

**THE RELATIONSHIP OF SUICIDE ATTEMPTS AND EATING DISORDER
SYMPTOMS: A MEDIATING ROLE FOR SUICIDE CAPABILITY?**

by

Arezoo Shahnaz

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The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, the thesis entitled:

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submitted by Arezoo Shahnaz in partial fulfillment of the requirements for

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in Psychology

Examining Committee:

E. David Klonsky, Psychology

Supervisor

Paul Hewitt, Psychology

Supervisory Committee Member

Ingrid Söchting, Psychology

Supervisory Committee Member

Abstract

Individuals with eating disorders (EDs) have an elevated risk for suicide compared to the general population. To date, research on EDs and suicide has mainly used ED diagnostic categories as the unit of analysis, for example, comparing Anorexia Nervosa and Bulimia Nervosa with regard to the frequency and lethality of suicide attempts. However, an increasing number of studies suggest that specific features of EDs (i.e., restrictive eating, fasting, binge-eating, and purging) may be most helpful in predicting suicide risk rather than the diagnostic categories, which can share similar features. Therefore, the present study examined a wide variety of specific ED features in relation to histories of suicidal ideation and attempts. In addition, the present study explored the role of capability in relation to ED features and suicide.

Participants were 387 adults recruited via an online platform (MTurk) who completed questionnaires assessing eating disorder features, history of suicide ideation and attempts, suicide capability, and other relevant variables. A total of 70 participants with a lifetime history of suicide attempts, 114 participants with a lifetime history of suicide ideation but no history of attempts, and 203 participants with no history of either suicide ideation or attempts were obtained.

Results revealed small to moderate differences on almost all ED features between ideators and nonsuicidal participants (d range = $-.44$ to $.07$, median = $-.29$), where ideators were more likely to endorse ED features than nonsuicidal participants. Smaller differences were observed between ideators and attempters for fewer ED features (d range = $-.31$ to $.00$, median = $-.14$), where attempters were more likely to endorse ED features than ideators. Specifically, cognitive restraint, restricting behaviours, excessive exercise, and muscle building were more

associated with attempts than with ideation. Practical capability mediated the relationships of cognitive restraint and restricting behaviours to suicide attempts.

Findings suggest that some ED features may be uniquely associated with suicidal ideation whereas others may be uniquely, albeit modestly, associated with suicide attempts among those with ideation. Future research, assessment, and treatment of individuals with certain ED features should consider the potential risk factor for suicidal thoughts and behaviours.

Lay Summary

Individuals with eating disorders (EDs) bear a heightened risk for suicide compared to the general population. However, it remains unclear which symptoms of EDs are most responsible for this increased risk. The current project examined a range of ED features in relation to suicidal thoughts and attempts and investigated whether capability for suicide (the extent one has the ability to engage in potentially harmful acts) may help explain their relationship to attempts. Results revealed that attempters were more likely to endorse cognitive restraint, restricting behaviours, excessive exercise, and muscle building, than ideators. Further, practical capability (factors that make a suicide attempt easier, or more feasible) accounted for the relationships of cognitive restraint and restricting behaviours to attempts. Findings suggest that certain ED features may be associated with suicide attempts, in part by indicating higher capability to make an attempt.

Preface

This thesis is original, unpublished, independent work by the author, Arezoo Shahnaz. This thesis is submitted in partial fulfillment of the requirements for Master of Arts in Psychology at the University of British Columbia. The design of the study, leading concept formation, data collection, data analysis, and the writing of the thesis was done solely by the author. Dr. E. David Klonsky was the supervisor on this project and assisted with study design, data interpretation, and manuscript edits. The project reported in this thesis was approved by the Behavioural Research Ethics Board of the University of British Columbia (approval certificate number: H18-01069) and was conducted in the Personality, Emotion, and Behaviour Laboratory (PEBL) at the University of British Columbia.

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Chapter 1: Introduction

Eating disorders (EDs) represent distressing and sometimes fatal forms of psychopathology occurring in approximately 1 in 5 women in the United States (National Institute of Mental Health, 2016). An estimated 25% of individuals with an ED are men. The National Institute of Mental Health (NIMH) defines EDs as serious medical illnesses characterized by disturbances to eating behaviours affecting an individual's physical and mental health (National Institute of Mental Health, 2016).

Anorexia nervosa (AN) and bulimia nervosa (BN) are two severe and potentially life-threatening eating disorders, ranked together as the 12th leading cause of disability-adjusted life years (DALYs) in 15-19 year old females in high-income countries (Hoek, 2016). The lifetime prevalence of AN among women is approximately 4% (Smink, Van Hoeken, & Hoek, 2013) and 0.3-0.53% in men (Raevuori, Keski-Rahkonen, & Hoek, 2014). Approximately 2% of women will report a lifetime prevalence of BN (Smink et al., 2013) and between 0.13-1.34% of men (Raevuori et al., 2014).

AN is characterized by: a drive for thinness, resistance to maintain body weight at or above a normal weight for age and height, intense fear of gaining weight even though underweight, restricting or avoiding food, and a misperception of size (Franko & Keel, 2006; National Institute of Mental Health, 2016). The NIMH describes two subtypes of AN: a restrictive subtype (AN-R), characterized by the placement of stringent restrictions over the amount and type of food consumed and a binge-purge subtype (AN-BP), represented by severe restrictions on food as well as engagement in binge-eating and purging behaviours.

BN is defined by recurrent episodes of eating unusually large amounts of food (i.e., binge-eating) accompanied with a lack of control over these episodes. Binge-eating episodes

within the context of BN are followed by behaviours which compensate for the overeating (compensatory behaviours), such as vomiting/purging, fasting, excessive laxative or diuretics use, and excessive exercise (Franko & Keel, 2006; National Institute of Mental Health, 2016). Unlike AN, individuals with BN may maintain a normal weight or be overweight. Eating disorders such as AN and BN, can create significant impairment as they are highly comorbid with other psychological disorders, specifically mood and anxiety disorders, and are associated with high mortality rates beyond the physical complications of the disorder, specifically suicide (Chesney, Goodwin, & Fazel, 2014; Guillaume et al., 2011; National Institute of Mental Health, 2016; O'Brien & Vincent, 2003).

1.1 Eating Disorders and Suicidality

Individuals with EDs bear a heightened risk for suicide compared to the general population (Preti, Rocchi, Sisti, Camboni, & Miotto, 2011; Smith, Ortiz, Forrest, Velkoff, & Dodd, 2018). Specifically, a meta-analysis conducted by Chesney et al. (2014) found that individuals with AN are 31 times more likely to die by suicide than the general population and individuals with BN are 7.5 times more likely to die by suicide (Chesney et al., 2014). This heightened risk for suicide in EDs, particularly in AN, may be greater than the suicide risk in other psychopathologies. For example, individuals with depression, the psychiatric diagnosis most commonly associated with suicide, are at 25 times greater risk for suicide than the general population (Bamonti, Price, & Fiske, 2014; Bostwick & Pankratz, 2000; Hawton, Comabella, Haw, & Saunders, 2013).

Given that EDs can include behaviours, such as starvation, that may lead to death, it may be useful to clarify the difference between these behaviours and suicide attempts. The US Centers for Disease Control and Prevention (CDC) define suicidal ideation as thinking about,

considering, or planning suicide (Centers for Disease Control and Prevention, 2015). The CDC defines suicide attempt as a nonfatal, self-directed, potentially injurious behavior with the intention to die even if the behavior does not result in injury. Within EDs, some behaviours may appear as a suicide attempt given that the behaviour may be dangerous and potentially lethal (i.e., starvation). However, per the CDC definition, such behaviours (i.e., starvation) would be seen as a suicide attempt only if it is deliberately done with the intention to die, rather than for some other motivation, such as a drive for thinness.

Despite the high prevalence rates of suicidality in EDs, it is unclear which ED, and which ED features, are most strongly associated with suicide attempts. For example, research reports that individuals with AN are more likely to die by suicide and make a more lethal suicide attempt than individuals with other EDs whereas some studies report that individuals with BN report the greatest number of suicide attempts (Bulik, Sullivan, & Joyce, 1999; Corcos et al., 2002; Guillaume et al., 2011; Mandelli, Arminio, Atti, & De Ronchi, 2018; Mayes et al., 2014). Franko and Keel (2006) highlight such mixed findings in the field, explaining that studies often find that individuals with AN are more likely to die as a result of a suicide attempt. However, findings become conflicting when comparing AN and BN groups with regard to the frequency of suicide attempts; with some studies reporting a higher frequency of attempts in BN groups and others finding no differences across groups (Bulik et al., 1999; Corcos et al., 2002; Herzog et al., 1999; Viesselman & Roig, 1985).

The aforementioned studies mainly focus on the association between diagnostic categories of EDs and suicide history. Such studies have shown mixed findings regarding which diagnostic ED group report a greater frequency of attempt history. One possible explanation for conflicting findings when examining suicidality at the level of diagnostic categories may be the

overlap in defining features. For example, AN and BN are separate diagnostic categories yet bingeing and purging are characteristic of BN and are also apparent in cases of AN (i.e., AN-BP subtype). Overlap in key features may lead to confusion over which features should be included in which diagnostic category; this is evident in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) modifications. For example, one significant change to the criteria defining AN included the elimination of the amenorrhea criterion for a diagnosis (Call, Walsh, & Attia, 2013). The previous inclusion of amenorrhea indicated that women who met all other criteria for AN except for amenorrhea were given a diagnostic category of Eating Disorder Not Otherwise Specified (EDNOS; now known as Other Specified Eating and Feeding Disorder, OSFED), yet these women did not differ clinically from women with amenorrhea and AN (Call, Walsh, & Attia, 2013). This illustrates how defining features (e.g., amenorrhea) may change from one edition of diagnostic manuals to the next.

Indeed, an increasing number of studies suggest that features of EDs (i.e., restrictive eating, fasting, binge-eating, purging, and other compensatory behaviours) may be most helpful in identifying suicide risk rather than the actual diagnostic category (Fedorowicz et al., 2007). Notably, Stein, Lilenfeld, Wildman, and Marcus (2004) explored prevalence rates of suicide attempts within 150 patients treated in an outpatient ED clinic and found that a history of suicide attempts were more significantly associated with binge-eating and purging symptomology compared to rates of AN. Similarly, Forcano et al. (2011) found that in a sample of 104 outpatients with AN-R and 68 outpatients with AN-BP, outpatients with AN-BP were significantly more likely than AN-R to report a history of suicide attempts. In addition, in a sample of 1436 in- and outpatients with EDs, Portzky, van Heeringen, and Vervaeke (2014) found that patients with AN-R show the lowest risk of suicide attempts whereas patients with BN,

characterized primarily by bingeing and purging behaviours, displayed the highest risk of suicide attempts, followed by patients with AN-BP. Findings from Portzky et al (2014) align with a study conducted by Federowicz et al. (2007) who found that a history of suicide attempts was greater in patients with BN characterized by purging followed by AN-BP. The authors suggest that purging symptomology specific to EDs was associated with an increased risk for suicide attempts. Similarly, Favaro and Santonastaso (1997) assessed the prevalence of lifetime suicide attempts in 495 patients referred to an ED outpatient unit and reported that bingeing and purging subtypes yielded a greater history of suicidality. Specifically, Favaro and Santonastaso (1997) found that patients with bingeing and purging BN and AN reported a greater frequency of lifetime suicide attempts compared to AN restricting subtype (AN-R). Ahn, Lee, and Jung, (2018) also found that AN-BP and BN were strongly associated with a history of suicide attempt and suggest that binge-purge symptomology is an important driving behaviour for a suicide attempt.

Thus far, the preceding studies highlight the elevated suicide risk within EDs specifically with bingeing and purging as part of their symptoms profile. Under the ideation-to-action framework, (a) the development of suicide ideation and (b) the progression from suicide ideation to attempts, are understood to have different predictors and explanations (Klonsky & May, 2015). For example, traditionally cited risk factors (e.g., depression, anxiety, hopelessness) robustly predict suicide ideation, but are no different between suicide attempters and suicide ideators who have never attempted suicide (Klonsky & May, 2010; May & Klonsky, 2016; Qiu, Klonsky, & Klein, 2017). A key implication of this framework is that research should aim to determine whether correlates of suicidality are most predictive of suicide ideation, suicide attempts, or both.

Given the elevated suicide risk in EDs, features of EDs may be potential factors involved in the progression from thinking about suicide to making a suicide attempt. However, much of the focus of preceding literature has remained on defining features within the context of ED diagnostic categories and to our knowledge, little to no studies have focused on defining features in EDs more generally. Moreover, another limitation of the preceding literature on EDs and suicidality, specifically bingeing and purging features and suicidality, is that studies do not address the reasons why certain ED features may elevate suicide risk. ED features and suicidality share many correlates, each of which could potentially contribute to their overlap. These correlates may vary somewhat depending on the specific ED feature but in general variables correlated with both EDs and suicidal thoughts and behaviors include: substance use, depression, anxiety, hopelessness, psychological pain, emotion dysregulation, low belongingness, and burdensomeness (Forrest et al., 2016; Hudson, Hiripi, Pope, & Kessler, 2007; Klonsky, May, & Saffer, 2016; Klonsky, Qiu, & Saffer, 2017; Monell, Clinton, & Birgegård, 2018; Raevuori et al., 2014). Notably, within the suicide literature these variables are linked with suicide ideation far more than suicide attempts (Klonsky et al., 2016). In contrast, variables that may increase risk for suicide attempts among ideators, and that may account for the increased risk of suicide attempts in EDs, have yet to be clarified. One possibility that may account for increased risk of suicide attempts in EDs is a construct called suicide capability.

The Potential Role of Suicide Capability in Eating Disorders

Current theories of suicide emphasize the role of suicide capability as a key factor in the progression from suicidal thoughts to suicide attempts (Joiner, 2005; Klonsky & May, 2015; O'Connor, 2011; Van Orden et al., 2010). Broadly speaking, capability for suicide represents the extent an individual is able to engage in potentially harmful acts as well as their comfort with

and preparation for potentially harmful situations (Joiner, 2005). Thomas Joiner's Interpersonal-Psychological theory of suicide (IPTS; Joiner, 2005; Van Orden et al., 2010) asserts that desire for suicide by itself is an inadequate explanation for why individuals may attempt suicide. Rather, the theory asserts that an individual must have both the desire and the acquired capability for suicide (acquired capability; i.e., habituation to pain, fear, and death necessary to engage in and endure lethal self-harm) to make a suicide attempt. The desire for suicide (i.e., suicide ideation) is a consequence of an individual experiencing perceived burdensomeness (i.e., feeling like a burden on others) and thwarted belongingness (i.e., feeling like they do not belong, feeling alone). Further, the IPTS posits that suicide attempts are made by those who present suicide ideation and who also bear the acquired capability for an attempt. An individual may acquire capability through the experience and exposure to a wide variety of painful and provocative life events which can habituate an individual to fears of pain, injury, and death- such as, nonsuicidal self-injury, abuse, combat training, and other life events.

Klonsky and May's (2015) Three-Step Theory of suicide (3ST) supports Joiner's notion that capability for suicide is critical factor in explaining the progression of suicide ideation to attempts. However, Klonsky and May's 3ST offers alternative explanations for suicidal desire and expands on Joiner's theory in three ways. First, the 3ST postulates that the combination of pain and hopelessness is what causes suicide ideation to develop. Second, when an individual's level of pain - whether psychological or physical - exceeds one's connectedness to life (i.e., to other people, to a job, role, interest, etcetera) then passive suicide ideation will progress to active desire for suicide. Third, the 3ST expands on Joiner's concept of capability by taking a broader perspective including dispositional, practical, and acquired capability as contributing to an individual's overall suicide capacity. Dispositional capability refers to variables such as low pain

sensitivity, squeamishness, or blood phobia which may largely be driven by genetics (Klonsky & May, 2015). Practical capability is characterized by factors which make a suicide attempt easier or more feasible. For example, knowledge and access to lethal means are considered factors of practical capability which may influence an individual to be more able to act on their suicidal thoughts. Acquired capability refers to the same construct as Joiner's acquired capability construct.

