

THE RELATIONSHIP OF PERSONALITY AND NON-SUICIDAL SELF INJURY TO
AGGRESSION AND ALCOHOL USE

by

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A Dissertation
Submitted to the
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in Partial Fulfillment of
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of
Doctor of Philosophy
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DEDICATION

This is dedicated to my loving husband Mika, my best friend Christy, my parents, my mentor Sarah Fischer, and my best work-buddy, Sir Purr.

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I would like to thank the many friends, family, and supervisors who have made this project happen. My loving husband, Mika, assisted me in day-to-day life, made sure that I had my basic human needs, provided unyielding support and understanding, and most importantly, supplied never-ending laughter throughout the (almost) decade I have been in graduate school. I cannot thank him enough for the amount of time, effort, and patience he has had with me throughout my endeavors; this is for you, Mika! My best friend, Christy, who helped to keep me motivated and sane throughout this process. With every text, phone call, and email, she has been by my side every step of the way. My mother, Mary Ann, who not only helped me apply to my doctoral programs, but always believed in me and never doubted me, even when times were incredibly hard. My dad, “Poppy,” who was always supportive and there for me when I needed it most. Dr. Sarah Fischer who is undoubtedly the savior of this dissertation; Sarah picked me up and provided me with the supervision and guidance that was unmatched during a time where I had nowhere to turn. She constantly went out of her way to help me and this project to be successful. I owe her my entire PhD; if it was not for her, I would not be where I am today clinically, professionally, or personally. Special thank you to my committee members, Drs. Adams and Short for their invaluable patience, understanding, and help during this entire process. Without a doubt, this dissertation would not have been possible without these supportive and caring people.

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LIST OF ABBREVIATIONS AND SYMBOLS

| | |
|---------------------------------------|----------|
| Alpha..... | α |
| Antisocial personality disorder | ASPD |
| Beta..... | β |
| Borderline personality disorder..... | BPD |
| Chi-square..... | X^2 |
| Distress tolerance | DT |
| Latent class analysis..... | LCA |
| Latent profile analysis..... | LPA |
| Non-suicidal self-injury | NSSI |
| Number of participants..... | N |
| Structural equation modeling..... | SEM |

ABSTRACT

THE RELATIONSHIP OF PERSONALITY AND NON-SUICIDAL SELF INJURY TO AGGRESSION AND ALCOHOL USE

Emily A. Alexoudis, Ph.D.

George Mason University, 2021

Dissertation Director: Dr. Sarah F. Fischer

The following dissertation utilizes secondary data analysis of a cross-sectional dataset collected from 876 undergraduate students. The purpose of the parent study was to examine the relationship of personality traits and motives to a wide variety of mood symptoms and impulsive behaviors. The current dissertation has two studies. The goal of Study 1 is to explore the relationship of Antisocial Personality Disorder (ASPD) traits, Borderline Personality Disorder (BPD) traits, and distress tolerance to aggressive behavior, non-suicidal self injury (NSSI), and binge drinking among male and female undergraduates. The goals of Study 2 are twofold: Part 1 attempts to replicate the class distinctions found in previous LCA and LPA analyses of college students who self-injure, then Part 2 compares these classes on validators related to alcohol use and aggression. For Study 1, structural equation modeling (SEM) was used to examine how individual differences in distress tolerance predict drinking, NSSI, and aggression, distinct from

ASPD and BPD. For Study 2, Latent Profile Analysis (LPA) is used for Part 1 to examine how people who have ever engaged in NSSI cluster together based on frequency, type, and motives for NSSI. In Part 2, independent sample t-tests are used to compare mean differences on aggression, binge drinking, DT, and impulsivity (validators) among the classes from Part 1. Results partially supported hypotheses for both Study 1 and Study 2. Clinical implications and future research directions are explored.

