is not clear that these studies were measuring the same construct. The authors encouraged more research assessing longitudinal associations using standardized measures of perceived burden, and suggested that future tests of the IPTS should assess whether the interaction of perceived burden and thwarted belonging is significantly associated with thoughts of suicide across more diverse samples. The review by Hill and Pettit (2014) captured a broader literature on perceived burden compared to this thesis, in part because they did not focus on studies that explicitly tested a hypothesis of the IPTS, and their focus was not on older adults. As a result, their review shares only one paper in common with this thesis. More work is needed to explicitly test the hypotheses of the IPTS concerning perceived burden and thoughts of suicide among community-residing older adults.

The literature reviewed in this chapter is consistent with the larger body of research on the construct of burden outside the context of the IPTS, which has established a clear connection between perceived burden and suicide-related behaviours (e.g., reviews by McPherson, Wilson, & Murray, 2007; Gruenewald & White, 2006). Furthermore, validation studies of the Perceived Burdensomeness subscale of the INQ suggest that perceived burden is also associated with other well-known risk factors for suicide-related behaviours, such as hopelessness, depression, suicide ideation, death ideation, low meaning in life and loss of social worth among older adults (Marty, Segal, Coolidge, & Klebe, 2007; Van Orden, Cukrowicz, Witte, & Joiner, 2012). Yet, it is not
clear whether perceived burden is associated with suicide thoughts as specifically hypothesized in the IPTS (Van Orden et al., 2010), in particular, among community-residing older adults.

2.3 Associations Between Thwarted Belonging and Suicide-Related Behaviours

The literature generally supports the IPTS’s conceptualization of thwarted belonging. For example, a systematic review of studies investigating suicide risk among older adults in long-term care facilities found that loneliness and social isolation are correlated with suicide ideation (Mezuk, Rock, Lohman, & Choi, 2014). Among older adults, perceived social support is inversely associated with suicide ideation (Kleiman & Riskind, 2013; O’Riley, Van Orden, He, Richardson, Podgorski, & Conwell, 2014). In addition, studies that have validated the INQ among older adults report associations between thwarted belonging, loneliness, and perceived social support (Marty, Segal, Coolidge, & Klebe, 2007; Van Orden, Cukrowicz, Witte, & Joiner, 2012). Consistent with the literature showing conceptual similarities between thwarted belonging, loneliness, and perceived social support, the IPTS defines thwarted belonging as a primary construct comprised of two latent constructs (i.e. loneliness and perceived social support).

Among the eight studies included in this review, two showed that thwarted belonging is significantly associated with suicide ideation among older adults (Christensen, Batterham, Soubelet, & Mackinnon, 2013; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013). Christensen, Batterham, Soubelet and Mackinnon (2013) found a significant association between thwarted belonging and suicide ideation in a
population-based sample of community-residing older adults, both in the whole sample (6133 individuals) and in the subsample of adults in their 60’s (1973 individuals), even controlling for perceived burden, hopelessness, perceived burden, and two- and three-way interactions of these constructs. Cukrowicz, Jahn, Graham, Poindexter and Williams (2013) found a significant association between thwarted belonging and suicide ideation in a sample of 239 individuals 60 years and older who were recruited from a primary care centre, even controlling for hopelessness, depression, perceived burden and two- and three-way interactions of these constructs. However, thwarted belonging was not associated with death ideation, controlling for perceived burden, hopelessness and depression in Cukrowicz, Jahn, Graham, Poindexter and Williams (2013). These findings do not support the IPTS’s first hypothesis that thwarted belonging contributes to death ideation, but instead suggest that thwarted belonging may be associated with suicide ideation among older adults. Further tests of the IPTS may clarify the expected association between thwarted belonging and thoughts of suicide among older adults.

The studies included in this review varied in measures used to assess thwarted belonging, and no two studies used the same measure. Cukrowicz, Jahn, Graham, Poindexter, & Williams (2013) used the 15-item version of the INQ (Van Orden et al., 2012); Christensen, Batterham, Soubelet and Mackinnon (2013) used a proxy measure for thwarted belonging comprised of four items from the Schuster Social Support scale (SSS); and Van Orden, Wiktorsson, Duberstein, Berg, Fassberg and Waern (2014) identified perceived burden thematically among participants’ responses to the question, “Why did you attempt suicide?” The lack of consistency in the measures is a limitation in the literature that may prevent drawing general conclusions regarding the construct and
its associations to suicide-related behaviours. Studies should seek to use standardized measures of thwarted belonging in order for results to be comparable across studies.

A recent review of the literature examined associations between a sense of belonging and suicide-related behaviours (Hatcher & Stubbersfield, 2013). Studies were included if the outcome was suicide ideation or suicide attempts, if the study used a measure that explicitly assessed belonging (but not thwarted belonging), and had no age restrictions on study samples. These authors identified 16 studies that consistently showed negative associations between a sense of belonging and both thoughts of suicide and history of suicide attempts, but the authors did not report on the statistical significance of these associations. Five different measures of belonging were used among these studies, including the INQ in five of the 16 studies. A key difference between the INQ and other measures of belonging is that the INQ measures thwarted belonging, which is not necessarily the opposite of belonging. Thus, the conclusions from some studies assessing belonging may not have meaning in the context of the ITPS. The authors also noted that, “current concepts make it hard to distinguish [thwarted belonging] from loneliness or other measures of social support,” (Hatcher & Stubbersfield, 2013, p. 432), necessitating the use of a validated measure of thwarted belonging in future studies.

Research has shown that thwarted belonging is common among older adults who attempt suicide (Van Orden, Wiktorsson, Duberstein, Berg, Fassberg & Waern, 2014). From my literature review, only two studies have investigated associations between thwarted belonging and suicide plans and attempts. Christensen, Batterham, Soubellet and Mackinnon (2013) failed to find a significant association between thwarted belonging
and suicide plans and attempts after controlling for suicide ideation, hopelessness, acquired capability (a measure of the ability to enact self-harm), and two-and three-way interactions between thwarted belonging, perceived burden and hopelessness. However, the authors were only able to examine this association among participants in their sample who were in their 40s and 50s, but not among the oldest group of adults who were 60 years and older, because suicide plans and attempts were exceedingly rare outcomes across the age groups. In another study, Van Orden, Wiktorsson, Duberstein, Berg, Fassberg and Waern (2014) found that older adults who reported experiencing thwarted belonging were significantly more likely to have engaged in repeat suicidal behaviour during a 1-year follow-up period compared to older adults who did not report thwarted belonging at baseline. From the mixed findings in these two studies it is not clear whether thwarted belonging is associated with suicidal behaviours among older adults, as the IPTS would contend.

2.4 Joint Associations of Perceived Burden, Thwarted Belonging and Hopelessness on Suicide Ideation

The IPTS predicts that the combination of perceived burden, thwarted belonging, and hopelessness leads to suicide ideation. Some support for this hypothesis can be found in studies suggesting that perceived burden may interact with thwarted belonging in the association with suicide ideation (Hill & Pettit, 2014), but it is not yet clear whether hopelessness also interacts with these constructs. Hopelessness has been defined as a negative cognitive style in which individuals attribute stable, global causes to negative events, and have negative expectations about future events (Abramson et al., 1998). There is a general consensus in the suicide literature that hopelessness is a strong risk
factor for suicide-related behaviours (reviewed in Van Orden et al., 2010), and many studies with diverse samples have shown that hopelessness is also associated with perceived burden and thwarted belonging (Chochinov et al., 2007; Cukrowicz, Cheavans, Van Orden, Ragain, & Cook, 2011; Davidson, Wingate, Rasmussen, & Slish, 2009). These findings are consistent with the IPTS’s prediction that hopelessness contributes to suicide-related behaviours, and, in particular, to suicide ideation.

Of the eight studies included in this review, two included tests of the association between the two-way interaction of perceived burden and thwarted belonging on thoughts of suicide (Christensen, Batterham, Soublet, & Mackinnon, 2013; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013). Christensen, Batterham, Soublet and Mackinnon (2013) found that the two-way interaction was significantly associated with suicide ideation among the older adults in their study, even controlling for the main effects of perceived burden, thwarted belonging and hopelessness. Consistent with the IPTS’s predictions, Cukrowicz, Jahn, Graham, Poindexter and Williams (2013) found that the two-way interaction was significantly positively associated with a reduction in the probability of being a suicide ideator, defined in their study as someone who does not report suicide ideation, but shows other signs associated with suicide risk. These findings suggest the presence of an interaction between perceived burden and thwarted belonging on suicide ideation, but it is not known from these studies whether the interaction holds for death ideation. In addition, it is not yet clear which interpersonal construct moderates the other as the authors of both studies did not interpret the interaction term. Another study of middle-age adults assessed the association between thwarted belonging and suicide ideation at three different levels of perceived burden, and found that high levels
of burden, but not low levels of burden, influenced the effect of thwarted belonging on suicide ideation (Van Orden, Witte, Gordon, Bender, & Joiner, 2008). This finding suggests an interaction in which perceived burden moderates the effect of thwarted belonging on suicide ideation. This has yet to be replicated among older adults.

Among the eight studies included in this review, two found that hopelessness was significantly positively correlated with both suicide ideation and death ideation (Christensen, Batterham, Soubelet, & Mackinnon, 2013; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013). Cukrowicz, Jahn, Graham, Poindexter and Williams (2013) also found that hopelessness was significantly associated with death ideation, but not with suicide ideation, after controlling for perceived burden, thwarted belonging and depression. This study failed to find support for the IPTS’ second hypothesis regarding the association between hopelessness and suicide ideation, but showed that hopelessness may instead lead to death ideation. On the contrary, Christensen, Batterham, Soubelet and Mackinnon (2013) found that hopelessness was significantly associated with suicide ideation after controlling for perceived burden, thwarted belonging, and the two-way and three way interactions of these interpersonal constructs. These contradictory findings might arise from the differences in measures used to assess the interpersonal constructs and suicide ideation across these studies. Alternatively, sample characteristics may have influenced these outcomes, including sample size and the context of participant recruitment, whether community-based or clinic-based. Overall, these studies suggest that hopelessness may be associated with suicide ideation among community-based older adults (Christensen, Batterham, Soubelet, & Mackinnon, 2013), and with death ideation...
among older adults presenting at primary care clinics (Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013).

In this literature review, only one study has found a significant association between the three-way interaction of perceived burden, thwarted belonging and hopelessness, and suicide ideation (Christensen, Batterham, Soublelet, & Mackinnon, 2013), in part because the large sample size in this study increased the probability of detection of such an effect. These authors did not interpret the interaction term, but suggested that the model comprising the combination of perceived burden, thwarted belonging, hopelessness, the two-way interactions of these terms and the three-way interaction term explained less variance in suicide ideation among the oldest age group (60s) than in models among the younger age groups (20s and 40s). Another test of the IPTS’s second hypothesis is needed to determine whether perceived burden, thwarted belonging and hopelessness together contribute to suicide ideation using standardized measures of the interpersonal constructs.

2.5 Gaps in the Late Life Suicide Literature Regarding the Interpersonal Theory of Suicide

The IPTS has been insufficiently tested among older adults, and among the studies reviewed here, results are mixed. The evidence is not yet clear with respect to the IPTS’s predictions of the association between perceived burden, thwarted belonging, hopelessness, death ideation and suicide ideation. In addition, researchers have focused on suicide ideation while generally neglecting death ideation and suicidal behaviours, in spite of the IPTS’s primary concern with the latter. Overall, the eight studies reviewed in this chapter suggest that there may be an association between the interpersonal factors of
perceived burden, thwarted belonging, hopelessness, and thoughts of suicide among older adults. However, the literature reviewed here suggests that these associations may not follow the specific predictions of the IPTS. More studies are needed to assess these constructs and their predicted associations according to the specific hypotheses of the IPTS using samples of older adults. Through these additional tests the theory may be validated among older adults and could then be used to inform clinical interventions or public health prevention strategies.

This literature review also revealed several potential limitations to the IPTS itself. Support for the main predictions of the IPTS varied across studies, and several studies failed to find significant associations between the interpersonal constructs and suicide-related behaviours (Christensen, Batterham, Soubelet, & Mackinnon, 2013; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013; Mitchell, Jahn, & Cukrowicz, 2014; O’Keefe, Wingate, Tucker, Rhoades-Kerswill, Slish, & Davidson, 2014; Van Orden, Wiktorsson, Duberstein, Berg, Fassberg, & Waern, 2014; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Although the lack of significant associations may be explained by data limitations in these studies, differences in socio-cultural contexts across studies (e.g. Cahill, Lewis, Barg, Bogner, 2009; Chan, Caine, You, Fu, Change, & Fip, 2013), and due to the control variables used in regression analyses, the similarity of this finding across studies suggests a potential limitation in the theory. Perhaps a lack of data may also explain this observation, yet it is unusual that studies seem preferential to measuring one construct over the other. In addition, it is not clear whether perceived burden and thwarted belonging are differentially associated with death ideation and suicide ideation, or whether the associations between each interpersonal variable and death ideation and
suicide ideation are equally strong. Several studies suggest that thwarted belonging may not be as strong a predictor of suicide-related behaviours as perceived burden (e.g. O’Keefe, Wingate, Tucker, Rhoades-Kerswill, Slish, & Davidson, 2014; Van Orden, Witte, Gordon, Bender and Joiner, 2008; Wong, Koo, Tran, Chiu and Mok, 2011). These associations need to be addressed in future studies of older adults.