The aforementioned theoretical models may explain why individuals with EDs are at greater risk for suicide and may explain why certain ED features pose a greater risk than others. Specifically, restrictive eating, which is a key characteristic of AN, has been highlighted as a painful and provocative experience aiding in the acquired capability for suicide (Joiner, 2005). Similarly, repetitive engagement in purging and compensatory behaviours, such as vomiting and laxative use, have also been suggested to increase an individual's capability to make a suicide attempt (Selby et al., 2010).

1.2 Literature Review on Suicide Capability in Eating Disorders

While a large literature has examined the association between suicide ideation and eating disorders within the context of Joiner's IPTS constructs (i.e., perceived burdensomeness and thwarted belongingness; Forrest et al., 2016; Kwan, Gordon, Carter, Minnich, & Grossman, 2017; Pisetsky, Crow, & Peterson, 2017; Smith, Stanley, Joiner, Sachs-Ericsson, & Van Orden, 2016), less is known about how EDs and ED features may increase suicide capability and hasten progression from suicide ideation to attempts. Smith et al. (2016) tested IPTS constructs in a sample of 278 women at a residential ED treatment facility and compared such women to women at an inpatient general psychiatric treatment facility and 85 women in university without any presenting ED symptomology. Smith and colleagues (2016) found that within the ED group,

fearlessness about death (a component of acquired capability) was associated with suicide attempts. Conversely, Silva, Ribeiro, and Joiner (2015) examined the relationship between various mental disorders and the acquired capability for suicide construct and found that EDs were not associated with acquired capability; although the authors suggest this may possibly be due to the low base rates of AN and BN in the sample (total = 10). Other studies mainly focus on AN or AN-specific characteristics (i.e., fasting and food restriction) in relation to acquired capability. For example, Zuromski and Witte (2015) explored acquired capability in 152 undergraduates who endorsed fasting behaviour and 142 controls with no endorsement of fasting behaviours and found that although the fasting group was more likely to report a suicide attempt history, there were no differences on acquired capability between groups. In a sample of 100 adult females diagnosed with an ED in a residential treatment facility, Witte et al. (2015) found that individuals with AN did not report a greater history of suicide attempts and an AN diagnosis was not associated with acquired capability nor were AN characteristics, such as fasting and food restriction.

1.3 Summary of Literature Reviews

Research to date has failed to find robust relationships between capability and ED features. However, this research has focused on restricting and fasting, more than other behaviours. Others suggest that bingeing and purging may be more relevant for suicide capability and, in turn, increase risk for suicide attempts. Specifically, Selby et al. (2010) highlight two potential routes which may increase capability to suicidal behaviour in AN; one route is by exposure to pain through the starvation of restricting food behaviours in AN-R. In addition to restricting and fasting, the second route Selby et al. (2010) explain, is through repetitive experience with painful and injurious behaviours such as vomiting, laxative use, and other

purging and compensatory behaviours (AN-BP). This suggestion is in line with previously mentioned studies linking bingeing and purging behaviours to risk for suicide attempts (Favaro & Santonastaso, 1997; Portzky et al., 2014; Stein et al., 2004). Notably, in a sample of 787 individuals diagnosed with either AN-R or AN-BP, Selby et al. (2010) found that individuals with AN-BP endorsed more suicidal behaviours than individuals with AN-R. Additionally, Selby et al. (2010) found that the relationship between AN-BP and suicidal behaviour is mediated by purging and compensatory behaviours (i.e., laxative use). Previous studies have focused mainly on the first route suggested by Selby et al. (2010), rather than on bingeing and purging features.

Another reason for equivocal findings about EDs and capability may be the focus on just one facet of suicide capability (acquired capability) and early (often discredited) approaches to measuring this facet. Recent work by Ribeiro and colleagues (2014) suggest re-evaluating and redeveloping widely used measures of acquired capability (i.e., Acquired Capability for Suicide Scale – ACSS) due to a lack of psychometric data and low reliability of the scale. Further, as mentioned earlier, Klonsky and May (2015) have expanded Joiner's (2005) original concept of capability by including dispositional and practical capability. Therefore, it is unclear whether this broadened construct of capability established by Klonsky and May (2015) may account for the greater risk of suicide attempts in ED, and more specifically in bingeing and purging features.

1.4 Study Aims

Therefore, the purpose of the present study is two-fold. The first aim of the present study is to determine if ED features (and clarify which features) may be involved in the progression from suicidal thoughts to attempts. Therefore, the study first assessed whether individuals with a history of suicide attempts were more likely to endorse ED features compared to individuals with a history of suicide ideation but no history of suicide attempts. Study aim 1 consisted of one

hypothesis and three exploratory research questions. The **hypothesis** for study aim 1 was as follows; we are hypothesizing that individuals with a history of suicide attempts will be more likely to endorse bingeing and purging features of EDs compared to individuals with a history of suicide ideation but no attempts. In addition, we will explore (1) whether other features of EDs differentiated attempts from ideation, (2) gender differences on ED features between suicide groups, and (3) whether clinical variables and traditionally cited risk-factors for suicide ideation and attempts are potential covariates in the association between ED features of interest and suicide.

The second aim of the present study is to explore if capability for suicide (as a broadened construct) is one theoretical construct that may explain why individuals with certain defining features of EDs are at greater risk for suicide compared to those with other features. The second aim of the study is exploratory in nature; we are assessing whether the relationship between ED features and suicide attempts will be mediated by suicide capability. We will execute this aim by first factor analyzing the suicide capability items to identify reliable and distinct dimensions of capability. Following the factor analysis, we will examine which, if any, of these dimensions mediate the relationship between ED features and suicide attempts. This study will aim to contribute to the current research by clarifying the relationship between EDs and suicide attempts and help inform clinical practice in working with vulnerable populations (i.e., individuals with ED and suicidality).

Chapter 2: Methods

2.1 Procedure

Participants were recruited from Amazon's Mechanical Turk (MTurk). Participation in the study was limited to U.S. residents who had at least a 95% approval rating in completing 100 or more Human Intelligence Tasks (HITs). Studies have demonstrated that MTurk participants are more demographically diverse than undergraduate populations (Buhrmester, Kwang, & Gosling, 2011) and clinically similar to the general population (Shapiro, Chandler, & Mueller, 2013). Moreover, MTurk participants have been found to provide high-quality data equal to data collected in laboratory settings (Buhrmester et al., 2011; Crump, McDonnell, & Gureckis, 2013; Goodman, Cryder, & Cheema, 2013; Paolacci, Chandler, & Stern, 2010). Participants were told the study would take approximately 5 minutes to complete and that they would be paid \$0.15 for their participations. Further, participants were provided with a link to a screening questionnaire hosted by Qualtrics, an online questionnaire software company. To avoid multiple survey completions by the same MTurk participant, Qualtrics restrictions allowing one response per IP address and one response per MTurk ID were enabled (as outlined by Peer, Paolacci, Chandler, & Mueller, 2012). Furthermore, participants had to complete a "captcha" or "reverse Turing test" to verify that human participants were completing the questionnaires as opposed to programs (bots) designed to automatically complete MTurk HITs for payment.

Upon providing informed consent, participants completed a brief online survey which included a four item Eating Disorder Screening Questionnaire developed by Cotton, Ball, and Robinson, (2003) screening participants for eating disorder symptomology, the Youth Risk Behaviour Survey – Suicide Screening Questionnaire (YRBS; Grunbaum et al., 2004; Kolbe,

Kann, & Collins, 1993) assessing lifetime history of suicidal ideation and suicide attempts, as well as the Patient-Reported Outcome Measurement Information System (PROMIS®; Cella et al., 2010, 2007; Fries, Bruce, & Cella, 2005) Anxiety short-form 4a and Depression short-form 4a instruments assessing anxiety- and depression-related symptoms occurring during the previous seven days. Participants' who endorsed one or more items on the Eating Disorder Screening Questionnaire were invited to complete the longer full-study survey for an additional payment. A subset of participants who did not endorse one or more items on the Eating Disorder Screening Questionnaire were also invited to complete the full-study survey. Further, participants' responses to the YRBS suicide items determined their membership into one of three groups; participants that endorsed no lifetime history of suicidal ideation or suicide attempts were classified as nonsuicidal, participants with a lifetime history of suicidal ideation but no history of suicide attempts were classified as ideators, and participants with a history of suicidal ideation and suicide attempts were categorized as attempters. Participants that reported no history of suicidal ideation, but a history of suicide attempts were excluded from further participation in the study since suicidal ideation must, even briefly, precede any suicide attempt.

Once participants successfully completed the screening questionnaire, they were invited to complete a longer 30-40-minute survey for an additional payment of \$4.00. Recruitment was limited to 400 of those who endorsed one or more items on the Eating Disorder Screening Questionnaire and 100 participants who did not endorse any items on the Eating Disorder Screening Questionnaire. Once the quota for a particular group was met or funds were finished, further recruitment of participants was blocked. Participants were free to withdraw participation from the study at any time at no penalty. Participants were assigned an arbitrary ID number and

there was no way to connect their responses with their identity, the ID number was also be cross-checked to ensure the same participant does not complete the study more than once.

Participants who agreed to participate in the longer full-study survey were required to provide informed consent prior to participating in the full-study survey. Participants were given the option to decline further participation in the longer survey and were presented with a unique code to enter into MTurk which indicated that they had completed the screening survey. Upon providing consent to the full-study survey, participants first completed a demographics questionnaire alongside several clinical measures. Sequentially this included the following measures: (1) the Beck Hopelessness Scale - Short Form (BHS; Aish & Wasserman, 2001), (2) Difficulties in Emotion Regulation Scale – Short Form (DERS-18; Victor & Klonsky, 2016), (3) Psychache Scale (Holden, Mehta, Cunningham, & McLeod, 2001), (4) the Drug Abuse Screening Test (DAST-10; Skinner, 1982), (5) the Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, & Joiner, 2012), (6) a gateway question assessing lifetime history of nonsuicidal self-injury followed by items from the Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007) and the Inventory of Statements about Self-Injury (ISAS; Klonsky & Glenn, 2009), (7) the Beck Scale for Suicidal Ideation (BSI; Beck, Kovacs, & Weissman, 1979; Beck, Steer, & Ranieri, 1988), (8) the Acquired Capability for Suicide Scale (ACSS-FAD; Ribeiro et al., 2014), (9) the Suicide Capacity Scale (SCS-3; Klonsky & May, 2015), (10) the Acquired Capability with Rehearsal for Suicide Scale (ACWRSS; George, Page, Hooke, & Stritzke, 2016), (11) items from the newly developed Suicide Capability Research Scale (Bauer & Daruwala, *not yet available*), (12) the Suicide History Form which includes items based on language from the World Mental Health-2000 Composite International Diagnostic Interview (WMH-CIDI; Kessler & Üstün, 2004), the Self

Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007), and the Suicide Attempt Self Injury Interview (SASII; Linehan, Comtois, Brown, Heard, & Wagner, 2006), (13) the Suicide Intent Scale – Self-Report (SIS-SR; Beck, Schuyler, & Herman, 1974) which consisted of 4-items taken from the original Suicide Intent Scale (SIS) and modified to be used in a self-report format, and (14) the Eating Pathology Symptoms Inventory (EPSI; Forbush et al., 2013).

Participants classified as nonsuicidal were not administered the BSI. Similarly, participants who did not indicate a lifetime history of suicide attempts were not administered the SHF or the SIS-SR. Attention checking, and manipulation check questions were employed throughout the full study. Such questions requested that participants either select a particular answer (e.g., “Please select Sometimes”), respond to a question with only one possible correct answer (e.g., “Have you ever walked on the moon?”), and Winograd schema questions (e.g., “Babar wonders how he can get new clothing. Luckily, a very rich old man who has always been fond of little elephants understands right away that he is longing for a fine suit. As he likes to make people happy, he gives him his wallet. Who wants a new suit? Who likes to make people happy?”) were used to ensure that participants were paying attention to the questions being asked. Participants who failed the attention checking question in the pre-screen survey were not invited to complete the full-study survey.

After the completion of the full-study measures, before completing the study, participants were asked to select positive strategies used when feeling stressed or upset. These questions were completed to induce positive mood and elicit positive coping strategies to buffer the effect of the more sensitive questions. Participants were also provided with an extensive list of mental health resources before being provided with their unique MTurk study completion code. Throughout

both surveys, participants were provided with a link to a crisis line number, chat service, as well as a link to general information about mental health. Ethical approval for this study was obtained from the Behavioural Research Ethics Board of the University of British Columbia (UBC BREB Number: H18-01069).

2.2 Participants

As shown in Figure 1, 1106 attempts were made to access the screening survey. Of these, 48 were identified as duplicate attempts and subsequently blocked, 42 failed the attention checking question in the screener, and 51 did not complete the screening survey, leaving a total of 1007 unique participants who completed the screening survey only once. Of the 1007 who completed the screening survey, 469 were invited to complete the full-study survey, 30 declined the offer, 6 did not complete the full-study survey, and 42 failed one or more attention-checking questions, leaving a total of 387 that completed the longer, full-study survey; 203 lifetime nonsuicidal participants, 114 lifetime ideators, and 70 lifetime attempters. Of the participants who completed the full-study survey, 320 had endorsed 1 or more items on the ED screening measure and 67 did not endorse any items on the ED screening measure.

2.3 Measures

2.3.1 Demographic Measures

Demographic information was obtained using a lab-based questionnaire (See Appendix A. PEBL Demographics Questionnaire). The questionnaire includes 12 questions asking participants to report their date of birth, gender, race/ethnicity, sexual orientation, and current marital status. The questionnaire also assesses highest level of education, yearly household income, occupation, weekly working hours, and number of people residing in the household.

2.3.2 Measures of Eating Disorder Features

Four-Item Eating Disorder Screening Questionnaire.

The Four-Item Eating Disorder Screening Questionnaire (Cotton et al., 2003) is a four item self-report inventory created as a screening instrument by comparing the performance characteristics of two widely used ED screening tools, the SCOFF and the Eating disorder Screen for Primary care (ESP), and found four individual items that were the best for ruling in an eating disorder (see Appendix B). The items on this measure are taken from the SCOFF and the ESP, both are well-validated (Cotton et al., 2003; Hill, Reid, Morgan, & Lacey, 2010). This measure was used to determine eligibility of incoming participants. Specifically, participants were eligible into the eating disorder symptomology groups if they endorsed 1 or more items on this questionnaire.

Eating Pathology Symptoms Inventory.

The Eating Pathology Symptoms Inventory (EPSI; Forbush et al., 2013) is a 45-item self-report measure for assessing ED dimensions. For each item, participants rate, on a scale from 0 (*Never*) to 4 (*Very Often*), the frequency they have experienced or engaged in the described behaviour. Higher scores indicate greater eating pathology symptoms. The EPSI yields a total score and eight subscales corresponding to ED features; Body Dissatisfaction, Binge Eating, Cognitive Restraint, Excessive Exercise, Restricting, Purging, Muscle Building, and Negative Attitudes Towards Obesity. The EPSI demonstrates excellent convergent and discriminant validity and reliability (Forbush, Wildes, & Hunt, 2014; Forbush et al., 2013). The internal consistency reliability (Cronbach's alpha) was .90 for the Body Dissatisfaction subscale, .92 for the Binge Eating subscale, .77 for the Cognitive Restraint subscale, .86 for the Excessive

Exercise subscale, .86 for the Restricting subscale, .88 for the Purging subscale, .81 for the Muscle Building subscale, and .90 for the Negative Attitudes Towards Obesity subscale.

2.3.3 Measures of Nonsuicidal Self-Injury, Suicidal Ideation, and Suicide Attempts

Youth Risk Behavior Survey Suicide Screening.

