SUICIDAL IDEATION AND RISKY BEHAVIOR –

RELATIONSHIPS WITH WISH TO LIVE,

HOPELESSNESS, AND IMPULSIVITY

By

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Tallahassee, Florida

2016

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Date of Degree: JULY, 2021

Title of Study: SUICIDAL IDEATION AND RISKY BEHAVIOR – RELATIONSHIPS
                WITH WISH TO LIVE, HOPELESSNESS, AND IMPULSIVITY

Major Field: PSYCHOLOGY

Abstract: Numerous studies have found support for the relationship between suicide and risky behavior. However, few studies have examined factors that may help explain the relationship between suicidal ideation and risky behavior. This study examined the relationship between suicidal ideation and risky behavior and whether there may be an indirect relationship through low wish to live, hopelessness, or impulsivity. We tested five hypotheses: (1) suicidal ideation would be positively associated with risky behavior; (2a) wish to live would be negatively associated with suicidal ideation and (2b) negatively associated with risky behavior; (3a) hopelessness would be positively associated with suicidal ideation and (3b) positively associated with risky behavior; (4a) impulsivity would be positively associated with suicidal ideation and (4b) positively associated with risky behavior, and there would be indirect relationships of suicidal ideation on risky behavior through (5a) wish to live, (5b) hopelessness, and (5c) impulsivity. Two hundred eighty-four participants recruited from Amazon Mechanical Turk completed measures of suicidal ideation, risky behavior, wish to live, hopelessness, impulsivity, and other related constructs. Results supported the majority of our hypotheses, with hypothesis 5b being the only hypothesis with null results. Our findings fit with our conceptual understanding that suicidal thoughts and behaviors may be associated with a decreased future orientation, as expressed through decreased wish to live and increased impulsivity. All of the factors investigated in this study have been reliably associated with suicidal thoughts and behaviors, but our study is the first to find associations between wish to live and risky behavior and hopelessness and risky behavior. These findings have important implications for models of suicidal thoughts and behaviors and offer some of the first data directly testing the relationship between some of these constructs.

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CHAPTER I

INTRODUCTION

SUICIDAL IDEATION AND RISKY BEHAVIOR

Current data indicates that the suicide rate in the United States is increasing, with

a 30% increase in suicide from 1999 to 2016 (Pompili, 2018). This phenomenon of

increased suicide rates is not exclusive to the United States, with mortality due to suicide

increasing in Europe and Asia as well (König, et al., 2018; Tandon & Nathani, 2018).

Rising suicide rates are a pressing public health concern; not only is suicide a leading

cause of mortality, but exposure to suicidal ideation and behavior becomes a negative life

event for people close to the suicidal individual (Harris & Bettiol, 2017).

Risky behavior (e.g., reckless driving, unprotected sex, drug and alcohol misuse)

is also a major public health issue. It is associated with various negative mental and

behavioral health outcomes such as higher rates of mental illness (McCloughen, Foster,

Marabong, Miu, & Fethney, 2015), lower rates of cancer screenings (González, Suárez,

& Ortiz, 2015), negative reproductive health outcomes (Tang, Qu, Li, & Tan, 2018), and

increased substance use issues (Atlam, Aldemir, & Altintoprak, 2017). With multiple associations between risky behavior and negative health outcomes there is a great need for more data on the nature of this phenomenon.

Interestingly, suicidal ideation is associated with risky behavior across a number of different age groups and populations, such as adolescents (Ammerman, Steinberg, & McCloskey, 2018), United States college students (Barrios, Everett, Simon, & Brener, 2000), and a nationally representative French sample (Husky, Guignard, Beck, & Michel, 2013). Much of this research, and most prominent models of suicide, focus on the contribution of risky behaviors to increased suicidal thoughts and behaviors. One model of suicide, the Interpersonal Theory of Suicide, posits that engagement in risk taking and dangerous behaviors could gradually reduce a fear of death, leading to increased suicidal risk (Van Orden et al., 2010). For example, increasingly engaging in reckless driving and speeding may gradually reduce an individual's fear of death and pain, thus increasing their likelihood of engaging in deliberate self-harm behavior.

However, it may also be the case that suicidal ideation increases engagement in risky behavior. Selzer and Payne (1962) proposed that certain risky behaviors might be an often unconscious expression of suicidal ideation. Based on a psychodynamic understanding of suicide, they argued that engaging in risky driving that leads to automobile accidents, combined with reduced inhibitions through alcohol intoxication, may be a reflection of unconscious suicidal desire. While modern theories of suicide do not ascribe to a psychodynamic understanding of the issue, there is evidence that risky behaviors may sometimes be a consequence of suicidal thinking. For example, a review of studies with data on psychosocial variables among drivers in car accidents

found that levels of stress, depression, and negative life events were associated with higher incidence of single-car accidents (Pompili, Girardi, Tatarelli, & Taterelli, 2006). The authors of this study interpreted their review and empirical findings as (indirect) evidence for Selzer and Payne's (1962) theory of suicide and risky behavior, suggesting that individuals who are thinking about suicide engage in risky driving that leads, either accidentally or deliberately, to car accidents. Additionally, numerous studies have found that alcohol use is strongly related to suicidal ideation and behavior. While the majority of this research has looked at alcohol use as a potential cause of suicide, a comprehensive, qualitative review of the literature suggests that alcohol use may also be a consequence of suicidal thoughts and behaviors (Hufford, 2001). However, it is currently unclear how suicidal thinking may lead to risky behavior; we hypothesize that low wish to live, hopelessness, and impulsivity may help explain this relationship. These factors were selected due to their relationship with suicidal thoughts and behaviors and their potential relationship with risky behavior.

Wish to Live

A landmark study published in 1977 suggested that suicidal action is often the culmination of an internal struggle between two competing forces: a wish to live (WTL), and a wish to die (WTD; Kovacs & Beck, 1977). Subsequent empirical studies have shown that a low WTL is associated with increased risk for suicide attempts (Brown, Steer, Henriques, & Beck, 2005; Bryan, Rudd, Peterson, Young, & Wertenberger, 2016). As individuals experience a diminished wish to live, they may also begin to engage in risky behaviors that are consistent with a decreased desire for life. While the specific term "wish to live" has not been studied in the context of risky behavior, many studies

have investigated it under different names. For example, a diminished interest in living among heroin users is associated with increased risky behaviors such as needle sharing and continued heroin use despite prior overdoses (Miller, 2006). Similar WTL-like factors have been associated with single-car accidents (Pompili, Girardi, Tatarelli, & Taterelli, 2006), aggression, and impulse control issues (Apter, Gothelf, Orbach, Weizman, Ratzoni, Har-Even, & Tyano, 1995).

Hopelessness

Hopelessness is a key component in several models of suicide, specifically Beck's theory of suicide (Beck, Kovacs, & Weissman, 1975), the Hopelessness Theory of Suicide (Abramson, Alloy, Hogan, Whitehouse, Gibb, Hankin, & Cornette, 2000), and the Three-Step Theory (Klonsky & May, 2015). A recent meta-analysis of 166 longitudinal studies involving hopelessness as a risk factor for suicidal ideation and behavior found support or this relationship (Ribeiro, Huang, Fox, & Frankling, 2018). However, there are relatively few studies that have directly investigated the relationship between hopelessness and risky behavior, but several studies do provide a plausible association between these factors. For example, among adolescents, a "nothing to lose" attitude, a construct similar to hopelessness, is positively associated with several risky behaviors, including earlier onset of sexual behavior, likelihood of selling drugs, and likelihood of using weapons (Harris, Duncan, & Boisjoly, 2002). Similarly, hopelessness is associated with drug use, risky sexual behavior, aggressive behavior, and heavy drinking among college students (Kelly, Rollings, & Harmon, 2005).

Impulsivity

Baumeister's (1990) Escape Theory of suicide and Mann and colleagues' (1999) "stress-diathesis" posit that impulsivity is an important contributor to suicidal behavior. A recent review and meta-analysis of 70 studies found a small but significant relationship between impulsivity and suicidal behavior (Anestis, Soberay, Gutierrez, Hernández, & Joiner, 2014). Perhaps unsurprisingly, there is a large body of literature linking impulsivity and a number of risky behaviors. For example, a meta-analysis of 96 studies found a strong relationship between impulsivity and alcohol use (Coskunpinar, Dir, & Cyders, 2013). Similarly, impulsivity is associated with substance use beyond alcohol (Beaton, Abdi, & Filbey, 2014). Impulsivity has also been linked to other risky behaviors such as problem gambling and risky sexual behavior (Wong, Zane, Saw, & Chan, 2013).

Current Study

Risky behavior has been associated with suicide in a number of contexts and is relevant to prominent models of suicidal ideation and behavior. Engagement in risky behavior has primarily been viewed as a contributor to suicidal ideation and behavior, but it may be the case that suicidal ideation leads to increased risky behavior. Low wish to live, hopelessness, and impulsivity all contribute to STB and are associated with risky behavior. However, no studies to date have specifically examined the relationships between suicidal ideation, risky behavior, wish to live, hopelessness, and impulsivity. As such, this study represents a first step in investigating the relationships between these factors. The following hypotheses were tested:

1. Suicidal ideation would be positively associated with risky behavior.

2a. Wish to live would be negatively associated with suicidal ideation and (2b) negatively associated with risky behavior.

3a. Hopelessness would be positively associated with suicidal ideation and (3b) positively associated with risky behavior.

4a. Impulsivity would be positively associated with suicidal ideation and (4b) positively associated with risky behavior.

5. There would be indirect relationships of suicidal ideation on risky behavior through (5a) wish to live, (5b) hopelessness, and (5c) impulsivity.

CHAPTER II

METHODOLOGY

Participants

An a priori power analysis using G*Power (Faul, Erdfelder, Lang & Buchner, 2007) indicated that we would need 95 participants to detect the relationship between suicidal ideation and risky behavior (r = .25; Roehrig & Range, 1995) with a power of .8 and an alpha of .05. Other relationships of interest have effect sizes that range from r = .33 (suicidal ideation and impulsivity; Neufeld & O'Rourke, 2009) to r = .47 (risky behavior and impulsivity; Maher, Thomson, & Carlson, 2015), which would indicate a need for fewer participants. A bias-corrected bootstrap model to detect indirect effects (i.e. mediation) with relationships of this size would require approximately 116 participants to achieve a power of .8 (Fritz & MacKinnon, 2007).

In total, 1,461 participants were recruited from Amazon Mechanical Turk (Mturk) to achieve a final sample of 284 participants with valid data. Mturk is an online forum that allows individuals from around the world to complete "Human Intelligence Tasks" (e.g. answer questionnaires) in exchange for a compensation of small a sum of money. A 2018 study found that the median pay for one hour of work for Mturk participants was $2 (Hara, Adams, Milland, Savage, Callison-Burch, & Bigham, 2018). We did not anticipate our study will take a full hour to complete, and therefore felt that compensating participants with $2 for their participation was adequate. In order to better the odds of gathering data from participants best suited for this study, international participants were excluded; data quality is compromised when gathering data from participants for whom English is a second language (Goodman, Cryder, & Cheema, 2013). Additionally, we oversampled for the presence of suicidal ideation to ensure we were adequately able to measure the presence of this construct; oversampling was conducted via eligibility requirements for survey participation.

Questionnaires

Primary Measures

Demographics. Participants completed a detailed demographics form to assess for basic demographic information, such as age, gender, sexual orientation, and race/ethnicity.

Suicidal ideation. Suicidal ideation was assessed using the Hopelessness Depression Symptom Questionnaire (HDSQ-SS; Metalsky & Joiner, 1997). The HDSQ-SS is a 4-item questionnaire commonly used to assess suicidal thoughts, plans, and

impulses. Within this questionnaire, participants were asked to evaluate a series of statements and select the one that most accurately describes their experience over the previous two weeks. We found the internal consistency of the HDSQ-SS to be Cronbach's α = .94.

Hopelessness. Hopelessness was assessed using the Beck Hopelessness Scale (BHS; Beck et al., 1974). The BHS is a 20-item questionnaire commonly used to assess different theorized components of hopelessness, including attitude towards the future, expectations, and motivations. Within this questionnaire, participants responded to a variety of true/false questions regarding how they have felt over the past week. We found the BHS to have an internal consistency of α = .90

Impulsivity. Impulsivity was assessed using the UPPS-P Impulsive Behavior Scale (UPPS-P; Whiteside & Lynam, 2001). The UPPS-P is a 59-item Likert-type scale designed to measure an individual's levels of negative urgency, premeditation, perseverance, sensation seeking, and positive urgency. Within this questionnaire, participants selected how strongly they agree or disagree with statements designed to assess their impulsive behaviors. A review of the literature suggests that negative urgency may be most closely associated with risky behavior, which is where the present study will focus. We found the UPPS-P to have an internal consistency across all components of α = .96. We also calculated the internal consistency of all facets of impulsivity as measured by the UPPS-P, their internal consistencies were found to be as follows: Negative Urgency, α = .92; Positive Urgency, α = .97; Sensation Seeking, α = .89; Lack of Premeditation, α = .85; Lack of Perseverance, α = .82.