Another potential limitation of the IPTS arises from the definitions of its constructs and the measures used to assess them (Van Orden, Cukrowicz, Witte, & Joiner, 2012). Although Joiner (2005) and Van Orden et al. (2010) proposed that perceived burdensomeness and thwarted belongingness are separate constructs, and thus should contribute independently to thoughts of suicide, some authors report strong bivariate correlations between them (e.g., Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Collinearity between the interpersonal constructs may influence study outcomes and limit the interpretation of results, and ultimately may weaken the explanatory strength of this theory. However, studies showing that thwarted belongingness and perceived burdensomeness are differentially associated with death ideation and suicide ideation (Christensen, Batterhman, Soubelet, & Mackinnon, 2013; Gunn, Lester, Haines, & Williams, 2012) suggest that the constructs may indeed be distinct, as the IPTS contends. These associations should be explored further in order to clarify the roles of interpersonal factors in suicide thoughts.

2.6 Proposed Study

The purpose of this thesis is to test the first two hypotheses of the IPTS by investigating the associations between perceived burdensomeness, thwarted belongingness, social hopelessness, death ideation and suicide ideation. I intended to test
the theory’s hypotheses using the approaches suggested in Van Orden et al. (2010) as potential ways of falsifying the IPTS. In doing so, I addressed the relative scarcity of studies testing the IPTS among community-residing older adults. This literature review has shown that studies using measures of both death ideation and suicide ideation, and of both perceived burdensomeness and thwarted belongingness, are generally lacking. Whereas past literature has include both interpersonal constructs as predictors in regression models, this thesis used separate analyses for each construct to test their independent associations with death ideation – a test suggested by Van Orden et. al. (2010). Finally, as in Cukrowicz, Cheavens, Van Orden, Ragain and Cook (2011), I control for the potential confounding effects of age, sex, and depression symptom severity – a step that is inconsistently used in the literature testing the IPTS. Although Van Orden and colleagues do not state that these variables should be controlled for when testing the IPTS, they leave open the possibility of doing so. There is a great deal of evidence to suggest that age, sex, and depression are associated with suicide ideation (e.g., reviews by Nock et. al. (2008) and Van Orden & Conwell (2011); Oquendo et. al., 2007), and with indices of thwarted belonging and perceived burden (e.g., review by Fassberg et. al., 2012), and hence are potential confounding factors in the association between the interpersonal constructs, death ideation and suicide ideation.

This literature review revealed that hopelessness has tended to be measured using scales or proxy measures of general hopelessness. In this thesis, hopelessness was assessed using a measure of social hopelessness - a domain-specific construct of general hopelessness. While general hopelessness represents negative expectations about the future, social hopelessness represents expectations about one’s interpersonal
relationships. Both social hopelessness and general hopelessness are significantly associated with suicide ideation, but are distinct, yet related constructs (Heisel, Flett, & Hewitt, 2003). The IPTS does not explicitly specify one or the other in its hypotheses, but suggests that hopelessness with respect to perceptions of being a burden and of not belonging exacerbates the risk of engaging in suicidal behaviours. The current literature has not employed a measure of interpersonal hopelessness; this thesis proposes to fill this gap.
Chapter 3:

Materials & Methods

In this thesis I aimed to test the Interpersonal Theory of Suicide (IPTS: Joiner, 2005; Van Orden et al., 2010) using a community-based sample of older adults that were recruited as part of a larger study of late life suicide ideation (Heisel & Flett, 2014). The larger study aimed to examine risk and resiliency factors associated with the onset or exacerbation of suicide-related thoughts, and to identify points of early intervention. In this thesis I tested the first two predictions of the IPTS. Specifically, I conducted cross-sectional analyses to test the hypotheses that perceived burdensomeness and thwarted belongingness are individually associated with death ideation, and that the combination of perceived burdensomeness, thwarted belongingness and social hopelessness is associated with suicide ideation. As the larger study was not designed to investigate suicide attempts, data were not available to test the IPTS’s predictions regarding the associations between acquired capability for suicide and suicidal behaviour.

3.1 Procedure and Participant Sample

The larger study consisted of community-dwelling adults 65 years of age and older who resided in London, Ontario and surrounding areas. Participants were recruited using convenience sampling methods. Individuals contacted the Principal Investigator (Dr. Marnin Heisel) in response to flyers that were posted in exercise and wellness programs, recreation or health fairs, places of worship, public malls, coffee shops, and in local newspaper advertisements throughout London, Ontario. Participants were included if they were 65 years or older, English-speaking, and had adequate cognitive functioning.
to participate meaningfully in this study (i.e. a score of at least 21 out of 30 on the Mini Mental State Examination, or MMSE: Folstein, Folstein, & McHugh, 1975). Individuals were further required to provide written informed consent, consistent with the study protocol approved by The University of Western Ontario Health Sciences Research Ethics Board. Participants were excluded from the study if they appeared to be sufficiently cognitively impaired (i.e. were deemed so by the PI or other interviewer), even if they produced acceptable scores on the MMSE to participate meaningfully, or appeared to be intoxicated, psychotic, or delusional to study personnel. Measures were administered verbally to all participants. Participants were reimbursed for time and travel expenses.

The larger study comprised an initial sample of 173 community-residing older adults. After administering measures at baseline (Time 1), these participants were reassessed at three time points between 2008 and 2012 (2-4 week follow-up [Time 2], 6-12 month follow-up [Time 3], and 12-24 month follow-up from the previous appointment [Time 4]), with individuals lost to attrition over time. Of the 173 initial participants, 109 completed the study through all four time points. During the follow-up interviews, study personnel administered multiple measures of risk and resiliency factors, physical and psychological health, socio-demographic characteristics and suicide thoughts. The various measures used in the larger study were not all administered at each time point. For example, the Interpersonal Needs Questionnaire, a prominent measure of constructs of the IPTS, was only administered at the final two time points of data collection. In this thesis, I focus on the larger sample from the third wave of assessment for several reasons, as explained next.
Although the larger study provided two potential data points for testing the hypotheses of the IPTS, several factors encouraged the use of the sample at Time 3. First, there were no statistical differences in mean scores on key study measures, including those used to assess the two primary outcomes in this thesis of Death Ideation and Suicide Ideation, between Time 3 and Time 4, thus limiting the use of longitudinal analyses. Second, the sample of participants at Time 3 was the larger of the two time points during which the INQ (and other measures used in this thesis) was administered. A total of 124 participants completed the INQ at Time 3, compared to only 107 at Time 4. Third, an advantage of using the larger sample from Time 3 is that this sample had higher mean scores of depression symptom severity compared to the participants at Time 4. Hence, the participants at Time 3 potentially make a better study sample for testing a theory of suicide because they approached clinical significance to a greater extent than the sample at Time 4. Fourth, there were delays in re-assessing participants at Time 4 that may have challenged the validity of the data. Finally, the measures used in this thesis had slightly greater internal consistencies (Cronbach’s alpha) for participant at Time 3 than at Time 4. In light of these issues I have used the data from participants at Time 3 and have conducted cross-sectional analyses, which are adequate to test the theory-based hypotheses stated in Sections 3.3.1 and 3.3.2.

3.2 Measures

3.2.1. Geriatric Suicide Ideation Scale (GSIS)

In this thesis, passive suicide ideation was operationalized as a score on a measure of death ideation, and active suicide ideation was operationalized as a score on a measure
of suicide ideation. Death ideation and suicide ideation were assessed with the GSIS, a 31-item scale developed and validated among a heterogeneous sample of older adults (Heisel & Flett, 2006). The GSIS produces total scores and contains subscale scores assessing Suicide Ideation (10 items; e.g., “I am preoccupied with wishing that my life were over soon.”), Death Ideation (5 items; e.g., “I often wish that I would pass away in my sleep.”), Loss of Personal and Social Worth (7 items; e.g., “I frequently feel useless.”), and Perceived Meaning in Life (8 items; e.g., “Life is extremely valuable to me.”). It also contains an additional item (“I have tried ending my life in the past.”) that is included in total scores, but not on one of the subscales. Items are scored on a 5-point Likert scale, with item responses ranging from scores of 1 (strongly disagree) to 5 (strongly agree), and total scores potentially ranging from 31 to 155. Higher scores on the GSIS suggest more severe suicide ideation. Studies assessing community-residing older adults using the GSIS have shown strong psychometric properties, including high internal consistency and construct validity as indicated by significant associations with measures of depression and hopelessness (Heisel & Flett, 2006; Jahn, Cukrowicz, Linton & Prabu, 2011). In the present study, internal consistency at Time 3 for GSIS totals (Cronbach’s α=.94), Suicide Ideation subscale (Cronbach’s α=.91) and Death Ideation subscales (Cronbach’s α=.90) were strong.

3.2.2. Interpersonal Needs Questionnaire (INQ)

Two of the main constructs of the IPTS, Perceived Burdensomeness and Thwarted Belongingness, were assessed with the original 25-item version of the INQ (Anestis, Bagge, Tull, & Joiner, 2011; Anestis & Joiner, 2011; Van Orden, 2009; Van
Orden, Witte, Gordon, Bender, & Joiner, 2008) that was available in the existing database. The INQ contains subscales for Perceived Burdensomeness (15 items; e.g., “These days I think my death would be a relief to the people in my life,” and “These days I think I contribute to the well-being of the people in my life.”) and Thwarted Belongingness (10 items; e.g., “These days, I often feel like an outsider in social gatherings,” and “These days, I often feel that there are people I can turn to in times of need.”). The items are scored on a 7-point Likert scale, with possible responses ranging from scores of 1 (“Not at all true for me”) to 7 (“Very true for me”), and total scores potentially ranging from 15 to 105 for the Perceived Burdensomeness subscale, and from 10 to 70 for the Thwarted Belongingness subscale. Higher scores on the Perceived Burdensomeness subscale suggest more intense perceptions of being a burden on others. Higher scores on the Thwarted Belongingness subscale suggest more intense perceptions of not belonging. The INQ has demonstrated discriminant validity for the subscales in that thwarted belongingness, but not perceived burdensomeness, was associated with loneliness and low social support among a heterogeneous sample of adults 60 years and over who were recruited from primary care and mental health centres (Van Orden, Cukrowicz, Witte, & Joiner, 2012). In the present study, internal consistency (Cronbach’s α) assessed at Time 3 was .85 for the Perceived Burdensomeness subscale and .87 for the Thwarted Belongingness subscale.

3.2.3. Social Hopelessness Questionnaire (SHQ)

The data available in the larger study allowed us to measure social hopelessness rather than general hopelessness – a convenience, as the IPTS is concerned with interpersonal risk factors. Social hopelessness was assessed with the SHQ, a 20-item
measure that assesses the degree of hopelessness within one’s interpersonal life, as characterized by negative perceptions and beliefs about one’s relationships (Flett, Hewitt, Heisel, Davidson, & Gayle, 2003). Responses to items are rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), yielding total scores ranging from 20 to 100. Items include, “Some people do little to inspire hope in me,” “I expect that some people will always be mean to me,” and “I will never be able to do things as well as other people can.” The Social Hopelessness Questionnaire has been shown to be valid among older adults (Heisel & Flett, 2004). In the present study, the internal consistency (Cronbach’s α) assessed at Time 3 was .89.

3.2.4. Geriatric Depression Scale (GDS)

The GDS is a self-rated, 30-item, yes/no scored measure of depressive symptoms developed for use with older adults (GDS: Yesavage et al., 1983). The GDS was designed to be used as a screening tool and for assessment and monitoring of symptoms, rather than for diagnostic purposes (Yesavage et al., 1983), although in practice it is sometimes used for diagnosis. Items assess engagement in activities and attitudes towards one’s life, among others. Items include, “Do you feel that your life is empty?” and “Do you prefer to stay at home, rather than going out and doing new things?” Total scores range from 0 to 30. Scores from 0-9 are considered “normal,” while scores from 10-19 suggest “mild depression,” and scores from 20-30 suggest “severe depression” (Brink et al., 1982). The GDS has been validated in community residing older adults and among individuals receiving mental care (Evans & Katona, 1993; McGivney, Mulvihill, & Taylor, 1994; Yesavage et al., 1983). In the present study, the internal consistency given by Cronbach’s alpha was .90 at Time 3.
3.3 Statistical Analyses

Descriptive statistics for demographic variables and for the measures used in the analyses of this thesis were first computed. Categorical descriptive variables were reported as frequencies and percentages; continuous descriptive variables are reported as means and standard deviations. The demographic variables include sex, age, marital status, number of children, years of education, employment status, and birthplace.