The Youth Risk Behavior Survey Suicide Screening (YRBS; Brener et al., 2002; Kolbe, Kann, & Collins, 1993) was used to measure lifetime suicidal ideation and suicide attempt in the sample. The YRBS is a 10-item, large-scale survey administered in the United States by the Centre for Disease Control assessing health risk behaviours including lifetime suicide ideation, suicide planning, and a history of suicide attempt. The YRBS items assessing lifetime history of suicide ideation and attempts were utilized to screen participants into the three study groups: attempters, ideators without attempts, and nonsuicidal. The YRBS suicide questions have demonstrated good reliability (Brener et al., 2002; A. May & Klonsky, 2011).

Beck Suicide Ideation Scale.

Originally administered as a semi-structured clinical interview, The Beck Scale for Suicidal Ideation (BSI; Beck, Kovacs, & Weissman, 1979). has been adapted to accommodate self-reported suicidal ideation (Aaron T. Beck et al., 1988). The BSI measures suicidal ideation using nineteen items. For each item, participants are presented with three statement responses organized in increasing severity. For example, a participant completing the BSI must select from 42 the following response options on a three-point scale; (0) “I have no desire to kill myself”, (1) “I have a weak desire to kill myself” or (2) “I have a moderate to strong desire to kill myself”. A total score is calculated by combining the values of each question and therefore ranges from 0 to 48. Greater scores indicate greater suicidal ideation. The BSI demonstrates strong psychometric

properties (Beck et al., 1988; Steer, Rissmiller, Ranieri, & Beck, 1993; Witte et al., 2006). The internal consistency reliability (Cronbach's alpha) in this sample was .90.

Nonsuicidal Self-Injury Questions.

A single item asking "Have you ever purposely hurt yourself without wanting to die, known as non-suicidal self-injury? (for example, cutting or burning)" was used to assess history of nonsuicidal self-injury. The Nonsuicidal Self-Injury Questions consisted of 11-items taken from the well-validated measures of the Self Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007) and the Inventory of Statements about Self-Injury (ISAS; Klonsky & Glenn, 2009) are used to assess details of self-injurious behaviours for those who indicated a history of nonsuicidal self-injury (see Appendix D).

Suicide History Form.

The Suicide History Form (SHF) is a brief, 21-item, self-report measure constructed by our laboratory. Items are based on language from the World Mental Health-2000 Composite International Diagnostic Interview (WMH-CIDI; Kessler & Üstün, 2004), the Self Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007), and the Suicide Attempt Self Injury Interview (SASII; Linehan, Comtois, Brown, Heard, & Wagner, 2006). Questions from the SHF were used to verify suicide group membership (i.e., nonsuicidal, ideator, or attempter groups), and characterize, for descriptive purposes, the nature of suicide attempts including medical severity and potential lethality of an attempt. Suicide lethality is measured by a single item taken from the SHF: "Did your first suicide attempt result in an injury or poisoning?" Medical severity is measured by "Did your first suicide attempt require medical attention?"

Suicide Intent Scale – Self-Report

The Suicide Intent Scale – Self-Report (SIS; Beck, Schuyler, & Herman, 1974) is comprised of 4-items taken from the well-validated measure of the Suicide Intent Scale and modified to be used in a self-report format (see Appendix C). Briefly, the four items assess expectations about death, understanding about the lethality of the method chosen, attitude towards the suicide attempt, and attitude towards living and dying. The Suicide Intent Scale was used to better characterize, for descriptive purposes, the nature of suicide attempts. The internal consistency reliability (Cronbach's alpha) in this sample was .75.

2.3.4 Measures of Suicide Capability

Current validated measures of suicide capability may not necessarily encompass the entire construct and characteristics of suicide capability, prompting the inclusion of multiple suicide capability measures in the current study. At present knowledge, a fully inclusive and well-validated measure has yet to be created.

Acquired Capability for Suicide Scale.

The Acquired Capability for Suicide Scale (ACSS-FAD; Ribeiro et al., 2014) is a 7-item, revised version of the original ACSS, measuring fearlessness about death, a construct of acquired capability and a key component of suicide capability theories. For each item, participants indicate how much the statements represent them from a scale of 0 (*Not at all like me*) to 4 (*Very much like me*). The ACSS-FAD has demonstrated good psychometric properties (Ribeiro et al., 2014). The internal consistency reliability (Cronbach's alpha) in this sample was .89.

Suicide Capacity Scale.

The Suicide Capacity Scale (SCS-3; Klonsky & May, 2015) is a 6-item measure designed to assess three characteristics Klonsky and May (2015) suggest contribute to suicide capability; (1) dispositional capability, (2) acquired capability, and (3). practical capability. Items are rated

on a 7-point Likert scale with total scores ranging from 0 to 36. For each item, participants indicate how much they agree with the statements ranging from 0 (*Strongly Disagree*) to 6 (*Strongly Agree*). The SCS-3 correlated positively with the ACSS, an established measure of suicide capability (Klonsky & May, 2015). The internal consistency reliability (Cronbach's alpha) in this sample was .50 for the Dispositional Capability subscale, .46 for the Acquired Capability subscale, .90 for the Practical Capability subscale, and .70 for the total score.

Acquired Capability with Rehearsal for Suicide Scale.

The Acquired Capability with Rehearsal for Suicide Scale (ACWRSS; George, Page, Hooke, & Stritzke, 2016) is a 7-item scale measuring the key facets of acquired capability. The ACWRSS yields a total score and 3 subscales corresponding to acquired capability; (1) pain tolerance, (2) fearlessness of death, and (3) preparedness for suicide. For each item, participants rate how much they agree with each statement ranging from 0 (*Not at All*) to 8 (*Very Strongly*). The ACWRSS has demonstrated good internal consistency (George et al., 2016). The internal consistency reliability (Cronbach's alpha) in this sample was .74 for the Pain Tolerance subscale, .70 for the Fearlessness about Death subscale, .85 for the Preparation subscale, and .73 for the total score.

Suicide Capability Items – Research Scale.

The Suicide Capability Items – Research Scale (Bauer & Daruwala, *not yet available*) consisted of 7-items we selected from a Suicide Capability scale currently in development (Bauer & Daruwala; see Appendix E). The 7-items we chose correspond to two subscales; (1) Practical Capability and (2) Acquired Capability. For the Practical Capability items (3 items) participants were asked to indicate how much they agreed with each statement from a scale of 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). For the Acquired Capability items (4 items),

participants were asked to rate how much certain aspects of them have changed over time through rating their agreement with each statement from a scale of 1 (*Decreased a lot*) to 5 (*Increased a lot*). The internal consistency reliability (Cronbach's alpha) in this sample was .46 for Practical Capability and .51 for Acquired Capability.

2.3.5 Covariate Measures

Beck Hopelessness Scale Short Form.

The Beck Hopelessness Scale Short Form (BHS-SF; Aish & Wasserman, 2001; Beck, Weissman, Lester, & Trexler, 1974) was utilized to assess hopelessness. The BHS is a 4-item, true-or-false, self-report instrument used to assess hopelessness (i.e., feelings about the future, loss of motivation, and expectations). This 4-item measure is a shortened version of the 20 item BHS. The BHS-SF questions have demonstrated good reliability (Aish & Wasserman, 2001). The internal consistency reliability (Cronbach's alpha) was .85 for the BHS.

Difficulties in Emotion Regulation Scale Short Form.

The Difficulties in Emotion Regulation Scale Short Form (DERS-SF; Victor & Klonsky, 2016) is a modified, 18-item version of the original 36-item scale used to assess difficulties regulating emotion across six subscales including (1) Nonacceptance, (2) Goal-Directed Behaviour, (3) Impulse Control Difficulties, (4) Lack of Emotional Awareness, (5) Limited Access to Emotion Regulation Strategies, (6) and Lack of Emotional Clarity. For each question, participants indicate on a Likert scale ranging from 1 (*Almost Never*) to 5 (*Almost Always*) how often each item applies to them. Higher scores indicate greater emotion dysregulation. The DERS-SF has demonstrated strong psychometric properties (Victor & Klonsky, 2016). The internal consistency reliability (Cronbach's alpha) of the DERS-SF scales in this sample was .91 for Nonacceptance, .92 for Goal-Directed Behaviour, .92 for Impulse Control Difficulties, .81 for

Lack of Emotional Awareness, .89 for Limited Access to Emotion Regulation Strategies, .84 for Lack of Emotional clarity, and .92 for the combined subscales total score.

Drug Abuse Screening Test.

A modified, 10-item self-report version of the Drug Abuse Screening Test (DAST-10; Skinner, 1982) was used in this study to assess drug use severity in the previous 12-months. For each question, participants indicate whether they have engaged in the specific behaviour by selecting either “Yes” or “No”. A total score is calculated by counting the number of positive responses on nine of the ten questions and one reverse-scored question. Higher scores indicate greater drug abuse. The DAST questions have been found to have strong psychometric properties (Carey, Carey, & Chandra, 2003; Cocco & Carey, 1998; McCabe & Teter, 2007). The internal consistency reliability (Cronbach’s alpha) of the DAST-10 total score in this sample was .87.

Interpersonal Needs Questionnaire.

The Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, & Joiner, 2012) is a 15-item scale used to assess thwarted belongingness and perceived burdensomeness, two main facets of Joiner’s Interpersonal Psychological Theory of Suicide (IPTS; Van Orden et al., 2010). The INQ has demonstrated strong psychometric properties (Hill et al., 2015; Van Orden et al., 2012). Gutierrez et al., 2016. The internal consistency reliability (Cronbach’s alpha) for the Belongingness subscale is .93, and .95 for the Burdensomeness subscale in this sample.

PROMIS-SF Anxiety & Depression Questionnaire.

The Patient-Reported Outcome Measurement Information System (PROMIS® ; Cella et al., 2007, 2010; Fries et al., 2005) are a set of instruments designed to measure Patient-Reported Outcomes (PROs) across several domains of functioning including anxiety, depression, fatigue, pain interference (and pain intensity), satisfaction with social roles, and sleep disturbance in

individuals over 18 years of age. In this study, only the PROMIS® Anxiety 4a and PROMIS® Depression 4a short forms were used to assess anxiety- and depression-related symptoms occurring in the previous seven days. Each form is composed of four questions. For each question, participants rate the frequency of the symptom specified on a scale ranging from 1 (*Never*) to 5 (*Always*). Higher scores indicate more of the domain being measured. The PROMIS-SF questions have demonstrated good reliability and strong convergent validity (Pilkonis et al., 2011, 2014). For each item, participants indicate on a scale from 1 (*Never*) to 5 (*Always*) the frequency they have experienced feelings mapping onto depression and anxiety in the past 7 days. Higher scores indicate greater depressive or anxious symptoms in the past 7 days. The internal consistency reliability (Cronbach's alpha) was .94 for the depression subscale and .91 for the anxious subscale.

Psychache Scale.

The Psychache Scale (Holden et al., 2001) is a 13-item measure assessing psychache, or psychological pain which has been theorized to be particularly pertinent in the explanation of suicide (Shneidman, 1993). The Psychache Scale has demonstrated strong reliability and validity (Holden et al., 2001; Mills, Green, & Reddon, 2005). The internal consistency reliability (Cronbach's alpha) for the Psychache Total Score was .96 in this sample.

Chapter 3: Results

3.1 Demographics

Demographic information for all participants is outlined in Table 1. Participants reported an average age of 35.6 years ($SD = 10.59$). More than half of the participants reported being female (62.3%, $N=241$), over a third reported being male (37.5%, $N=145$), and 1 participant identified as nonbinary (0.3%, $N=1$). Under half of the participants reported being single (46.5%, $N=180$), while 42.4% reported being married or common-law ($N=164$). The majority of participants reported Caucasian ethnicity (73.1%, $N=283$) and heterosexual sexual orientation (82.9%, $N=321$). Highest level of education was varied with 25.6% ($N=99$) reporting some college or university and 42.9% reporting college or university graduate ($N=166$). Yearly reported household income also varied with 12.4% ($N=48$) participants reporting earning between \$20,000-\$29,999 annually and 13.4% ($N=52$) reporting earning between \$75,000-\$99,999 annually.

Demographic information for lifetime nonsuicidal, ideators, and attempters is presented in Table 2. Significant age differences between the three groups were obtained, *Welch's F*(2, 186.71) = 4.86, $p = .009$, $\omega^2 = .02$. Post hoc tests using Bonferroni correction revealed that attempters were significantly older than nonsuicidal participants ($p = .03$) but not ideators ($p = .55$). There were no significant age differences obtained between nonsuicidal participants and ideators ($p = .15$).

Chi-square tests found no significant differences between the three groups on gender χ^2 (4, $N=387$) = 8.42, $p = .077$, $\Phi = .15$, current marital status χ^2 (6, $N=387$) = 4.48, $p = .612$, $\Phi = .11$, highest level of education χ^2 (14, $N=387$) = 19.62, $p = .143$, $\Phi = .22$, and yearly household income χ^2 (20, $N=387$) = 26.32, $p = .156$, $\Phi = .26$. There were some differences observed in

Race/Ethnicity $\chi^2 (12, N=387) = 25.77, p = .012, \Phi = .26$. About 9.4% of the nonsuicidal participant group were East Asian/East Asian descent compared to 7.9% of ideators, and 7.1% of attempters. Similarly, 9.4% of the nonsuicidal participant group were Latin American-Hispanic/Latin American-Hispanic descent compared to 4.4% of the ideators group and 0% of the attempter group. 76.3% of ideators were of European/European descent compared to 68.5% of the nonsuicidal group and 71.4% of the attempter group. 8.6% of the attempter participant group were of African/African descent compared to 7.9% of ideators and 5.9% of nonsuicidal participants. The attempter participant group had the greatest proportion of participants with Native American/Indigenous descent with 1.4% of the sample, compared to 0% of both ideators and nonsuicidal participant group samples. Roughly 1.5% of both nonsuicidal and attempter participant group samples were of Indian-South Asian/Indian-South Asian descent compared to 0.9% of the ideators participant group.

Further, all three groups differed significantly from one another on sexual orientation $\chi^2 (8, N=387) = 34.53, p < .001, \Phi = .30$. Nonsuicidal participants had the greatest proportion of participants who identify as heterosexual (92.1% of the nonsuicidal sample) compared to ideators (75.4%), and attempters (68.6%). Ideator participants had the greatest proportion of participants who identify as bisexual (16.7% of the ideators sample) compared to nonsuicidal participants (4.4%) and attempters (12.9%). Attempters had the greatest proportion of participants who identified as homosexual (8.6% of the attempter sample) compared to ideators (1.8%) and nonsuicidal participants (0.5%).

3.2 Descriptive Statistics and Intercorrelations for Key Study Variables

Table 3 outlines the descriptive statistical information obtained for the entire sample on the study measures. All study variables were normally distributed with skewness and kurtosis

less than ± 2 . Intercorrelations for eating disorder features and suicidal thoughts and behaviours are presented in Table 4.

Further, as we recognize that not all suicide attempts are homogenous, descriptive information on the suicide intent, lethality and medical severity of suicide attempts was included in the analyses (Presented in Table 5).

3.3 Power Analysis and Reporting of Effect Sizes and p -values

Power analyses were conducted a priori through a power sample size analysis ran using an online calculator (<https://www.danielsoper.com/statcalc/calculator.aspx?id=47>). Previous literature on a similar topic did not report effect sizes or common effect size metrics, therefore an effect size of $d = .5$ was chosen as this is common practice to indicate a moderate effect size difference. The power analysis suggested a sample size of 64 in each group to detect a modest effect size of $d = .5$, $\alpha = .05$, and with power .80.

The data analytic plan of the present study utilizes effect size estimates (Cohen's d) to describe the nature of group differences and p -values as a continuous index of the reliability of effect-size estimates, not as a categorical decision involving pre-determined alpha cut-offs. This data analytic plan is consistent with current developments in the field of statistics in science. For instance, a recent article published in Nature proposes that researchers discontinue the conventional use of p -values as a categorical indicator of either supporting or refuting a scientific hypothesis (Amrhein, Greenland, & Mcshane, 2019). Rather, the article, which has over 800 signatories, suggests employing the view of p -values as a continuous index of reliability.