Wish to live. Wish to live was assessed using the first item on the Beck Scale for

Suicidal Ideation (BSSI; Beck & Steer, 1991). This item uses a three-point Likert-type

scale to assess wish to live (item 1; 0 = moderate to strong, 1 = weak, 2 = none). This

item has previously been used to assess wish to live (Bryan et al., 2016). This item is

measured based on the worst-point assessment scale, where participants are asked to

answer questions while thinking of a time when their symptoms were at the most

extreme; this is in contrast to a recency scale, which asks participants to answer questions

based on how they have been feeling recently. The use of a worst-point assessment is in

line with previous research that has found this to be a significant predictor of suicidal risk

(Joiner et al., 2003). While the use of one item is a suboptimal approach to measuring a

distinct construct, there are currently no comprehensive measures of wish to live and this

single item has been used successfully in prior research. To ensure that we examined a

participant's wish to live as thoroughly as possible, we utilized both a recency scale and a

worst-point assessment scale of the previous three months.

Risky behavior. Risky behavior was assessed using a revised version of the

Maladaptive Behavior Scale (MBS-R; Helle, 2016), a 30-item measure designed to assess

various components of what is widely regarded as risky behavior. Assessed behaviors

including substance use, risky sexual behavior, reckless driving, gambling, physical and

verbal aggression, and other related constructs. The MBS-R assesses the frequency of

these behaviors over the past month, with answers provided in a five-point Likert scale

ranging from 0 (never/not at all) to 4 (every day or nearly every day). We found the

MBS-R to have an internal consistency of $\alpha = .99$. We also tested the internal consistency

of all components of impulsivity as measured by the MBS-R, their internal consistencies

were found to be as follows: Risky Substance Use, $\alpha = .91$; Sexual Impulsivity, $\alpha = .95$; Self-Harm / Suicide, $\alpha = .89$; Maladaptive Eating, $\alpha = .91$; Impulsive Stealing, $\alpha = .94$; Impulsive Driving, $\alpha = .85$; Impulsive Spending, $\alpha = .91$; Aggression, $\alpha = .92$.

Validity Checks

In line with the recommendations from Chmielewski & Kucker (2019) regarding Mturk data collection, we added additional validity checks into our study to ensure participants who provided invalid data were excluded from analyses. These included items designed to assess consistency in responses (e.g. providing two different ages when asked about their age at separate parts of the survey), statistically improbable responses (e.g. answering that they speak more languages than could reasonably be expected of a typical person), and instructional manipulation checks (e.g. placing a sentence in the middle of instructions that directly tells the participant to choose a certain response item; participants who fail to follow this instruction indicate that they are not properly reading instructions). Additionally, we used open-ended text response questions to assess the quality of the answers being given by participants. For example, all participants were asked the question "What should a person do if they are having thoughts of suicide?". Responses such as "talk to a doctor" or "call somebody" were seen as valid responses, whereas responses such as "DEATH" or "OK" were seen as invalid responses. These validity checks were placed throughout the survey to minimize the chance that a participant would be able to complete this survey without focusing on the given material.

We also included items to detect nonhuman participants (i.e., "bots"). For example, we used a reCAPTCHA, which is a type of challenge-response test designed to

limit the chances of an automated software program being able to complete a given task. We also used honeypots to automatically screen for automated software programs disguised as participants. Honeypots are questions that appear to the human eye as a blank screen with nothing on it. However, to a computer program, the screen appears as a question that simply is the same color as the background behind it. Any responses to these questions indicated a participant that was able to see a question invisible to the human eye and should be excluded from these data.

In total, 15 validity questions were used during this survey; validity questions were spread throughout the survey, with an average of 1.5 measures between each validity check. The consequences for failing different types of validity checks varied between each type. Participants who failed one instructional manipulation check were excluded from the data without exception; failing to pass a reCAPTCHA or Honeypot carried the same consequence. Inconsistent responses, statistically improbable responses, and invalid open-ended text responses each resulted in a score of one point towards an "invalid score" for each occurrence. Participants who scored a two or higher on this invalid score were excluded from the data; failing just one or fewer of these validity questions resulted in the participant remaining in our data set. All validity questions are provided in Appendix C.

Exploratory Measures

History of suicidal behavior. History of suicidal behaviors was assessed using a modified version of the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock et al., 2007). The modified SITBI assesses a participant's history of suicidal actions and

behaviors using four questions with scale options ranging from "No" to "Yes, three times or more." We found the modified SITBI to have an internal consistency of $\alpha = .87$.

Capability for suicidal behavior. In order to better understand an individual's capacity for suicidal behavior, their capability to enact lethal self-injury was assessed. Multiple theories of the development of suicidal behavior have found the capability to enact lethal self-injury to be a primary way by which an individual may increase their suicidal risk (Klonsky & May, 2015; Van Orden, Witte, Cukrowicz, Braithwaite, Selby, & Joiner, 2010). Assessing the participant's capability to enact lethal self-injury was done using the Acquired Capability for Suicide Scale – Fearlessness About Death scale (ACSS-FAD; Ribeiro et al., 2014). The ACSS-FAD asks participants to read 7 statements regarding their fearlessness about death and rate the extent that they agree with the statement; answers provided are in a Likert scale format with options ranging from 0 ("Not at all like me") to 4 ("Very much like me"). We found the ACSS-FAD to have an internal consistency of $\alpha = .80$. Inclusion of the ACSS-FAD allows us to evaluate the results of the study in the context of ideation to action models of suicide.

Thwarted belongingness and perceived burdensomeness. Thwarted belongingness and perceived burdensomeness, key components of the interpersonal theory of suicide, are prime candidates for the etiology and maintenance of suicidal ideation. They were assessed using the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012). The INQ is a 15-item Likert-type scale designed to measure an individual's perceptions of social attachment and relationships. Participants rated statements depending on how true the statements felt for them in that moment, with options ranging from "Not at all true for me" (1) to "Very true for me" (7). The thwarted

belongingness component of the INQ was found to have an internal consistency of $\alpha =$ .88, and the perceived burdensomeness component was found to have an internal consistency of $\alpha = .97$. Measuring these constructs allowed a more detailed analysis of interpersonal factors associated with suicidal ideation.

Depression symptoms. Previous research has found strong associations between depression and suicidal ideation; measuring the extent to which a participant is experiencing symptoms consistent with depression allowed us to evaluate the degree to which the observed effects are associated with symptoms of depression. Depression symptoms were assessed using the Patient Health Questionnaire – 9 (PHQ-9; Kroenke et al., 2001). The PHQ-9 is a 9-item Likert-type scale designed to measure symptoms consistent with depression. Within this scale, participants answer questions regarding how often they had been bothered by potential symptoms over the previous two weeks, with answers ranging from "Not at all" (0) to "Nearly every day" (3). We found the PHQ-9 to have an internal consistency of $\alpha = .93$.

Anxiety symptoms. Previous research has found a strong relationship between anxiety and suicidal ideation; a measure of symptoms consistent with this construct allowed us to evaluate the degree to which the observed effects are associated with symptoms of anxiety. Symptoms of general anxiety were assessed using the Generalized Anxiety Disorder 7-item (GAD-7; Spitzer et al., 2006). The GAD-7 is a 7-item Likert-type scale designed to measure symptoms consistent with anxiety. Within this scale, participants answer questions regarding how often they had been bothered by potential symptoms over the previous two weeks, with answers ranging from "Not at all" (0) to "Nearly every day" (3). We found the GAD-7 to have an internal consistency of $\alpha = .93$.

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Procedure

We conducted successive runs of mTurk Human Intelligence Tasks (HITs), with the overall validity of the data examined after each HIT to determine how many participants were still needed in order meet requirements for adequate statistical power. After the initial HITs were conducted, we determined that we had recruited an adequate number of participants with suicidal ideation and did not screen specifically for suicidal ideation in subsequent HITs.

Participants completed all measures online via Qualtrics. Before completing measures, participants provided their informed consent by indicating that they had read and understand the consent form prior to continuing with the survey. Participants encountered validity questions throughout the study, as is described in greater detail above.

At the end of the survey all participants were debriefed as to the nature and purpose of the study and provided a list of resources in the event they experienced negative emotions as a result of the study. Participants were provided with a random number that would serve as their participant ID; participants who entered this into the Amazon Mechanical Turk (mTurk) platform were able to be paid for their participation, pending a review of the validity of the data associated with that participant ID. After each batch of mTurk HITs was completed, the validity for that entire batch was assessed. Individuals who passed the validity checks received a payment through the mTurk system, whereas individuals who failed to pass the validity checks did not receive

payment and were provided with a reason as to why they did not receive a payment through the automated one-way response system on mTurk.

Analytic Plan

Associations between primary variables (suicidal ideation, risky behavior, hopelessness, wish to live, and impulsivity) were examined with zero-order correlations (hypotheses 1, 2a, 2b, 3a, 3b, 4a, and 4b). To test our fifth hypothesis, we entered suicidal ideation and risky behavior variables into three individual bias corrected bootstrapping models with 5,000 resamples, with wish to live worst-point, hopelessness, and impulsivity, respectively, entered as mediating variables. For these analyses, HDSQ-SS scores were entered as the independent variable and MBS-R scores were entered as the dependent variable.

CHAPTER III

FINDINGS

Data Validity

Participants were 1,461 individuals from the Amazon Mechanical Turk (mTurk) platform. However, 1,177 participants were excluded from the data due to invalid responses. Looking at these data, 455 participants were removed because they reached the end of the survey without responding to any questions. A further 247 participants were eliminated for providing inconsistent responses between questions. Instructional manipulation checks eliminated 457 participants from our data. One "participant" was removed for answering a honeypot question. The remaining 301 participants were screened according to their responses on open-ended text response questions; of these participants, 17 answered in a manner that indicated an invalid response and were excluded from our analyses.

Data from a final sample of 284 participants were used in analyses. Of these participants,

146 had indicated current suicidal ideation, while 138 indicated that they did not have any current suicidal ideation.

Descriptives

Full demographic data are available in Table 1. Participants had a mean age of 38.5 (SD = 12.0). No association was found between a participant's suicidal ideation category and their gender (p = .448) or racial identity (p = .333). However, an association was found between a participant's suicidal ideation category and their sexual orientation (p = .017) and Hispanic identity (p = .025), such that the suicidal ideation category had significantly more individuals reporting a sexual minority identity or a Hispanic identity.

Table 1 – Demographic Data

	Full Sample		No SI		SI		Chi-Square (*p* value)
	n =	%	n =	%	n =	%	
Gender							**1.61 (.448)**
Female	116	42.3 %	61	44.9 %	55	39.9 %	
Male	157	57.3 %	75	55.1 %	82	59.4 %	
Prefer not to answer	1	0.3%	0	0.0%	1	0.7%	
Sexual Orientation							**13.76 (.017)**

Heterosexual	230	83.9%	112	82.4%	118	85.5%
Gay or lesbian	12	4.4%	11	8.1%	1	0.7%
Bisexual	28	10.2%	11	8.1%	17	12.4%
Asexual	2	0.7%	2	1.4%	0	0.0%
None of the above	1	0.4%	0	0.0%	1	0.7%
Prefer not to answer	1	0.4%	0	0.0%	1	0.7%
Racial Identity						11.33 (.333)
White	224	82.7%	114	85.1%	110	80.3%
Black	25	9.2%	11	8.2%	14	10.2%
Native American / Alaskan Native	9	3.3%	2	1.5%	7	5.1%
Asian	6	2.2%	3	2.2%	3	2.2%
Multi-racial	6	2.2%	4	3.0%	2	1.5%
Prefer not to answer	1	0.4%	0	0.0%	1	0.7%
Hispanic Identity						7.37 (.025)
Yes	24	8.9%	6	4.5%	18	13.1%

No	246	90.8 %	128	95.5 %	118	86.1 %
Prefer not to answer	1	0.3%	0	0.0%	1	0.8%

Hypothesized Results

All data for hypotheses 1 – 4 are provided in Table 2. All hypotheses were supported. Specifically, suicidal ideation was positively associated with the frequency of risky behaviors $(p < .001)$. Additionally, wish to live worst-point scores were negatively associated with suicidal ideation $(p < .001)$ and the frequency of risky behaviors $(p = .003)$. Similarly, hopelessness scores were positively associated with suicidal ideation $(p < .001)$ and the frequency of risky behaviors $(p < .001)$. Finally, impulsivity scores were positively associated with suicidal ideation $(p < .001)$ and the frequency of risky behaviors $(p < .001)$.

Table 2. Zero-order correlations between suicidal ideation, risky behavior, wish to live, hopelessness, and impulsivity.

Measure	1.	2.	3.	4.	5.
1. HDSQ-SS	-				
2. MBS-R	**.530***	-			
3. WTL Worst Point	**-.591***	**-.190**	-		
4. BHS	**.509***	**.312***	-.476***	-	
5. UPPS-P	**.567***	**.635***	-.393***	.411***	-
Mean	2.44	28.64	1.55	7.32	131.20
SD	2.90	32.58	0.63	5.65	30.54

Note: *** = $p < .001$; ** = $p < .01$; * = $p < .05$; HDSQ-SS = Hopelessness Depression Symptom Questionnaire – Suicidality Subscale; MBS-R = Maladaptive Behavior Scale - Revised; WTL Recency = Wish to Live – Recency; WTL Worst Point = Wish to Live – Worst Point; BHS = Beck Hopelessness Scale; UPPS-P = Impulsive Behavior Scale. Bolded values represent hypothesized effects.