CHAPTER ONE: INTRODUCTION

Borderline Personality Disorder (BPD) and Antisocial Personality Disorder (ASPD) are both personality disorders that are associated with substance abuse and aggression (American Psychiatric Association [APA], 2013). Borderline Personality Disorder (BPD) is a chronic psychological disorder characterized by a persistent and “pervasive pattern of instability” in emotion regulation, interpersonal relationships, sense of self, and impulsive behavior (e.g., alcohol misuse; APA, 2013, p. 663). People with BPD features also exhibit impairment by fears of abandonment, suicidal behaviors or NSSI, inappropriate or intense anger, feelings of emptiness, and symptoms of paranoia or dissociation. Antisocial Personality Disorder (ASPD) is another chronic and persistent psychological disorder that is commonly associated with a variety of risky behaviors. ASPD is characterized by a “pervasive pattern of disregard for, and violation of, the rights of others” (APA, 2013, p. 659). This pattern may be exhibited through persistent inability to conform to social norms and lawful behavior, deceitfulness (e.g., lying, manipulation), egocentricity, impulsive behaviors or difficulty planning ahead, aggressive behavior, irresponsible behaviors, risk taking, lack of remorse and callous lack of concern for others (APA, 2013).

The purpose of the parent study was to examine the relationship of personality traits and motives to a wide variety of mood symptoms and impulsive behaviors. The

current dissertation has two studies. The goal of the Study 1 is to explore the relationship of ASPD traits, BPD traits, and distress tolerance to aggressive behavior, NSSI, and binge drinking among male and female undergraduates. Structural equation modeling (SEM) will be used to examine how individual differences in distress tolerance predict drinking, NSSI, and aggression, distinct from ASPD and BPD.

The goals of Study 2 are twofold: Part 1 attempts to replicate the class distinctions found in previous LCA and LPA analyses of college students who self-injure, then Part 2 compares these classes on validators related to alcohol use and aggression. Latent Profile Analysis (LPA) is used for Part 1 to examine how people who have ever engaged in NSSI cluster together based on frequency, type, and motives for NSSI. In Part 2, independent-sample t-tests are used to compare mean differences on aggression, binge drinking, DT, and impulsivity (validators) among the classes from Part 1.

CHAPTER TWO: INSTABILITY IN THE RELATIONSHIP BETWEEN BORDERLINE AND ANTISOCIAL PERSONALITY TO RISKY BEHAVIORS: A TALE OF DISTRESS TOLERANCE

Borderline Personality Disorder (BPD) and Antisocial Personality Disorder (ASPD) are both personality disorders that are associated with substance abuse and aggression (American Psychiatric Association [APA], 2013). Borderline Personality Disorder (BPD) is a chronic psychological disorder characterized by a persistent and “pervasive pattern of instability” in emotion regulation, interpersonal relationships, sense of self, and impulsive behavior (e.g., alcohol misuse; APA, 2013, p. 663). People with BPD features also exhibit impairment by fears of abandonment, suicidal behaviors or NSSI, inappropriate or intense anger, feelings of emptiness, and symptoms of paranoia or dissociation. Antisocial Personality Disorder (ASPD) is another chronic and persistent psychological disorder that is commonly associated with a variety of risky behaviors. ASPD is characterized by a “pervasive pattern of disregard for, and violation of, the rights of others” (APA, 2013, p. 659). This pattern may be exhibited through persistent inability to conform to social norms and lawful behavior, deceitfulness (e.g., lying, manipulation), egocentricity, impulsive behaviors or difficulty planning ahead, aggressive behavior, irresponsible behaviors, risk taking, lack of remorse and callous lack of concern for others (APA, 2013).

People with BPD or ASPD exhibit a wide range of maladaptive behaviors, and both disorders are characterized by similar profiles on stable, dimensional, personality traits. For example, people with BPD tend to engage in a range of impulsive behaviors, including self-destructive behaviors, such as self-injurious behavior (Linehan, 1993) and suicidal behaviors (e.g., Linehan et al., 2008). In addition, people with BPD often engage in behaviors that meet diagnostic criteria for other psychiatric disorders, such as alcohol use disorder (Lieb et al., 2004). Similarly, people with ASPD demonstrate high levels of substance use (Compton et al., 2005). The presence of ASPD is also related to aggressive or violent behavior, such as homicide (Eronen et al., 1996) and intimate partner violence (Fals-Stewart et al., 2005).