In this thesis I employed cross-sectional bivariate correlation analyses and multiple regression analyses to test the IPTS’s first two hypotheses regarding the associations between perceived burdensomeness, thwarted belongingness, social hopelessness, death ideation and suicide ideation. In these analyses I controlled for the potential confounding effects of age, sex and depressive symptoms severity, which are known to be associated with suicide thoughts, and also associated with the interpersonal constructs, as discussed in the literature review (e.g., Brown & Vinokur, 2003; Cukrowicz et al., 2009; Donker, Batterham, Van Orden, & Christensen, 2014). Linear regression analysis was chosen because the outcomes assessed in this study are continuous. I analyzed the normality of the data by assessing the skewness and kurtosis of the two outcome measures of this thesis. For Death Ideation, these were, respectively, 1.78 ($SE=0.22$) and 2.91 ($SE=0.43$); for Suicide Ideation, these were, respectively, 2.41 ($SE=0.22$) and 5.50 ($SE=0.43$). Sample sizes over 50 participants (as in this thesis) would typically suggest little reason to be concerned with moderately skewed data (Vittinghoff, Glidden, Shiboski, & McCulloch, 2012). However, to assess the potential influence of non-normally distributed variables I re-ran analyses using log-transformed outcomes. The results were consistent with respect to the size and direction of findings, suggesting good
model fit of a linear regression to the data and robustness in the results. In each regression model, predictors and outcomes were not centered (that is, they were not standardized with respect to the mean of the independent variable), as it was not necessary to interpret the beta coefficients from the regression equations for the purpose of this study (Dalal & Zickar, 2012). The effect of each set of predictors on the outcomes was assessed with $R^2$-change statistics and $F$-change statistics. Associations between predictors and outcomes were assessed in terms of p-values to determine whether a hypothesized association was supported or not. All statistical tests were two-tailed with alpha = 0.05, and were conducted using SPSS version 22 (Chicago IL).

3.3.1. Testing the Association of Perceived Burdensomeness and Thwarted Belongingness on Death Ideation (IPTS Hypothesis 1)

Past studies have shown significant correlations between perceived burdensomeness, thwarted belongingness, and death ideation among older adults recruited from primary care clinics (Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013). I first sought to test bivariate correlations between perceived burdensomeness, thwarted belongingness, and death ideation among the sample of community-residing older adults in this thesis. It was expected, based on the first hypothesis of the IPTS, that both perceived burdensomeness and thwarted belongingness would be significantly positively correlated with death ideation. Next, regression analyses were conducted to test the independent associations between perceived burdensomeness and death ideation, and between thwarted belongingness and death ideation. It was hypothesized that perceived burdensomeness and thwarted belongingness would each be significantly associated with death ideation in separate regression analyses, controlling for age, sex.
and depression symptom severity. Blocks of variables were entered into the regression models, with the first block consisting of the control variables, and the second block consisting of the interpersonal variables.

Following this, I conducted a linear regression analysis testing the association between the potential interaction of perceived burdensomeness and thwarted belongingness on death ideation. A two-way interaction term was added to the linear regression model with perceived burdensomeness, thwarted belongingness, age, sex, and depression symptom severity. Prior to testing this hypothesis, I examined the extent of collinearity between perceived burdensomeness and thwarted belongingness. The bivariate correlation between these constructs was fairly high ($r = .725$), but did not exceed one recommended cut-off for multicollinearity of .80 (Garson, 2012), although other authors have suggested lower cutoffs. I then calculated the Variance Inflation Factor (VIF) for each interpersonal predictor from the $R^2$ values of a linear regression of that predictor on all other predictors (age, sex, depression symptom severity, and either perceived burdensomeness or thwarted belongingness). For thwarted belongingness the VIF is 2.71, and for perceived burdensomeness the VIF is 2.14. These results suggest acceptable levels of variance inflation due to collinearity according to some authors (for example, a maximum VIF of 5: Rogerson, 2001), although other authors have suggested lower or higher cutoffs. Taken together, the bivariate correlation and the VIF’s suggest that the interpersonal constructs may be included in a regression model as separate predictor variables. The potential implications of collinearity for testing the IPTS are discussed in Chapter 5.
Given that past literature has not interpreted interactions between the interpersonal constructs, I aimed to do this in the case of a significant interaction. To aid with interpreting the two-way interaction term, I plotted the interaction effect. Since the literature on the IPTS does not specify whether perceived burdensomeness moderates thwarted belongingness, or vice versa, I used the approach in Van Orden, Witte, Gordon, Bender and Joiner (2008) and plotted perceived burdensomeness as the moderating variable. The interaction term was only centered in order to produce a plot that would aid with interpreting the moderating effect of perceived burdensomeness on the association between thwarted belongingness and suicide ideation, but was not centered in the regression analyses as it was not necessary to interpret the regression coefficients.

3.3.2 Testing the Combined Association of Perceived Burdensomeness, Thwarted Belongingness and Social Hopelessness on Suicide Ideation (IPTS Hypothesis 2)

Past studies have shown that hopelessness is significantly positively correlated with perceived burdensomeness, thwarted belongingness, and suicide ideation among older adults recruited from medical centers or medical registries (Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013; Cukrowicz, Cheavens, Van Orden, Ragain, & Cook, 2011). I attempted to replicate these findings among older adults recruited from a community setting. It was hypothesized that hopelessness would be significantly positively correlated with perceived burdensomeness, thwarted belongingness, and with suicide ideation.

Next, I conducted cross-sectional linear regression analyses to examine the associations between perceived burdensomeness, thwarted belongingness and social
hopelessness on suicide ideation. This test is similar to that conducted in Cukrowicz, Jahn, Graham, Poindexter and Williams (2013), but these were older adults recruited from primary care centers rather than community-dwelling older adults. It was hypothesized that perceived burdensomeness, thwarted belongingness, and social hopelessness would be significantly associated with suicide ideation, controlling for the effects of age, sex, and depression symptom severity. In addition, it was hypothesized that the combination of perceived burdensomeness, thwarted belongingness, and social hopelessness would account for significant variance in suicide ideation beyond age, sex, and depression symptom severity. The extent of multicollinearity between the perceived burdensomeness, thwarted belongingness and social hopelessness was assessed using bivariate correlation analysis. The bivariate correlations between these constructs (shown in Table 3.1) were in the range of 0.21 to 0.58, and not likely to result in multicollinearity issues.

Finally, I was not able to test the association between the three-way interaction of perceived burdensomeness, thwarted belongingness and social hopelessness with suicide ideation using the method described in Braumoeller (2004) due to the small sample size in this thesis. This method, which was employed in two of the studies included in the literature review (Christensen, Batterham, Soubelet, & Mackinnon, 2013; Cukrowicz, Jan, Graham, Poindexter, & Williams, 2013), would require that the two-way interactions between perceived burdensomeness/thwarted belongingness, perceived burdensomeness/social hopelessness, and thwarted belongingness/social hopelessness be included in a regression model, along with the three-way interaction of perceived burdensomeness/thwarted belongingness/social hopelessness. Given the small sample
size, adding all of these interaction terms would take up degrees of freedom and likely result in an unstable model. Both of the aforementioned studies had considerably larger sample sizes to test this interaction.
Chapter 4: Results

This chapter presents findings of several tests of the Interpersonal Theory of Suicide (IPTS: Van Orden et al., 2010). Two of the theory’s main hypotheses were tested: the first is that perceived burdensomeness and thwarted belongingness are each associated with death ideation, and the second is that the combination of perceived burdensomeness, thwarted belongingness, and hopelessness is associated with suicide ideation. These results comprise a secondary analysis of data collected from 124 community-dwelling older adults who were recruited as part of a larger study assessing risk and resiliency factors associated with late life suicide ideation (Heisel & Flett, 2014). Participant characteristics are summarized in Table 4.1. Bivariate correlations for the measures used in this thesis are reviewed first (Table 4.2). Results from analyses testing the first hypothesis are presented in Tables 4.2 to 4.5. Table 4.6 and 4.7 show results of post-hoc tests between perceived burdensomeness, thwarted belongingness and suicide ideation. Finally, tests of the IPTS’s second hypothesis are presented in Table 4.8.

4.1 Descriptive Statistics

The 124 participants at Time 3 had a mean age of 74.5 years (SD = 6.0, range: 65 - 95). A majority of the participants were women (n = 92, or 73.0%) who were married (n = 61; 48.4%), and most of the participants were retired (n = 114; 90.5%). Participants had a mean of 3.1 siblings (SD = 2.7), 3 children (SD = 1.4)) and 5.6 grandchildren (SD = 4.2). Most participants were born in North America (61.1%) or Europe (34.4%). Participants had a mean depression symptom severity score of 3.1 on the GDS (SD=4.2),
which is considered within the non-depressed range (Brink et. al., 1982). Participants also had relatively low scores on the GSIS-Death Ideation subscale ($M=11.7, SD=3.2$) and the GSIS-Suicide Ideation subscale ($M=6.7, SD=2.4$).

| Table 4.1. Descriptive characteristics of participants at Time 3 (n = 124) |
|-----------------|----|----|---|
| **Demographic Characteristics** | N  | %  | Mean (SD) |
| Sex (Women)     | 92 | 73.0 |    |
| Age             | 124 |     | 74.5 (6.0) |
| Number of siblings | 116 | 3.1 | 2.7 |
| Number of children       | 117 | 3.0 | 1.4 |
| Number of grandchildren | 107 | 5.6 | 4.2 |
| Number of great grandchildren | 17 | 2.2 | 2.4 |
| Number of years of education | 125 | 15.1 | 3.1 |
| Married (Yes)   | 61 | 48.4 |    |
| Living alone (Yes) | 56 | 44.4 |    |
| Retired (Yes)   | 114 | 90.5 |    |
| **Birthplace**  |    |    |    |
| North America   | 77 | 61.1 |    |
| United Kingdom  | 30 | 23.8 |    |
| Europe (other than U.K.) | 14 | 11.1 |    |
| Other           | 5  | 4.0  |    |
| **Marital status** |    |    |    |
| Single, never married | 2 | 1.6 |    |
| Married, living with spouse | 61 | 48.4 |    |
| Separated       | 25 | 20.2 |    |
| Widowed         | 33 | 26.2 |    |
| Other           | 5  | 4.0  |    |
| **Employment status** |    |    |    |
| Working         | 10 | 8.1  |    |
| Retired         | 114 | 90.5 |    |
| Other           | 2  | 1.4  |    |
| **Highest Education Level Attained** |    |    |    |
| Incomplete High School | 10 | 7.9 |    |
| High School     | 45 | 35.7 |    |
| University or College | 52 | 42.1 |    |
| Graduate Program | 18 | 14.3 |    |
| GSIS-SI         | 124 | 11.7 (3.2) |    |
| GSIS-DI         | 124 | 6.7 (2.4) |    |
| INQ-PB          | 124 | 23.5 (7.5) |    |

 Continued...
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>INQ-TB</td>
<td>124</td>
<td>38.0 (17.7)</td>
</tr>
<tr>
<td>SHQ</td>
<td>124</td>
<td>42.6 (10.9)</td>
</tr>
<tr>
<td>GDS</td>
<td>124</td>
<td>3.1 (4.2)</td>
</tr>
</tbody>
</table>

Notes: Separated = all individuals who were “legally separated” or “divorced.” Working = all individuals who were working full-time or part-time. Other (Employment status) = all individuals who were retired or students. GSIS-S.I. = Geriatric Suicide Ideation Scale-Suicide Ideation subscale; GSIS-D.I. = GSIS Death Ideation subscale; INQ-PB = Interpersonal Needs Questionnaire-Perceived Burdensomeness subscale; INQ-TB = INQ-Thwarted Belongingness subscale; SHQ = Social Hopelessness Questionnaire; GDS = Geriatric Depression Scale;

4.2 Testing the Association of Perceived Burdensomeness and Thwarted Belongingness on Death Ideation (IPTS Hypothesis 1)

The first hypothesis of the IPTS states that thwarted belongingness and perceived burdensomeness are each associated with death ideation (Van Orden et. al., 2010). I first examined the associations between perceived burdensomeness, thwarted belongingness and death ideation by conducting a bivariate correlation analysis. I next tested the first hypothesis by regressing death ideation (GSIS-DI) on perceived burdensomeness, controlling for the potential confounding effects of age, sex and depression symptom severity, which are well-known covariates of both the interpersonal constructs and of suicide thoughts. This hypothesis would be supported if perceived burdensomeness was significantly associated with death ideation, even after controlling for covariates. A similar test was conducted for thwarted belongingness to test the hypothesis that thwarted belongingness would be significantly associated with death ideation, even after controlling for covariates.

All bivariate correlations between perceived burdensomeness, thwarted belongingness, death ideation, and suicide ideation were significant and positive (Table 4.2). The correlation between perceived burdensomeness and death ideation \( r = 0.33, p < \)
.01) suggests that as perceptions of being a burden on others increases, death ideation also increased in intensity. Similarly, the significant positive correlation between thwarted belongingness and death ideation \((r = 0.41, p < .01)\) suggest that as perceptions of not belonging increase, death ideation also increases in intensity. These findings are consistent with the IPTS and other studies.