All data for hypotheses 5a – 5c are provided in Table 3. For hypothesis 5a, results indicate that the overall model was statistically significant and there was a significant indirect effect of HDSQ-SS scores on MBS-R scores through worst point wish to live as indicated by a bootstrapped confidence interval that did not include zero. Similarly, for hypothesis 5c, the model was statistically significant and there was a significant indirect effect of HDSQ-SS scores on MBS-R scores through impulsivity as indicated by a bootstrapped confidence interval that did not include zero. However, for hypothesis 5b, while the overall model was statistically significant, there was not a significant indirect

effect of HDSQ-SS scores on MBS-R scores through hopelessness, as indicated by a bootstrapped confidence interval that included zero.

Table 3. Individual bias correcting bootstrap models with 5,000 resamples between HDSQ-SS and MBS-R scores and each variable.

Measure	Overall Model R²	β	p	AB Path Lower CI	AB Path Upper CI
WTL Worst-Point	.303	7.05	< .001	-2.14	-0.29
BHS	.289	5.55	< .001	-0.42	1.08
UPPS-P	.460	3.39	< .001	2.29	4.15

Note: WTL = wish to live; BHS = Beck Hopelessness Scale; UPPS-P = Impulsive Behavior Scale.

Exploratory Analyses

Relationships between Hopelessness, Suicidal Ideation, and Risky Behavior

To investigate whether the non-significant indirect effect model with suicidal ideation, risky behavior, and hopelessness may be explained by an overlap in hopelessness and suicidal ideation in the variance explained in risky behavior, we performed a series of regression analyses with risky behavior as the outcome variable and suicidal ideation and hopelessness serving as predictor variables. We found that, when hopelessness is added in a second step to the regression with suicidal ideation and risky

behavior, hopelessness does not improve the model (r square change $= .002$, $p = .387$) and is not a significant predictor in the model, $\beta = .055$, p $= .387$, whereas suicidal ideation remains a significant predictor, $\beta = .505$, p $< .001$. However, when the predictors are flipped for the second model, the addition of suicidal ideation in the second step improves the model (r square change $= .190$, $p < .001$) and is a significant predictor, $\beta = .505$, p $< .001$, and hopelessness is no longer significant, $\beta = .055$, p $= .387$.

Relationships between primary and exploratory variables

In order to better understand the specificity of the relationship between suicidal ideation and risky behavior, we first examined zero order correlations between suicidal ideation, risky behavior, and the exploratory variables listed above in the Methods section. These data are provided in Table 4.

Table 4. Zero-order correlations between risky behavior, suicidal ideation, and exploratory variables.

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1. MBS-R	-							
2. HDSQ-SS	.530***	-						
3. SITBI	.814***	.620**	-					
4. ACSS-FAD	.141*	.099	.152*	-				
5. INQ Thwar. Belong.	.228**	.391**	.312**	-.029	-			
6. INQ Perc. Burd.	.733***	.638***	.708***	.097	.563***	-		
7. PHQ-9	.670***	.678***	.676***	.056	.548***	.805***	-	
8. GAD-7	.553***	.579***	.587***	.002	.535***	.739***	.882***	-

Note: *** = $p < .001$; ** = $p < .01$; * = $p < .05$; MBS-R = Maladaptive Behavior Scale - Revised; HDSQ-SS = Hopelessness Depression Symptom Questionnaire – Suicidality Subscale; SITBI = Self-Injurious Thoughts and Behaviors Interview; ACSS-FAD = Acquired Capability for Suicide Scale – Fearlessness About Death scale; INQ Thwar. Belong. = Interpersonal Needs Questionnaire, Thwarted Belongingness; INQ Perc. Burd. = Interpersonal Needs Questionnaire, Perceived Burdensomeness; INQ Total = Interpersonal Needs Questionnaire Total subscore; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder Scale - 7.

As can be seen in Table 4, correlations between the MBS-R and SITBI scores ($p <$ .001), INQ Perceived Burdensomeness scores ($p <$ .001), PHQ-9 scores ($p <$ .001), and GAD-7 scores ($p <$ .001) were all as strong or stronger than the association between the MBS-R and HDSQ-SS. To understand the specificity of the relationship between suicidal ideation and risky behavior, each of these exploratory variables were entered into separate partial correlations with MBS-R and HDSQ-SS.

The relationship between suicidal ideation and risky behavior remained significant when controlling for perceived burdensomeness, $r =$ .125, $p =$ .049. Similarly, the relationship between suicidal ideation and risky behavior remained significant when controlling for depression (PHQ-9), $r =$ .133, $p =$ .037. The relationship between suicidal ideation and risky behavior also remained significant while controlling for anxiety (GAD-7), $r =$ .307, $p <$ .001. The relationship between suicidal ideation and risky behavior was no longer significant after controlling for a history of suicidal behavior (SITBI), $r =$ .060, $p =$ .348. However, because the HDSQ-SS (suicidal ideation) and the SITBI are measuring constructs with significant overlap, this result was expected.

The correlation between risky behavior and fearlessness about death was found to be low, but still statistically significant, $r =$ .141, $p <$ .05. The low correlation was surprising given previous research on ideation to action models of suicide showing that a fearlessness about death is often increased by exposure to painful and provocative events, which often take the form of risky behaviors.

Suicidal Ideation and Specific Risky Behaviors

To determine if there are specific risky behaviors that are correlated with suicidal ideation, we ran zero-order correlations between scores on the subscales of the MBS-R for each category of risky behavior and scores on the HDSQ-SS. As noted in Table 5, all MBS-R subscale scores were significantly and positively associated with suicidal ideation (all $p < .001$).

Table 5. Zero-order correlations between suicidal ideation and specific risky behaviors.

Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. HDSQ-SS	-								
2. Substance Abuse	.550***	-							
3. Sexual Impulsivity	.460***	.862***	-						
4. Self-harm / Suicide	.555***	.849***	.879***	-					
5. Maladaptive Eating	.535***	.877***	.877***	.897***	-				
6. Impulsive Stealing	.446***	.853***	.908***	.880***	.895***	-			
7. Impulsive Driving	.491***	.868***	.877***	.890***	.889***	.896***	-		
8. Impulsive Spending	.481***	.854***	.868***	.877***	.903***	.906***	.889***	-	
9. Aggression	.496***	.846***	.856***	.889***	.878***	.887***	.881***	.902***	-

Note: *** = p < .001; HDSQ-SS = Hopelessness Depression Symptom Questionnaire –
Suicidality Subscale.

Facets of Impulsivity

The UPPS-P measures several facets of impulsivity including negative urgency, positive urgency, sensation seeking, lack of premeditation, and lack of perseverance. As discussed in hypothesis 4, negative urgency was expected to be the facet of impulsivity most closely associated with suicidal ideation (4a) and risky behavior (4b). To investigate this, we ran zero-order correlations between each of the facets of the UPPS-P and the MBS-R (risky behavior) and the HDSQ-SS (suicidal ideation). Risky behavior and suicidal ideation were positively associated with all facets of impulsivity; these data are provided in Table 6.

Table 6. Zero-order correlations between the risky behavior, suicidal ideation,

impulsivity, and each facet of impulsivity.

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1. MBS-R	-							
2. HDSQ-SS	.530**	-						
3. UPPS-P Total	.635**	.567**	-					
4. Negative Urgency	.501**	.541**	.879**	-				
5. Positive Urgency	.598**	.493**	.904**	.803**	-			
6. Sensation Seeking	.462**	.374**	.731**	.571**	.695**	-		
7. Lack of Premeditation	.231**	.187**	.474**	.190**	.175**	.083	-	
8. Lack of Perseverance	.325**	.260**	.606**	.440**	.337**	.059	.668**	-

Note: ** = p < .01; MBS-R = Maladaptive Behavior Scale - Revised; HDSQ-SS =

Hopelessness Depression Symptom Questionnaire – Suicidality Subscale; UPPS-P =

Impulsive Behavior Scale.

These data were also analyzed using Fisher's r-to-z transformation to determine if

the correlation coefficient of *suicidal ideation* and each facet of the UPPS-P scale was

significantly different than the correlation coefficient of suicidal ideation and the negative

urgency facet of impulsivity, which we hypothesized would have the strongest correlation

to suicidal ideation. Results indicate that the correlation coefficients are not significantly different between the negative urgency facet of the UPPS-P scale and positive urgency (z = 1.49, p = .068). However, negative urgency had a stronger positive correlation with suicidal ideation than sensation seeking (z = 3.439, p < .001), lack of premeditation (z = 5.15, p < .001), and lack of perseverance (z = 4.946, p < .001).

We also examined the relationship between *risky behavior* and the facets of impulsivity. As with suicidal ideation above, we expected negative urgency to have the strongest relationship with risky behavior. However, positive urgency had a stronger relationship with risky behavior compared to the relationship between negative urgency and risky behavior (z = -3.104, p = .001). Negative urgency and sensation seeking were not significantly different in their relationship with risky behavior (z = 0.813, p = .208). However, negative urgency did have a stronger correlation compared to lack of premeditation (z = 3.899, p < .001) and lack of perseverance (z = 3.10, p = .001).

As discussed in hypothesis 5c, negative urgency was expected to be the facet of impulsivity most closely associated with suicidal ideation and risky behavior when examined as part of a bootstrap model. To investigate this, we entered data for each facet of impulsivity into an individual bias corrected bootstrapping models as the mediating variable. For these analyses, suicidal ideation scores were entered as the independent variable and risky behavior scores were entered as the dependent variable. All data for these analyses are provided in Table 7.

All facets of impulsivity were found to have significant indirect effects on the relationship between suicidal ideation and risky behavior, as evidenced by all confidence intervals not containing zero.

Table 7. Individual bias correcting bootstrap models with 5,000 resamples between suicidal ideation scores, risky behavior scores, and each facet of impulsivity.

Measure	Overall Model R^2	β	p	AB Path Lower CI	AB Path Upper CI
Negative Urgency	.344	4.03	< .001	1.09	2.69
Positive Urgency	.427	3.36	< .001	1.71	3.35
Sensation Seeking	.366	4.85	< .001	0.77	2.01
Lack of Premeditation	.303	5.63	< .001	0.31	0.64
Lack of Perseverance	.341	5.73	< .001	0.21	0.96

Note: UPPS-P = Impulsive Behavior Scale.

Wish to Live Recency and Wish to Live Worst-Point

We collected data regarding a participant's rating of their wish to live over the past month (recency) and their perception of their wish to live at its lowest point (worst-

point). Zero-order correlations were run to determine if both forms of wish to live were correlated with suicidal ideation and risky behavior. As noted above in the analysis for Hypothesis 2a and 2b, wish to live worst-point scores were negatively associated with suicidal ideation ($r = -.591$, $p < .001$) and the frequency of risky behaviors ($r = -.190$, $p = .003$). Wish to live recency scores were also negatively associated with suicidal ideation ($r = -.586$, $p < .001$) and the frequency of risky behavior ($r = -.155$, $p = .014$). We used Fisher's r-to-z transformations to determine if the relationship between suicidal ideation and wish to live recency scores and wish to live worst-point scores were significantly different from each other. Our results found that there was no significant difference in the strength of the relationships between suicidal ideation and both measures of wish to live, $z = 0.09$, $p = .464$. Similarly, there were no differences in the strength of the relationship between risky behavior and each measure of wish to live, $z = 0.569$, $p = -.285$.

Risky Behavior, Suicidal Ideation, Wish to Live, Hopelessness, and Impulsivity as a Combined Model

Additionally, we included wish to live, hopelessness, and impulsivity in one indirect effects model with suicidal ideation and risky behavior, in order to determine how well each of these constructs performs when accounting for the others. We entered each of these simultaneously as mediating variables into a single individual bias corrected bootstrapping models with suicidal ideation as the independent variable and risky behavior as the dependent variable. All data for these analyses are provided in Table 8.

This overall model was found to be statistically significant, $R^2 = .494$, $\beta = 4.56$, $p < .001$. Within this model, the indirect effects of each variable were assessed. As evidenced by a confidence interval not containing zero, wish to live worst-point scores were found to have a significant indirect effect on suicidal ideation and risky behavior (CI: -2.27 to -0.59) as was impulsivity (CI: 2.41 to 4.32). However, hopelessness was found to not have a significant indirect effect on suicidal ideation and risky behavior, as evidenced by a confidence interval containing zero (CI: -0.87 to 0.65). This is consistent with the results when each variable was considered independently.

Table 8. Individual bias correcting bootstrap models with 5,000 resamples between suicidal ideation scores, risky behavior scores, and each of the three variables being investigated.

Measure	Overall Model R^2	β	p	AB Path Lower CI	AB Path Upper CI
Total Model	.494	4.56	< .001		
WTL Worst-Point				-2.27	-0.59
Hopelessness				-0.87	0.65
Impulsivity				2.41	4.32

Note: WTL = Wish to live scale.