The Five Factor Model of Personality (FFM) is a dimensional model of personality structure (McCrae & Costa, 2003). The FFM describes personality structure in terms of five dimensions: Neuroticism (i.e., emotional adjustment and stability), Extraversion (i.e., need for stimulation, amount and “intensity” of desired social experiences, and aptitude to feel emotions of joy), Conscientiousness (i.e., degree to which someone is organized, persists, and is motivated), Agreeableness (i.e., the social experiences preferred by a person, ranging from antagonistic to compassionate), and Openness to Experience (i.e., pursuing and appreciating life events and social experiences for their “own sake;” Widiger & Costa, 1994; Widiger et al., 2013). According to the FFM, personality disorders may be characterized as maladaptive or extreme variants of FFM traits (e.g., Widiger et al., 2013). Moreover, a large body of research has

documented the relationship between individual differences in these traits and outcomes such as substance abuse, aggression, and self-injury (e.g., Sleep et al., 2018).

BPD and ASPD are constructs that appear to have several overlapping personality traits. For example, both BPD and ASPD disorders are characterized by underlying personality features of high antagonism (i.e., low agreeableness) and low conscientiousness (e.g., Samuel & Widiger 2008; Trull, 1992; Decuyper et al., 2009). One key difference in these personality profiles is that people with BPD are characterized by high neuroticism (e.g., Leichsenring et al., 2003), while the literature on people with ASPD is generally mixed regarding their levels of neuroticism. For example, some studies indicate a positive relationship between people with ASPD and neuroticism, while other studies indicate a negative relationship (Decuyper et al., 2009; Sher & Trull, 1994; Widiger et al., 2013).

Theoretical and empirical research on the FFM indicates that personality traits are moderately reliable predictors of behavior (e.g., McCrae & Costa, 2003; 2013). For example, low agreeableness (or high antagonism) and low conscientiousness, as well as high neuroticism, are positively related to aggression, with the former two traits also being positively related to antisocial behavior (Seibert et al., 2011). Additionally, high antagonism and neuroticism are related to aggressive behavior (Bettencourt et al., 2006). Research has also shown that neuroticism is positively related to alcohol use (Malouff et al., 2007) and substance use disorders (Kotov et al., 2010). In summary, people with BPD and ASPD have similar dimensional personality profiles and engage in similar maladaptive behaviors.

Distress Tolerance and Risky Behavior

Distress tolerance is another construct that is related to a range of maladaptive behaviors (e.g., Leyro et al., 2010). Broadly speaking, distress tolerance is defined as the perceived ability or the behavioral act of tolerating experiences of negative emotions and other aversive internal states (e.g., uncertainty, ambiguity, frustration) and/or physical pain (Leyro et al., 2010; Zvolensky et al., 2010). There are two methodologies for measuring these distress tolerance concepts. For example, self-report measures assess a person's perception of their ability to tolerate distress, while non self-report measures, such as behavioral tasks (e.g., physical tolerance tasks) assess a person's actual behavior in the moment while tolerating distress. Given the differences in measurement and resulting definitions of distress tolerance, Leyro and colleagues (2010) suggested that the two methods of assessing distress tolerance may contribute to mixed or inconsistent findings within the distress tolerance literature.

Research using both methodologies has indicated that difficulties tolerating distress are related to psychological symptoms. For example, low self-reported distress tolerance is related to higher levels of anxiety and depressive symptoms (e.g., Leyro et al., 2010). Low self-reported distress tolerance is also related to higher levels of trauma-related stress (e.g., Vujanovic, Bernstein, & Litz, 2011; Vujanovic, Marshall-Berenz, & Zvolensky, 2011). Research using behavioral measures of distress tolerance have also found that difficulties tolerating distress are related to higher levels of depressive symptoms (e.g., Ellis et al., 2010), alcohol use (e.g., Simons & Gaher, 2005), and drug

use (Daughters, Lejuez, Bornoalova, et al., 2005; Daughters, Lejuez, Kahler, et al., 2005).