3.4 Study Aim 1:

The first aim of the present study is to determine if ED features may be involved in the progression from suicidal thoughts to action. Therefore, the study first assessed whether

individuals with a history of suicide attempts were more likely to endorse ED features compared to individuals with a history of ideation but no history of suicide attempts. Particularly, we were hypothesizing that individuals with a history of suicide attempts to be more likely to endorse bingeing and purging symptoms. In addition, we will explore (1) whether other features of EDs differentiated attempts from ideation, (2) explore gender differences on ED features between suicide groups, and (3) to explore whether clinical variables and traditionally cited risk-factors for suicide ideation and attempts are potential covariates in the association between ED features of interest and suicide.

3.4.1 Eating Disorder Features

Non-Suicidal vs. Ideators

We first examined which ED features distinguished nonsuicidal participants from suicide ideators to provide a context for understanding ED differences between attempters and ideators. Given that epidemiological and meta-analytic evidence suggests that strong predictors of suicide ideation are minimally predictive of suicide attempts (Kessler, Borges, & Walters, 1999; May & Klonsky, 2016; Nock, Borges, & Ono, 2012), we wanted to examine differences in ED features when comparing nonsuicidal vs ideators to ideators vs attempters.

Table 6 summarizes the effect size (Cohen's d) differences in the nine EPSI subscales which correspond to eating disorder features. Independent samples t -tests revealed small to moderate differences between nonsuicidal participants and ideators (Cohen's d range = -.44 to .07). Ideators scored significantly higher on the Body Dissatisfaction subscale ($d = -.39, p = .001$), Binge Eating subscale ($d = -.22, p = .051$), Cognitive Restraint ($d = -.29, p = .012$), Purging ($d = -.30, p = .007$), Restricting ($d = -.44, p < .001$), Muscle Building ($d = -.23, p = .044$), and the Total Subscale Scores ($d = -.39, p < .001$) compared to nonsuicidal participants.

Given that previous literature discusses differences in ED features endorsed between women and men (Lewinsohn, Seeley, Moerk, & Striegel-Moore, 2002; Striegel-Moore et al., 2009), we also examined which ED features distinguished nonsuicidal participants from suicide ideators in men and women separately. As outlined in Table 7, small to moderate effect sizes were found between women nonsuicidal participants and ideators. Specifically, women ideators scored significantly higher on the Body Dissatisfaction subscale ($d = -.34, p = .025$), Cognitive Restraint ($d = -.36, p = .018$), Purging ($d = -.36, p = .011$), Restricting ($d = -.41, p = .006$), Excessive Exercise ($d = -.32, p = .031$), Muscle Building ($d = -.36, p = .014$), and the Total Subscale Scores ($d = -.43, p = .005$) compared to nonsuicidal participants. In men there were fewer, but significant moderate differences between nonsuicidal participants and ideators; Body Dissatisfaction subscale ($d = -.51, p = .007$), Binge Eating ($d = -.30, p = .094$), Purging ($d = -.20, p = .264$), Restricting ($d = -.48, p = .008$), and the Total Subscale Scores ($d = -.32, p = .043$).

Ideators vs. Attempters

We next examined which ED features distinguished suicide ideators (without attempts) from suicide attempters (Table 8) to evaluate our hypothesis of study aim 1. Smaller differences were observed on four of the subscales between ideators and attempters (Cohen's d range = $-.31$ to $.00$), indicating that attempters scored slightly higher on Restrictive eating behaviours ($d = -.20, p = .022$), Cognitive Restraint subscale ($d = -.23, p = .035$), Excessive Exercise subscale ($d = -.26, p = .040$), and the Muscle Building subscale ($d = -.31, p = .044$) compared to ideators.

Further, in regard to gender differences on EPSI subscales when comparing ideators and attempters, Table 9 outlines small to moderate differences on many of the EPSI subscales. Specifically, women attempters scored significantly higher on the Cognitive Restraint subscale

($d = -.34, p = .044$), Restricting behaviours ($d = -.21, p = .253$), Excessive Exercise ($d = -.37, p = .044$), and Muscle Building ($d = -.46, p = .020$) compared to ideators. Interestingly, women ideators scored higher on the Body Dissatisfaction subscale ($d = .32, p = .041$), Binge Eating subscale ($d = .29, p = .126$), and the Total Subscale Scores ($d = .30, p = .011$) compared to attempters. In men, only one subscale was significantly different between ideators and attempters; attempters were more likely to endorse Binge Eating ($d = -.28, p = .031$) compared to ideators.

3.4.2 Traditional Correlates and Potential Covariates

Regarding one of the exploratory aspects of the first study aim, traditional correlates for suicidal thoughts and behaviours were included in the analyses, given that they may influence the association between ED features and suicide. Specifically, these traditional correlates include clinical variables such as; past-year drug abuse, depression, and anxiety, as well as theory-driven suicide risk factors such as; hopelessness, psychological pain (psychache), thwarted belongingness, perceived burdensomeness, and emotion dysregulation. These variables were first examined here as traditional correlates, and in later analyses as covariates. Nonsuicidal self-injury was also examined as a potential covariate in the relationship between ED features of interest and suicide attempts.

Non-Suicidal vs. Ideators

As outlined in Table 10, independent samples *t*-tests revealed that non-suicidal participants and ideators differed significantly on almost all traditional correlates, with moderate to strong effect sizes (Cohen's d range = .38 to .89). Significant differences on traditional correlates included past-year drug abuse ($d = -.38, p = .001$), depression ($d = -.64, p = .003$), anxiety ($d = -.62, p < .001$), hopelessness ($d = -.62, p < .001$), psychache ($d = -.89, p < .001$),

thwarted belongingness ($d = -.49, p < .001$), perceived burdensomeness ($d = -.74, p < .001$), and emotion dysregulation ($d = -.68, p < .001$). These results indicate that ideators scored significantly higher on all aforementioned traditional correlates compared to nonsuicidal participants.

Ideators vs. Attempters

As outlined in Table 10, independent samples t -tests revealed that differences between ideators and attempters ranged from negligible to moderate. Small differences on traditional correlates included depression ($d = -.35, p = .024$), anxiety ($d = -.31, p = .041$), psychache ($d = -.28, p = .061$), thwarted belongingness ($d = -.39, p = .005$), perceived burdensomeness ($d = -.20, p = .177$), and emotion dysregulation ($d = -.24, p = .117$). Such results indicate that attempters scored slightly higher on the aforementioned traditional correlates compared to ideators.

3.4.3 Covariate Analyses

Nonsuicidal vs. Ideator

First, the eight ED features subscales were simultaneously entered into a binary logistic regression. The logistic regression model was statistically significant $\chi^2(8) = 30.444, p < .001$. The eight subscales together explained 12.6% (Nagelkerke R^2) of the variance in nonsuicidal vs. ideators status and correctly classified 68.8% of cases. Two of the eight ED features subscales accounted for unique variance in differentiating ideators from non-suicidal individuals; Restricting (Odds Ratio = 1.08, 95% CI [1.02 – 1.14]), and Negative Attitudes Towards Obesity (Odds Ratio = .934, 95% CI [.89 - .98])

Next, logistic regressions were utilized to determine whether significant differences on ED features between nonsuicidal participants and ideators remained after controlling for the aforementioned traditional correlates of suicidal thoughts and behaviours. In each regression, the

relevant ED feature was included as the predictor, one of the covariates was entered, and the outcome was group status (nonsuicidal vs. ideators). For example, in one regression analyses binge-eating was entered as the predictor, depression was entered as the covariate, and group status was nonsuicidal vs. ideator.

As seen in Table 11 and Table 12, only Body Dissatisfaction maintained statistically significant relationships to group status (nonsuicidal vs. ideator) when controlling for all 9 covariates (past-year drug abuse, depression, anxiety, hopelessness, psychache, thwarted belongingness, perceived burdensomeness, emotion dysregulation, and a history of nonsuicidal self-injury; $ps < .05$). Cognitive Restraint remained significant when controlling for past-year drug abuse and thwarted belongingness ($ps < .05$), but not for depression, anxiety, hopelessness, psychache, perceived burdensomeness, emotion dysregulations, or nonsuicidal self-injury ($ps > .05$). Additionally, Restricting remained significant while controlling for past-year drug abuse, depression, anxiety, hopelessness, thwarted belongingness, emotion dysregulation, and nonsuicidal self-injury ($ps < .05$), however not when controlling for psychache or perceived burdensomeness ($ps > .05$). The subscales total score remained significant while controlling for past-year drug abuse, hopelessness, thwarted belongingness, and nonsuicidal self-injury ($ps < .05$), but not when controlling for depression, anxiety, psychache, or perceived burdensomeness ($ps > .05$). Binge-eating, Purging, and Muscle Building did not maintain statistically significant relationships with suicide ideation after controlling for each of the covariates ($ps > .05$).

Ideator vs. Attempter

We next examined whether significant differences on ED features between ideators and attempters remained after controlling for traditional clinical correlates. The logistic regression model for the eight ED features subscales were not statistically significant $\chi^2(8) = 13.096, p =$

.109. The eight subscales together explained 9.4% (Nagelkerke R^2) of the variance in ideators vs. attempter status and correctly classified 62.3% of cases. Only one of the eight ED features subscales accounted for unique variance in differentiating ideators from attempters; Muscle Building (Odds Ratio = .877, 95% CI [.78 - .99]).

As seen in Table 13 and Table 14, Cognitive Restraint and Excessive Exercise both maintained statistically significant relationships to group status (ideator vs. attempter) when controlling for Depression, Anxiety, Psychache, Thwarted Belongingness, and a history of nonsuicidal self-injury ($ps < .05$). However, Cognitive Restraint and Excessive Exercise did not maintain statistically significant relationships to group status when controlling for past-year drug abuse, hopelessness, perceived burdensomeness, and emotion dysregulation ($ps > .05$). Restricting behaviours maintained significant when controlling for depression, thwarted belongingness, and nonsuicidal self-injury ($ps < .05$), but did not remain significant when controlling for past-year drug abuse, anxiety, hopelessness, psychache, perceived burdensomeness, and emotion dysregulation ($ps > .05$). Muscle Building remained significant while controlling for past-year drug abuse, depression, anxiety, psychache, thwarted belongingness, emotion dysregulation, perceived burdensomeness, and nonsuicidal self-injury ($ps < .05$); however, did not remain significant when controlling for hopelessness.

3.5 Study Aim 2:

The second aim of the present study is to explore if capability for suicide (as a broadened construct) is one theoretical construct that may explain why individuals with certain defining features of EDs are at greater risk for suicide compared to those with other features. We are examining whether the relationship between ED behaviours and suicide attempts is mediated by capability.

3.5.1 Exploratory Factor Analysis

Existing measures of suicide capability may not encompass the entire construct. For example, some measures specifically address acquired capability (but not practical or dispositional), and others target fear of death, but not pain or injury. Consequently, we included multiple suicide capability measures in the current study. Table 15 displays the correlations between the several measures of capability used in this study. Given that, to our knowledge, this is the first study to include each of these measures of capability, and because different measures include items addressing both overlapping and potentially distinct content domains, we first conduct an exploratory factor analysis on all capability items. This approach will allow us to identify distinct, reliable domains of suicide capability that cover the construct more comprehensively than any single measure.

Therefore, exploratory factor analysis using a principal-axis factor extraction with promax rotation was conducted to determine the factor structure of several suicide capability measures. Bartlett's test of sphericity, which tests the overall significance of all the correlations within the correlation matrix, was significant ($\chi^2(351) = 5952.91, p < 0.001$) indicating that it was appropriate to use the factor analytic model on this set of data. The Kaiser-Meyer-Olkin measure of sampling adequacy indicated that the strength of the relationships among variables was high ($KMO = .88$). Analyses revealed a three-factor solution (eigenvalues: 7.6, 3.9, 2.4) which, combined, accounted for a total of 52% of the variance. Table 16 outlines the summary of exploratory factor analysis results for the capability measures. Factor 1 indexed fearlessness about death ($\alpha = .92$), Factor 2 indexed practical capability ($\alpha = .88$), and Factor 3 indexed pain tolerance ($\alpha = .80$).

Correlations among the subscales obtained from the exploratory factor analysis and suicide ideation and attempts are displayed in Table 17. With regards to capability facets distinguishing between ideators and attempters, small differences were found on Fearlessness About Death ($d = .33, p = .033$), Practical Capability ($d = .21, p = .036$), and Pain Tolerance ($d = .28, p = .067$) subscales between the two groups.

3.5.2 Mediation Analyses

Next, we tested a mediation model, where the three factor capability subscales obtained from the factor analysis, mediates the relationship between ED features (with Cohen's d .20 and higher) and suicide attempt history. PROCESS SPSS Macro, model four, was used to calculate the pathways in the proposed mediation models (Preacher & Hayes, 2008).

Cognitive Restraint

Using bootstrapping with 5,000 resamples, the indirect effect yielding a 95% confidence interval included zero for both the model of Cognitive Restraint and suicide attempt history mediated by fearlessness about death, as well as, cognitive restraint and suicide attempt history mediated by pain tolerance. Therefore, there was no mediation effect.

However, the indirect effect yielded a 95% confidence interval that did not include zero for the model of cognitive restraint and suicide attempt history mediated by practical capability (see Figure 2). All conditions for mediation were met (Baron & Kenny, 1986; Preacher & Hayes, 2008), indicating that practical capability did account for the relationship between cognitive restraint and suicide attempts.

Restricting

Similarly, the indirect effect yielded a 95% confidence interval that included zero for both the model of restricting behaviours and suicide attempt history mediated by fearlessness

about death, as well as, restricting behaviours and suicide attempt history mediated by pain tolerance. Therefore, there was no mediation effect.

In regard to the model of restricting behaviours and suicide attempt history mediated by practical capability, the indirect effect yielded a 95% confidence interval that did not include zero, indicating that practical capability mediated the relationship between restricting and suicide attempts (see Figure 3).

Excessive Exercise

No mediation model was found for the model of excessive exercise and suicide attempt history mediated by fearlessness about death and excessive exercise and suicide attempt history mediated by practical capability (95% confidence intervals included zero). Using bootstrapping with 5,000 resamples, the indirect effect yielded a 95% confidence interval that did not include zero for the model of excessive exercise and suicide attempts mediated by pain tolerance. However, conditions for mediation were not met, as the total effect ($c = .004, p = .61$) and the direct effect ($c' = .008, p = .29$) was not found to be significant, while path a and b were significant. As path a and b were significant, c' was not significant, and c was not significant, conditions were not met for mediation (Baron & Kenny, 1986; Preacher & Hayes, 2008).

Muscle Building

No mediation model was found for the model of muscle building and suicide attempt history mediated by fearlessness about death (95% confidence intervals included zero). Using bootstrapping with 5,000 resamples, the indirect effect yielded a 95% confidence interval that did not include zero for the model of excessive exercise and suicide attempts mediated by practical capability as well as the model of excessive exercise and suicide attempts mediated by pain tolerance. However, conditions for mediation were not met for either model, as the total

effect ($c = .013, p = .89$; $c = .001, p = .90$) and the direct effect ($c' = .011, p = .18$; $c' = .003, p = .73$) was not found to be significant, while path a and b were significant. As path a and b were significant, c' was not significant, and c was not significant, conditions were not met for mediation (Baron & Kenny, 1986; Preacher & Hayes, 2008).

Chapter 4: Discussion

This study investigated the relationship of self-reported eating disorder features to histories of suicidal ideation and suicide attempts using a large, online sample. Eating disorder features were examined given the high prevalence rate of suicide attempts in individuals with eating disorders (Chesney et al., 2014). Attention to features of eating disorders, rather than diagnostic categories, was given due to overlapping features (i.e., purging) across diagnostic categories as well as some evidence suggesting that specific features may be most helpful for explaining heightened suicide rates in ED populations (Bulik et al., 1999; Chesney et al., 2014; Corcos et al., 2002). The current study also examined the construct of suicide capability more broadly and its potential relationship to eating disorder features and suicide history as a mediating variable. The construct of suicide capability was examined given current theories of suicide emphasizing capability as a key factor in the progression to suicide attempts (Klonsky & May, 2015; O’connor, 2011; Van Orden et al., 2010). Further, studies suggest that ED features such as restricting food behaviours/starvation and purging may increase an individual’s capability to attempt suicide through repeated experience with such ED behaviours (Selby et al., 2010).