CHAPTER IV

CONCLUSION

The current study tested several hypotheses which aimed to explore the

relationship between suicidal ideation and risky behavior, and how the variables of wish

to live, hopelessness, and impulsivity may be related to and influence the relationship

between suicidal ideation and risky behavior. Our first hypothesis, that suicidal ideation

would be positively associated with risky behavior, was supported. Ideation-to-action

models of suicide suggest that risky behavior contributes to suicidal behavior through an

acquired capability (Klonsky, Saffer, & Bryan, 2018). Specifically, risky behaviors are

thought to increase fearlessness about death, which increases capability to inflict lethal

self-harm. However, we found a stronger relationship between risky behavior and suicidal ideation than risky behavior and fearlessness about death. This is in contrast to previous research that found risky behaviors to be a potential driver of fearlessness about death (Van Orden et al., 2010) and suggests that the relationship between risky behavior

and suicidal ideation than risky behavior and fearlessness about death. This is in contrast to previous research that found risky behaviors to be a potential driver of fearlessness about death (Van Orden et al., 2010) and suggests that the relationship between risky behavior and suicidal thoughts and behaviors may extend beyond that proposed by ideation-to-action models. A potential conceptual model that links risky behavior and suicidal ideation is discussed in more detail below.

We found that low wish to live was associated with increased suicidal ideation (hypothesis 2a). Traditionally, wish to live has been assessed alongside wish to die (e.g., Brown, Steer, Henriques, & Beck, 2005; Kovacs & Beck, 1977), but more recent work indicates that wish to live and wish to die may be independently related to suicidal behaviors with a low wish to live more predictive of future attempts (Bryan, Rudd, Peterson, Young, & Wertenberger, 2016). The present study is the first to specifically examine the relationship between wish to live (separately from wish to die) and suicidal ideation. Our results indicate that wish to live may be an important factor in suicidal ideation, though future research will be needed to determine exactly how wish to live and ideation are related to each other.

Similarly, we found that hopelessness was associated with increased suicidal ideation (hypothesis 3a). There is a large existent body of literature linking hopelessness

with suicidal ideation. For example, numerous theoretical models of suicide feature hopelessness as a key component of suicidal ideation, including Beck's theory of suicide (Beck, Kovacs, & Weissman, 1975), the Hopelessness Theory of Suicide (Abramson, Alloy, Hogan, Whitehouse, Gibb, Hankin, & Cornette, 2000), and the Three-Step Theory (Klonsky & May, 2015). Additionally, a recent meta-analysis of 166 longitudinal studies found that the relationship between hopelessness and suicidal ideation has widespread empirical support (Ribeiro, Huang, Fox, & Franklin, 2018). Unsurprisingly, the results of the current study are consistent with this large body of theoretical and empirical work.

We also found that impulsivity was associated with increased suicidal ideation (hypothesis 4a). There is a wide body of research investigating the relationship between impulsivity and suicidal behavior, including theoretical models (the Escape Theory of Suicide, Baumeister, 1990; the Stress-Diathesis Model for Suicide, Mann, Waternaux, Haas, & Malone, 1999), as well as a recent review and meta-analysis (Anestis, Soberay, Gutierrez, Hernández, & Joiner, 2014). The few studies that have examined impulsivity and suicidal ideation have done so while combining suicidal ideation with suicidal behaviors (Whiteside & Lynam, 2001; Klonsky & May, 2010). Thus, the present study is one of the few to specifically examine the relationship between suicidal ideation specifically and impulsivity. Below, we explore a theoretical model that may help explain this association.

We also found that low wish to live, increased hopelessness, and increased impulsivity were all associated with increased risky behavior (hypotheses 2b, 3b, and 4b, respectively). This study is the first to directly assess the relationship between wish to live specifically and risky behaviors as a whole; however, the results are consistent with

prior studies that have found that individuals with a strong "wish to not be here for a time" (a construct distinct from wish to die and similar to a low wish to live) had high rates of risky violent behavior (Apter, Gothelf, Orbach, Weizman, Ratzoni, Har-Even, & Tyano, 1995). Similarly, our data adds to the literature related to hopelessness and risky behavior that had previously found a strong relationship between hopelessness and various risky behaviors, including drug use, risky sexual behavior, aggressive behavior, and heavy drinking (Kelly, Rollings, & Harmon, 2005; Broccoli & Sanchez, 2009), and provides some of the clearest evidence to date for the relationship between hopelessness and risky behavior more broadly. Additionally, and perhaps unsurprisingly, our results were consistent with the large body of literature linking impulsivity and various risky behaviors (Beaton, Abdi, & Filbey, 2014; Black, McMahon, Potenza, Fiellin, & Rosen, 2015).

Wish to live, hopelessness, and impulsivity have not typically been incorporated all together in theoretical models of risky behavior. However, a concept that may provide a unified explanation of their relationship with risky behavior is future orientation, which is an individual's general thoughts, feelings, and attitudes towards the future and their place within it. The Three-Component Model of future orientation posits that an individual's future orientation is comprised of their motivations, cognitive representations, and behaviors (Seginer, 2009). Within this model, an individual's motivations to think about the future are influenced by their values, their expectations of the future, and their sense of internal control. Similarly, an individual's cognitive representation of the future is determined by their hopes and fears about said future. Finally, the behavioral component of this model can be divided into an individual's

exploration of future options and their commitment to specific future options for their life. Taken together, the Three-Component Model of future orientation is a helpful framework for understand how an individual's future orientation can develop based on thinking patterns, access to resources, and overall affect.

A negative future orientation can be described as a belief that one does not have a future or that their future can or should not be positively changed (Hirsch, Duberstein, Conner, Heisel, Beckman, Franus & Conwell, 2006). A negative future orientation has been found to be associated with numerous negative outcomes, as is discussed further below. A negative future orientation has been found to predict engagement in risky behaviors in an adolescent sample (Jackman & MacPhee, 2017). Similarly, future orientation has been found to be a protective factor in the relationship between an exposure to community violence and subsequent risky behavior; individuals with an positive future orientation were less likely to engage in risky behavior after exposure to community violence, and individuals with a negative future orientation were more likely to engage in subsequent risky behavior (So, Gaylord-Harden, Voisin & Scott, 2018). More broadly, we can see that a negative future orientation has been associated with a greater propensity towards risky behavior.

Wish to live may be thought of as a combination of "judgments, emotions, and projections into the future, one of whose outcomes is a conception of how long one wishes to live" (p. 407, Lawton, Moss, Hoffman, Grant, Ten Have, and Kleban, 1999). Thus, wish to live is a future oriented concept and is consistent with the motivational and cognitive representation aspects of the Three-Component Model of future orientation. Specifically, the projections into the future that comprise an individual's wish to live are

likely affected by their expectations of the future as well as their hopes and fears for the future, an integral part of one's future orientation.

Similarly, hopelessness is an "inaction when threatened … reflect[ing] negative future expectancies" (p. 456, Range & Penton, 1994). This is also a future oriented concept consistent with the motivational and cognitive representation aspects of the Three-Component model. Additionally, a negative future orientation is specifically associated with increased hopelessness and suicidality (Williams, Van der Does, Barnhofer, Crane, & Segal, 2008).

Impulsivity is a "swift action without forethought or conscious judgement" (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001), which is consistent with a reduced future orientation. In fact, a widely used impulsiveness scale includes (low) future orientation as one of the subscales (Meule, 2013), indicating that future orientation is considered a potential component of impulsivity. Unsurprisingly, a number of studies have found that lower future orientation is associated with impulsivity (Chen & Vazsonyi, 2011; Gouveia-Pereira, Gomes, Roncon, & Mendonca, 2017; Robbins & Bryan, 2004; Steinberg, Graham, O'brien, Woolard, Cauffman, & Banich, 2009).

The concept of a negative future orientation has also been specifically proposed as a theoretical driver of suicidal ideation (Kirtley, Melson, & O'Connor, 2018). A negative future orientation, when combined with negative affect, is posited to result in the development of a desire for an end to life. Given the theoretical and empirical connections between future orientation and the variables involved in the present study, we propose the following conceptual model (Figure 1): low wish to live, hopelessness,

and impulsivity are all expressions of future orientation. In turn, suicidal ideation and risky behavior are related to each other through their associations with low wish to live, hopelessness, and impulsivity.

Figure 1: Conceptual Model of Study
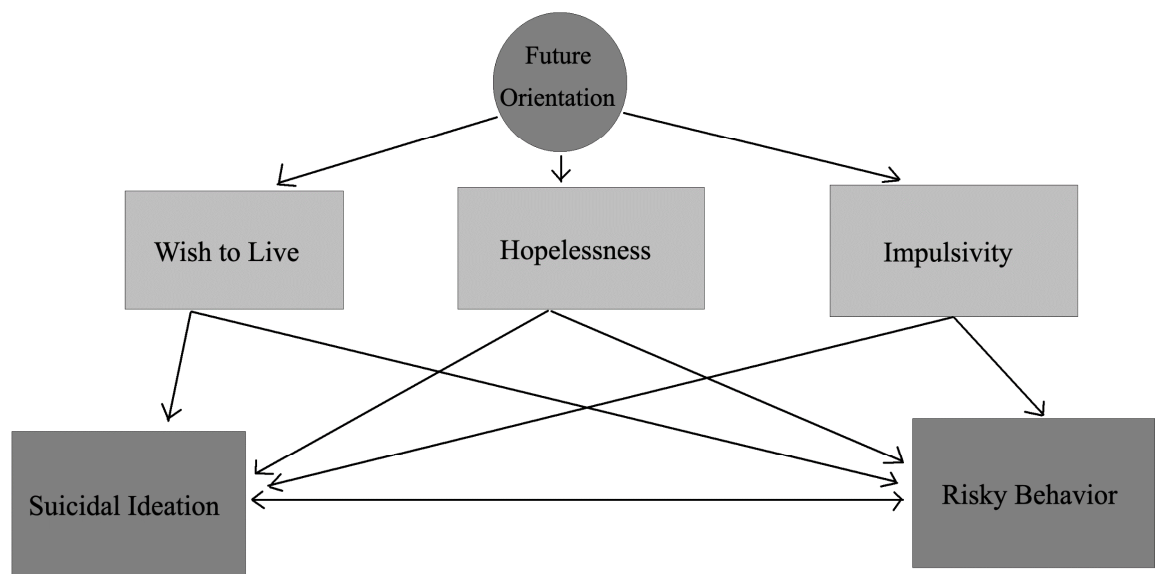
Our fifth hypotheses, that there would be an indirect relationship of suicidal ideation on risky behavior through wish to live, hopelessness, and impulsivity, had mixed support. Wish to live and impulsivity both had significant indirect effects on the relationship between suicidal ideation and risky behavior, while hopelessness did not. This was true when wish to live, hopelessness, and impulsivity were included in one model and when they were evaluated in individual models. Future longitudinal or experimental work will be needed to determine whether there are causal relationships

between suicidal ideation, wish to live, impulsivity and risky behavior. While these results are consistent with our conceptual model, future work will also be needed to determine to what degree future orientation may help explain these relationships.

While hopelessness was found to be directly associated with suicidal ideation and risky behavior, there was not an indirect effect of suicidal ideation on risky behavior through hopelessness. We found that a large amount of the variance that hopelessness predicts in risky behavior scores is accounted for by suicidal ideation. It is possible that this overlap is explained by future orientation, but future work is needed to investigate this conceptual model further.

We also conducted many exploratory analyses to further investigate the relationships between our main variables of interest as well as other variables important in models of suicidal thoughts and behaviors. Regarding the individual components of impulsivity, based on previous research (Anestis & Joiner, 2011), we expected negative urgency (the impulse to act rashly when experiencing negative affect) to be the component most closely associated with suicidal ideation. However, the relationship between suicidal ideation and negative urgency was not significantly different from the relationship between suicidal ideation and positive urgency – the tendency to act rashly when experiencing positive affect. On the other hand, the relationship between suicidal ideation and negative urgency *was* significantly stronger than the relationship between SI and the other components of impulsivity (sensation seeking, lack of premeditation, lack of perseverance). Thus, in our sample, both negative urgency and positive urgency were strongly associated with suicidal ideation. While there is consistent support in the literature for negative urgency being a component of impulsivity strongly associated with

suicidal ideation and behavior (Beach, Gissandaner, & Schmidt, 2021), previous research supporting positive urgency's relationship with suicidal ideation is scarcer. However, one study regarding individuals seeking treatment for substance use disorders found that positive urgency was positively associated with increased suicide attempts (Anesits, Tull, Lavender, & Gratz, 2014.) Important to note, however, is that this relationship lost statistical significance once NSSI was controlled for. This finding is similar to other studies that have found positive urgency is no longer significantly associated with suicidal thoughts and behaviors once controlling for depression and substance use (Johnson, Carver, & Tharp, 2017; Szanto, Galfalvy, Kenneally, Almasi, & Dombrovski, 2020). Future research is needed to further explore the potential relationship between suicidal ideation and positive urgency.