The empirical literature is relatively limited in terms of distress tolerance and related risk behavior. However, some research has found that perceived difficulties tolerating distress are related to higher levels of risky behaviors (McHugh et al., 2011). For example, lower levels of distress tolerance is related to higher levels of aggression (e.g., self-aggression; Sorgi et al., 2020), alcohol use and drug use (e.g., Buckner et al., 2007; Vujanovic, Bernstein, & Litz, 2011; Zvolensky et al., 2010), and non-suicidal self injury (NSSI; Anestis et al., 2013).

Commonalities Between Borderline and Antisocial Traits and Distress Tolerance

Some of the risky behaviors associated with distress tolerance difficulties are also characteristics of people with underlying personality features of ASPD or BPD. Research has shown that people with BPD traits (Linehan, 1993; Iverson et al., 2011) and ASPD traits (Daughters et al., 2008; Sargeant et al., 2011) self-report low levels of distress tolerance. This suggests that people with more BPD or ASPD personality traits are at greater risk for behaving in maladaptive ways but are at a potentially heightened risk if they have poor distress tolerance.

For example, Bornoalova and colleagues (2008) utilized behavioral tasks to measure distress tolerance via participant's ability to persist through a computerized task. Bornoalova et al. (2008) found that participants that endorsed more BPD symptoms on the Personality Assessment Inventory (PAI; Morey, 1991) were less likely to persist through a stressful task compared to those participants that reported fewer BPD

symptoms. Relatedly, Nock and Mendes (2008) found that participants with a history of self-injurious behavior were less likely to persist through frustrating tasks compared to participants that do not engage in self-injurious behavior.

Empirical research is relatively limited regarding the underlying mechanism through which why some people have lower levels of distress tolerance than others (e.g., Zvolensky et al., 2010). The underlying personality dimensions common to these disorders may contribute to the development of poor distress tolerance. For example, as people with ASPD and BPD features have higher levels of impulsivity, it may be that they may not tend to think through effective coping strategies to tolerate distress (e.g., Daughters et al., 2008). People with these disorders also tend to have high levels of anger and more frequent experiences of negative affect (Daughters et al., 2008). If someone with low levels of impulse control and high levels of anger and negative affect experiences acute negative emotion, they may be more likely to lash out or engage in immediately reinforcing but maladaptive behaviors. Thus, the combination of personality features associated with both ASPD and BPD may also be associated with poor distress tolerance.

Theoretical work may be particularly helpful in explaining the underpinnings of why some people have lower levels of DT and engage in more risky behaviors than others. For example, Linehan's (1993) DBT skills deficit model describes dysfunctional behaviors (e.g., NSSI, substance use) as maladaptive coping strategies that result from difficulty tolerating distress adaptively. Specifically, when in distress, a person may be unable to think through their problem adaptively and consequently act in ways that

quickly reduce painful and unwanted emotions. Thus, difficulties with distress tolerance leads to emotional dysregulation and heightened difficulty thinking through adaptive strategies for handling distress. Thus, impulsive and risky problem-solving behaviors are used, instead of more thoughtful and healthy coping skills. These maladaptive behaviors are considered effective as the behaviors help to quickly reduce painful emotions, which then reinforces these unhealthy behaviors. This results in the strengthening of impulsive and risky behaviors as well as a deficit in alternative more adaptive coping strategies (Linehan, 1993; Neacsiu et al., 2010).

Kahneman's (2011) System 1 and System 2 theory on decision making can also be used to help explain how people with BPD and ASPD traits tend to have lower DT and engage in risky behaviors. Kahneman (2011) described how the brain has two types of "operating systems" that results in fast (System 1) and slow (System 2) thinking and decision making. System 1 is the faster, less self-aware, and more automatic thinking that makes up the majority of our decision-making (Kahneman, 2011). System 2 is the slower, more conscious and deliberate thinking that tends to be more logical and rational (Kahneman, 2011). As such, it may be that people are utilizing more System 1 thinking when in emotional distress, which leads to more maladaptive behavior in the moment as a way to quickly and more effortlessly reduce painful emotions (Kahneman, 2011). And as described by the skills deficit model (Linehan, 1993), these maladaptive behaviors are then negatively reinforced and more likely to be utilized in the future when in distress.