**Table 4.2. Bivariate correlations of measures used in analyses.**

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GSIS-Total</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. GSIS-SI</td>
<td>.888**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. GSIS-DI</td>
<td>.784**</td>
<td>.714**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. GDS</td>
<td>.682**</td>
<td>.591**</td>
<td>.476**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. SHQ</td>
<td>.373**</td>
<td>.215*</td>
<td>.099</td>
<td>.415**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6. INQ-PB</td>
<td>.548**</td>
<td>.391**</td>
<td>.332**</td>
<td>.431**</td>
<td>.323**</td>
<td>-</td>
</tr>
<tr>
<td>7. INQ-TB</td>
<td>.601**</td>
<td>.357**</td>
<td>.407**</td>
<td>.586**</td>
<td>.545**</td>
<td>.725**</td>
</tr>
</tbody>
</table>

Notes: * \(p < 0.05\) level (2-tailed) ** \(p < 0.01\) level (2-tailed); GSIS-Total = Geriatric Suicide Ideation Scale total scores; GSIS-S.I. = GSIS Suicide Ideation subscale; GSIS-D.I. = GSIS Death Ideation subscale; GDS = Geriatric Depression Scale INQ = Interpersonal Needs Questionnaire; SHQ = Social Hopelessness Questionnaire; INQ-PB = INQ-Perceived Burdensomeness subscale; INQ-TB = INQ-Thwarted Belongingness subscale;

The results of linear regression analyses assessing the association between thwarted belongingness and death ideation, and between perceived burdensomeness and death ideation, are presented in Table 4.3 and Table 4.4, respectively. Consistent with the IPTS’s first hypothesis, thwarted belongingness was significantly associated with death ideation after controlling for age, sex, and depression symptom severity. In this regression model, thwarted belongingness by itself accounted for an additional 3.4% \((\Delta F_{(1,119)}=5.32, p = .023)\) of the variance in death ideation beyond the covariates. This result indicates that in this sample of older adults thwarted belongingness is positively associated with death ideation, and contributes a small but significant amount to the
variance in death ideation. This result also indicates that the model with only
demographic variables and depression symptoms explains more variance in death
ideation than does thwarted belongingness alone.

Table 4.3. Linear regression analysis testing the association between thwarted
belongingness on death ideation (GSIS-DI).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>SE (B)</th>
<th>β</th>
<th>(95% CI)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.09</td>
<td>2.46</td>
<td>-0.04</td>
<td>(-4.97, 4.78)</td>
<td>-0.04</td>
<td>.970</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.21</td>
<td>0.43</td>
<td>-0.04</td>
<td>(-1.05, 0.63)</td>
<td>-0.50</td>
<td>.616</td>
</tr>
<tr>
<td>Age</td>
<td>0.09</td>
<td>0.03</td>
<td>0.22</td>
<td>(0.02, 0.15)</td>
<td>2.68</td>
<td>.008*</td>
</tr>
<tr>
<td>Depression</td>
<td>0.25</td>
<td>0.05</td>
<td>0.40</td>
<td>(0.15, 0.34)</td>
<td>4.96</td>
<td>.000**</td>
</tr>
<tr>
<td>Block 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.97</td>
<td>2.45</td>
<td>-0.40</td>
<td>(-5.82, 3.88)</td>
<td>-0.40</td>
<td>.692</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.05</td>
<td>0.42</td>
<td>-0.01</td>
<td>(-0.89, 0.79)</td>
<td>-0.12</td>
<td>.908</td>
</tr>
<tr>
<td>Age</td>
<td>0.08</td>
<td>0.03</td>
<td>0.20</td>
<td>(0.02, 0.14)</td>
<td>2.53</td>
<td>.013*</td>
</tr>
<tr>
<td>Depression</td>
<td>0.17</td>
<td>0.06</td>
<td>0.27</td>
<td>(0.05, 0.28)</td>
<td>2.75</td>
<td>.007**</td>
</tr>
<tr>
<td>INQ-TB</td>
<td>0.07</td>
<td>0.03</td>
<td>0.23</td>
<td>(0.01, 0.13)</td>
<td>2.31</td>
<td>.023*</td>
</tr>
</tbody>
</table>

Notes: * p < 0.05 level (2-tailed) ** p < 0.01 level (2-tailed). $R^2 = .219, F(3,120) = 11.24, p < .000$ (Block 1); $\Delta R^2 = .034, \Delta F(1,119) = 5.32, p = .023$ (Block 2). Depression = Depression symptom severity from the Geriatric Depression Scale (GDS); INQ-TB = INQ-Thwarted Belongingness subscale

Table 4.4. Linear regression analysis testing the association between perceived
burdensomeness on death ideation (GSIS-DI).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>SE (B)</th>
<th>β</th>
<th>(95% CI)</th>
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<th>p</th>
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<tr>
<td>Constant</td>
<td>-0.09</td>
<td>2.46</td>
<td>-0.04</td>
<td>(-4.97, 4.78)</td>
<td>-0.04</td>
<td>.970</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.21</td>
<td>0.43</td>
<td>-0.04</td>
<td>(-1.05, 0.63)</td>
<td>-0.50</td>
<td>.616</td>
</tr>
<tr>
<td>Age</td>
<td>0.09</td>
<td>0.03</td>
<td>0.22</td>
<td>(0.02, 0.15)</td>
<td>2.68</td>
<td>.008*</td>
</tr>
<tr>
<td>Depression</td>
<td>0.25</td>
<td>0.05</td>
<td>0.40</td>
<td>(0.15, 0.34)</td>
<td>4.96</td>
<td>.000**</td>
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<td>Constant</td>
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<td>-0.29</td>
<td>(-5.60, 4.15)</td>
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<td>Sex</td>
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<td>(-1.01, 0.66)</td>
<td>-0.42</td>
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<tr>
<td>Age</td>
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<td>0.20</td>
<td>(0.02, 0.14)</td>
<td>2.48</td>
<td>.015*</td>
</tr>
<tr>
<td>Depression</td>
<td>0.20</td>
<td>0.05</td>
<td>0.33</td>
<td>(0.10, 0.31)</td>
<td>3.76</td>
<td>.000**</td>
</tr>
<tr>
<td>INQ-PB</td>
<td>0.05</td>
<td>0.03</td>
<td>0.16</td>
<td>(0.00, 0.11)</td>
<td>1.82</td>
<td>.071</td>
</tr>
</tbody>
</table>

Notes: * p < 0.05 level (2-tailed) ** p < 0.01 level (2-tailed). $R^2 = .219, F(3,120) = 11.24, p < .000$ (Block 1); $\Delta R^2 = .021, \Delta F(1,119) = 3.32, p = .071$ (Block 2). Depression = Depression symptom severity from the Geriatric Depression Scale (GDS); INQ-PB = INQ-Perceived Burdensomeness subscale
Contrary to expectations based on the IPTS’s first hypothesis, perceived burdensomeness was not significantly associated with death ideation after controlling for age, sex and depression symptom severity (Table 4.4). In addition, perceived burdensomeness did not account for significant variance beyond the covariates age, sex, and depression symptom severity.

In summary, results from the linear regression analyses reveal that thwarted belongingness, but not perceived burdensomeness, is independently associated with death ideation, after controlling for age, sex and depression symptom severity. These findings partially support the IPTS’s first hypothesis by suggesting that only thwarted belongingness contributes to death ideation. The results of regression analyses also suggest that the combination of age, sex and depression symptom severity may be more important predictors of death ideation than either perceived burdensomeness or thwarted belongingness alone. However, the combination of perceived burdensomeness and thwarted belongingness may also contribute significantly to death ideation beyond covariates, and this hypothesis is tested next.

In the next analysis, the IPTS’s prediction that each of the interpersonal constructs is separately associated with death ideation was extended. For this analysis I hypothesized that the combination of perceived burdensomeness and thwarted belongingness would also be significantly associated with death ideation. To test this, death ideation (GSIS-DI) was regressed on perceived burdensomeness, thwarted belongingness, and the covariates age, sex, and depression symptom severity. The results of this regression analysis are shown in Table 4.5. The main effects of both perceived burdensomeness and thwarted belongingness on death ideation were non-significant, after
controlling for covariates. However, the two-way interaction of perceived burdensomeness and thwarted belongingness was significantly positively associated with death ideation, even after controlling for covariates. The positive coefficient of the interaction term can be interpreted to mean that at a higher intensity of perceived burdensomeness there is a greater (more positive) effect of thwarted belongingness on death ideation. The regression model with the two-way interaction term accounted for significant variance in death ideation ($\Delta F_{(2,115)} = 4.37, p = .039$), with the interaction term explaining an additional 6.2% of variance beyond the covariates. These findings suggest that the interaction of perceived burdensomeness and thwarted belongingness contributes to death ideation above and beyond age, sex, depression symptom severity, and the main effects of perceived burdensomeness and thwarted belongingness. In this analysis, the absence of a significant association between perceived burdensomeness and death ideation, and between thwarted belongingness and death ideation, after controlling for covariates, may have been the result of statistical overlap between perceived burdensomeness and thwarted belongingness, since controlling for one variable would partially remove the effect of the other variable. This also suggests a potential limitation for the theory, which states that these two constructs are distinct and each causally related to death ideation (see Discussion in Chapter 5).
Table 4.5. Linear regression analysis testing the interaction of perceived burdensomeness and thwarted belongingness on death ideation (GSIS-DI).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>SE (B)</th>
<th>β</th>
<th>(95% CI)</th>
<th>t</th>
<th>p</th>
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<tr>
<td>Constant</td>
<td>-0.09</td>
<td>2.46</td>
<td>(-4.97, 4.78)</td>
<td>-0.04</td>
<td>.970</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>-0.21</td>
<td>0.43</td>
<td>(-1.05, 0.63)</td>
<td>-0.50</td>
<td>.616</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.09</td>
<td>0.03</td>
<td>0.22</td>
<td>(0.02, 0.15)</td>
<td>2.68</td>
<td>.008**</td>
</tr>
<tr>
<td>Depression</td>
<td>0.25</td>
<td>0.05</td>
<td>0.40</td>
<td>(0.15, 0.34)</td>
<td>4.96</td>
<td>.000**</td>
</tr>
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</tr>
<tr>
<td>Constant</td>
<td>-1.03</td>
<td>2.46</td>
<td>(-5.90, 3.84)</td>
<td>-0.42</td>
<td>.676</td>
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<tr>
<td>Sex</td>
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<td>(-0.91, 0.78)</td>
<td>-0.15</td>
<td>.879</td>
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<td>Age</td>
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<td>0.03</td>
<td>0.20</td>
<td>(0.02, 0.14)</td>
<td>2.47</td>
<td>.015*</td>
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<tr>
<td>Depression</td>
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<td>0.06</td>
<td>0.27</td>
<td>(0.05, 0.28)</td>
<td>2.74</td>
<td>.007**</td>
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<tr>
<td>INQ-PB</td>
<td>0.02</td>
<td>0.04</td>
<td>0.05</td>
<td>(-0.06, 0.09)</td>
<td>0.45</td>
<td>.651</td>
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<tr>
<td>INQ-TB</td>
<td>0.06</td>
<td>0.04</td>
<td>0.19</td>
<td>(-0.02, 0.14)</td>
<td>1.46</td>
<td>.147</td>
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<td>Constant</td>
<td>2.62</td>
<td>2.99</td>
<td>(-3.30, 8.54)</td>
<td>0.88</td>
<td>.383</td>
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<tr>
<td>Sex</td>
<td>-0.17</td>
<td>0.42</td>
<td>-0.03</td>
<td>(-1.01, 0.66)</td>
<td>-0.41</td>
<td>.682</td>
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<tr>
<td>Age</td>
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<td>0.03</td>
<td>0.20</td>
<td>(0.02, 0.14)</td>
<td>2.51</td>
<td>.013*</td>
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<tr>
<td>Depression</td>
<td>0.13</td>
<td>0.06</td>
<td>0.21</td>
<td>(-0.01, 0.25)</td>
<td>2.11</td>
<td>.037*</td>
</tr>
<tr>
<td>INQ-PB</td>
<td>-0.14</td>
<td>0.08</td>
<td>-0.44</td>
<td>(-0.30, 0.03)</td>
<td>-1.68</td>
<td>.096</td>
</tr>
<tr>
<td>INQ-TB</td>
<td>-0.12</td>
<td>0.09</td>
<td>-0.37</td>
<td>(-0.30, 0.07)</td>
<td>-1.24</td>
<td>.216</td>
</tr>
<tr>
<td>PB*TB</td>
<td>0.01</td>
<td>0.00</td>
<td>1.03</td>
<td>(0.00, 0.01)</td>
<td>2.09</td>
<td>.039*</td>
</tr>
</tbody>
</table>

Notes: * p < 0.05 level (2-tailed)  ** p < 0.01 level (2-tailed). $R^2 = .219$, $F_{(3,120)} = 11.24, p = .000$ (Block 1); $\Delta R^2 = .035, \Delta F_{(2,118)} = 2.74, p = .068$ (Block 2); $\Delta R^2 = .062, \Delta F_{(2,115)} = 4.37, p = .039$ (Block 3). Depression = Depression symptom severity from the Geriatric Depression Scale (GDS); GSIS-DI = Geriatric Suicide Ideation Scale – Death Ideation subscale; INQ-PB= Interpersonal Needs Questionnaire-Perceived Burdensomeness subscale; INQ-TB = INQ-Thwarted Belongingness subscale; PB*TB = Interaction of perceived burdensomeness and thwarted belongingness

The results in Table 4.5 indicate that the main effects of perceived burdensomeness and thwarted belongingness contribute negatively to death ideation, while the interaction term contributes positively. To clarify the expected effect of the combination of both interpersonal constructs on death ideation, a plot of the interaction between perceived burdensomeness and thwarted belongingness was created and is shown in Figure 7. The plot shows that the positive association between thwarted belongingness and death ideation is moderated by the intensity of perceived
burdensomeness (low, med or high). Specifically, the combination of high thwarted belongingness and high perceived burdensomeness is associated with the highest intensity of death ideation. The moderating effect of perceived burdensomeness on death ideation is a phenomenon not explained in the IPTS.