We also expected negative urgency to be the component of impulsivity most closely associated with risky behavior (Derefinko, Peters, Eisenlohr-Moul, Walsh, Adams, & Lynam, 2014; Wong, Zane, Saw, & Chan, 2013). Our findings indicate that the strength of the relationship between risky behavior and positive urgency was actually stronger than that of risky behavior and negative urgency, and negative urgency did not have a stronger relationship with risky behavior than sensation seeking. However, negative urgency, positive urgency, and sensation seeking did have a stronger relationship with risky behavior than lack of premeditation and lack of perseverance. These findings are contrary to our predictions, and understanding how these data relate to the broader literature requires a degree of nuance. For example, previous research into the components of impulsivity and risky sexual behavior found that the sensation seeking and negative urgency components of impulsivity were most closely associated with specific

risky sexual behaviors (Derefinko et al., 2014). However, negative urgency and sensation seeking each predicted different risky sexual behaviors, with negative urgency associated with irregular condom use, and sensation seeking associated with the number of sexual partners and having sex with strangers. As such, each facet of impulsivity may be related to risky behavior but may relate to different specific risky behaviors.

To determine if specific risky behaviors were more closely related to suicidal ideation than other types of risky behavior, we examined the individual categories of risky behavior in the MBS-R (Helle, 2016): substance abuse, sexual impulsivity, self-harm / suicide, maladaptive eating, impulsive stealing, impulsive driving, impulsive spending, and aggression. Of these specific types of risky behavior, substance abuse, self-harm / suicide, and maladaptive eating were found to be more closely related to suicidal ideation than other types of risky behavior, but only slightly. This is in line with previous research that has found substance use (Oquendo & Volkow, 2018), self-harm (Toprak, Cetin, Guven, Can, & Demircan, 2011), and suicide attempts (Brière, Rohde, Seeley, Klein, & Lewinsohn, 2015) to be closely related to suicidal ideation. Previous research has also found a relationship between eating pathology and suicidal ideation (Smith, Forrest, Duffy, Jones, Joiner, & Pisetsky, 2020).

Understanding why these three components of risky behavior were more closely related to suicidal ideation than the other components may be explained by examining how related they are, conceptually, to suicide than the other components. Given that suicidal ideation is often comorbid with a negative affect (Yang et al., 2020), it is possible that the other components of risky behavior – impulsive stealing, impulsive driving, impulsive spending, and aggression – simply are not associated with as strong of

a negative affect than the other components of risky behavior. For example, shoplifting behavior – similar to impulsive stealing – has been found to be more closely associated with positive mood, thrill, and the pursuit of fun (Lo, 1994). Similarly, one study has found that inducing negative affect in drivers makes them more perceptive, and perhaps avoidant, of risky driving conditions (Hu, Xie, & Li, 2013). Additionally, positive affect has become increasingly thought to work as a risk factor for aggressive behavior, especially as it relates to the potential evolutionarily reinforcing role that aggressive behavior may play in some individuals (Chester, 2017). While a detailed explanation of each of these relationships is outside the scope of this study, these examples serve to illustrate the point that understanding why certain components of risky behavior are less associated with suicidal ideation than other components requires a degree of nuance. Further research is needed to explore these relationships in greater detail.

Additionally, to further investigate if the relationship between suicidal ideation and risky behavior may better be explained by our target distal factors (wish to live, hopelessness, impulsivity) or other distal factors, we also examined whether a history of suicidal behavior, fearlessness about death, thwarted belongingness, perceived burdensomeness, depression symptoms, and anxiety symptoms could explain the relationship between suicidal ideation and risky behavior. We found that the relationship between suicidal ideation and risky behavior remained significant even after controlling for each of these variables, with the exception of a history of suicidal behaviors. Thus, the relationship between suicidal ideation and risky behavior does not appear to be better explained by other factors often associated with suicidal ideation. Given the strong association between current suicidal ideation and a history of suicidal behavior it is

perhaps not surprising that the relationship between suicidal ideation and risky behavior was no longer significant after controlling for a history of suicidal behaviors. However, it does raise the question as to whether suicidal behavior is more strongly associated with, or a better predictor, of risky behavior. Future research will be needed to disentangle the relationships between suicidal ideation, suicidal behavior, and risky behaviors.

Limitations

Limitations of the current study include the use of an Amazon Mechanical Turk sample. While these samples may be more generally representative than the traditional college student samples used in psychological research (Ross, Zaldivar, Irani, & Tomlinson, 2009), they still may not be completely representative of the population at large. This is apparent in the demographics of our sample, which was predominantly White (82.7% vs US population of 73%; United States Census Bureau, 2020). As such, our results may not generalize to more diverse samples. Additionally, the cross-sectional design of this study provided only a momentary snapshot into psychological constructs that may be better assessed over time; due to this, we are not able to assess causality in the relationship between our variables of interest. Future research should employ a longitudinal design in order to examine the relationships between suicidal ideation, risky behavior, wish to live, hopelessness, and impulsivity over time.

Strengths

The current study had several notable strengths. Our study had a reasonably large sample size of individuals reporting suicidal ideation. Given that research into suicidal

ideation is often complicated by its low base rate in the population (Cohen, 1986), our suicidal ideation sample size ensured we had adequate statistical power to detect our hypothesized relationships. Additionally, our thorough use of validity checks increased the likelihood that our data were valid and that our results were reliable. Though there are concerns about data quality from Mturk (Chmielewski & Kucker, 2020), our efforts likely resulted in more reliable and valid results.

Summary

The current study provides evidence for the relationship between suicidal ideation and risky behavior with indirect effects through wish to live and impulsivity. Our conceptual approach to these relationships focused on the idea of future orientation and how a reduced future orientation could indicate increased suicidal ideation and risky behavior. The strength of the relationship between suicidal ideation and risky behavior was found to be stronger than the relationship between fearlessness about death and risky behavior; this suggests that the relationship between suicidal ideation and risky behavior may not simply be explained by a gradual increase in fearlessness about death, as is anticipated by many current models of suicidal behavior, but may be explained by a reduced future orientation. Additionally, this study is one of the first to examine how a low wish to live may be associated with increased suicidal ideation and risky behavior. Our findings also indicate that impulsivity may also be associated with increased suicidal ideation and risky behavior. These findings have important theoretical implications for our understanding of the development of suicidal risk. Additionally, the interactions of these constructs with suicidal ideation and risky behavior may inform our understanding

of each of these constructs. Future studies should employ a longitudinal design and further examine this relationship.

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APPENDICES

APPENDIX A

Review of the Literature

Current data indicates that the suicide rate in the United States is increasing, with

a 30% increase in suicide from 1999 to 2016 (Pompili, 2018). This phenomenon of

increased suicide rates is not exclusive to the United States, with mortality due to suicide

increasing in Europe and Asia as well (König, et al., 2018; Tandon & Nathani, 2018).

Rising suicide rates are a pressing public health concern; not only is suicide a leading

cause of mortality, but exposure to suicidal ideation and behavior becomes a negative life

event for people close to the suicidal individual (Harris & Bettiol, 2017).

Risky behavior (e.g., reckless driving, unprotected sex, drug and alcohol misuse) is also a

major public health issue. It is associated with various negative mental and behavioral

health outcomes such as higher rates of mental illness (McCloughen, Foster, Marabong,

Miu, & Fethney, 2015), lower rates of cancer screenings (González, Suárez, & Ortiz,

2015), negative reproductive health outcomes (Tang, Qu, Li, & Tan, 2018), and increased

substance use issues (Atlam, Aldemir, & Altintoprak, 2017). With multiple associations between risky behavior and negative health outcomes there is a great need for more data on the nature of this phenomenon.

Interestingly, suicidal ideation is associated with risky behavior across a number of different age groups and populations, such as adolescents (Ammerman, Steinberg, & McCloskey, 2018), United States college students (Barrios, Everett, Simon, & Brener, 2000), and a nationally representative French sample (Husky, Guignard, Beck, & Michel, 2013). As described in more detail below, much of this research, and most prominent models of suicide, focus on the contribution of risky behaviors to increased suicidal thoughts and behaviors. However, it may also be the case that suicidal ideation leads to increased engagement in risky behaviors. The proposed study will investigate this relationship as well as potential factors that may explain the relationship, such as low wish to live, hopelessness, and impulsivity. An exploration of these constructs, and how they all relate to and interact with each other, may offer important information regarding the transition from suicidal ideation to risky behavior.

Risky Behavior

Examples of risky behavior vary between cultures and time periods, with certain actions or lifestyles included or excluded based on prevailing norms. However, the overarching definition of risky behavior focuses on actions or lifestyles that could directly lead to an adverse outcome, such as a negative health event or premature mortality (McKie, et al., 1993). Broad examples of risky behavior include speeding, unprotected sex, drug abuse, and driving a vehicle under the influence of alcohol (Turner et al., 2004). People who undertake risky behavior usually do so without consideration

for the potential harm that may result from their actions (Horvath, & Zuckerman, 1993).

Risky behavior is a symptom or consequence of a wide variety of mental health disorders. For example, individuals with ADHD have increased lifetime rates of alcohol and drug use, higher rates of risky sexual behaviors, increased rates of car accidents, increased rates of speeding citations, and increased rates of credit card misuse (Graziano, Reid, Slavec, Paneto, McNamara, & Geffken, 2015). Similarly, studies of individuals with borderline personality disorder have found increased rates of self-harm, substance abuse, binge eating, and impulsive sexual behaviors (Tull, Gratz, & Weiss, 2011). A study examining adolescents diagnosed with schizophrenia found higher rates of unprotected sex, self-injury, alcohol and tobacco use, and general rule-breaking behaviors (Wang, Zhou, Liu, Li, Yang, Qi, … Liu, 2016). Additionally, bipolar disorder is associated with increased rates of alcohol and tobacco use, aggression and violence, unprotected sex, general rule-breaking behaviors, and self-injury (Tian, Li, Liu, Yang, Zhou, Wang, & Liu, 2015). While by no means an exhaustive account of the relationship between mental health disorders and risky behavior, these examples serve to illustrate that risky behavior is often a consequence of psychopathology.

Risky Behavior and Suicidal Thoughts and Behaviors

In addition to the association between psychological disorders and risky behavior, suicidal thoughts and behaviors (STBs) are associated with risky behavior. Risky behavior is prominently, though indirectly, associated with STB through acquired capability/capacity for suicide, which is a core component in two of the leading models of suicide: the Interpersonal Theory of Suicide (Van Orden, Witte, Cukrowicz, Braithwaite, Selby, & Joiner, 2010), and the Three-Step Theory (Klonsky & May, 2015).

A new understanding of the formulation of suicidal behavior came through

Thomas Joiner's Interpersonal Theory of Suicide. Within this theory, thwarted

belongingness and perceived burdensomeness interact to make an individual more prone

towards suicidal thinking while the transition from suicidal thinking to suicidal behavior

is facilitated by a gradual habituation to pain and reduced fear of death, often through

experiencing painful events and engaging in risky behaviors (Van Orden et al., 2010). For

example, increasingly engaging in reckless driving and speeding may gradually reduce an

individual's fear of death and pain, thus increasing their likelihood of engaging in

deliberate self-harm behavior. This is one of the first theories of its kind to directly link

risky behavior to STB, and was substantially influential to the field of suicidology as a

whole (Chu et al., 2017).

Another theory that established a clear link between risky behavior and STB is the

Three-Step Theory of Suicide, in which the development of suicidal ideation and the

development of suicidal behavior are seen as separate but related processes (Klonsky &

May, 2015). Within this theory, suicidal ideation is thought to develop as a result of pain

and hopelessness, and individuals with low levels of connectedness are hypothesized to

be more susceptible to the effects of these processes. Next, individuals experiencing

suicidal thinking are posited to engage in suicidal behavior only when they have the

capacity for suicide, which may be acquired, dispositional, and/or practical. Risky

behavior is hypothesized to play a leading role specifically in acquired capacity for

suicidal behavior; as individuals engage in risky behaviors, they habituate themselves

towards pain or the threat of pain, thereby reducing the likelihood that the threat of pain

would prevent them from engaging in suicidal behavior.

The Interpersonal Theory of Suicide (Van Orden et al., 2010) and the Three-Step

Theory (Klonsky & May, 2015) both view risky behavior as an indirect cause of suicidal

behavior through acquired capability/capacity. However, as with psychological disorders,

risky behavior may also be a *consequence* of suicidal thinking, though few theories or

models have framed the relationship in this direction. In fact, the only theory that we are

aware of to suggest that risky behavior is a consequence of suicidal ideation was

developed by Selzer and Payne (1962), who posited that a number of automobile

fatalities are actually the result of suicidal intent, whether conscious or unconscious.

Consistent with the psychodynamic underpinnings of their theory, the authors

hypothesized that individuals who view STBs as unacceptable may unconsciously engage

in risky behaviors that lead to consequences such as car accidents, as they can be

rationalized as true "accidents" rather than suicidal behavior. Similarly, Selzer and Payne

suggest that, due to the stigma of suicide, individuals may consciously engage in risky

behaviors that lead to car accidents to prevent the shame (for themselves and their family)

that would accompany a clear suicide attempt. While there are no modern theories of

suicide that incorporate risky behaviors as a consequence of suicidal ideation, a small

body of work has investigated the potential relationship.