Results suggest that there are some differences in eating disorder features both between nonsuicidal individuals and ideators and between ideators and attempters. Regarding specific ED features, body dissatisfaction, binge eating, cognitive restraint, purging, restricting, muscle building, and the overall total ED features subscales score differentiated ideators from nonsuicidal participants. Body dissatisfaction and restricting eating behaviours presented the greatest group differences ($d = -.39$ and $d = -.44$, respectively), indicating that ideators were more likely to endorse dissatisfaction with their body and engaging in restricting eating

behaviours (i.e., eating smaller amounts of food, skipping meals) compared to individuals with no history of suicidal thoughts and/or behaviours.

The main hypothesis of the present study speculated that bingeing and purging were ED features that would distinguish suicide ideators from attempters, therefore, we were expecting individuals with a history of attempts to be more likely to endorse bingeing and purging features compared to ideators. However, the hypothesis was not supported. When comparing ideators to attempters, restrictive eating behaviours, cognitive restraint, excessive exercise, and muscle building yielded small differences between the two groups (d range = $-.31$ to $-.20$). Excessive exercise and Muscle Building presented the largest group differences ($d = -.26$ and $d = -.31$, respectively), indicating that attempters were more likely to endorse engaging in activities pertaining to excessive exercise and muscle building compared to ideators.

These results contradict previous' findings which have found an association between bingeing and purging and attempts rather than restrictive eating behaviours and suicide attempts. However, previous studies have mainly focused on such symptoms within diagnostic categories of Anorexia Nervosa and Bulimia Nervosa, rather than looking at the symptoms more generally, which may in part account for differences in findings. One explanation of these results may be that some ED features such as binge-eating and purging decrease from adolescence to adulthood (Abebe, Lien, Torgersen, & Von Soest, 2012). Given that this current sample was comprised of adults (mean age = 35.6 years) it may be that such ED features are no longer relevant for these participants. Another explanation may be that certain features of EDs that are more associated with restriction and discipline (i.e., restrictive eating, cognitive restraint, excessive exercise, and muscle building involve restricting intake of certain foods, being wary of certain caloric-dense foods, etcetera) may represent behaviours that are risk factors for a suicide attempt.

We were also interested in several exploratory research questions. First, we examined whether traditionally cited risk factors of suicidal thoughts and behaviours (past-year drug abuse, depression, anxiety, hopelessness, psychache, thwarted belongingness, perceived burdensomeness, emotion dysregulation, and a history of nonsuicidal self-injury) affected the relationship between ED features and suicide ideation and attempts. Therefore, we analyzed the aforementioned risk factors as potential covariates. Logistic regression analyses revealed that the relationship of ED features to suicidal ideation and attempts was largely, though not completely, explained by the covariate measures; past-year drug abuse, depression, anxiety, hopelessness, psychache, thwarted belongingness, perceived burdensomeness, emotion dysregulation, and a history of nonsuicidal self-injury.

Notably, when looking at nonsuicidal vs ideators, body dissatisfaction was associated with ideation even after controlling for all nine covariates, indicating unique association with suicidal ideation over and above all nine covariate analyses. Restricting eating behaviours was associated with ideation even after controlling for past-year drug abuse, depression, anxiety, hopelessness, thwarted belongingness, emotion dysregulation, and nonsuicidal self-injury but not when controlling for psychache or perceived burdensomeness. Excessive exercise remained significant even after controlling for covariate such as depression, anxiety, psychache, thwarted belongingness, and a history of nonsuicidal self-injury; however, did not remain significant after controlling for past-year drug abuse, hopelessness, perceived burdensomeness, and emotion dysregulation. Similarly, muscle building remained significant while controlling for depression, anxiety, psychache, thwarted belongingness, emotion dysregulation, and nonsuicidal self-injury; however, did not remain significant when controlling for past-year drug abuse, hopelessness, or perceived burdensomeness.

The next exploratory research question analyzed whether there were differences in ED features across suicide history statuses when looking at women separately than men. Specifically, in women, there were moderate differences between ideators and nonsuicidal participants on all but two ED features (i.e., body dissatisfaction, cognitive restraint, purging, restricting, excessive exercise, muscle building, and subscales total score). Similarly, smaller to moderate differences were observed between attempters and ideators on all but two ED features (body dissatisfaction, binge-eating, cognitive restraint, restricting, excessive exercise, muscle building, subscales total score). In men, fewer, although moderate, differences were observed when comparing ideators to nonsuicidal participants (i.e., body dissatisfaction, binge-eating, restricting, subscales total score). Further, in men, only one difference was observed between ideators and attempters on ED features (i.e., binge-eating). This gender difference may support previous research which finds that a variety of ED symptoms (i.e., fasting, purging, body dissatisfaction, drive for thinness), with the exception of binge-eating in some samples, are more prevalent across women than they are in men with women more likely to self-report ED symptoms compared to men (Striegel-Moore et al., 2009; Lewinsohn et al., 2002).

The final exploratory research aims surrounded the notion of capability for suicide. Specifically, the construct of capability was examined as one possible explanation for the findings, particularly as a mediator in the association between ED features and a history of suicide attempts. Broadly speaking, capability for suicide represents the extent an individual is able to engage in potentially harmful acts and situations as well as their comfort with and preparation for potentially harmful situations such as suicide (Joiner, 2005).

The few research studies examining ED features and capability for suicide have only measured one dimension of capability or often used early (and discredited) approaches to

measuring capability (Ribeiro et al., 2014; Silva et al., 2015; Smith et al., 2016; Witte et al., 2015; Zuromski & Witte, 2015). In fact, recent research suggests re-evaluating and re-developing widely used measures of suicide capability due to a lack of psychometric data and low reliability. For this reason, we first conducted an exploratory factor analysis to examine the underlying structure of several suicide capability measures. The first factor represents fearlessness about death. Theories of suicide and suicide capability propose that the act of a suicide attempt is so scary that an individual has to not only have the desire for suicide but overcome the fear of death which relates to the capability to act on desire for suicide (Ribeiro et al., 2014). The second factor represents practical capability which Klonsky and May (2015) define as factors which make a suicide attempt easier or more feasible. For example, knowledge and access to lethal means are considered factors of practical capability which may influence in individual to be more able to act on their suicidal thoughts. The third factor represents pain tolerance, which refers to one's ability to endure pain.

We next examined each capability construct as a mediating factor between the significant ED features and suicide attempt history. Practical capability mediated the relationship between cognitive restraint features and suicide attempt history as well as restricting food behaviours and suicide attempt history. Cognitive restraint refers to behaviours which involve cognitive, rather than behaviourally, restricting food intake (i.e., avoiding foods you believe are high calorie or “unhealthy” and counting calories). Restricting reflects eating smaller amounts of food compared to others, others commenting on the lack of food intake, and skipping meals. No other mediation models were found for the other ED features and capability factors. Thus, the findings partially supported our hypothesis that capability factors would mediate the relationship between ED features and suicide attempt as only one facet of capability supported the mediation model.

Although this speculation is post hoc, one possible explanation of these results may be that engaging in cognitive restraint features of EDs and restricting food behaviours in turn increases ones access to knowledge regarding lethal means which may increase likelihood of acting on suicidal thoughts. As such behaviours may arguably involve searching for knowledge on food types (i.e., on the internet; healthy vs unhealthy, high calorie vs low, harmful vs not) perhaps during this search individuals also come across information and knowledge regarding lethal means and death. However, this is merely a speculation and future studies should seek to investigate the role practical capability may play as a mediator within these relationships.

An alternative explanation may be that practical capability increases the longer one thinks about suicide, including how they might act on it, and in turn increases the ability to actually attempt suicide. Therefore, those reporting cognitive restraint and restricting features may have thought about suicide longer than those reporting other ED features. It may be a product of length of time spent with suicidal thoughts rather than ED features specifically. Furthermore, as previously discussed, previous studies examining ED features and capability have failed to find significant relationships between capability and ED features (as described in chapter 2). However, the aforementioned studies have only assessed one facet of capability – acquired capability – and have mainly focused on fasting and restricting behaviours rather than other features of EDs. Therefore, it is difficult to conclude the extent to which the results of our study overlap with that of previous research.

Taken together, the findings from the current study suggest that several self-reported ED features may be uniquely associated with a history of ideation and few self-reported ED features may be slightly yet uniquely associated with suicide attempts, over and above suicidal ideation. Further, practical capability may account for the relationship between certain ED features and

suicide attempts (i.e., cognitive restraint and restricting behaviours). However, although significant, differences between ideators and attempters were small, therefore interpretation of results should be taken with caution.

In addition, there are unfortunately few studies to compare the findings of this study to. To our knowledge no other study has compared self-reported ED features, outside of a diagnostic category of EDs, in suicide ideators and attempters. Further, no study has examined the role of capability, over and above the one facet of acquired capability and its relationship to ED features and suicide attempts. Future research should seek to further examine the relationship of ED features, outside of their diagnostic categories, to suicidal thoughts and behaviours as well as further explore the role of capability (as a broadened construct), using well-validated measures to examine whether results overlap with those of the present study.

4.1 Implications

Findings from this study have important clinical implications. One aim of suicide risk assessment is identifying who among those with suicidal thoughts are most likely to progress to make a suicide attempt. Risk factors that are widely utilized in risk assessment protocols (i.e., depression, anxiety, impulsivity) have been suggested to actually be more predictive of suicidal thoughts than suicide attempts (Kessler, Borges, & Walters, 1999; Klonsky & May, 2010; Klonsky et al., 2017; M. Nock, Borges, & Ono, 2012). The results of our study, although preliminary, suggest that some ED features (cognitive restraint, restricting, excessive exercise, and muscle building) may be more slightly more associated with lifetime suicide attempts than suicide thoughts. Therefore, endorsement of certain ED features on assessment protocols in individuals with suicidal thoughts might be useful when performing suicide risk assessment. Similarly, as individuals with EDs bear a heightened risk for suicide compared to the general

population (Preti et al., 2011), it may be useful for clinicians and health professionals to identify which ED features may be more predictive of suicidal acts than suicidal thoughts. Further, regarding the finding of practical capability mediating the relationship between certain ED features and suicide attempts, health professionals may utilize such information by identifying ways in which to reduce capability when working with ED or at-risk patients such as, reducing access to lethal means.

Findings also present important theoretical implications. Theories of suicide have introduced and defined capability in different ways. For example, Joiner's Interpersonal Psychological Theory of Suicide focused on acquired capability which refers to the habituation of fear, death, and pain. Klonsky and May's 3-Step Theory expand Joiner's perspective by offering a broader approach to capability, namely introducing practical capability (factors that may make a suicide attempt easier or more feasible), and dispositional capability (factors largely driven by genetics, blood phobia, etc.) in addition to Joiner's concept of acquired capability. The results of the present study finding a three-factor structure of capability (fearlessness about death, practical capability, and pain tolerance) support the 3-Step Theory's expansion of the construct of capability to include practical capability and suggest other potential subscales of capability which should be further evaluated.

4.2 Limitations

There are a number of limitations in the present study. Although, the results suggest that some eating disorder features may be more associated with suicide attempts than suicidal thoughts, whereas others are more associated with suicidal thoughts, the cross-sectional design used in this study precludes the examination of the temporal relationship between ED features and the onset of suicidal thoughts and attempts. The obscurity of the directionality of the findings

limits the conclusions that can be drawn as it is unclear if ED features are a correlate, cause, or consequence of suicidal thoughts and behaviours.

Second, this study utilized only self-report questionnaires to assess study variables. The utility of self-reported information may be susceptible to biases such as, social desirability bias as well as other self-presentation and memory biases. Similarly, participants may be unwilling to disclose or accurately report their personal experiences. Furthermore, using self-reported measures of ED features also limits the ability to integrate findings with previous literature as previous studies have mainly used diagnostic interviews as well as self-report measures to assess ED features and symptoms. Prospective research may seek to incorporate a multi-method approach that includes self-report, clinical interviews and behavioural measures of eating disorder features to further examine the relationship of ED features to suicidal thoughts and behaviours.

Third, some studies suggest that further research needs to be conducted to create a well-validated measure of suicide capability (Ribeiro et al., 2014). The current study employed an exploratory factor analysis to examine the underlying structure of several capability measures. However, the results of a 3-factor structure of capability are preliminary and additional research needs to be conducted to evaluate the factor structure and psychometric properties of the 3-factor structure proposed in this, study across varying samples.

Fourth, the small sample size of individuals with a lifetime history of suicide attempts is also a limitation of the present study. Therefore, caution should be used in interpreting the results of this study as a small sample size may limit the generalizability of findings to the population. Lastly, although previous studies have supported MTurk recruitment samples to be more demographically diverse than undergraduate populations and clinically similar to non-online

samples, (Buhrmester et al., 2011; Shapiro et al., 2013), the generalizability of our findings may be limited due to characteristics of our online sample. For instance, the majority of our participants reported identifying as female, coming from a Caucasian ethnic background, and a heterosexual sexual orientation, which may limit the generalizability of our findings to more diverse populations.

4.3 Future Directions

The present study, to our knowledge, is the first to examine a wide range of eating disorder features - outside of an eating disorder diagnosis or classification system - as well as examine the role of capability, beyond the construct of acquired capability, in its relationship to suicide attempts. Therefore, the present research takes one step towards clarifying and better understanding the elevated suicide attempt rates in eating disorders. While results are preliminary, they suggest that some eating disorder symptoms may be better associated with suicidal thoughts while others with suicide attempts, with features associated with suicide attempts being mediated by practical capability. Future research should further explore features of eating disorders and the role of different constructs of capability to see whether results of prospective studies can be integrated with results of the present study. Additionally, prospective studies should examine eating disorder features across individuals formally diagnosed with eating disorders, rather than compare diagnostic categories of eating disorders, to investigate whether results generalize to a clinical population. To establish the temporal relationship between eating disorder features and suicide, future studies should seek to carefully employ longitudinal research designs examining the relationship of eating disorder features to suicide ideation and attempts to clarify whether these features predict future suicidal thoughts and behaviours.