**Figure 7.** Moderating effect of perceived burdensomeness on the association between thwarted belongingness and death ideation (GSIS-DI).

![Graph showing the moderating effect of perceived burdensomeness on the association between thwarted belongingness and death ideation](image)

Notes: PB = Perceived Burdensomeness; GSIS-DI = Geriatric Suicide Ideation Scale-Death Ideation subscale

4.3 Testing the Association of Perceived Burdensomeness and Thwarted Belongingness on Suicide Ideation (Post-Hoc Analyses)

As shown in Table 4.3, there is a significant bivariate correlation between perceived burdensomeness and suicide ideation ($r = .39, p < 0.01$), and between thwarted belongingness and suicide ideation ($r = .60, p < 0.01$). This suggests that these interpersonal constructs may also be associated with suicide ideation. The IPTS does not specifically theorize an association between perceived burdensomeness, thwarted
belongingness and suicide ideation in its four main hypotheses. However, the framework of the theory would suggest that the interpersonal constructs should be associated with suicide ideation because it is just one step downstream the causal chain leading to suicidal behaviour (Van Orden et al., 2010), as described in Chapter 1. I conducted post-hoc linear regression analyses to examine the associations between perceived burdensomeness and suicide ideation, and between thwarted belongingness and suicide ideation. In these post-hoc analyses I hypothesized that the two interpersonal constructs would be significantly associated with suicide ideation, even after controlling for the potential confounding effects of age, sex and depression symptom severity.

The results of these regression analyses are presented in Table 4.6 and Table 4.7. Thwarted belongingness (Table 4.6) was not associated with suicide ideation, after controlling for age, sex and depression symptom severity, and thwarted belongingness did not account for significant variance in suicide ideation above the covariates, as it did for death ideation. However, perceived burdensomeness (Table 4.7) was significantly positively associated with suicide ideation after controlling for age, sex and depression symptom severity. The regression model with perceived burdensomeness, sex, age and depression symptom severity accounted for significant variance in suicide ideation \( (\Delta F_{(1,119)} = 5.25, p = .024) \), and perceived burdensomeness by itself contributed an additional 3.0% to the variance in suicide ideation beyond covariates. Consistent with my hypothesis, these results suggest that perceived burdensomeness is significantly positively associated with suicide ideation.
Table 4.6. Linear regression analyses testing the association of thwarted belongingness on suicide ideation (GSIS-SI).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>SE (B)</th>
<th>β</th>
<th>(95% CI)</th>
<th>t</th>
<th>p</th>
</tr>
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<td></td>
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<tr>
<td>Constant</td>
<td>8.00</td>
<td>3.05</td>
<td></td>
<td>(1.96, 14.03)</td>
<td>2.62</td>
<td>.010</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.47</td>
<td>0.53</td>
<td>-0.07</td>
<td>(-1.51, 0.57)</td>
<td>-0.89</td>
<td>.376</td>
</tr>
<tr>
<td>Age</td>
<td>0.04</td>
<td>0.04</td>
<td>0.09</td>
<td>(-0.04, 0.12)</td>
<td>1.10</td>
<td>.274</td>
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<tr>
<td>Depression</td>
<td>0.40</td>
<td>0.06</td>
<td>0.51</td>
<td>(-0.28, 0.52)</td>
<td>6.57</td>
<td>.000**</td>
</tr>
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<tr>
<td>Constant</td>
<td>7.69</td>
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<td></td>
<td>(1.57, 13.82)</td>
<td>2.49</td>
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</tr>
<tr>
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<td>-0.77</td>
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<td>.300</td>
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<tr>
<td>Depression</td>
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<td>0.08</td>
<td>0.48</td>
<td>(0.23, 0.53)</td>
<td>4.95</td>
<td>.000**</td>
</tr>
<tr>
<td>INQ-TB</td>
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<td>0.06</td>
<td>(-0.05, 0.10)</td>
<td>0.63</td>
<td>.529</td>
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</table>

Notes: * p < 0.05 level (2-tailed) ** p < 0.01 level (2-tailed). $R^2 = .280$, $F_{(3,120)} = 15.56, p < .000$ (Block 1); $\Delta R^2 = .002, F_{(1,119)} = 0.39, p = .529$ (Block 2). GSIS-SI = Geriatric Suicide Ideation Scale-Suicide Ideation subscale; Depression = Depression symptom severity from the Geriatric Depression Scale (GDS); INQ-TB = Interpersonal Needs Questionnaire-Thwarted Belongingness subscale

Table 4.7. Linear regression analyses testing the association of perceived burdensomeness on suicide ideation (GSIS-SI).

<table>
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<th>Predictors</th>
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<th>SE (B)</th>
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</tr>
<tr>
<td>Constant</td>
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<td>3.05</td>
<td></td>
<td>(1.96, 14.03)</td>
<td>2.62</td>
<td>.010</td>
</tr>
<tr>
<td>Sex</td>
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<td>0.53</td>
<td>-0.07</td>
<td>(-1.51, 0.57)</td>
<td>-0.89</td>
<td>.376</td>
</tr>
<tr>
<td>Age</td>
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<td>0.04</td>
<td>0.09</td>
<td>(-0.04, 0.12)</td>
<td>1.10</td>
<td>.274</td>
</tr>
<tr>
<td>Depression</td>
<td>0.40</td>
<td>0.06</td>
<td>0.51</td>
<td>(-0.28, 0.52)</td>
<td>6.57</td>
<td>.000**</td>
</tr>
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<tr>
<td>Constant</td>
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<td>(1.03, 13.01)</td>
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<td>(-1.44, 0.61)</td>
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<td>0.43</td>
<td>(0.21, 0.47)</td>
<td>5.07</td>
<td>.000**</td>
</tr>
<tr>
<td>INQ-PB</td>
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<td>0.03</td>
<td>0.20</td>
<td>(0.01, 0.15)</td>
<td>2.29</td>
<td>.024*</td>
</tr>
</tbody>
</table>

Notes: * p < 0.05 level (2-tailed) ** p < 0.01 level (2-tailed). $R^2 = .280$, $F_{(3,120)} = 15.56, p < .000$ (Block 1); $\Delta R^2 = .030, F_{(1,119)} = 5.25, p = .024$ (Block 2). GSIS-SI = Geriatric Suicide Ideation Scale-Suicide Ideation subscale; Depression = Depression symptom severity from the Geriatric Depression Scale (GDS); INQ-PB = Interpersonal Needs Questionnaire-Perceived Burdensomeness subscale

In summary, the result from the linear regression analyses reveal that perceived burdensomeness, but not thwarted belongingness, is associated with suicide ideation – the
reverse of the results with respect to death ideation. Taken together, these findings suggest a differential association between perceived burdensomeness and suicide ideation, and between thwarted belongingness and death ideation, that is not theorized in the IPTS. Overall, results show partial support for the first hypothesis of the IPTS by suggesting that thwarted belongingness is significantly associated with death ideation, even after controlling for covariates. However, there was no support for the theory’s prediction regarding an association between perceived burdensomeness and death ideation. In addition, the finding that perceived burdensomeness is associated with suicide ideation, but not with death ideation, conflicts with the IPTS’s first hypothesis.

4.4 Testing the Combined Association of Perceived Burdensomeness, Thwarted Belongingness, and Social Hopelessness on Suicide Ideation (IPTS Hypothesis 2)

According to the IPTS, the presence of thwarted belongingness, perceived burdensomeness and hopelessness about these states is associated with suicide ideation (Van Orden et al., 2010). The IPTS specifically states that hopelessness with respect to both perceived burdensomeness and thwarted belongingness will bring about suicide ideation. The results of a bivariate correlation analysis show that social hopelessness is significantly positively correlated with perceived burdensomeness \((r = 0.32, p < .01)\), and also with thwarted belongingness \((r = 0.55, p < .01)\). In addition, social hopelessness was significantly positively correlated with suicide ideation \((r = 0.22, p < 0.01)\), but not with death ideation \((r = 0.10, p > .05)\). These results suggest that a higher intensity of social hopelessness is associated with higher intensities of perceived burdensomeness, thwarted belongingness, and suicide ideation.
I next tested the hypothesis that thwarted belongingness, perceived burdensomeness and social hopelessness would be associated with suicide ideation (GSIS-SI) using a linear regression analysis. The results of this analysis are presented in Table 4.8. Contrary to my hypothesis, the results indicate that neither thwarted belongingness nor social hopelessness was significantly associated with suicide ideation after controlling for age, sex, depression symptom severity, and the other interpersonal factors. However, perceived burdensomeness was significantly positively associated with suicide ideation, even after controlling for age, sex, depression symptom severity, thwarted belongingness and social hopelessness. The latter finding seems to confirm our results from Table 4.6 in showing a significant association between perceived burdensomeness and suicide ideation after controlling for covariates. Unexpectedly, the regression model with perceived burdensomeness, thwarted belongingness and social hopelessness did not account for significant variance in suicide ideation beyond covariates. This suggests that the combination of these interpersonal constructs does not contribute significantly to suicide ideation, as the IPTS contends. I was not able to test the three-way interaction of perceived burdensomeness, thwarted belongingness and social hopelessness due to limitations in the sample size. Overall, our results failed to find support for the IPTS’s second hypothesis.
Table 4.8. Linear regression analysis testing the associations of perceived burdensomeness, thwarted belongingness and social hopelessness on suicide ideation (GSIS-SI).

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>SE (B)</th>
<th>β</th>
<th>(95% CI)</th>
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<th>p</th>
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<tr>
<td>Constant</td>
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<td>3.05</td>
<td>(1.96, 14.03)</td>
<td>2.62</td>
<td>.010</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
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<td>0.53</td>
<td>-0.07</td>
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<td>(0.28, 0.52)</td>
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<td>.000**</td>
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<tr>
<td>Constant</td>
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<td>(0.80, 14.03)</td>
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<td>(-1.56, 0.53)</td>
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<td>(-0.05, 0.05)</td>
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Notes: * p < 0.05 level (2-tailed)  ** p < 0.01 level (2-tailed). $R^2 = .280, F_{(3,120)}=15.56, p = .000$ (Block 1); $\Delta R^2 = .037, \Delta F_{(3,117)}=2.14, p = .099$ (Block 2). GSIS-SI = Geriatric Suicide Ideation Scale-Suicide Ideation subscale; Depression = Depression symptom severity from the Geriatric Depression Scale (GDS); INQ-PB = INQ-Perceived Burdensomeness subscale; INQ-TB = INQ-Thwarted Belongingness subscale; Social Hopelessness = Social Hopelessness Questionnaire.
Chapter 5

Discussion and Conclusion

In this thesis a pair of hypotheses of the Interpersonal Theory of Suicidal Behavior (IPTS: Joiner, 2005; Van Orden et al., 2010) was tested using a community-based sample of older adults. I employed multiple linear regression analyses to examine theory-based associations among the constructs of perceived burdensomeness, thwarted belongingness, social hopelessness, death ideation and suicide ideation. Findings provide limited support for the theory. Some key results are that thwarted belongingness is associated with death ideation after controlling for age, sex, and depression symptom severity, while perceived burdensomeness is associated with suicide ideation after controlling for these covariates. However, there was no association between perceived burdensomeness and death ideation when controlling for covariates. Overall, the first hypothesis of the IPTS was only partially supported, and the IPTS’ second hypothesis was largely unsupported. The results discussed below add significant depth to a currently sparse literature on the utility and validity of the IPTS among community-residing older adults, and raises some concerns with the IPTS that have not been addressed by other authors.

5.1 Tests of the IPTS’s Main Hypotheses

5.5.1. Associations Between Perceived Burdensomeness, Thwarted Belongingness and Death Ideation

The IPTS proposes that perceived burdensomeness and thwarted belongingness are each associated with death ideation. Although some of the findings in this thesis are
consistent with this hypothesis, results suggest that it is not supported in this sample of community-residing older adults. First, perceived burdensomeness was not significantly associated with death ideation after controlling for age, sex and depression symptom severity. Other studies that have shown significant associations between perceived burdensomeness and both suicide ideation and death ideation have also controlled for age, sex, and depression symptoms (e.g., Cukrowicz, Cheavens, Van Orden, Ragain & Cook, 2011; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013; Jahn & Cukrowicz, 2011). The results of this thesis instead suggest that perceived burdensomeness is associated with suicide ideation, but not with death ideation, after controlling for key covariates. Although the latter finding is not consistent with the predictions of the IPTS, the theory does not explicitly exclude the possibility that perceived burdensomeness may lead to suicide ideation in the absence of thwarted belongingness. The IPTS could be clearer regarding the expected associations between perceived burdensomeness and suicide ideation, and between thwarted belongingness and suicide ideation.