For example, a review of studies with data on psychosocial variables among

drivers in car accidents found that levels of stress, depression, and negative life events

were associated with higher incidence of car accidents (Pompili, Girardi, Tatarelli, &

Taterelli, 2006). In the same paper, the authors compared 30 drivers in single-car

accidents with 30 individuals who were never involved in a car accident. The single-car

accident drivers demonstrated higher levels of stress, depression, and life weariness

compared to the no-accident control group. The authors interpreted the review and empirical findings as (indirect) evidence for Selzer and Payne's (1962) theory of suicide and risky behavior, suggesting that individuals who are thinking about suicide engage in risky driving that leads, either accidentally or deliberately, to car accidents.

Numerous studies have found that alcohol use is strongly related to suicidal ideation and behavior. While the majority of this research has looked at alcohol use as a potential cause of suicide, a comprehensive, qualitative review of the literature suggests that alcohol use may also be a consequence of STB (Hufford, 2001). This review suggests that individuals may engage in alcohol consumption in response to suicidal ideation, intending for alcohol to help resolve their ideation either through increasing positive mood and decreasing negative mood or increasing capability for suicide (thus resolving their suicidal ideation through an attempt). This idea is consistent with the present study's hypothesis that certain risky behaviors (e.g. alcohol intoxication) may be an expression of suicidal ideation.

It has also been suggested that some opioid-related deaths are a consequence of suicidal ideation (Oquendo & Volkow, 2018). Specifically, opioid addiction and its consequences may lead to deliberate opioid overdose as a suicide attempt as well as unintentional overdose as a consequence of increased risk-taking behavior. Taken together with the data on alcohol described above, risky substance use broadly may both contribute to, and be a risk factor of STB.

A study of over 800 adolescents followed into adulthood examined the relationship between early life suicide attempts and a range of risky behaviors in

adulthood (Brière, Rohde, Seeley, Klein, & Lewinsohn, 2015). Suicide attempts during adolescence were found to predict risky sexual behavior during adulthood, even after controlling for concurrent psychopathology, family risk factors, and sociodemographic differences. This is of note for the current study due to the credence it lends to our working hypothesis: that STB precedes certain risky behaviors (in this case, risky sexual behavior), which may be an expression of suicide ideation.

The above studies illustrate the idea that certain risky behaviors may be an expression or consequence of suicidal ideation. However, it is currently unclear *how* suicidal thinking leads to risky behavior, but we hypothesize that it may be through a low wish to live, hopelessness, and impulsivity. Each of these factors is explored in detail below.

Wish to Live

Wish to Live and Suicide

A landmark study published in 1977 suggested that suicidal action is often the culmination of an internal struggle between two competing forces: a wish to live, and a wish to die (Kovacs & Beck, 1977). These two concepts are not mutually exclusive; individuals who exhibit suicidal behavior can report both a wish to live and a wish to die, but different levels of each desire, or even a general ambivalence about living or dying. This study found that suicide attempts were highest among participants who either had an ambivalence about living, or who had a significantly higher wish to die than a wish to live. At the time of publication, the authors recommended that wish to live and wish to die be assessed as a unipolar scale with wish to live subtracted from wish to die, suggesting that this could be used to predict suicidal intent.

A 2005 study sought to test these findings with an analysis of 5,814 patient records with follow-up data from a psychiatric outpatient clinic (Brown, Steer, Henriques, & Beck, 2005). Each participant's suicide ideation severity and wish to live and wish to die was measured using the Scale for Suicide Ideation (Beck, Steer, & Ranieri, 1988). They found that when the wish to die is moderate to strong, and the corresponding wish to live is absent, the risk for suicide increases. Additionally, individuals with a strong wish to die were much more likely to attempt suicide than individuals with an ambivalence about living or dying. Conversely, when the participant's wish to live outweighed their wish to die, their suicide risk substantially decreased. The authors suggested that a measure of wish to die and wish to live could be a valuable tool to signal suicide risk.

A 2012 study sought to determine if suicide risk could be categorized using three distinct groupings: wish to live (WTL), ambivalence about living or dying (AMB), and wish to die (WTD; O'Connor, Jobes, Yeargin, FitzGerald, Rodríguez, Conrad, & Lineberry, 2012). An analysis of 105 participants from a psychiatric inpatient unit, all of whom endorsed suicidal ideation during the time of the study, determined that suicidal individuals could accurately be classified into one of these three distinct groupings. Participants in the WTD group had more severe psychopathology, more previous suicide attempts, and a higher overall risk for suicide than the WTL or AMB group. However, the authors noted that longitudinal data is needed to draw meaningful conclusions, as the group that an individual is classified into could change over time.

As noted above, most research categorizes WTD and WTL as a unidimensional construct; however, recent research suggests WTD and WTL are two interrelated but

competing forces that may change independently over time. The first study to measure WTL and WTD independently followed 152 active duty soldiers over a 2-year period (Bryan, Rudd, Peterson, Young, & Wertenberger, 2016). Low-WTL was more closely associated with subsequent suicidal behavior than high-WTD. Specifically, participants who reported a suicide attempt during follow-up contact had significantly lower WTL than participants who did not attempt suicide. However, no difference was found in levels of WTD between participants who attempted suicide and participant who did not. Overall, an absence of WTL may drive suicidal behavior over and above a high WTD.

Wish to Live and Risky Behavior

As individuals experience a diminished wish to live, they may begin to engage in risky behaviors that are consistent with a decreased desire for life. While this has not been tested directly, a number of studies provide indirect support for this relationship.

For example, a qualitative study of 60 regular heroin users in Australia, examined overt STB as well as risky behaviors and attitude toward death (Miller, 2006). Almost half of the sample reported feeling indifferent about whether they live or die. The author points out that this indifference towards death may not necessarily be an expression of suicidal desire or a wish to die, but rather a diminished interest in whether or not they continue to live, a concept quite similar to low-WTL. The sample also reported engaging in a number of high risk behaviors including continued heroin use despite former overdoses and sharing needles despite understanding the increased risk of contracting diseases such as hepatitis C or HIV. While qualitative in nature, this study draws a connection between the sample's indifference toward death and engagement in these substance-related risky behaviors.

Similarly, the study mentioned above that indirectly examined the relationship between suicidal intent and single-car accidents (Pompili, Girardi, Tatarelli, & Taterelli, 2006), also examined "attachment to life" as a variable of interest. They found that the individuals injured in single-car accidents reported lower attachment to life compared to the control group. Low attachment to life appears to be a near similar construct to low-WTL and again suggests a potential connection between low-WTL and risky behavior.

A study conducted on 136 adolescents in a psychiatric inpatient unit probed two different types of suicidal ideation: a wish to die and a "wish to not be here for a time" (Apter, Gothelf, Orbach, Weizman, Ratzoni, Har-Even, & Tyano, 1995). Individuals who had a stronger "wish to not be here for a time" engaged in violent behaviors more frequently had stronger correlations with symptoms consistent with impulse control issues than with depressive symptoms. "Wish to not be here for a time" sounds similar to the construct of low-WTL. This would make sense conceptually; if low-WTL is expressed through risky behaviors, then adolescents experiencing low-WTL could be expected to express this through violent behaviors, which may be categorized as issues with impulse control. Once again, this study aligns with our understanding of low-WTL and risky behavior, and helps inform our approach to these constructs.

While none of the above studies directly measured WTL, they all addressed similar concepts and their potential relationship to risky behavior. Individuals who have a low-WTL may engage in a number of risky behaviors (e.g., alcohol use, tobacco use, risky sex, jaywalking, trespassing) as a result of their reduced sense of importance of their own wellbeing. However, no studies have examined this directly and there is a clear need for data regarding how these processes may relate to and influence each other.

Hopelessness

Hopelessness and Suicide

Hopelessness is a key component in several models of suicide, specifically Beck's theory of suicide (Beck, Kovacs, & Weissman, 1975), the Hopelessness Theory of Suicide (Abramson, Alloy, Hogan, Whitehouse, Gibb, Hankin, & Cornette, 2000), and the Three-Step Theory (Klonsky & May, 2015). To better understand the current state of empirical research on the relationship between hopelessness and suicide, these theories will be explored below.

In his book, Beck (1967) suggests that hopelessness is more essential to suicidal ideation in depression than any other symptom. In Beck's view, hopelessness was essential for suicidal action, with this being especially true for individuals with depression. Beck did not attempt to explain why hopelessness was required for suicidal action, but his work provided a foundation for later researchers in this area.

Abramson and colleagues (2000) later proposed the Hopelessness Theory of Suicide, in which hopelessness is required for an individual to move from suicidal ideation to action. Specifically, they propose that hopelessness leads to a decrease in problem solving abilities, which results in suicide being viewed as a viable solution to problems and conflicts. This was a precursor to the ideation-to-action framework of suicide theory (see, Klonsky, May, & Saffer, 2016) in which components that contribute to suicidal ideation are differentiated from those that contribute to suicidal behavior.

The most prominent modern model of suicide that includes hopelessness is the Three-Step Theory (3ST; Klonsky & May, 2015). The 3ST views suicidality within the

ideation-to-action framework, in which the development of suicidal ideation, and the progression of suicidal action, should be viewed separately and independent from each other. This theory posits that pain is required for suicidal ideation to develop; the researchers emphasize that the type of pain is purposely not specified (e.g. psychological pain, physical pain, emotional pain, etc.). Next, Klonsky and May propose that pain alone is not enough to lead to suicidal ideation, and that this pain must be combined with a sense of hopelessness. The combination of these two constructs is hypothesized as being the ingredients necessary for suicidal ideation to develop. While a full explanation of this theory would involve detailing the other components of the 3ST and the transitions from ideation to action, a focus on the portion that explains hopelessness is sufficient for this review.

A recent meta-analysis of 166 longitudinal studies involving hopelessness as a risk factor for suicidal ideation and behavior found support for this relationship, although the presence of publication bias indicates that hopelessness may drive suicidal risk less than previously thought (Ribeiro, Huang, Fox, & Franklin, 2018). The authors note that the weaker relationship between hopelessness and suicide found in the meta-analysis may be a reflection of the methodological constraints present throughout their meta-analysis and the overall design of their included studies and may underestimate the true strength of the relationship. In sum, hopelessness is expected to be a risk factor for suicide, although the strength of this relationship is hard to determine at this time.

In summary, there is strong theoretical and empirical support for the relationship between hopelessness and STB. While the extent to which hopelessness influences

suicidal behavioral is not entirely known, there is clear theoretical and empirical support for these constructs being interrelated.

Hopelessness and Risky Behavior

In contrast to the relationship between hopelessness and suicide, there is no foundational model that explains the relationship between hopelessness and risky behavior. In addition, there are relatively few studies that have directly investigated this relationship, but several studies do provide a plausible association between these factors.

A study using the comprehensive Add Health dataset of adolescents examined the relationship between adolescent risky behavior and a "nothing to lose" attitude, a construct similar to hopelessness that the researchers defined as participants' expectations of attending college and expectations of living past the age of 35 (Harris, Duncan, & Boisjoly, 2002). The authors found a positive association between a nothing to lose attitude and several relevant behaviors including earlier onset of sexual behavior, likelihood of selling drugs, and likelihood of using weapons. While this study did not examine hopelessness directly, it provides some support for the relationship between hopelessness and some risky behaviors in adolescents.

A study of 245 college students examined the role of hopelessness in "chronic self-destructiveness", a catchall term for a wide range of risky behaviors (Kelly, Rollings, & Harmon, 2005). They found a strong association between hopelessness and drug use, risky sexual behavior, aggressive behavior, and heavy drinking in this sample.

A study of 108 African American males between the ages of 15 and 24 examined the relationship between hopelessness and sexual risk behavior (Kagan, Deardorff, McCright, Lightfoot, Lahiff, & Lippman, 2012). The authors found that higher levels of hopelessness were associated with lower levels of condom use with non-main sexual partners, but there was no relationship between hopelessness and condom use with a main partner. A similar study on a representative undergraduate sample found similar results (Broccoli & Sanchez, 2009). An examination of explicit and implicit levels of hopelessness among 60 undergraduate college students (female = 38) found that increased levels of hopelessness led to decreased condom use. However, the relationship between condom use and hopelessness was stronger among male participants than female participants.

Additionally, hopelessness has been found to have an indirect effect on alcohol use. A study conducted on a sample of college students ($n = 230$) found that hopelessness had an effect on coping mechanisms for anxiety, which had an effect on alcohol use (Baines, Jones, & Christiansen, 2016). The authors suggest that hopelessness may increase negative affect, which individuals may attempt to cope with through increased alcohol use. Similarly, a study on college students ($n = 763$) who engaged in nonmedical use of prescription drugs (NMUPD) found an association between driving while under the influence of NMUPD and hopelessness (Benotsch, Martin, Koester, Mason, Jeffers, & Snipes, 2015).

Hopelessness may also be related to risky behavior related to medical treatment such as poor medication adherence. For example, a study of 378 patients with type 2 diabetes investigated the relationship between diabetes fatalism – a combination of

despair, hopelessness, and powerlessness often associated with the disease – and self-care

and medication adherence (Walker, Smalls, Hernandez-Tejada, Campbell, Davis &

Egede, 2012). Poor medication adherence in diabetes is an inherently dangerous

phenomenon that puts diabetes patients at risk for medical complications, decreased

quality of life, and premature death. This study found that, as diabetes fatalism increased,

levels of self-care and medication adherence decreased.