Table 1. Demographic Information for All Participants

Age (<i>n</i> = 387)	Mean 35.6	SD 10.6
	<i>N</i>	%
SEX		
Male	145	37.5
Female	241	62.3
Other	1	0.3
SEXUAL ORIENTATION		
Straight (Heterosexual)	321	82.9
Bisexual	37	9.6
Gay (Homosexual)	15	3.9
Questioning	5	1.3
Other	9	2.3
MARITAL STATUS		
Single	180	46.5
Married/common-law	164	42.4
Divorced/separated	35	9.0
Widowed	0	0
Other	8	2.1
RACE/ETHNICITY		
African	27	7.0
East-Asian	33	8.5

European/Caucasian	276	71.3
Indian/South-Asian	5	1.3
Latin-American/Hispanic	24	6.2
Middle Eastern	0	0
Native American	3	0.8
Other	19	4.9

HIGHEST LEVEL OF EDUCATION

8 th grade or less	1	0.3
Some high school	1	0.3
High school graduate/GED	35	9.0
Some college or university	99	25.6
College or university graduate	166	42.9
Some graduate or professional school after college	22	5.7
Master's degree	58	15
Doctoral degree	5	1.3

YEARLY HOUSEHOLD INCOME

Less than \$5,000	4	1.0
\$5,000 - \$9,999	8	2.1
\$10,000 - \$19,999	46	11.9

\$20,000 - \$29,999	48	12.4
\$30,000 - \$39,999	48	12.4
\$40,000 - \$49,999	48	12.4
\$50,000 - \$59,000	39	10.1
\$60,000 - \$74,999	38	9.8
\$75,000 - \$99,999	52	13.4
More than \$100,000	49	12.7
Do not wish to answer	7	1.8

Table 2. Demographic Information for Lifetime Nonsuicidal, Ideator, and Attempter Groups

	Nonsuicidal (<i>n</i> =203)		Ideator (<i>n</i> =114)		Attempter (<i>n</i> =70)	
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>
Age	37	10.7	34.6	11.2	33.16	8.8
	N	%	N	%	N	%
SEX						
Male	83	40.9	43	37.7	19	27.1
Female	120	59.1	71	62.3	50	71.4
Other	0	0	0	0	1	1.4
SEXUAL ORIENTATION						
Straight (Heterosexual)	187	92.1	86	75.4	48	68.6
Bisexual	9	4.4	19	16.7	9	12.9
Gay (Homosexual)	5	2.5	4	3.5	6	8.6
Questioning	1	0.5	2	1.8	2	2.9

Other	1	0.5	3	2.6	5	7.1
MARITAL STATUS						
Single	96	47.3	51	44.7	33	47.1
Married/common-law	87	42.9	48	42.1	29	41.4
Divorced/separated	18	8.9	10	8.8	7	10
Widowed	0	0	0	0	0	0
Other	2	1.0	5	4.4	1	1.4
RACE/ETHNICITY						
African	12	5.9	9	7.9	6	8.6
East-Asian	19	9.4	9	7.9	5	7.1
European/Caucasian	139	68.5	87	76.3	50	71.4
Indian/South-Asian	3	1.5	1	0.9	1	1.4
Latin-American/Hispanic	19	9.4	5	4.4	0	0

Middle Eastern	0	0	0	0	0	0
Native American	0	0	0	0	3	4.3
Other	11	5.4	3	2.6	5	7.1

HIGHEST LEVEL OF EDUCATION

8 th grade or less	0	0	0	0	1	1.4
Some high school	0	0	0	0	1	1.4
High school graduate/GED	15	7.4	9	7.9	11	15.7
Some college or university	47	23.2	30	26.3	22	31.4
College or university graduate	97	47.8	48	42.1	21	30
Some graduate or professional school after college	12	5.9	6	5.3	4	5.7
Master's degree	29	14.3	20	17.5	9	12.9
Doctoral degree	3	1.5	1	0.9	1	1.4

YEARLY HOUSEHOLD INCOME

Less than \$5,000	1	0.5	1	0.9	2	2.9
\$5,000 - \$9,999	6	3.0	1	0.9	1	1.4
\$10,000 - \$19,999	22	10.8	11	9.6	13	18.6
\$20,000 - \$29,999	24	11.8	13	11.4	11	15.7
\$30,000 - \$39,999	21	10.3	19	16.7	8	11.4
\$40,000 - \$49,999	21	10.3	15	13.2	12	17.1
\$50,000 - \$59,000	17	8.4	16	14	6	8.6
\$60,000 - \$74,999	21	10.3	11	9.6	6	8.6
\$75,000 - \$99,999	32	15.8	15	13.2	5	7.1
More than \$100,000	35	17.2	9	7.9	5	7.1
Do not wish to answer	3	1.5	3	2.6	1	1.4

Table 3. Descriptive Statistics for All Participants on Study Measures

	All Participants (N=387)			
	Mean	<i>SD</i>	Skew.	Kurt.
Acquired Capability with Rehearsal for Suicide Scale (ACWRSS)				
<i>Subscales Total</i>	23.70	11.63	.39	-0.17
Pain Tolerance	7.79	4.20	-0.04	-0.70
Fearlessness of Death	5.60	4.66	0.55	-0.71
Preparation for Suicide	10.31	7.68	0.22	-1.12
Acquired Capability for Suicide Scale – Fearlessness about Death				
Fearlessness about Death	12.78	7.69	0.21	-0.83
Beck Hopelessness Scale (BHS)				
Total Score	1.35	1.55	0.68	-1.13
Beck Suicide Ideation Scale (BSI)^a				
Total Score	9.14	6.71	1.19	1.24
Drug Abuse Screening Test (DAST)				
Total Score	1.35	2.27	2.09	3.76
Difficulties in Emotion Regulation Scale (DERS)				
<i>Subscales Total</i>	44.67	14.15	0.25	-0.59
Awareness	7.04	2.63	0.50	-0.04
Clarity	5.91	2.63	0.96	0.33

All Participants (N=387)				
	Mean	<i>SD</i>	Skew.	Kurt.
Goals	9.84	3.55	-0.22	-0.91
Impulse	6.48	3.42	0.84	-0.23
Nonacceptance	7.98	3.70	0.31	-1.03
Strategies	7.42	3.53	0.51	-0.79
Eating Pathology Symptoms Inventory (EPSI)				
<i>Subscales Total</i>	53.23	27.93	0.56	0.35
Body Dissatisfaction	13.68	7.95	0.02	-0.94
Binge Eating	11.26	8.23	0.61	-0.34
Cognitive Restraint	5.10	3.20	0.29	-0.70
Purging	2.78	4.80	1.98	1.66
Restricting	5.55	5.60	0.99	0.19
Excessive Exercise	5.40	4.94	0.79	-0.20
Negative Attitudes Toward Obesity	6.39	5.54	0.58	-0.60
Muscle Building	3.06	3.91	1.76	1.97
Interpersonal Needs Questionnaire (INQ)				
<i>Subscales Total</i>	44.76	20.66	0.42	-0.62

All Participants (N=387)				
	Mean	SD	Skew.	Kurt.
Thwarted Belongingness	31.67	14.04	0.14	-0.89
Perceived Burdensomeness	13.09	8.90	1.23	0.58
PROMIS-SF				
<i>Subscales Total</i>	19.80	8.04	0.31	-0.56
Depression	9.86	4.33	0.33	-0.76
Anxiety	9.95	4.11	0.30	-0.57
Psychache Scale				
Total Score	29.92	13.26	0.70	-0.36
Suicide Capability Items – Research Scale				
<i>Subscales Total</i>	22.05	4.63	-0.06	0.02
Practical Capability	9.63	3.05	-0.39	-0.57
Acquired Capability	12.42	2.76	-0.34	0.84
Suicide Capability Scale				
<i>Subscales Total</i>	18.21	7.20	0.02	-0.25
Dispositional Capability	5.72	2.90	0.14	-0.49
Acquired Capability	6.58	2.89	-0.18	-0.52

All Participants (N=387)				
	Mean	<i>SD</i>	Skew.	Kurt.
Practical Capability	5.91	4.10	-0.11	-1.34
Suicide Intent Scale^b				
Total Score	8.78	1.99	-0.08	-0.56

Note. a = only completed by those who endorsed a history of suicide ideation (ideators) and a history of suicide attempts (attempters) *n*=184

b = only completed by those who endorsed a history of suicide attempts (*n*=70)

Table 4. Intercorrelations for Key Study Measures

Variables	1	2	3	4	5	6	7	8	9	10
1. Lifetime Ideation ^a	-									
2. Suicide Attempt ^b	.49	-								
3. EPSI – Body Dissatisfaction	.17	.05	-							
4. EPSI – Binge Eating	.09	.01	.58	-						
5. EPSI – Cognitive Restraint	.10	.02	.36	.22	-					
6. EPSI – Purging	.15	.08	.35	.40	.27	-				
7. EPSI – Restricting	.25	.18	.19	.03	.21	.40	-			
8. EPSI – Excessive Exercise	.02	.07	.17	.16	.50	.34	.30	-		
9. EPSI – Negative Attitudes	-.03	-.01	.31	.37	.26	.29	.18	.31	-	
10. EPSI – Muscle Building	.06	.06	.16	.26	.31	.51	.35	.51	.37	-

Note. Correlations above 0.10 and 0.15 are statistically significant at alphas of 0.05 and 0.01, respectively.

^a This variable is determined by YRBS Survey Q1, “Have you ever seriously thought about killing yourself?”.

^b This variable is determined by YRBS Survey Q3, “Have you ever tried to kill yourself”.

Table 5. Descriptive Information on Suicide Intent, Lethality, and Medical Severity of Attempts

Attempters (N=70)	<i>N</i>	%
Attempter Status Recency^a		
Non-Recent Attempter (over 12 months)	60	85.7
Recent Attempter (within 12 months)	10	14.3
Attempter Status Multiple^b		
One Attempt	34	48.6
Multiple Attempt	36	51.4
Age at First Attempt		
10-14	23	32.8
15-19	22	31.4
20-24	16	22.9
25-29	4	5.7
30-39	4	5.7
Method at First Attempt		
Overdose (alcohol/drugs/pills)	38	54.3
Poison	1	1.4
Cutting	14	20
Hanging	7	10
Carbon Monoxide	1	1.4
Jumping	2	2.9
Drowning	3	4.3
Other	4	5.7
Lethality at First Attempt^c		
No	37	52.9
Yes	33	47.1
Medical Severity at First Attempt^d		
No	46	65.7
Yes	24	34.3
Suicide Intent		
<i>Total Score</i>		
4-6 (Low Intent)	7	10.0
7-9 (Medium Intent)	38	54.3
10-12 (High Intent)	25	35.7

^a = attempter status recency (past 12 months); based on YBRS Survey Q3 and Q8^b = attempter status multiple; based on YRBS Survey Q4^c = lethality at first attempt; based on SHF Q6 "Did your first suicide attempt result in an injury or poisoning?"^d = medical severity at first attempt; based on SHF Q7 by "Did your first suicide attempt require medical attention?"

Table 6. Differences on EPSI Subscales between Nonsuicidal and Ideator Groups

	Group	<i>n</i>	Mean	Std. Deviation	Std. Error Mean	<i>d</i>	<i>p</i>
Eating Pathology Symptoms Inventory (EPSI)							
<i>Subscales Total Score</i>	Nonsuicidal	203	48.84	25.95	1.82	-0.39	< .001
	Ideator	114	59.66	29.69	2.78		
Body Dissatisfaction	Nonsuicidal	203	12.38	8.00	0.56	-0.39	.001
	Ideator	114	15.48	7.74	0.73		
Binge Eating	Nonsuicidal	203	10.60	7.86	0.55	-0.22	.051
	Ideator	114	12.39	8.61	0.81		
Cognitive Restraint	Nonsuicidal	203	4.80	3.00	0.21	-0.29	.012
	Ideator	114	5.73	3.38	0.32		
Purging	Nonsuicidal	203	2.07	4.03	0.28	-0.30	.007
	Ideator	114	3.56	5.66	0.53		
Restricting	Nonsuicidal	203	4.24	4.75	0.33	-0.44	< .001
	Ideator	114	6.57	5.79	0.54		
Excessive Exercise	Nonsuicidal	203	5.33	4.64	0.33	-0.13	.242
	Ideator	114	6.00	5.29	0.50		
Negative Attitudes Towards Obesity	Nonsuicidal	203	6.57	5.57	0.39	0.07	.523
	Ideator	114	6.16	5.45	0.51		
Muscle Building	Nonsuicidal	203	2.85	3.72	0.26	-0.23	.044
	Ideator	114	3.77	4.33	0.41		

Note. A positive directionality of *d* values indicates that nonsuicidal participants scored higher than ideators on the particular subscales whereas a negative directionality signifies that ideators scored higher than nonsuicidal participants.

Table 7. Differences on EPSI Subscales between Nonsuicidal and Ideator Groups Across Gender

Nonsuicidal vs. Ideator				
	Women		Men	
	Cohen's <i>d</i>	<i>p</i> -value	Cohen's <i>d</i>	<i>p</i> -value
Eating Pathology Symptoms Inventory (EPSI)				
<i>Subscales Total Score</i>	-0.43	.005	-0.32	.043
Body Dissatisfaction	-0.34	.025	-0.51	.007
Binge Eating	-0.26	.298	-0.30	.094
Cognitive Restraint	-0.36	.018	-0.19	.301
Purging	-0.36	.011	-0.20	.264
Restricting	-0.41	.006	-0.48	.008
Excessive Exercise	-0.32	.031	0.11	.562
Negative Attitudes Towards Obesity	0.10	.526	0.03	.896
Muscle Building	-0.36	.014	-0.15	.426

Note. For women; *n* = 120 for nonsuicidal participants, *n* = 71 for ideators. For men; *n* = 83 for nonsuicidal participants, *n* = 43 for ideators.

A positive directionality of *d* values indicates that nonsuicidal participants scored higher than ideators on the particular subscales whereas a negative directionality signifies that ideators scored higher than nonsuicidal participants.

Table 8. Differences on EPSI Subscales between Ideator and Attempter Groups

	Group	<i>n</i>	Mean	Std. Deviation	Std. Error Mean	<i>d</i>	<i>p</i>
Eating Pathology Symptoms Inventory (EPSI)							
<i>Subscales Total Score</i>	Ideator	114	55.49	28.59	3.44	-0.14	.352
	Attempter	70	59.66	29.69	2.78		
Body Dissatisfaction	Ideator	114	14.49	7.54	0.91	-0.13	.398
	Attempter	70	15.48	7.74	0.73		
Binge Eating	Ideator	114	11.36	8.58	1.03	-0.12	.436
	Attempter	70	12.39	8.61	0.81		
Cognitive Restraint	Ideator	114	4.96	3.36	0.40	-0.23	.035
	Attempter	70	5.73	3.38	0.32		
Purging	Ideator	114	3.56	5.66	0.53	0.00	.990
	Attempter	70	3.55	5.08	0.61		
Restricting	Ideator	114	6.57	5.79	0.54	-0.20	.022
	Attempter	70	7.78	6.51	0.79		
Excessive Exercise	Ideator	114	4.64	5.15	0.62	-0.26	.040
	Attempter	70	6.00	5.29	0.50		
Negative Attitudes Towards Obesity	Ideator	114	6.16	5.45	0.51	-0.02	.917
	Attempter	70	6.25	5.67	0.68		
Muscle Building	Ideator	114	2.53	3.61	0.44	-0.31	.044
	Attempter	70	3.77	4.33	0.41		

Note. A positive directionality of *d* values indicates that ideators scored higher than attempters on the particular subscales whereas a negative directionality signifies that attempters scored higher than ideators participants.

Table 9. Differences on EPSI Subscales between Ideator and Attempter Groups Across Gender

Ideator vs. Attempter				
	Women		Men	
	Cohen's <i>d</i>	<i>p</i> -value	Cohen's <i>d</i>	<i>p</i> -value
Eating Pathology Symptoms Inventory (EPSI)				
<i>Subscales Total Score</i>	0.30	.011	-0.12	.674
Body Dissatisfaction	0.32	.041	0.00	.991
Binge Eating	0.29	.126	-0.28	.031
Cognitive Restraint	-0.34	.044	0.00	.998
Purging	0.08	.688	-0.15	.600
Restricting	-0.21	.253	-0.14	.611
Excessive Exercise	-0.37	.044	-0.04	.870
Negative Attitudes Towards Obesity	-0.09	.629	0.01	.981
Muscle Building	-0.46	.020	0.05	.849

Note. For women; $n = 71$ for ideators, $n = 49$ for attempters. For men; $n = 43$ for ideators, $n = 19$ for attempters.