Purpose and Hypotheses

There is ample empirical evidence indicating that people with BPD or ASPD traits are more likely to have lower distress tolerance and are at greater risk for maladaptive behaviors. What is not clear, however, is whether or not a person's level of distress tolerance predicts risky behaviors above and beyond the underlying personality features of ASPD or BPD. Some empirical research has suggested that distress tolerance provides unique contributions to behavioral outcomes, even when taking into account empirically based risk factors (e.g., Leyro et al., 2010; Zvolensky et al., 2010). For example, de Bruin and colleagues (2007) found that there are individual differences in distress tolerance, such that higher levels of distress tolerance, specifically tolerance of uncertainty, predicts anxiety even when personality factors such as neuroticism are taken into account.

Thus, the purpose of Study 1 is to utilize secondary data to explore the relationship of ASPD traits, BPD traits, and distress tolerance to aggressive behavior, NSSI, and binge drinking. Do individual differences in distress tolerance account for unique variance in BPD and ASPD and aggression, NSSI, and problematic alcohol use over and above BPD and ASPD symptoms? As the FFM, biosocial (Linehan, 1993), and System 1 and System 2 (Kahneman, 2011) theories and the empirical literature suggests, it is hypothesized that there will be a positive relationship between BPD and ASPD to risky behaviors, as well as a negative relationship between distress tolerance and risky behavior. It is hypothesized that distress tolerance will account for unique variance in the

behavioral outcomes over and above BPD and ASPD features. Gender differences in the relationship between these constructs will also be explored.

Method

Participants

Data were drawn from an existing study with male and female college students recruited from undergraduate psychology courses at a public university in the southeastern United States. The sample includes 798 undergraduate students. The sample consisted of 184 men (23.1%) and 604 females (75.7%). Participants ranged in age between 17 to 49 years old, and ranged between 1 and 5 years of schooling, with the majority (56.3%) being first-year undergraduate students. The majority of participants identified as White at 77.9% of the sample, while 6.8% identified as Black, 0.3% American-Indian, 7.4% Asian-American, 3.0% Hispanic or Latino, 2.3% biracial, and 1.0% another ethnicity. Regarding mental health treatment variables, a total of 10.3% of the sample reported ever participating in psychotherapy, with 2.0% currently in psychotherapy. A total of 8.8% of the sample reported ever taking psychiatric medication, with 3.4% currently taking psychiatric medication. A total of 2.0% of the sample reported a history of ever attempting suicide, with 0.6% reportedly attempting suicide in the past two months. Regarding the variables of particular interest for the current study, 136 (17.0%) students reported at least one instance of NSSI in their lifetime.

Materials and Procedure

Students were recruited from undergraduate psychology courses and earned research participation credit for completing the parent study. There were no eligibility criteria for this study and the university's Institutional Review Board approved all study procedures. Students were given the option to participate in the current study, other research studies, or to complete alternative assignments for their participation credit. Students who volunteered to participate provided written informed consent then completed the study measures in groups of up to 30 students.

Missing Data

A total of 75 participants did not complete the full PAI measure and were therefore removed from analyses. This resulted in a final sample of $N = 798$ for the current study. Linear interpolation was used to account for the missing data items that are missing at random.

Measures

Demographics and History Questionnaire. Participants self-reported demographic information, such as age, ethnicity, year in school, and sex (“male”/“female”). Participants also self-reported their psychiatric history, including current and past psychotherapy experience and psychiatric medication use, as well as lifetime (“yes”/“no”) and past two-years suicide attempts (“yes”/“no”). Frequency of lifetime history of suicide attempts were also self-reported.