These studies provide evidence for a link between hopelessness and a range of

risky behaviors. However, no studies have directly linked suicidal ideation, hopelessness

and engagement in risky behavior. As such, the proposed study would advance our

understanding of the relationship between these three important and potentially

interrelated factors.

Impulsivity

Impulsivity and Suicide

As noted above, the most prominent modern theories of suicide fall within the

ideation-to-action framework in which factors that lead to increased suicidal ideation are

differentiated from factors that may lead to a transition from suicidal ideation to suicidal

behavior. One such factor that may be related to the transition from suicidal thinking to

suicidal behavior is impulsivity. Though an in-depth review is beyond the scope of this

proposal, it is important to note that research investigating impulsivity is complicated by

the heterogeneity in the definition and measurement of the construct (e.g., see Lynam &

Miller, 2004). While acknowledging this limitation of the literature, below is a brief

review of the relationship between impulsivity and suicide.

Baumeister (1990) incorporated impulsivity in his Escape Theory of suicide wherein he proposed that attempts to escape from negative affect and one's own awareness of inadequacy leads to "cognitive deconstruction", a state that involves (among other things) concrete thinking and a focus on more immediate goals. He posits that this cognitive deconstruction leads to irrational and impulsive decision-making which, when combined with the desire to escape from negative affect, leads to suicidal behavior. While this theory is not in wide use among most modern suicidologists, it provided an initial model of suicide that incorporated impulsivity.

Mann, Waternaux, Haas, and Malone (1999) expanded on this idea with their "stress-diathesis" model for suicide. An examination of 347 patients at a psychiatric hospital found that impulsivity was one trait more present in suicide attempters than suicide non-attempters. The authors posited that risk for suicide may have resulted from the combination of a stressor (psychiatric illness) and a diathesis (impulsivity). Although not a widely-held theory of suicide, it provides further support for the idea that impulsivity plays a pivotal role in suicide risk.

A recent review and meta-analysis of 70 studies that tested the relationship between impulsivity and suicide found that the resulting effect was significant, but small (Anestis, Soberay, Gutierrez, Hernández, & Joiner, 2014). For these analyses, Anestis and colleagues separated the data from studies on suicide and impulsivity into four groupings: studies with only one effect ($n = 57$), studies with only cross-sectional effects ($n = 57$), studies with only prospective effects ($n = 7$), and studies with only psychological autopsy effects ($n = 7$). For these studies, the effect size was always small (Hedges $g = .09 - .37$). In their review, the authors summarized that the current

understanding was that impulsivity and suicide were strongly correlated, and that the prevailing theory at the time was that suicide often occurred in response to strong affective states and without significant forethought. However, the authors noted that this does not align with a more nuanced understanding of suicidal ideation, and that a gradual weakening fear of death and significant rehearsal of suicidal behavior is often necessary for a person to actually act in a significantly self-harming manner. After summarizing the current shortcomings with regards to research on suicide and impulsivity, Anestis and colleagues proposed that impulsivity results in individuals engaging in more painful and provocative events. They argue that it is through this engagement in painful and provocative events that individuals experience an increased acquired capability for suicide, thus increasing their risk for suicide more broadly. As such, impulsivity may act as a distal (rather than proximal) risk factor for STB.

The studies that have examined impulsivity as a distal risk factor for STB have typically done so within the UPPS model (Whiteside & Lynam, 2001) of impulsive behavior. The UPPS model sees impulsive behavior as being comprised of four distinct personality traits: urgency, (decreased) premeditation, (decreased) perseverance, and sensation seeking. These four personality traits offer an explanation for the development of impulsivity and provide reasoning for why the manifestation of impulsivity can vary between individuals.

A large sample of military personnel (n = 2,011), undergraduate students (n = 1,296), and high school students (n = 399), found that the UPPS model was able to make this distinguish between suicide ideation and attempts while a unidimensional model of impulsivity could not (Klonsky & May, 2010). While this study found that both groups

displayed high urgency, the groups were able to be differentiated based on their levels of premeditation, with suicide attempters displaying poor premeditation when compared to suicide ideators.

Similarly, in a study of 492 community outpatients, individuals with high levels of negative urgency were found to be at a greater risk for suicide attempts compared to individuals with lower levels of negative urgency (Anestis & Joiner, 2011). While having high scores on all components of the UPPS model was associated with increased suicide risk, scores on the negative urgency scale predicted suicide risk over and above the other components.

Thus, there does appear to be a connection between impulsivity and STB, though the strength of the relationship may be smaller than previously suspected. In addition, impulsivity may be better thought of as a distal risk factor that interacts with other risk factors from ideation-to-action models than a more proximal risk factor for suicidal behavior. Nevertheless, there is some promising work identifying elements of the UPPS model of impulsivity and STB and, as describe below, there is substantial evidence for the relationship between impulsivity and risky behavior.

Impulsivity and Risky Behavior

Perhaps unsurprisingly, there is a large body of literature linking impulsivity and a number of risky behaviors. A comprehensive review of the literature is beyond the scope of this proposal, but relevant studies linking impulsivity and substance use, gambling, risky driving, and risky sexual behavior are detailed below.

For example, a meta-analysis examined 96 studies on alcohol use and impulsivity to determine the strength of the relationship (Coskunpinar, Dir, & Cyders, 2013). Their findings determined that there was strong support for the widely held view that impulsivity was related to alcohol use, and that the strength of the relationship varied depending on the particular facet of impulsivity being examined, with lack of perseverance being most closely associated with drinking quantity, and alcohol dependence more strongly associated with negative urgency and lack of planning.

Similarly, a close examination of the relationship between impulsivity and substance use beyond alcohol found broad support for the hypothesized relationship (Beaton, Abdi, & Filbey, 2014). In this study, researchers examined 297 participants for substance use tendencies and impulsivity traits. Higher levels of impulsivity were found in individuals with addictions to various substances, with individuals who had multiple concurrent addictions reporting higher levels of impulsivity. These data provide continued support for the idea that impulsivity is strongly associated with a wide range of risky behaviors, including substance use and addiction.

Impulsivity has also been linked to other risky behaviors such as problem gambling and risky sexual behavior. For example, a study of college students ($n = 743$) negative urgency was associated with more self-reported risk-taking and with problem gambling (Wong, Zane, Saw, & Chan, 2013). A study investigating impulsivity and casual sex among a sample of 89 adults found that men who scored higher on scales of impulsivity were three times as likely to have a casual sex partner than men who scored lower on scales of impulsivity (Black, McMahon, Potenza, Fiellin, & Rosen, 2015). A study examining impulsivity and risky sexual behavior among 135 undergraduate men

found that men who scored higher on scales of negative urgency and sensation seeking were less likely to use a condom with new sexual partners (Derefinko, Peters, Eisenlohr-Moul, Walsh, Adams, & Lynam, 2014). Additionally, a study examining risky sexual behaviors more broadly in a sample of 1,349 college students found that negative affect was associated with increased levels of impulsivity, which led to increased risky behaviors more broadly (Jardin, Sharp, Garey, & Zvolensky, 2017). Taken together, these studies provide further support for the idea that impulsivity is strongly associated with risky behavior.

In summary, there is a large amount of data supporting the link between impulsivity and risky behavior. When considering the construct of impulsivity, the most common traits examined alongside risky behavior are negative urgency and sensation seeking, although other facets of impulsivity are associated with risky behavior as well. There is also a relationship between impulsivity and STB. As such, impulsivity will be important to study in the context of the relationship between STB and risky behavior.

Questionnaires

HDSQ-SS

Please read all of the statements in a given group. Check the one statement in each group that describes you best for the past **_two weeks_**. If several statements in a group seem to apply to you, pick the one with the higher number. *Be sure to read all of the statements in each group before making your choice*.

(A)

0   I do not have thoughts of killing myself.

1   Sometimes I have thoughts of killing myself.

2   Most of the time I have thoughts of killing myself.

3   I always have thoughts of killing myself.

(B)

0   I am not having thoughts about suicide.

1   I am having thoughts about suicide but have not formulated any plans.

2   I am having thoughts about suicide and am considering possible ways of doing it.

3   I am having thoughts about suicide and have formulated a definite plan.

(C)

0   I am not having thoughts about suicide.

1   I am having thoughts about suicide but have these thoughts completely under

my control.

2   I am having thoughts about suicide but have these thoughts somewhat under

my control.

3   I am having thoughts about suicide but have little or no control over these thoughts.

(D)

0   I am not having impulses to kill myself.

1   In some situations I have impulses to kill myself.

2   In most situations I have impulses to kill myself.

3   In all situations I have impulses to kill myself.

This questionnaire consists of 20 statements. Please read the statements carefully one by one. If the statement describes your attitude for the past week including today, select "T" indicating TRUE in the column next to the statement. If the statement does not describe your attitude, select "F" indicating FALSE in the column next to this statement. Please be sure to read each statement carefully.

		True	False
1.	I look forward to the future with hope and enthusiasm.	T	F
2.	I might as well give up because there is nothing I can do about making things better for myself.	T	F
3.	When things are going badly, I am helped by knowing that they cannot stay that way forever.	T	F
4.	I can't imagine what my life would be like in ten years.	T	F
5.	I have enough time to accomplish the things I want to do.	T	F
6.	In the future, I expect to succeed in what concerns me most.	T	F
7.	My future seems dark to me.	T	F
8.	I happen to be particularly lucky, and I expect to get more of the good things in life than the average person.	T	F
9.	I just can't get the breaks, and there's no reason I will in the future.	T	F
10.	My past experiences have prepared me well for the future.	T	F
11.	All I can see ahead of me is unpleasantness rather than pleasantness.	T	F

12.	I don't expect to get what I really want.	T	F
13.	When I look ahead to the future, I expect that I will be happier than I am now.	T	F
14.	Things just don't work out the way I want them to.	T	F
15.	I have great faith in the future.	T	F
16.	I never get what I want, so it's foolish to want anything.	T	F
17.	It's very unlikely that I will get any real satisfaction in the future.	T	F
18.	The future seems vague and uncertain to me.	T	F
19.	I can look forward to more good times than bad times.	T	F
20.	There's no use in really trying to get anything I want because I probably won't get it.	T	F

UPPS-P

Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement. If you **Agree Strongly** select **1**, if you **Agree Somewhat** select **2**, if you **Disagree Somewhat** select **3**, and if you **Disagree Strongly** select **4**. Be sure to indicate your agreement or disagreement for every statement below. Also, there are questions on the following pages.

		Agree Strongly	Agree Some	Disagree Some	Disagree Strongly
1.	I have a reserved and cautious attitude toward life.	1	2	3	4
2.	I have trouble controlling my impulses.	1	2	3	4
3.	I generally seek new and exciting experiences and sensations.	1	2	3	4
4.	I generally like to see things through to the end.	1	2	3	4
5.	When I am very happy, I can't seem to stop myself from doing things that can have bad consequences.	1	2	3	4
6.	My thinking is usually careful and purposeful.	1	2	3	4
7.	I have trouble resisting my cravings (for food, cigarettes, etc.).	1	2	3	4
8.	I'll try anything once.	1	2	3	4
9.	I tend to give up easily.	1	2	3	4

10.	When I am in great mood, I tend to get into situations that could cause me problems.	1	2	3	4
11.	I am not one of those people who blurt out things without thinking.	1	2	3	4
12.	I often get involved in things I later wish I could get out of.	1	2	3	4
13.	I like sports and games in which you have to choose your next move very quickly.	1	2	3	4
14.	Unfinished tasks really bother me.	1	2	3	4
15.	When I am very happy, I tend to do things that may cause problems in my life.	1	2	3	4
16.	I like to stop and think things over before I do them.	1	2	3	4
17.	When I feel bad, I will often do things I later regret in order to make myself feel better now.	1	2	3	4
18.	I would enjoy water skiing.	1	2	3	4
19.	Once I get going on something I hate to stop.	1	2	3	4
20.	I tend to lose control when I am in a great mood.	1	2	3	4
21.	I don't like to start a project until I know exactly how to proceed.	1	2	3	4
22.	Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.	1	2	3	4
23.	I quite enjoy taking risks.	1	2	3	4

24.	I concentrate easily.	1	2	3	4
25.	When I am really ecstatic, I tend to get out of control.	1	2	3	4
26.	I would enjoy parachute jumping.	1	2	3	4
27.	I finish what I start.	1	2	3	4
28.	I tend to value and follow a rational, "sensible" approach to things.	1	2	3	4
29.	When I am upset I often act without thinking.	1	2	3	4
30.	Others would say I make bad choices when I am extremely happy about something.	1	2	3	4
31.	I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.	1	2	3	4
32.	I am able to pace myself so as to get things done on time.	1	2	3	4
33.	I usually make up my mind through careful reasoning.	1	2	3	4
34.	When I feel rejected, I will often say things that I later regret.	1	2	3	4
35.	Others are shocked or worried about the things I do when I am feeling very excited.	1	2	3	4
36.	I would like to learn to fly an airplane.	1	2	3	4
37.	I am a person who always gets the job done.	1	2	3	4
38.	I am a cautious person.	1	2	3	4