A positive directionality of d values indicates that ideators scored higher than attempters on the particular subscales whereas a negative directionality signifies that attempters scored higher than ideators participants

Table 10. Differences on Traditional Correlates between Lifetime Nonsuicidal, Ideators, and Attempter Groups

	Nonsuicidal vs. Ideator		Ideator vs. Attempter	
	Cohen's <i>d</i>	<i>p</i> -value	Cohen's <i>d</i>	<i>p</i> -value
BHS				
Total Score	-0.62	< .001	0.08	.576
DAST				
Total Score	-0.38	.001	0.15	.341
DERS				
<i>Subscales Total</i>	-0.68	< .001	-0.24	.117
Awareness	0.06	.638	-0.01	
Clarity	-0.42	< .001	0.03	.819
Goals	-0.65	< .001	-0.14	.340
Impulse	-0.55	< .001	-0.17	.244
Nonacceptance	-0.53	< .001	-0.28	.068
Strategies	-0.69	< .001	-0.28	.064
INQ				
Perceived Burdensomeness	-0.74	< .001	-0.20	.177
Thwarted Belongingness	-0.49	< .001	-0.43	.005
PROMIS				
Anxiety	-0.62	< .001	-0.31	.041
Depression	-0.64	.003	-0.35	.024
PSYCHACHE				
Total Score	-0.89	< .001	-0.28	.061

Note. For the Nonsuicidal vs Ideator column positive directionality of *d* values indicates that nonsuicidal participants scored higher than ideators on the particular subscales whereas a negative directionality signifies that ideators scored higher than nonsuicidal participants. For the Ideator vs Attempter column positive directionality of *d* values indicates that ideators scored higher than attempters on the particular subscales whereas a negative directionality signifies that attempters scored higher than ideators

Table 11. Logistic Regression Using EPSI Subscales to Predict Ideator vs. Nonsuicidal Group Status: Controlling for Clinical Covariates

Covariate	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
Past-Year Drug Abuse								
EPSI Body Dissatisfaction	.05	.02	9.65	1	.002	1.05	1.02	1.08
EPSI Binge Eating	.02	.02	1.65	1	.199	1.02	.99	1.05
EPSI Cognitive Restraint	.09	.04	5.52	1	.019	1.09	1.02	1.18
EPSI Purging	.05	.03	3.57	1	.059	1.05	1.00	1.10
EPSI Restricting	.07	.02	9.61	1	.002	1.08	1.03	1.13
EPSI Muscle Building	.04	.03	1.45	1	.228	1.04	.98	1.10
EPSI Subscales Total Score	.01	.01	6.63	1	.010	1.01	1.00	1.02
Depression								
EPSI Body Dissatisfaction	.02	.02	1.13	1	.021	1.02	.98	1.05
EPSI Binge Eating	-.01	.02	.042	1	.837	1.00	.97	1.03
EPSI Cognitive Restraint	.07	.04	3.41	1	.071	1.08	.99	1.16

EPSI Purging	.03	.03	.98	1	.321	1.03	.98	1.08
	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
EPSI Restricting	.06	.02	6.10	1	.014	1.06	1.01	1.11
EPSI Muscle Building	.04	.03	1.57	1	.211	1.04	.98	1.10
EPSI Subscales Total Score	.01	.01	1.34	1	.248	1.01	1.00	1.02
Anxiety								
EPSI Body Dissatisfaction	.02	.02	1.85	1	.017	1.02	.99	1.06
EPSI Binge Eating	.01	.02	.001	1	.975	1.00	.97	1.03
EPSI Cognitive Restraint	.07	.04	3.25	1	.072	1.07	.99	1.16
EPSI Purging	.03	.03	1.34	1	.246	1.03	.98	1.08
EPSI Restricting	.05	.02	4.61	1	.032	1.05	1.00	1.10
EPSI Muscle Building	.04	.03	1.85	1	.174	1.04	.98	1.11
EPSI Subscales Total Score	.01	.01	1.85	1	.173	1.01	1.00	1.02

Table 12. Logistic Regression Using EPSI Subscales to Predict Ideator vs. Nonsuicidal Group Status: Controlling for Theory Driven Suicide Risk Covariates

Covariate	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
Hopelessness								
EPSI Body Dissatisfaction	.03	.02	3.28	1	.040	1.03	1.00	1.06
EPSI Binge Eating	.01	.02	.653	1	.42	1.01	.98	1.04
EPSI Cognitive Restraint	.08	.04	3.78	1	.052	1.08	1.00	1.17
EPSI Purging	.05	.03	3.02	1	.082	1.05	.99	1.10
EPSI Restricting	.07	.02	7.62	1	.006	1.07	1.02	1.12
EPSI Muscle Building	.05	.03	2.87	1	.090	1.05	.99	1.12
EPSI Subscales Total Score	.01	.01	4.60	1	.032	1.01	1.00	1.02
Psychache								
EPSI Body Dissatisfaction	.01	.02	.18	1	.037	1.01	.97	1.04
EPSI Binge Eating	-.01	.02	.08	1	.780	.99	.96	1.03
EPSI Cognitive Restraint	.06	.04	2.30	1	.133	1.06	.98	1.15

	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
EPSI Purging	.01	.03	.01	1	.936	1.00	.95	1.06
EPSI Restricting	.03	.03	1.62	1	.204	1.03	.98	1.10
EPSI Muscle Building	.02	.03	.35	1	.556	1.02	.96	1.10
EPSI Subscales Total Score	.01	.01	.03	1	.868	1.00	.99	1.01
Thwarted Belongingness								
EPSI Body Dissatisfaction	.03	.01	11.11	1	.001	1.03	1.01	1.05
EPSI Binge Eating	.01	.02	.93	1	.334	1.02	.98	1.05
EPSI Cognitive Restraint	.10	.04	6.28	1	.012	1.10	1.02	1.19
EPSI Purging	.05	.03	3.74	1	.053	1.05	1.00	1.10
EPSI Restricting	.07	.02	8.90	1	.003	1.07	1.02	1.12
EPSI Muscle Building	.04	.03	1.97	1	.160	1.04	.98	1.10
EPSI Subscales Total Score	.01	.01	5.34	1	.021	1.01	1.00	1.02
Perceived Burdensomeness								
EPSI Body Dissatisfaction	.03	.02	2.24	1	.013	1.03	.99	1.06

	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
EPSI Binge Eating	.01	.02	.03	1	.864	1.00	.97	1.04
EPSI Cognitive Restraint	.07	.04	3.28	1	.070	1.08	.99	1.16
EPSI Purging	-.01	.03	.01	1	.947	1.00	.94	1.06
EPSI Restricting	.04	.03	2.84	1	.092	1.04	.99	1.10
EPSI Muscle Building	-.006	.03	.03	1	.862	.99	.93	1.06
EPSI Subscales Total Score	.01	.01	.40	1	.527	1.00	.99	1.01
Emotion Dysregulation								
EPSI Body Dissatisfaction	.02	.02	1.11	1	.029	1.12	.99	1.05
EPSI Binge Eating	-.01	.02	.34	1	.560	.99	.96	1.02
EPSI Cognitive Restraint	.06	.04	1.99	1	.158	1.06	.98	1.14
EPSI Purging	.012	.03	.21	1	.648	1.01	.96	1.07
EPSI Restricting	.05	.02	4.46	1	.035	1.05	1.00	1.10
EPSI Muscle Building	.02	.03	.21	1	.643	1.02	.95	1.08
EPSI Subscales Total Score	.01	.01	.29	1	.591	1.00	.99	1.01

	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
Nonsuicidal Self-Injury								
EPSI Body Dissatisfaction	.04	.02	4.89	1	.027	1.04	1.00	1.07
EPSI Binge Eating	.02	.02	1.30	1	.256	1.02	.987	1.05
EPSI Cognitive Restraint	.08	.04	3.74	1	.052	1.08	1.00	1.17
EPSI Purging	.04	.03	2.59	1	.108	1.04	.99	1.10
EPSI Restricting	.08	.02	9.64	1	.002	1.08	1.03	1.13
EPSI Muscle Building	.04	.03	1.50	1	.222	1.04	.98	1.11
EPSI Subscales Total Score	.01	.01	5.05	1	.025	1.01	1.00	1.02

Table 13. Logistic Regression Using EPSI Subscales to Predict Ideator vs. Attempter Group Status: Controlling for Clinical Covariates

Covariate	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
Past-Year Drug Abuse								
EPSI Cognitive Restraint	.07	.05	2.19	1	.139	.93	.85	1.02
EPSI Restricting	.03	.03	1.09	1	.297	1.03	.98	1.17
EPSI Excessive Exercise	.05	.03	2.88	1	.090	.95	.89	1.01
EPSI Muscle Building	.10	.04	4.67	1	.031	.91	.83	.99
Depression								
EPSI Cognitive Restraint	.08	.05	2.90	1	.039	.92	.84	1.01
EPSI Restricting	.02	.03	.54	1	.041	1.02	.97	1.07
EPSI Excessive Exercise	.06	.03	3.73	1	.043	.94	.89	1.00
EPSI Muscle Building	.09	.04	4.48	1	.034	.91	.84	.99
Anxiety								
EPSI Cognitive Restraint	.08	.05	2.55	1	.011	.93	.85	1.02

	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
EPSI Restricting	.02	.03	.56	1	.453	1.02	.97	1.07
EPSI Excessive Exercise	.06	.03	3.29	1	.030	.95	.89	1.00
EPSI Muscle Building	.10	.04	4.41	1	.036	.91	.84	.99

Table 14. Logistic Regression Using EPSI Subscales to Predict Ideator vs. Attempter Group Status: Controlling for Theory Driven Suicide Risk Covariates

Covariate	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
Hopelessness								
EPSI Cognitive Restraint	.07	.05	2.24	1	.134	.93	.85	1.28
EPSI Restricting	.03	.03	1.3	1	.254	1.03	.98	1.08
EPSI Excessive Exercise	.05	.03	2.85	1	.091	.95	.89	1.01
EPSI Muscle Building	.09	.04	3.85	1	.050	.92	.94	1.00
Psychache								
EPSI Cognitive Restraint	.08	.05	2.62	1	.010	.93	.85	1.02
EPSI Restricting	.02	.03	.50	1	.480	1.02	.97	1.07
EPSI Excessive Exercise	.06	.03	3.83	1	.033	.94	.89	1.00
EPSI Muscle Building	.09	.04	4.66	1	.031	.91	.84	.99
Thwarted Belongingness								
EPSI Cognitive Restraint	.06	.05	1.60	1	.026	.94	.86	1.03

	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
EPSI Restricting	.02	.03	.92	1	.033	1.03	.98	1.08
EPSI Excessive Exercise	.05	.03	2.38	1	.012	.95	.90	1.01
EPSI Muscle Building	.09	.04	4.06	1	.044	.91	.84	.99
Perceived Burdensomeness								
EPSI Cognitive Restraint	.08	.05	2.68	1	.102	.93	.85	1.02
EPSI Restricting	.02	.03	.62	1	.433	1.02	.97	1.08
EPSI Excessive Exercise	.06	.03	3.93	1	.047	.940	.88	1.00
EPSI Muscle Building	.10	.04	5.19	1	.023	.90	.83	.99
Emotion Dysregulation								
EPSI Cognitive Restraint	.09	.05	2.73	1	.098	.93	1.00	1.05
EPSI Restricting	.02	.03	.59	1	.443	1.02	.97	1.07
EPSI Excessive Exercise	.06	.03	3.44	1	.064	.95	.89	1.00
EPSI Muscle Building	.10	.04	5.31	1	.021	.90	.83	.99
Nonsuicidal Self-Injury								

	B	S.E.	Wald.	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
EPSI Cognitive Restraint	.06	.05	1.70	1	.019	.94	.86	1.03
EPSI Restricting	.03	.03	.97	1	.032	1.03	.98	1.08
EPSI Excessive Exercise	-.06	.03	3.60	1	.038	.94	.89	1.00
EPSI Muscle Building	.09	.04	4.42	1	.035	.91	.84	.99

Table 15. Intercorrelations for Suicide Capability Measures

Variables	1	2	3	4	5	6	7	8	9	10	11
1. ACSS – Fearlessness about Death	-										
2. ACWRSS – Acquired Capability Total	.37	-									
3. ACWRSS – Pain Tolerance	.27	.59	-								
4. ACWRSS – Fearlessness about Death	.66	.62	.21	-							
5. ACWRSS – Preparation for Suicide	.01	.82	.21	.21	-						
6. Practical Capability ^a	.19	.47	.26	.35	.36	-					
7. Acquired Capability ^a	.35	.46	.36	.30	.32	.27	-				
8. SCS – Total Score	.56	.74	.60	.52	.47	.45	.49	-			
9. SCS – Dispositional Capability	.65	.41	.50	.47	.06	.22	.39	.73	-		
10. SCS – Acquired Capability	.59	.56	.63	.48	.21	.29	.48	.77	.63	-	
11. SCS – Practical Capability	.10	.61	.27	.23	.64	.42	.24	.70	.13	.21	-

Note. Correlations above 0.10 and 0.19 are statistically significant at alphas of 0.05 and 0.01, respectively.

^a Subscales from the Suicide Capability Items – Research Scale (Bauer & Daruwala)

Table 16. Summary of Exploratory Factor Analysis Results for Capability Measures

Item	Factor Loadings		
	Factor 1: Fearlessness about Death	Factor 2: Practical Capability	Factor 3: Pain Tolerance
The fact that I am going to die does not affect me (ACSS-FAD #1)	.70	-.03	-.01
The pain involved in dying frightens me (ACSS-FAD #2)	.68	-.17	-.04
I am very much afraid to die (ACSS-FAD #3)	.92	-.13	-.07
It does not make me nervous when people talk about death (ACSS-FAD #4)	.47	.12	.10
The prospect of my own death arouses anxiety in me (ACSS-FAD #5)	.88	-.16	-.03
I am not disturbed by death being the end of life as I know it (ACSS-FAD #6)	.64	.01	.08
I am not at all afraid to die (ACSS-FAD #7)	.81	.01	.08
I've always been able to handle pain more easily than other people (SCS #1)	.12	-.06	.58
I've never really been afraid of death (SCS #2)	.74	-.07	.14
I can handle more physical pain than I used to (SCS #3)	.01	-.02	.76
Over time, I've gotten less afraid of dying (SCS #4)	.72	.10	.13
If I ever wanted to, I'd know how to kill myself (SCS #5)	.01	.82	.01
If I ever wanted to, I'd have access to the method/means I would use to kill myself (SCS #6)	.06	.68	.004

Picturing my own death is a very scary thing for me (ACWRSS #1)	.85	.07	-.12
I have thought of ways to kill myself that would be the least difficult for me to pull off (ACWRSS #2)	.06	.80	-.08
I can tolerate pain much more than I used to (ACWRSS #3)	-.07	.11	.83
Even if I wanted to, killing myself is too scary to follow through with it (ACWRSS #4)	.38	.28	-.03
I have learned to overcome fear of pain (ACWRSS #5)	.07	-.03	.65
I have considered whether some ways to kill myself would be easier than others (ACWRSS #6)	.01	.87	-.10
I have gone through in my mind what it would be like to die (ACWRSS #7)	-.02	.64	.05
I know someone who attempted suicide (SCI-Research Scale #1)	-.14	.37	.17
I know someone who died by suicide (SCI-Research Scale #2)	-.08	.29	.17
Thinking about suicide scares me (SCI-Research Scale #3)	.58	.26	-.12
Over time, I've become less afraid of dying (SCI-Research Scale #4)	.41	.14	.11
I'm not afraid of harming my body (SCI-Research Scale #5)	.06	.29	.10
I handle the sight of blood better than my peers (SCI-Research Scale #6)	.03	.18	.32
People tell me that I am fearless or brave (SCI-Research Scale #7)	.001	.06	.43
<i>Eigenvalues</i>	7.6	4.0	2.4
<i>% of variance</i>	28.15	14.80	8.70

Note. Factor loadings over .40 appear in bold

Table 17. Relationships of Factor Analytically Derived Capability Dimensions to Each Other, Suicide Ideation, and Attempt

Variables	1	2	3	4	5
1. Lifetime Ideation ^a	-				
2. Suicide Attempt ^b	.49	-			
3. Fearlessness about Death	.07	.13	-		
4. Practical Capability	.58	.32	.14	-	
5. Pain Tolerance	.17	.17	.35	.22	-

Note. Correlations above 0.07 are statistically significant at an alpha 0.01.

^a This variable is determined by YRBS Survey Q1, “Have you ever seriously thought about killing yourself?”.