Personality Assessment Inventory (PAI; Morey, 1991). BPD and ASPD symptoms were assessed using the Borderline Features scale and the Antisocial Features

scale of the PAI, respectively. The 24-item BPD total score is made up of four subscales: Affective Instability, Self-Harm, Negative Relationships, and Identity Problems. The 24-item ASPD total score is made up of three subscales: Stimulus Seeking, Egocentricity, and Antisocial Behaviors. Participants self-rated their agreement to items using a 4-point Likert type scale ranging from 1 (“False, Not At All True”) to 4 (“Very True”). Latent variables were created for BPD features as well as ASPD features by combining the subscales for each construct. The BPD and ASPD total scores were used as latent predictors in this study.

Distress Tolerance Scale (DTS; Simons & Gaher, 2005). The DTS is a 15-item self-report measure assessing distress tolerance. The DTS defines distress tolerance as “the capacity to experience and withstand negative psychological states” (p. 83). Specifically, scale items reflect four, first-order factors of the distress tolerance concept: 1) perceived ability to tolerate emotional distress (“Feeling distressed or upset is unbearable to me”); 2) subjective appraisal of distress (“My feelings of distress or being upset are not acceptable”); 3) attention being absorbed by negative emotions (“When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels”); and 4) regulation efforts to alleviate distress (“When I feel distressed or upset I must do something about it immediately”). Participants self-rated their agreement with items using a 5-point Likert scale, ranging from 1 (“strongly agree”) to 5 (“strongly disagree”). High scores on the DTS indicate high tolerance for distress. A latent variable of distress tolerance was used as a predictor in this study.

Deliberate Self-Harm Inventory (DSHI; Gratz, 2001). The DSHI is a self-report measure assessing the frequency and type of NSSI behavior. NSSI is defined as the “deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage (e.g., scarring) to occur” (Gratz, 2001, p.255). Participants were asked to self-report the number of times they engaged in 15 types of NSSI (e.g., cutting, burning, biting, carving, and banging head) during the past month. Frequency of NSSI behaviors was used as an outcome variable in analyses to represent the amount of NSSI behavior that occurred in the past month.

Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992). The BPAQ is a 29-item self-report measure assessing four different types of aggression. The four aggression dimensions include: 1) verbal aggression (e.g., “I have threatened people I know”), 2) physical aggression (e.g., “If someone hits me, I hit back”), 3) anger (e.g., “I flare up quickly, but get over it quickly”), and 4) hostility (e.g., “I wonder why sometimes I feel so bitter about things”). Participants were asked to self-report their agreement with items using a 5-point Likert scale, ranging from 1 (“Extremely uncharacteristic of me”) to 5 (“Extremely Characteristic of me”). High scores on the BPAQ indicate higher levels of aggression. A latent variable of aggression was used as an outcome variable in this study.

Timeline Follow Back (TLFB; Sobell and Sobell, 1992). The TLFB is a self-report measure assessing retrospective estimates of alcohol use. A daily calendar is used as a guide to more accurately assess one’s daily use beginning at the date of the interview

retroactively for one month. For the current study, number of days binge drinking during the last 30 days (one month) was used as an outcome measure of alcohol misuse.

Data Analysis Plan

Structural equation modeling (SEM) was used to examine how individual differences in distress tolerance predict drinking, NSSI, and aggression, distinct from ASPD and BPD. Although self-reported NSSI and binge drinking may be positively skewed, this would be expected given the nature of the frequency variable and the type of behaviors measured. However, utilizing maximum likelihood estimation procedures in SEM has been shown to be an effective method to manage these conditions by utilizing measured variables (e.g., Lei & Lomax, 2005). SEM was utilized in order to account for measurement error in the variables and to model the relationship of all three outcome variables to each other.

Distress tolerance, the BPD total score and the ASPD total score are the three predictor variables used in the model. All predictor variables were modeled as latent variables (and not as total scores of all items). . For example, the DT latent variable was estimated using three indicators that will be parcels of items. The 15 DTS items were randomly assigned to one of three parcels, then item scores were averaged to compute parcel scores. Latent variables were created for the BPD and ASPD predictor variables by using their respective PAI subscales as indicators. As the proposed factor structure of the PAI appears to have adequate psychometric properties (Morey 1991; 2007, but see Jackson & Trull, 2001) each of the subscale's total scores were used as indicator variables to create BPD and ASPD latent variables. The BPD predictor variable was

estimated using four indicator variables, including the following subscales: Affective instability, Self-harm, Negative relationships, and Identity problems. Similar to BPD, the ASPD latent variable was created using the same method, with the three PAI ASPD subscales as indicator variables: Stimulus seeking, Egocentricity, and Antisocial behaviors.