39.	It is hard for me to resist acting on my feelings.	1	2	3	4
40.	When I get really happy about something, I tend to do things that can have bad consequences.	1	2	3	4
41.	I sometimes like doing things that are a bit frightening.	1	2	3	4
42.	I almost always finish projects that I start.	1	2	3	4
43.	Before I get into a new situation I like to find out what to expect from it.	1	2	3	4
44.	I often make matters worse because I act without thinking when I am upset.	1	2	3	4
45.	When overjoyed, I feel like I can't stop myself from going overboard.	1	2	3	4
46.	I would enjoy the sensation of skiing very fast down a high mountain slope.	1	2	3	4
47.	Sometimes there are so many little things to be done that I just ignore them all.	1	2	3	4
48.	I usually think carefully before doing anything.	1	2	3	4
49.	When I am really excited, I tend not to think of the consequences of my actions.	1	2	3	4
50.	In the heat of an argument, I will often say things that I later regret.	1	2	3	4
51.	I would like to go scuba diving.	1	2	3	4
52.	I tend to act without thinking when I am really excited.	1	2	3	4

53.	I always keep my feelings under control.	1	2	3	4
54.	When I am really happy, I often find myself in situations that I normally wouldn't be comfortable with.	1	2	3	4
55.	Before making up my mind, I consider all the advantages and disadvantages.	1	2	3	4
56.	I would enjoy fast driving.	1	2	3	4
57.	When I am very happy, I feel like it is ok to give in to cravings or overindulge.	1	2	3	4
58.	Sometimes I do impulsive things that I later regret.	1	2	3	4
59.	I am surprised at the things I do while in a great mood.	1	2	3	4

Wish to Live - Recency

Please carefully read statements below. Select the one statement that **best** describes how you have been feeling for the **past week, including today.** Be sure to read all of the statements before making a choice.

0   I have a moderate to strong wish to live.

1   I have a weak wish to live.

2   I have no wish to live.

Wish to Live – Worst Point

Please carefully read statements below. Think back over the **past three months** to the time that you **felt the worst.** Select the one statement that **best** describes how you were feeling **at the time that you felt the worst**. Be sure to read all of the statements before making a choice.

0   I have a moderate to strong wish to live.

1   I have a weak wish to live.

2   I have no wish to live.

MBS-R

	In the past month, how often have you:	Never / not at all	Once this past month	Once a week over the past month	More than once a week	Every day or nearly every day
1.	Used illicit drugs (e.g., meth, cocaine, ecstasy, inhalants, PCP) or misused prescription drugs?	0	1	2	3	4
2.	Consumed too much alcohol for your own good or engaged in binge drinking?	0	1	2	3	4
3.	Driven under the influence of drugs and/or alcohol?	0	1	2	3	4
4.	Used marijuana to the point that you weren't engaging in other activities?	0	1	2	3	4
5.	Had problems related to your substance use?	0	1	2	3	4
6.	Had a one-night stand?	0	1	2	3	4
7.	Had multiple sexual partners?	0	1	2	3	4
8.	Had sex with someone who was involved with someone else?	0	1	2	3	4
9.	Had sex with someone you didn't want to have sex with or engaged in sexual activity you weren't comfortable with?	0	1	2	3	4
10.	Engaged in unsafe sex (e.g., failed to use contraceptives to prevent STDs or pregnancy)?	0	1	2	3	4
11.	Hurt yourself on purpose (e.g., pinching, biting, cutting, scratching, burning) without intending to kill yourself?	0	1	2	3	4
12.	Hurt yourself on purpose severely enough to require medical treatment or hospitalization?	0	1	2	3	4

1 3.	Attempted suicide?	0	1	2	3	4
1 4.	Binged on unusually large amounts of food?	0	1	2	3	4
1 5.	Fasted an entire day for nonreligious and/or nonmedical reasons?	0	1	2	3	4
1 6.	Forced yourself to vomit?	0	1	2	3	4
1 7.	Misused laxatives, diuretics, or diet pills?	0	1	2	3	4
1 8.	Eaten food in the grocery store without paying for it?	0	1	2	3	4
1 9.	Stolen food?	0	1	2	3	4
2 0.	Stolen material goods (e.g., clothing, electronics, or jewelry) from a store or vendor?	0	1	2	3	4
2 1.	Stolen personal items or money from acquaintances, friends, or family?	0	1	2	3	4
2 2.	Driven recklessly?	0	1	2	3	4
2 3.	Received a speeding ticket?	0	1	2	3	4
2 4.	Impulsively spent money on clothing, electronics, jewelry, or other items?	0	1	2	3	4
2 5.	Gambled more than you intended?	0	1	2	3	4
2 6.	Bet more money than you could afford to lose?	0	1	2	3	4
2 7.	Got into an argument with a close friend or family member?	0	1	2	3	4

2 8.	Intentionally hurt another person (e.g., hit, kicked, slapped, punched, pulled hair)?	0	1	2	3	4
2 9.	Intentionally hurt another person (e.g., hit, kicked, slapped, punched, pulled hair)?	0	1	2	3	4
3 0.	Vandalized school, public or private property?	0	1	2	3	4

Modified SITBI

Please indicate how often the following has been true for you.

		No	Yes, once	Yes, twice	Yes, three times or more
1.	Have you ever made an actual attempt to kill yourself in which you had at least some intent to die?	0	1	2	3
2.	Have you ever been very close to killing yourself and at the last minute someone or something else stopped you?	0	1	2	3
3.	Have you ever been close to killing yourself and at the last minute decided not to kill yourself?	0	1	2	3
4.	Have you ever done something to lead someone to believe that you wanted to kill yourself when you really had no intention of doing so?	0	1	2	3

ACSS-FAD

Please read each item below and indicate to what extent you feel the statement describes you. Rate each statement using the scale below, selecting the answer that is most accurate for you.

		0 Not at all like me	1	2	3	4 Very much like me
1.	The fact that I am going to die does not affect me.	0	1	2	3	4
2.	The pain involved in dying frightens me.	0	1	2	3	4
3.	I am very much afraid to die.	0	1	2	3	4
4.	It does not make me nervous when people talk about death.	0	1	2	3	4
5.	The prospect of my own death arouses anxiety in me.	0	1	2	3	4
6.	I am not disturbed by death being the end of life as I know it.	0	1	2	3	4
7.	I am not at all afraid to die.	0	1	2	3	4

INQ

The following questions ask you to think about yourself and other people. Please respond to each question by using your own current beliefs and experiences, NOT what you think is true in general, or what might be true for other people. Please base your responses on how you've been feeling recently. Use the rating scale to find the number that best matches how you feel and select that number. There are no right or wrong answers: we are interested in what you think and feel.

		Not at all true for me			Somewhat true for me			Very true for me
1.	These days, the people in my life would be better off if I were gone.	1	2	3	4	5	6	7
2.	These days, the people in my life would be happier without me.	1	2	3	4	5	6	7
3.	These days, I think I am a burden on society.	1	2	3	4	5	6	7
4.	These days, I think my death would be a relief to the people in my life.	1	2	3	4	5	6	7
5.	These days, I think the people in my life wish they could be rid of me.	1	2	3	4	5	6	7
6.	These days, I think I make things worse for the people in my life.	1	2	3	4	5	6	7
7.	These days, other people care about me.	1	2	3	4	5	6	7

8.	These days, I feel like I belong.	1	2	3	4	5	6	7
9.	These days, I rarely interact with people who care about me.	1	2	3	4	5	6	7
10.	These days, I am fortunate to have many caring and supportive friends.	1	2	3	4	5	6	7
11.	These days, I feel disconnected from other people.	1	2	3	4	5	6	7
12.	These days, I often feel like an outsider in social gatherings.	1	2	3	4	5	6	7
13.	These days, I feel that there are people I can turn to in times of need.	1	2	3	4	5	6	7
14.	These days, I am close to other people.	1	2	3	4	5	6	7
15.	These days, I have at least one satisfying interaction every day.	1	2	3	4	5	6	7

PHQ-9

Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself-or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3

9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people? Circle one:

Not difficult at all   Somewhat difficult   Very difficult   Extremely diff

GAD-7

Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people? Circle one:

Not difficult at all   Somewhat difficult   Very difficult   Extremely dif

Appendix C – Validity Questions

Validity Question 1 – Honeypot

"Are you feeling sad right now?"

- Yes
- No

Validity Question 2 – Direct Assessment

"We care about the quality of our survey data and hope to receive the most accurate measures of your opinions, so it is important to us that you thoughtfully provide your best answer to each question in the survey. Do you commit to providing your thoughtful and honest answers to the questions in this survey?"

- I will provide my best answers
- I will not provide my best answers
- I can't promise either way

Validity Question 3 – Statistically Improbable Responses

"How many languages do you speak fluently?"

- Participants will choose a number from a dropdown list.

Validity Question 4 – Instructional Manipulation

"Many people encounter challenges in their daily life that are difficult to navigate. We are interested in understanding your daily experiences and how this may be related to your stress levels. However, right now we are focused on whether you are reading the

question. In order to demonstrate that you have read the instructions entirely, please select the number eight as your answer. Do not choose any other number besides eight. Regardless of the different experiences that might contribute to your stress, we want to know how often you are experiencing stress in a typical week. How many times per week do you find yourself stressed out?"

- Participants will choose from a list of numbers ranging from 0 to 10+.

Validity Question 5 – reCAPTCHA

- Participants will solve a reCAPTCHA problem.

Validity Question 6 – Honeypot

"Have you eaten a meal today?"

- Yes
- No

Validity Question 7 – Item Inconsistency

"In the last month, have you been involved in a car accident?"

- Yes
- No

Validity Question 8 – Unusual Comments

"What is something risky you have done that could have had bad consequences but everything turned out OK?"

- Participants will provide a typed response.

Validity Check 9 – Item Inconsistency

"What year were you born?"

- Participants will choose a year from a dropdown list.

Validity Check 10 – Statistically Improbable Responses

"What is your estimated annual income from responding to mTurk HITs?"

- Participants will choose a number from a dropdown list.

Validity Check 11 – Unusual Comments

"What should a person do if they are having thoughts of suicide?"

- Participants will provide a typed response.

Validity Check 12 – Item Inconsistency

"What country do you currently live in?"

- Participants will type in the name of a country.

Validity Check 13 – Item Inconsistency

"In the last month, have you had suicidal thoughts?"

- Yes
- No

Validity Check 14 – Instructional Manipulation

"Social media (also called social networking sites) are software platforms that allow users to connect socially with others via smartphone or computer. We are interested in your social media use. But, please skip this question entirely. Just click the continue button without clicking any of the options below. Which of these social media platforms do you use regularly?"

- Participants will be given a range of options to click on (Facebook, Instagram, Twitter, Snapchat, Tik Tok, WhatsApp, Tumblr, Pinterest, LinkedIn), but will be expected to not click on any of them.

Validity Check 15 – Direct Assessment

"We care about the quality of our survey data and hope to receive the most accurate measures of your opinions, so it is important to us that you thoughtfully provided your best answer to each question in the survey. How much of the data you provided was high quality and accurate?"

$$\longleftrightarrow$$

0%   100%
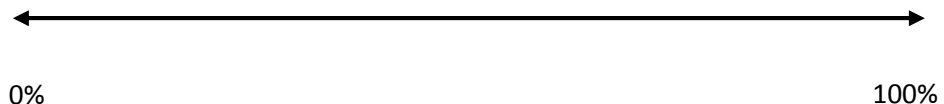
Oklahoma State University Institutional Review Board

Date:	07/22/2020
Application Number:	IRB-20-336
Proposal Title:	Mental Health and Risky Behavior
Principal Investigator:	Logan Smith
Co-Investigator(s):	Tony Wells
Faculty Adviser:	Tony Wells
Project Coordinator:	
Research Assistant(s):	
Processed as:	Exempt
Exempt Category:	

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which <u>continuing review is not required.</u> As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

VITA

Logan M. Smith

Candidate for the Degree of

Master of Science

Thesis: SUICIDAL IDEATION AND RISKY BEHAVIOR – RELATIONSHIPS WITH

WISH TO LIVE, HOPELESSNESS, AND IMPULSIVITY

Major Field: Psychology

Biographical:

Education:

Completed the requirements for the Master of Science in Psychology at Oklahoma State University, Stillwater, Oklahoma in July 2021.

Completed the requirements for the Bachelor of Science in Psychology at Florida State University, Tallahassee, Florida in 2016.

Research experience:
Clinical Psychology Doctoral Student – Behavior, Affect, and Thinking Lab, Director: Dr. Tony T. Wells, Ph.D.
Projects: Wildland Firefighter Suicide Study (Designed Study), Mental Health Outcomes Associated with Premature Discharge from Basic Military Training (Designed Study), and Accuracy in Screening for Suicide Attempts and Suicide Deaths: A Pooled Analysis

Professional Memberships: American Association of Suicidology, Graduate Psychology Student Government Association, Oklahoma State University Psi Chi Psychology Honors Club