^b This variable is determined by YRBS Survey Q3, “Have you ever tried to kill yourself

Figure 1. MTurk Participation Selection

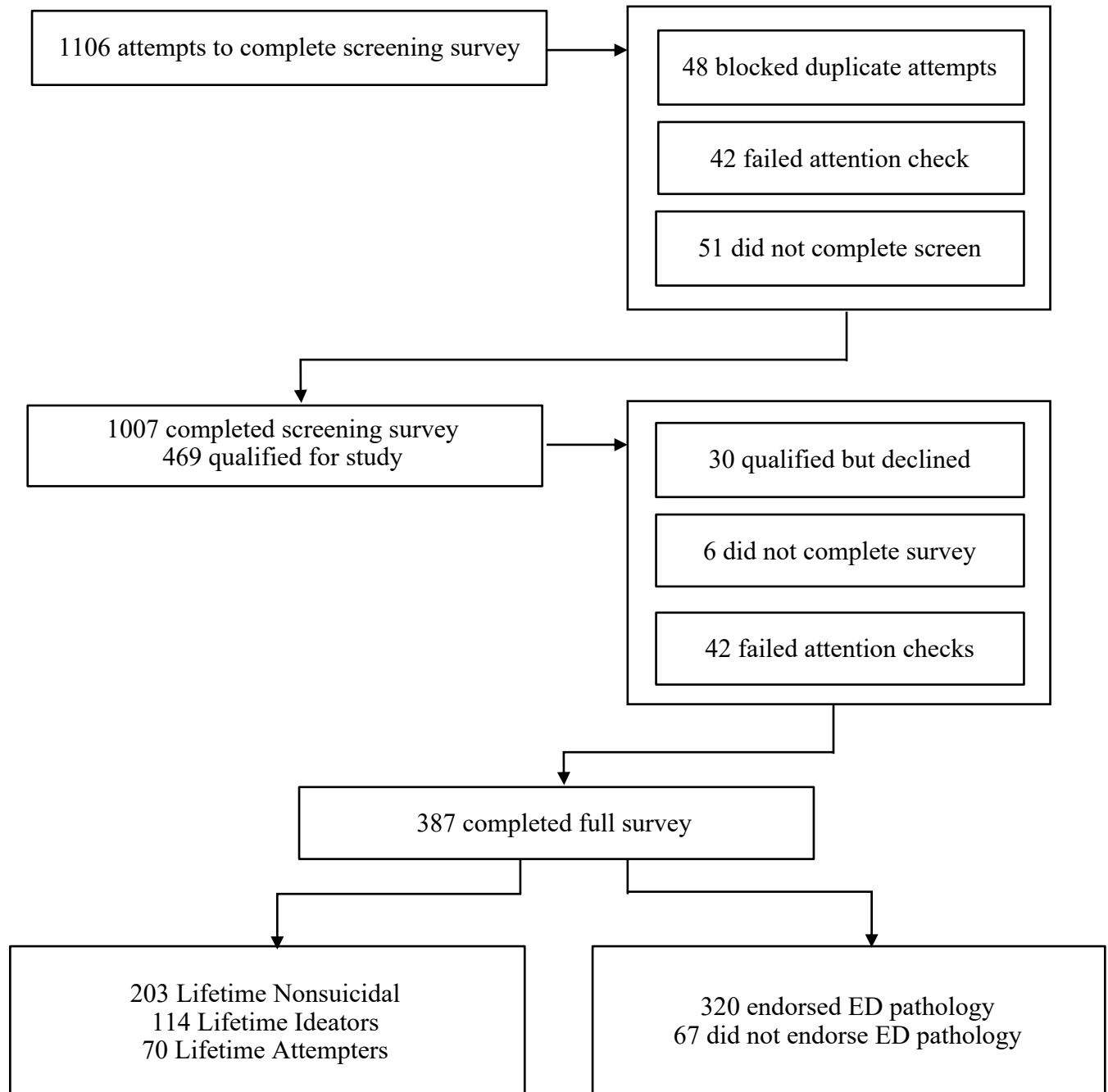


Figure 2. Cognitive Restraint and Practical Capability Mediation Model

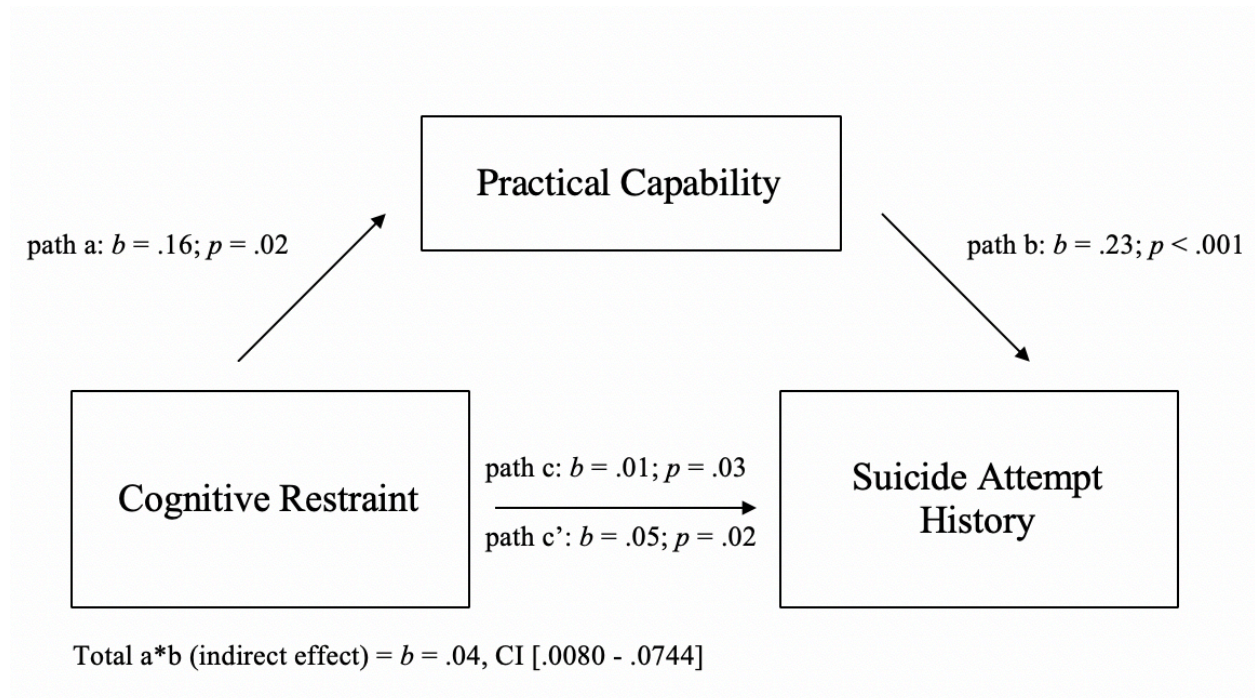
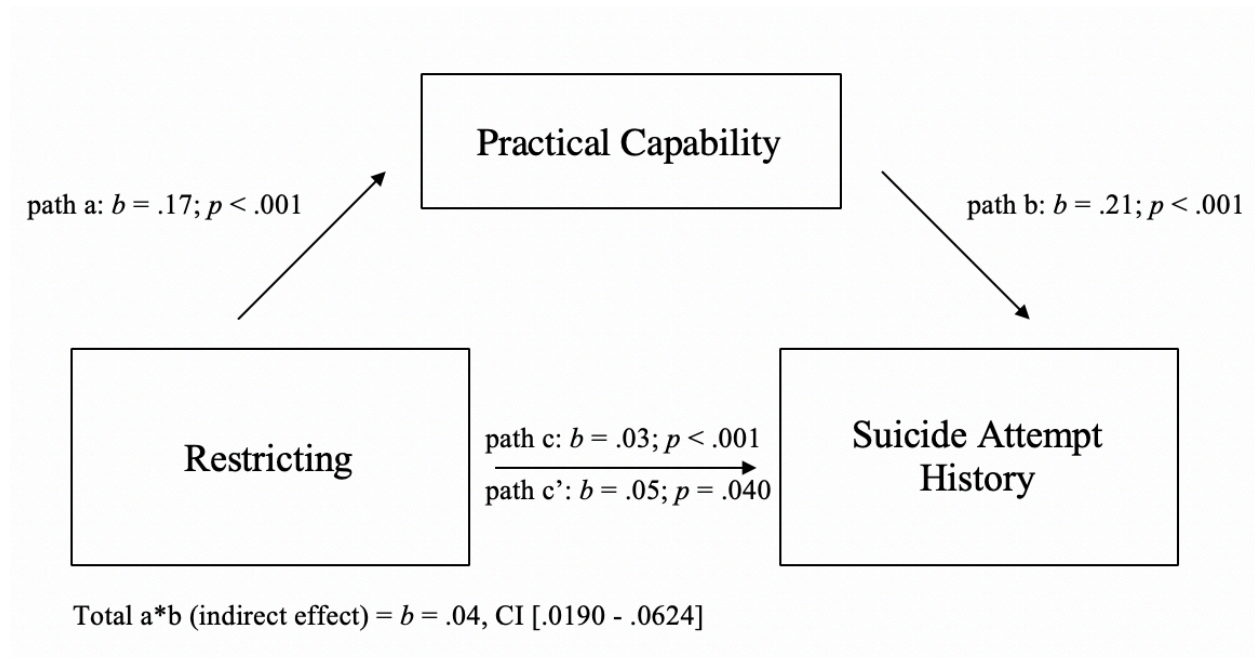


Figure 3. Restricting Behaviours and Practical Capability Mediation Model



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Appendix A

PEBL Demographics Questionnaire

Gender: _____

Date of Birth (YYYY/MM/DD): _____

Were you born in the United States?

- ☐ Yes
☐ No

If no, where were you born: _____

When did you move to the USA: _____

Race/Ethnicity:

- ☐ African/African Descent
☐ East Asian/East Asian Descent
☐ European/European Descent
☐ Indian-South Asian/Indian-South Asian Descent
☐ Latin American-Hispanic/Latin-American Hispanic Descent
☐ Middle Eastern/Middle Eastern Descent
☐ Native American
☐ Other: _____

Sexual Orientation:

- ☐ Bisexual
☐ Gay
☐ Lesbian
☐ Questioning
☐ Straight
☐ Other: _____

Current Marital Status:

- ☐ Single
☐ Married/Common-Law
☐ Divorced/Separated
☐ Widowed
☐ Other: _____

Highest Level of Education:

- ☐ 8th Grade or Less
- ☐ Some High School
- ☐ High School Graduate/GED
- ☐ Some College or University
- ☐ College or University Graduate
- ☐ Some Graduate or Professional School after College
- ☐ Master's Degree
- ☐ Doctoral Degree

Yearly **household** income (before taxes):

- ☐ Less than \$5,000
- ☐ \$5,000-\$9,999
- ☐ \$10,000-\$19,999
- ☐ \$20,000-\$29,999
- ☐ \$30,000-\$39,999
- ☐ \$40,000-\$49,999
- ☐ \$50,000-\$59,999
- ☐ \$60,000-\$75,000
- ☐ \$75,000-\$99,999
- ☐ More than \$100,000
- ☐ Do not wish to answer

Occupation: _____

Are you currently working outside the home?

- ☐ Yes
- ☐ No

If yes, how many hours per week do you work:

- ☐ 1-9 hours
- ☐ 10-19 hours
- ☐ 20-29 hours
- ☐ 30-39 hours
- ☐ 40-49 hours
- ☐ 50-59 hours
- ☐ 60-70 hours
- ☐ More than 70 hours

How many people (including you) live in your immediate household? _____

Appendix B

Four Item Eating Disorder Screening Questionnaire (Cotton et al., 2003)

Please answer “yes” or “no” for the following questions;

1. Do you worry that you have lost control over how much you eat?
2. Do you make yourself sick when you feel uncomfortably full?
3. Do you currently suffer with or have you ever suffered in the past with an eating disorder?
4. Do you ever eat in secret?

Appendix C

Suicide Intent Scale – Self Report

(Q #10-13 taken from Suicide Intent Scale)

Thinking about your most recent suicide attempt please answer the following questions;

1. At the time of your most recent suicide attempt, which of the following statements best represents your expectations about death?

- ☐ I thought that death was unlikely
- ☐ I thought that death was possible but not probable
- ☐ I thought that death was probable or certain

2. At the time of your most recent suicide attempt, which of the following statements best represents your understanding of the lethality (deadliness) of the method you chose?

- ☐ The method I chose did less to myself than what I thought would be lethal
- ☐ I wasn't sure if the method would be lethal
- ☐ The method equaled or exceeded what I thought would be lethal

3. At the time of your most recent suicide attempt, which of the following statements best represents your attitude towards the suicide attempt?

- ☐ I did not seriously attempt to end my life
- ☐ I was uncertain about my seriousness to end my life
- ☐ I seriously attempted to end my life

4. At the time of your most recent suicide attempt, which of the following statements best represents your attitude towards living and dying?

- ☐ I did not want to die
- ☐ A part of me did not want to die and a part of me wanted to die
- ☐ I wanted to die

Appendix D

Non-Suicidal Self-Injury Questions

Question #5 from Self-Injurious Thoughts & Behaviours Survey (SITBI; Nock et al., 2007)

1. When you have engaged in non-suicidal self-injury, did you do it...
- | | |
|--|-----------------|
| a. ...to get rid of bad feelings? | [a] Yes, [b] No |
| b. ...to feel something, because you were feeling numb or empty? | [a] Yes, [b] No |
| c. ...to communicate with someone else or to get attention? | [a] Yes, [b] No |
| d. ...to get out of doing something or to get away from others? | [a] Yes, [b] No |
| e. ...to release emotional pressure that had built up inside of you? | [a] Yes, [b] No |
| f. ...to punish yourself? | [a] Yes, [b] No |

Question #151 from SITBI

2. Have you ever received medical treatment for harm caused by NSSI?
- 0) no 1) yes

Question #163 from SITBI

3. During what percent of the time were you using drugs or alcohol when you engaged in NSSI?
[record percentage 0-100, rounding to nearest whole number]

Feeling Suicidal Question Using Language from SITBI

4. During what percent of the time were you feeling suicidal when you engaged in non-suicidal self-injury? [record percentage 0-100, rounding to nearest whole number]

Section I (Behaviours) from Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2009)

5. Please estimate the number of times in your life you have intentionally (i.e., on purpose) performed each type of non-suicidal self-harm (e.g., 0, 10, 100, 500):

Cutting []
Biting []
Burning []
Carving []
Pinching []
Pulling Hair []
Severe Scratching []
Banging or Hitting Self []
Interfering w/ Wound Healing (e.g., picking scabs) []
Rubbing Skin Against Rough Surface []
Sticking Self w/ Needles []

Swallowing Dangerous Substances []

Other _____

6.If you feel that you have a *main* form of self-harm, please indicate the behavior(s) that you consider to be your main form of self-harm.

Cutting []

Biting []

Burning []

Carving []

Pinching []

Pulling Hair []

Severe Scratching []

Banging or Hitting Self []

Interfering w/ Wound Healing (e.g., picking scabs) []

Rubbing Skin Against Rough Surface []

Sticking Self w/ Needles []

Swallowing Dangerous Substances []

Other _____

7.At what age did you:

First harm yourself? _____

Most recently harm yourself? (approx. date – month/date/year) _____

8. Do you experience physical pain during self-harm?

Yes []

Sometimes []

No []

9. When you self-harm, are you alone?

Yes []

Sometimes []

No []

10. Typically, how much time elapses from the time you have the urge to self-harm until you act on the urge?

< 1 hour []

1 – 3 hours []

3 – 6 hours []

6 – 12 hours []

12 – 24 hours []

>1 day []

11. Do/did you want to stop self-harming?

Yes []

No []

Appendix E

Suicide Capability Items – Research Scale (Bauer & Daruwala)

Practical Capability

Directions: Please rate your agreement with the following statements (Strongly Agree = 5, Agree = 4, Neither agree nor disagree = 3, Disagree = 2, Strongly Disagree = 1):

1. I know someone who attempted suicide
2. I know someone who died by suicide
3. Thinking about suicide scares me

Acquired Capability

Directions: For the following items, we would like to know how much certain aspects of you have changed over time. Please rate how much your agreement with the following statements has increased, decreased, or remained the same since early childhood. (Increased a lot = 5, Increased a little = 4, Stayed the same = 3, Decreased a little = 2, Decreased a lot = 1).

Example: Item 1 states, “I am comfortable with the fact that I am going to die.” If your agreement with this statement has increased significantly since you were young, you would select “Increased a lot,” because you now agree with this statement much more than you did when you were young.

1. Over time, I’ve become less afraid of dying
2. I’m not afraid of harming my body
3. I handle the sight of blood better than my peers
4. People tell me that I am fearless or brave