A second finding in this thesis that failed to support the IPTS is that although thwarted belongingness was significantly associated with death ideation after controlling for age, sex and depression symptom severity, this effect disappeared when controlling for perceived burdensomeness. Thwarted belongingness was not investigated in most studies of older adults included in the literature review, but this finding is consistent with those of Cukrowicz et al. (2013) who showed that thwarted belongingness is not significantly associated with death ideation among older adults after controlling for perceived burdensomeness. Still, both the present study and Cukrowicz et al. (2013)
showed significant bivariate correlations between thwarted belongingness and death ideation, suggesting that thwarted feelings of belonging tends to co-vary with death ideation among generally healthy, community-residing older adults. The literature would benefit from another study testing the IPTS’s hypothesis regarding the association between thwarted belonging and death ideation using a larger sample of older adults than in this study, and also controlling for the interaction of perceived burdensomeness/thwarted belongingness. In addition, future studies will need to be more open to including both perceived burdensomeness and thwarted belongingness in their analyses.

Our results from linear regression analyses suggest that perceived burdensomeness and thwarted belongingness are associated differently with death ideation and suicide ideation. In our sample of older adults, thwarted belongingness was significantly associated with death ideation, but perceived burdensomeness was not. Past studies of testing the IPTS among older adults would suggest the reverse to be the case, i.e. that perceived burdensomeness is associated with death ideation (Christensen et al., 2013; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013; Van Orden, Cukrowicz, Witte, & Joiner, 2012; Van Orden, Witte, James et al., 2008). A number of factors may account for this discrepancy, including methodological differences and sample characteristics. On the other hand, our results are consistent with this literature in showing that perceived burdensomeness is associated with suicide ideation. Thus, our results suggest that perceived burdensomeness and thwarted belongingness have unique associations with each outcome. Although the IPTS posits that only complete perceived burdensomeness or complete thwarted belongingness will cause death ideation, it leaves
open the possibility of testing the theory by examining the intensity of the constructs that will bring about death ideation. The literature testing the IPTS is not yet clear about whether it is the presence/absence, or instead, the severity, of the interpersonal constructs that mark this transition, but our findings challenge the concept of a continuum from death ideation to suicide ideation. Whereas the IPTS states that both perceived burdensomeness and thwarted belongingness (as well as hopelessness) are required for suicide ideation, our results from independent regression analyses show that only perceived burdensomeness, but not thwarted belongingness, was associated with suicide ideation. These findings are not currently addressed in the IPTS, suggesting a potential need for revision of the theory.

The finding in this thesis of a significant two-way interaction between perceived burdensomeness and thwarted belongingness on death ideation, even after controlling for age, sex and depression symptom severity, is consistent with some (e.g., Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013) studies of older adults, although others have failed to find a significant interaction effect (e.g., Christensen, Batterham, Soubelet, & Mackinnon, 2013). Specifically, it is shown in this study that the combination of high levels of perceived burdensomeness and high levels of thwarted belongingness is associated with higher intensity death ideation. Authors have often not interpreted this finding. An alternative method of assessing the prediction that the presence of both interpersonal factors confers a risk for thoughts of suicide was presented in Christensen, Batterham, Mackinnon, Donker, & Soubelet (2014). These authors showed that the presence of both high perceived burdensomeness and high thwarted belongingness accounts for a much greater percentage of individuals who experience suicide ideation.
than does a high score on only one of the constructs, suggesting that the presence of both constructs is associated with suicide ideation. However, no other studies seem to have examined the association between the two-way interaction of perceived burdensomeness and thwarted belongingness on death ideation to provide a deeper understanding of these relationships. Taken together with existing studies, findings in this thesis suggest that perceived burdensomeness and thwarted belongingness may interact to promote thoughts of suicide, whether death ideation, suicide ideation, or perhaps both.

A challenge in analyzing and interpreting associations between the presence of both interpersonal constructs and thoughts of suicide is that the theory proposed in Van Orden et al. (2010) is not explicitly clear about the expected outcome, whether they should lead to death ideation or suicide ideation, when hopelessness is not present. One might assume that the combination of perceived burdensomeness and thwarted belongingness confers greater risk for death ideation than either construct alone. However, a review of the literature would suggest that the combination is associated with suicide ideation, while death ideation has rarely been tested. Results in this thesis support the latter in showing that high levels of perceived burdensomeness and high levels of thwarted belongingness are associated with death ideation. This association indicates that individuals could also potentially experience simultaneously low intensity perceived burdensomeness and low intensity thwarted belongingness, which might indicate that one factor has a protective effect against the other. For example, perceived burdensomeness is not likely to occur if one has a strong sense of belonging. These points have yet to be elaborated on by the IPTS.
A potential explanation for the discrepancy in some findings between the present thesis and other studies may be that participants were recruited from community settings rather than clinical centers, which may affect the extent to which individuals endorse feelings of burdening others, perceptions of not belonging, and symptoms of depression. Perceptions of burdening others may be more common among older adults recruited from a clinical context (i.e. from primary care clinics, clinical registries, or other health-related centres where individuals self-identify as having a medical condition and seek medical care) because these individuals are more likely to require medical care. Participants were recruited from clinical centres in the majority of studies on older adults included in the literature review (Cukrowicz, Cheavens, Van Orden, Ragain, & Cook, 2011; Cukrowicz, Duberstein, Vannoy, Lynch, McQuoid, Steffens, 2009; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013; Jahn & Cukrowicz, 2011; Jahn, Cukrowicz, Linton, Prabhu, 2011; Jahn, Van Orden, & Cukrowicz, 2013). This pattern of research publications may suggest that perceived burdensomeness has been found to be associated with suicide ideation among medical help-seeking older adults (Cahill, Lewis, Barg & Bogner, 2009; Hamon & Bliezner, 1990), but leaves open the question of whether perceived burden also poses a risk among community-residing older adults. This thesis showed that perceived burdensomeness is associated with suicide ideation, even after controlling for age, sex and depression symptoms, and is correlated with death ideation, in community-residing older adults.

Another possible explanation for the differences in findings between this thesis and other studies is suggested by the numerous versions of the Interpersonal Needs Questionnaire (INQ) that have been employed across studies to measure perceived
burdensomeness and thwarted belongingness. The INQ has been used in four variations - 12, 15, 18 and 25-item measures – but it is not yet clear which measure should be used when assessing community-residing older adults. These versions of the INQ contain subsets of the items on the original, full version, which contains 25-items. To the author’s knowledge, this is the first study to use 25-item of the INQ among community-residing older adults, and it is shown that the 25-item INQ has good internal consistency and significant validity. Past studies have often used the 15-item version, which has been validated among older adults in past studies. Altering the number of items on the INQ could affect the results and interpretation of analyses because measures of psychometric properties depend on the number of items. The greater number of items in the 25-item version may capture individual differences in the constructs to a greater extent, potentially yielding greater validity in this measure compared to others.

A concern across all versions of the INQ is the collinearity between the subscales. Conceptual overlap and statistical association between perceived burdensomeness and thwarted belongingness could call into question their roles as separate risk factors for thoughts of suicide. Although results in this thesis suggest that perceived burdensomeness and thwarted belongingness are distinct constructs that associate differently with death ideation and suicide ideation, their relatively high bivariate correlation could have implications for the results of regression analyses when both are included into models. Still, other studies have found more moderate bivariate correlations between perceived burdensomeness and thwarted belongingness (e.g., Van Orden, Witte, Gordon, Bender, & Joiner, 2008), and the authors of the IPTS conceptualize them as separate constructs. Interestingly, this thesis showed that perceived burdensomeness and thwarted
belongingness are each associated with thoughts of suicide when assessed separately, but when both constructs are added into a regression model the effect of either construct is eliminated. Our results suggest that despite the apparent validity of the INQ, the two subscales may in some cases need to be used separately in order to avoid issues of collinearity. Future research may also consider combining the two subscales into a broader construct in order to capture both perceptions of being a burden and of not belonging, while avoiding statistical overlap in the constructs of the INQ. Finally, the literature testing the IPTS would benefit if consensus were reached on the best version of this INQ to use among particular demographic groups, or perhaps determining the overall best version of the INQ, as this would make results more comparable across studies.

5.5.2. The Role of Hopelessness in Suicide Ideation

According to the IPTS, suicide ideation occurs when perceived burdensomeness and thwarted belongingness are accompanied by a sense of hopelessness about these states. Although we were not able to test this using a three-way interaction, as others have done (e.g., Christiansen, Batterham, Soubelet, & Mackinnon, 2013), our findings indicate that the combination of these constructs does not account for significant variance in suicide ideation beyond age, sex and depression symptom severity. In addition, social hopelessness was not significantly associated with suicide ideation after controlling for covariates. These findings did not support the predictions the IPTS, and are unexpected given that other literature suggests hopelessness is a key interpersonal predictor of suicide ideation (Beck, Brown, Berchick, Stewart, & Steer, 1990; Christiansen, Batterham, Soubelet, & Mackinnon, 2013; Dryer & Kreitman, 1984). This discrepancy in results between our study and other studies could be the result of the different measures used to
assess hopelessness. To the author’s knowledge, this is the first study to test the role of social hopelessness, rather than general hopelessness, against the predictions of the IPTS. However, other results in this thesis show that social hopelessness is significantly positively correlated with both death ideation and suicide ideation, and also with perceived burdensomeness and thwarted belongingness, as would be expected from the theory’s predictions, and from other studies. Overall, findings in this thesis suggest a potential limitation in the IPTS’s second hypothesis in explaining suicide ideation in terms of one domain of general hopelessness – social hopelessness - that is particularly relevant for a theory of suicide focused on interpersonal factors.

5.2 Strengths of this Thesis

This thesis addresses a present gap in the literature investigating suicide-related thoughts among older adults from the perspective of the IPTS. The combination of several elements of this study, both conceptual and methodological, make it a unique contribution to the literature: the use of a community-based sample of older adults, tests of the IPTS’s specific hypotheses as outlined explicitly in the theory (Van Orden et al., 2010), use of the full 25-item version of the INQ, as well as other validated measures of death ideation and suicide ideation, and the separation of death ideation and suicide ideation as outcomes, whereas most research has instead focused primarily on suicide ideation. Many of the results of this study have not been shown in past work testing the IPTS. Our findings call for future studies addressing particular questions and hypotheses that have been outlined throughout this chapter.
There are several strengths to using community-based samples over clinical or other kinds of samples. Community-based samples can be used to engage individuals within a particular social context, and to identify risk and resiliency factors that affect individuals in everyday life (Leung, Yen, & Minkler, 2004). In addition, community-based sampling can be broad enough to draw inferences that may generalize beyond specific groups. Clinical samples, by contrast, may be more representative of individuals who seek medical or psychiatric help and who have clinical conditions. Alternatively, population-based samples are the most representative of large, heterogeneous groups, but may consequently dilute the effects of key factors associated with suicide ideation and behaviour. A potential solution to avoid diluting a population-based sample is stratification by variables of interest (Christensen, Batterham, Soubelat, & Mackinnon, 2013); however, outcomes that are inherently rare may be lost from stratified groups. Clinical samples may both be useful for informing clinical practice, while community and population-based samples may better inform public health prevention and intervention strategies. Both population and community-based samples are suitable for addressing broad epidemiologic questions about suicide thoughts and behaviours for which clinical samples would not suffice. The current peer-reviewed literature on the IPTS is largely lacking in research on community-dwelling older adults, yet these samples are ideal for examining the role of interpersonal factors in developing suicide thoughts and behaviours. This thesis partially addresses a need for such work.

By directly testing the IPTS’s hypotheses using validated measures, this thesis has conducted a more rigorous analysis of the theory than past studies of older adults, and has identified potential gaps in the IPTS’s validity among older adults. Our results suggest
that perceived burdensomeness and thwarted belongingness may not be robust risk factors for suicide-related thoughts as hypothesized by the theory. The IPTS does not currently account for differences in the associations between perceived burdensomeness, thwarted belongingness, death ideation and suicide ideation, nor for the effect of varying degrees of intensity in the interpersonal factors on thoughts of suicide. Instead, each construct is given equal weight as a risk factor for suicide-related thoughts. As outlined in Van Orden et al. (2010), and as we have shown, the IPTS may be falsified if either perceived burdensomeness or thwarted belongingness is not associated with death ideation. However, the results of this thesis are not entirely consistent with this conceptualization, because the interpersonal constructs are also associated with suicide ideation. Finally, this thesis suggests that the IPTS may not be sensitive enough to fully explain the impact of variations in these constructs on death ideation and suicide ideation.

5.3 Potential Limitations of this Thesis

There are several limitations to this thesis. The generalizability of results is potentially limited by the demographic characteristics of the participants. Although this study’s community-based sample was fairly heterogeneous, it consisted primarily of Caucasian women, many of whom were married and well educated. Similar participant demographic characteristics were reported in other studies testing the IPTS using older adults (e.g., Cukrowicz, Cheavens, Van Orden, Ragin, & Cook, 2011; De Leo et al., 2002; Untitzer et al., 2006), suggesting the need to recruit more men to test the theory. A barrier to recruiting a representative sample may be that older women are more likely to participate in studies than men (Heisel, Duberstein, Conner, Franus, Beckman, & Conwell, 2006), and may be more likely to report symptoms of suicide-related thoughts.
and behaviours than older men (Allen-Burge, Storandt, Kinscherf, & Rubin, 1994). Older adults may not report symptoms of suicide ideation to their mental health providers, even when they experience it (Heisel, 2006). The need to include more male participants in future research that tests the IPTS is also highlighted by some research reporting sex differences in suicide-related thoughts and behaviours (Christensen, Batterham, Soubellet, & Mackinnon, 2013), although other studies have failed to find sex-related differences in suicide ideation among older adults (e.g., Cukrowicz, Cheavens, Van Orden, Ragain, & Cook, 2011; Zhang, Lester, Zhao, & Zhou, 2013). In addition to the demographic characteristics, the participants examined in this thesis were relatively cognitively and physically healthy. Thus, our results may not generalize to older individuals who are most at-risk due to a physical or mental disorder. Conducting studies using more diverse samples, including participants with a variety of ethnic or cultural backgrounds, will help to engage a greater range of participants and will help to validate the IPTS among other populations.

Most tests of the IPTS are based on cross-sectional data, precluding the possibility of drawing causal conclusions. Although several longitudinal studies of older adults have examined associations between interpersonal constructs and suicide-related behaviours (e.g., Akechi, Okuyama, Sugawara, Nakano, Shima, & Uchitomi, 2004; De Leo et al., 2002; Eng, Rimm, Fitzmaurice, & Kawachi, 2002; Oquendo et al., 2007; Van Orden, Bamonti, King, & Duberstein, 2012; Van Orden, Wiktorsson, Duberstein, Berg, Fassberg, & Waern, 2014), these studies did not test the theory-driven hypotheses outlined in Van Orden et al. (2010). Adopting a longitudinal design when testing the IPTS would help in determining whether the theory's interpersonal constructs predict
suicide-related behaviours, (Van Orden et al., 2010). However, a challenge to constructing a longitudinal study is the recruitment of a large enough sample to test each of the theory’s hypotheses, and to overcome the relative rarity of suicidal behaviours, which are the primary concern of this theory. Population studies are more likely to capture these events, but must still overcome the additional challenge of measuring the interpersonal constructs using validated scales, and of feasibility. These remain challenges to be addressed.

This thesis also revealed two potential limitations in the literature testing the IPTS. First, several versions of the INQ have been developed and used across studies since the theory’s inception in 2005 (Hill, Rey, Marin, Sharp, Green, & Pettit, 2014). The variation in measures across study not only makes comparisons of results and generalization difficult, but may also indicate a chronic problem regarding conceptual overlap in the interpersonal constructs. Although these various INQ measures have been validated in diverse populations, the lack of consistency in the items within subscales that arises from changes in the length of the measure calls into question the definition and scope of each subscale. In the present study, the internal consistency (measured by Cronbach’s alpha) of the two subscales is high, suggesting the 25-item version of the INQ is suitable for use among community-residing older adults. Second, there are methodological challenges in testing the IPTS because perceived burdensomeness and thwarted belongingness are, to some extent, conceptually and empirically related. The potential for collinearity between these constructs could call into question their inclusion as distinct predictor variables in regression analyses, yet this approach is necessitated by
the hypotheses of the theory. Future studies may need to refine the theory’s constructs and their associations in order to improve the validity of the theory.

One of the most important shortcomings of extant literature on the IPTS is the relative paucity of studies examining lethal and near-lethal suicidal behaviours, despite this being the focus of the theory. Suicide plans and attempts have most frequently been investigated among younger adults recruited from universities, but these outcomes are largely untested among older adults. A barrier to research on suicide plans, attempts and deaths is the low-base rate of these behaviours, which necessitates the use of larger sample sizes than are possible from most community-based studies. To my knowledge, there is only one population-based study that has a sufficient sample size to test the IPTS’s hypothesis regarding suicidal behaviours among middle-age adults in their 40s and 50s, but not in their 60s or older (Christensen, Batterham, Soubelet, & Mackinnon, 2013). These authors found that the interpersonal constructs were generally not significantly associated with suicide plans and attempts, except for a significant negative association between the two-way interaction of perceived burdensomeness/hopelessness and suicide plans and attempts. However, the large proportion of women in their sample of older adults may challenge the generalizability of theses findings. In addition, this study used population survey data rather than validated scales to measures interpersonal variables and thoughts of suicide. In this thesis it was not possible to examine recent suicide attempts, or current suicide plans as these data were not collected, and the sample was likely too small to have a sufficient number of cases of suicidal behaviours. Future studies should examine the effects of past suicide attempts, as well as the effects of
perceived burdensomeness and thwarted belongingness, on current suicidal behaviours among community-residing older adults.

Finally, our findings should be considered with respect to ethnic and cultural differences in perceptions of being a burden on others and of not belonging (Cahill, Lewis, Barg, & Bogner, 2009; O'Riley, Van Orden, He, Richardson, Podgorski, & Conwell, 2014). Several studies testing the IPTS’s hypotheses within particular cultural or ethnic groups suggested that the interpersonal constructs have cultural dimensions, or are culture-bound (O’Keefe, Wingate, Tucker, Rhoades-Kerswill, Slish, & Davidson, 2014; Zaroff, Wong, & Van Schalkwyk, 2014). One cultural dimension, the individualist-collectivist nature of cultures, may influence individuals’ perceptions of being a burden on family members, particularly when these individuals require care as a result of illness. Individuals raised in collectivist cultures may be less susceptible to feelings of burdening others, compared to individualist cultures, since caretaking is engrained within normal cultural practices and is expected of family members. For example, research suggests that feelings of burdening family members are high among older, primarily Caucasian adults, especially when the burden is attributed to younger-generation family members such as children and grandchildren (Jahn & Cukrowicz, 2011; Jahn, Van Orden, & Cukrowicz, 2013). To my knowledge, very few studies have tested the IPTS among various ethnic and cultural groups of older adults, and most of these studies include heterogeneous samples of younger and older adults, necessitating more research in this area.
5.4 Implications of this Thesis

Interventions aimed at reducing the likelihood of suicide can benefit from knowledge of interpersonal factors associated with suicide thoughts. Interventions and prevention strategies for suicide may also be informed by theories that can guide empirical tests to determine how those factors interact to place older adults at risk (Conwell, Van Orden, & Caine, 2011). The findings in this thesis, which resulted from theory-driven tests of the IPTS among older adults, make way for future studies aiming to test interventions. Particularly revealing are the results indicating a significant association between perceived burdensomeness and suicide ideation, between thwarted belongingness and death ideation, and between the interaction of perceived burdensomeness/thwarted belongingness and death ideation. Together, these findings suggest that interpersonal factors should be investigated in clinical intervention studies, for example, through their effect on promoting social interconnectedness and feelings of belonging among older adults (Conwell, 2014). Our results also point to the need for concurrently addressing clinical factors associated with suicide thoughts, in particular, depression, as this was consistently associated with both suicide ideation and death ideation across our analyses.

An interpersonal form of therapy that addresses not only social deficits, but also clinical factors such as symptoms of depression and suicide thoughts, may work well to reduce the risk of suicide among older adults. One such therapy, termed Interpersonal Psychotherapy (IPT), was recently adapted for use among older adults at risk for suicide (Heisel, Duberstein, Talbot, King, & Tu, 2009). IPT was shown to be effective at reducing suicide ideation, death ideation and depressive symptom severity, while also
improving psychological well-being variables, in a sample of seventeen adults, 60 years and older, who were recruited from inpatient and outpatient medicine and mental health centers (Heisel, Talbot, King, Tu, & Duberstein, 2015). Future trials using interpersonal interventions such as the IPT might also examine whether this form of therapy results in reductions in perceived burdensomeness, thwarted belongingness, and perhaps also the acquired capability for suicide among at-risk older adults.

Finally, the finding that social hopelessness is positively correlated with suicide ideation and death ideation may be of some use in clinical practice, as it suggests that high social hopelessness might be indicative of suicide thoughts, warranting further clinical investigation. General hopelessness may still be a viable factor to target in interpersonal interventions, as some authors have found associations with thoughts of suicide (Cornette et al., 2009; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Taken together with this, the results in this thesis could be taken to suggest a potential benefit of regularly engaging older adults within the community, and encouraging family interactions, as a way of preventing recurrent feelings of disconnection that may otherwise leave individuals prone to developing thoughts of suicide.

5.5 Conclusion

A great deal is known about risk factors for suicide-related behaviours such as suicide ideation, plans, attempts and deaths. Cross-national comparisons consistently show that age, sex, and having a mental disorder are associated with these behaviours (Nock et. al., 2008), but many other risk factors have also been identified (reviewed in Van Orden et. al., 2010). While the IPTS has focused on three key interpersonal factors
associated with suicide, the majority of these factors have not yet been organized into a testable theoretical framework. A current challenge in the field of Suicidology is the integration of bio-psycho-social risk factors for suicide-related outcomes, but this work is still in its infancy. Two methodological challenges that are ever present in research on suicide are the rarity of the outcomes, and difficulty of analyzing psychological states post-mortem. Despite a theory-rich literature in suicide research, these barriers impede empirical examination of key hypotheses and theories. Future work will need to integrate these factors into a coherent theory to improve our capacity to identify individuals who are at risk, and to develop effective interventions that prevent deaths. With respect to the IPTS, future work should examine in greater depth whether perceived burdensomeness, thwarted belongingness and hopelessness are associated with current suicide plans, attempts and deaths among older adults. In addition, future work should test the other hypotheses of the IPTS that we were not able to test in this thesis, which have received very little attention in the literature on older adults.

To the author’s knowledge, this study is the first to examine both of the interpersonal constructs of the IPTS in a community-based sample of older adults using the specific framework of the theory, including both death ideation and suicide ideation. The findings presented here indicate that thwarted belongingness and perceived burdensomeness are differentially associated with death ideation and suicide ideation, and further, that their interaction is significantly associated with death ideation among older adults. This is also the first study to examine the influence of social hopelessness, rather than general hopelessness, on suicide-related thoughts within the framework of the IPTS. Overall, the results in this thesis provide little support for the IPTS’s hypotheses
among healthy, community-residing older adults, but suggest that the interpersonal factors examined in this thesis may have some implications for suicide prevention and intervention strategies, and could be investigated in clinical intervention studies.
References


Appendix A

<table>
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<tr>
<th>Study</th>
<th>Methods</th>
<th>Statistical Analyses</th>
<th>Main Results</th>
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<tr>
<td>Christensen, Batterham, Soubelet, and Mackinnon (2013)</td>
<td>Design: Population based cohort from the PATH Through Life project in Australia</td>
<td>- Exploratory factor analysis was first used to determine predictors to be used in later linear regression analyses for two main outcomes: suicide ideation, and suicidal plans/attempts. Items were chosen from existing scales that were included in the population surveys.</td>
<td>Results for the subsample of adults 68-72 years old: - The models with suicide ideation as the outcome and belongingness, burdensomeness, hopelessness, and the two-and three-way interactions between these predictors accounted for 24.3% of the variance in the outcome. The main effects of perceived burdensomeness and thwarted belongingness were both significant (estimate=0.108, p&lt;0.001; estimate=0.068, p&lt;0.001, respectively). The interaction of burdensomeness and belongingness was significant (estimate=0.051, p=0.046). The three-way interaction of burden, belonging, and hopelessness was also significant (estimate=0.051, p=0.006).</td>
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<tr>
<td></td>
<td>Participants: 6133 community residing individuals whose ages ranged from 28 years to 72 years with 3 age subcategories (28-32, 48-52, 68-72 with n=1940, n=2139, and n=1906 individuals, respectively), who were sampled from Canberra and Queanbeyan in Australia.</td>
<td>- Another set of linear regression models were constructed based on demographic and mental health predictors (i.e. the ‘epidemiological models’).</td>
<td>Data did not allow for examination of plans/attempts among the oldest subsample.</td>
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<tr>
<td></td>
<td>Main Measures: Ruminative Style Scale; PHQ-9; SSS; Perceived Mastery Scale; GDS; Self-harm; PSF</td>
<td></td>
<td>Results for the individuals who</td>
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</table>
hopelessness should account for additional variance above the other interpersonal constructs.

4. The IPTS model should account for more variance in suicide attempts than models based on mental disorders.

were 48-52 years:
- The models with suicide plans/attempts as the outcome and burdensomeness, belongingness, hopelessness, the two and three-way interactions of these predictors, as well as self-harm, and the interaction of self-harm with ideation, accounted for 55% of the variance in the outcome. Both perceived burdensomeness and thwarted belongingness were non-significant. The interaction of burden and belonging, and the three-way interaction of burden, belonging and hopelessness were also non-significant. However, self-harm (capability) was significant (estimate=.055, p=.002), controlling for the other predictors. In addition, the interaction of suicide ideation and self-harm was also significant (estimate=0.274, p<.001).

-The interpersonal model accounted for 34.1% of the variance in suicide ideation and 31.6% of the variance in suicidal
behaviours based on $R^2$ values. The epidemiologic model for suicide ideation did not significantly differ from the interpersonal model as it accounted for up to 34.8% of the variance, but the epidemiologic model for suicidal behaviours explained significantly less variance (26.2%). Overall, models of suicide based on interpersonal constructs were found to be better than epidemiological models based on mental illnesses and demographic factors.

| Design: Cross-sectional | Participants: Study 1 57 community-residing adults 55 years and older ($M=74.14$, $SD=7.51$) recruited from the Duke University Center for Aging and Human Development | Participants: Study 2 105 individuals 60 years and older ($M=70.89$, $SD=7.63$) recruited Texas Tech |
| Study 1: Regression analysis using Negative Binomial Regression because the data was skewed and had significant overdispersion | Study 2: Same analyses as in Study 1, but two new covariates were added (hopelessness, health) | Study 1: The regression model with just covariates (age, gender, depressive symptoms, loneliness) and suicide ideation as the outcome was significant (likelihood ratio chi-square = 35.02, $df=4$, $p<.001$). When perceived burdensomeness was added as a predictor, the model remained significant, and burdensomeness significantly predicted ideation controlling for covariates (coefficient = 0.11, exponentiated coefficient=$1.11$, |
University Health Sciences Center.

Main Measures:
INQ, GSIS, BHS

- Gender (coefficient = 1.08, \( p=0.004 \)) and loneliness (coefficient = 0.07, \( p=0.042 \)) significantly predicted for suicide ideation in model without perceived burdensomeness. Only gender was a significant predictor in the model with perceived burdensomeness (coefficient = 0.79, \( p=0.042 \)), while loneliness became non-significant (coefficient = 0.05, \( p=0.143 \)).

Study 2:
- The regression model with just covariates (age, gender, depressive symptoms, loneliness, hopelessness, perceptions of physical and emotional health) and suicide ideation as the outcome was significant (likelihood ratio chi-square = 72.06, \( df=6, p <0.001 \)). When perceived burdensomeness was added as a predictor the model remained significant (likelihood ratio chi-square = 76.29, \( df =7, p<0.001 \), with significant effects
Cukrowicz, Jahn, Graham, Poindexter and Williams (2013)

**Main Purpose:**
To test theory-based predictions regarding the development and variability of suicidal behaviours in older adults.

**Hypotheses:**
1. Perceived burdensomeness, thwarted belongingness, depressive symptoms, and hopelessness will each predict death ideation.
2. There will be a three-way interaction between thwarted belongingness, perceived burdensomeness, and hopelessness, where individuals who score higher on each risk factor will greater

<table>
<thead>
<tr>
<th>Design:</th>
<th>Cross-sectional</th>
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<tbody>
<tr>
<td>Participants:</td>
<td>239 individuals 60 years and older (M= 72.4, SD =6.9) recruited from primary care clinics (this sample was used in previous analyses)</td>
</tr>
<tr>
<td>Main Measures:</td>
<td>BHS, CES-D, INQ</td>
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- Zero-inflated negative binomial regression (ZINB) and negative binomial regression

- In the negative binomial regression model with death ideation as the outcome, perceived burdensomeness (estimate=0.03, p=.015) and hopelessness (estimate =0.04, p=.032) were significant predictors, but not depression (estimate=0.01, p=.092) or thwarted belongingness (estimate=0.00, p=.900). A 1-unit increase in perceived burdensomeness was associated with a 3.5% increase in the incidence rate of death ideation, holding hopelessness, depression, and thwarted belongingness constant. A 1-unit increase in hopelessness was associated with a 4.3% increase in death ideation, holding other variables constant. No variables associated significantly with nonideation.
3. The three-way interaction between thwarted belongingness, perceived burdensomeness and hopelessness will be associated with a significant reduction in the probability of being a non-ideator.

In negative binomial regression model with suicide ideation as the outcome no variables significantly predicted the outcome. Several factors predicted non-ideation: thwarted belongingness (estimate=-0.11, p=.021), the interaction between perceived burdensomeness/hopelessness (estimate=0.30, p=.033), and the interaction of perceived burdensomeness/thwarted belongingness (estimate=0.10, p=.038). There was a non-significant three-way interaction between burdensomeness/belongingness/hopelessness.

**Jahn and Cukrowicz (2011)**

**Main Question:** What is the impact of relationship type and quality on the association between perceived burdensomeness and suicide ideation.

**Hypotheses:**
1. The quality of a relationship with a family member will be

**Design:** Cross-sectional

**Participants:** 70 adults who were 65 to 93 years old ($M = 72.79$, $SD=6.56$) recruited from the Texas Tech University Health Sciences Center

**Main Measures:** - To compare relationship type (family vs. non-family, younger generation vs. same-older generation) on overall perceived burdensomeness and suicide ideation one-way MANOVA was used
- MANOVA was also used to determine which relationship was most burdened
- Overall results showed that family vs. non-family relationship type did not associate with overall perceived burdensomeness and suicide ideation. On the other hand, generation type associated with perceived burdensomeness and suicide ideation when all relationships were considered ($\lambda = .77$, $F [4,128] = 4.40, p = .002; \eta^2 = .12$), and
2. The quality of a relationship with older generation family members will be better than that of with younger generations.

3. The number of relationships that are identified as sources of burden will predict overall perceived burdensomeness.

4. A greater number of relationships identified as sources of burden will predict greater overall perceived burdensomeness and greater suicide ideation.

- Four one-way ANOVA’s were done to examine the quality of relationships (family vs. non-family, same generation vs. same-older generation)

- Negative Binomial Regression was used to determine whether the number of relationships predicts overall perceived burdensomeness and suicide ideation

also when only the most burdened relationship was considered on perceived burdensomeness ($F [2, 65] = 7.58, p = .001; \eta^2 = .19$) and suicide ideation ($F [2, 65] = 4.27, p = .018; \eta^2 = .12$).

- There was a non-significant association between family vs. non-family relationship and overall quality, but a significant association when generation type was the independent variable ($F [2,67] = 6.407, p = .003$), such that quality of younger generation relationships endorsed as burdened was worse than same-older generation relationships.

- The number of burdened relationships did not predict overall perceived burdensomeness or suicide ideation; however, results did suggest that endorsing a greater number of burdened relationships resulted in slightly greater overall perceived burdensomeness.
Jahn, Van Orden and Cukrowicz (2013)

Main Purpose:
To clarify the association between source of burden and one particular aspect of perceived burdensomeness – a feeling that others would be better off if one were gone.

Design:
Cross-sectional

Participants:
70 adults who were 65 years and older ($M=72.8$, $SD=6.56$) recruited from Texas Tech University Health Sciences Center.

Main Measures:
PBQ, INQ

- Two logistic regressions where the outcome was an item from the INQ, i.e. that others would be better off if one were gone (yes/no).
  - The first regression had a dichotomous predictor – whether the individual endorsed perceived burdensomeness on his/her spouse (yes/no).
  - The second regression also had a dichotomous predictor – whether the individual endorsed perceived burdensomeness on his/her child (yes/no).
- Two post-hoc logistic regressions to determine whether there is an additive effect of experiencing multiple source of burden.

- 76% of the sample reported feelings of burdening their spouse; 64% of the sample reported feelings of burdening a child; 44% reported feelings of burdening both their spouse and a child.
- Older adults who reported feelings of burdening their spouse were six times more likely to endorse the INQ item ‘others would be better off if I were gone’ compared to those who did not report burdening their spouses (Wald statistic = 6.56, $OR = 5.73$, $p = .01$)
- Older adults who reported feelings of burdening a child were not more likely to endorse the INQ ‘others would be better off if I were gone’ compared to those who did not report burdening a child (Wald statistic = 1.26, $OR = 2.05$, $p = .26$).
- There was no additive effect of reporting being a burden on both a spouse and a child on endorsing the INQ item ‘others...
| Jahn, Cukrowicz, Linton and Prabhu (2011) | Design: Community-based study | Main Purpose: To examine the associations between perceived burdensomeness, suicide ideation, and depressive symptoms. | - Regression analysis following Baron & Kenny’s (1986) guidelines to test the mediating pathway between depressive symptoms and suicide ideation via perceived burdensomeness | - Perceived burdensomeness mediated the pathway between depression and suicide ideation, accounting for 68.3% of the variance in suicide ideation. Including perceived burdensomeness into the prediction model for suicide ideation reduced the significance of the relation between depressive symptoms and suicide ideation from \( p < .001 \) to \( p = .258 \). |

| Van Orden, Bamonti, King and Duberstein (2012) | Design: Prospective cohort, with a two-month follow-up after intake. | Main Question: Is there a temporal association between perceived burdensomeness and meaning in life? | - Regression model with five baseline predictor variables (burdensomeness, depression, meaning in life, age, gender) predicting meaning in life at 2 months, as well as perceived burdensomeness at 2 months. | - Average perceived burdensomeness scores significantly decreased by follow-up time \( (t=2.38, p<.05) \), but meaning in life did not. Baseline levels of perceived burdensomeness significantly predicted meaning in life at follow-up \( (unstandardized estimate=1.055, p=.028) \) accounting for baseline depression, meaning, age and gender; greater burdensomeness predicted lower meaning. On the other hand, baseline levels of |
into account baseline depression. The reverse associations, with meaning predicting burdensomeness at follow-up, should not be significant (consistent with the IPTS).

PHQ-9; INQ; GSIS

Procedure:
Participants completed self-report questionnaires within a month following intake. Follow-up questionnaires were completed by phone interview two months later. Participants were receiving treatment with psychotropic drugs during the 2-month follow-up.

meaning did not predict burdensomeness at follow-up (unstandardized estimate=.011, p=.581).

- Baseline levels of perceived burdensomeness significantly predicted burdensomeness at follow-up (unstandardized estimate=0.564, p=.000), controlling for baseline depression, meaning, age, gender; baseline burdensomeness predicted decreased burdensomeness at follow-up.

- Baseline depression significantly predicted lower meaning in life at follow-up (unstandardized estimate=0.257, p=.002), and significantly predicted greater perceived burdensomeness at follow-up (unstandardized estimate=0.045, p=.021), controlling for covariates.

Van Orden, Wiktorsson, Duberstein, Berg, Fassberg, and Waern (2014)

Main Questions: Design:
Prospective cohort study in western Sweden with a one-year follow-up.

- Qualitative data from the self-reported reasons for suicide were presented as proportions and means
- Multinomial logistic

- The top three most commonly reported reasons for suicide were escape (28.7%), functioning and autonomy (23.8%), and psychological problems (23.8%).
Does endorsing thwarted belongingness or perceived burdensomeness predict more lethal means of attempted suicide? Does endorsing thwarted belongingness or perceived burdensomeness predict suicide re-attempt during follow-up?

Hypotheses:
1. Perceived burdensomeness and thwarted belongingness will be the most commonly reported reasons for attempted suicide.
2. The presence of perceived burdensomeness or thwarted belongingness would be associated with more lethal means of suicide attempts.
3. Perceived burdensomeness and thwarted belongingness would be associated with repeat suicide attempts during follow-up.

101 adults who were 70 years and older ($M=79.7$, $SD=5.3$, range: 70-91) recruited from medical emergency rooms for suicide attempts from five medical centers across Sweden.

Main Measures:
- Mini-Mental Status Examination
- Cumulative Illness Rating Scale for Geriatrics
- CPRS
- MADRS
- DSM-IV
- Self-reported reasons for suicide attempts

Regression was used to examine whether endorsement of perceived burdensomeness ("being a burden") or thwarted belongingness ("social problems" or "family conflict") predicted more lethal means, with pills as a reference group for each outcomes comparison (hanging, cutting, or ‘other’ – i.e. drowning and strangulation/suffocation).

- Logistic regression was used to determine whether perceived burdensomeness and thwarted belongingness predicted suicide attempts at follow-up.

Perceived burdensomeness and thwarted belongingness were not among the most commonly reported reasons for suicide attempts (12.9% each).

- Those who endorsed thwarted belongingness were significantly more likely to use hanging (OR = 2.34, $z=2.62$, $p=.01$) or cutting (OR = 1.64, $z=1.97$, $p=.049$) than pills; those who endorsed perceived burdensomeness were not more likely to use one method over another.

- Endorsement of thwarted belongingness was significantly associated with engaging in repeat suicide attempts during the follow-up compared to those who did not endorse (Wald $z = 2.07$, $b = 1.69$, OR = 5.43, $p=.04$); endorsement of perceived burdensomeness was not associated with repeat suicidal behaviour.

Legend: AUDIT: Alcohol Use Disorders Identification Test; BHS: Beck Hopelessness Scale; CES-D: Center for Epidemiologic Studies Depression Scale; CPRS: Comprehensive Psychopathological Rating Scale; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders 4th Edition; GAD-7: Generalized Anxiety Disorder; GDS: Goldberg Depression Scale; GSIS: Geriatric Suicide Ideation Scale; INQ: Interpersonal Needs Questionnaire; MADRS: Montgomery-Asberg Depression Rating Scale; MMSE: Mini
Mental Status Examination; **MSSI**: Modified Scale for Suicide Ideation; **PHQ**: Patient Health Questionnaire; **PBQ**: Perceived Burdensomeness Questionnaire; **PSF**: Psychiatric Symptom Frequency Scale; **SCS**: Suicide Cognitions Scale; **SF**: Medical Outcomes Study Short Form General Health Survey; **SSS**: Schuster Social Support
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2014-2015

Ontario Graduate Scholarship
2013-2014