NSSI, binge drinking, and aggression are the three behavioral outcomes in the model. NSSI and binge drinking were modeled as measured variables, while aggression was modeled as a latent variable. NSSI and binge drinking are count variables and as such, were modeled as measured variables. The aggression latent variable was estimated using five indicators that were parcels of items. The 29 BPAQ items were randomly assigned to one of five parcels, then item scores were averaged to compute parcel scores. Measurement error for each variable was also modeled.

The first step was to examine the bivariate correlations between all variables in the model, including subscales of relevant measures. The second step was to test the measurement model to determine whether the model demonstrates acceptable fit (e.g., Chi-Square, RMSEA, CFI). Hu and Bentler's (1999) cut off markers for acceptable fit were used, including non-significant Chi-Square, $RMSEA < .08$, and $CFI > .90$ for adequate fit. Additionally, if the items measuring each latent variable (i.e., BPD, ASPD, DT, aggression) are not highly correlated, then the model may not demonstrate acceptable fit and the model may not fit well using fit indices. Multicollinearity between independent variables was also examined to determine whether each variable is distinct.

Once acceptable fit was established, the structural model was tested using Structural Equation Modeling in AMOS. The model tested four main hypotheses: 1) distress tolerance, BPD, and ASPD features will all be significantly correlated with each other; 2) aggression, NSSI, and drinking will all be significantly correlated with each other; 3) there will be a significant path from BPD and ASPD features to each of the three outcomes; 4) there will be a significant path from distress tolerance to each of the three outcomes after taking into account the variance accounted for by BPD and ASPD.

Results

Participants

Table 1 provides the sample characteristics for measures used in the current study.

Table 1: Psychometric Properties for Variables of Interest in Study 1

| <u>Variable</u> | <u>M</u> | <u>SD</u> | <u>Range</u> |
|----------------------------|----------|-----------|--------------|
| DT | 50.77 | 11.70 | 15-75 |
| ASPD Total | 28.36 | 9.94 | 6-61 |
| ASPD Egocentricity | 5.05 | 3.20 | 0-17 |
| ASPD Antisocial Behaviors | 13.79 | 4.40 | 0-32 |
| ASPD Stimulus Seeking | 9.57 | 4.51 | 2-25 |
| BPD Total | 22.06 | 10.50 | 2-58 |
| BPD Negative Relationships | 6.29 | 3.51 | 0-17 |
| BPD Self-Harm | 3.47 | 2.75 | 0-16 |
| BPD Affective Instability | 5.32 | 3.58 | 0-17 |
| BPD Identity Problems | 6.97 | 3.48 | 0-18 |
| Binge Drinking Episodes | 2.66 | 3.93 | 0-20 |
| NSSI Frequency | 2.98 | 16.00 | 0-20 |
| Aggression Total | 15.71 | 5.91 | 9-40 |

Note. DT = Distress Tolerance; ASPD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; NSSI = Non-suicidal self injury.

Bivariate Correlations

Table 2 provides the bivariate correlations between all variables in the model. As expected, ASPD and BPD are positively correlated with each other, as well as with aggression, binge drinking, and NSSI. Whereas ASPD and BPD are negatively associated with DT. Also, DT is negatively related to aggression and NSSI but not to binge drinking. Lastly, aggression, NSSI, and binge drinking are positively correlated with each other.

Table 2: Bivariate Correlations

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|-------------------------------|-------|-------|--------|--------|-------|--------|--------|--------|-------|-------|-------|-------|----|
| 1. Aggression Total | — | | | | | | | | | | | | |
| 2. Binge Drinking Episodes | .21** | — | | | | | | | | | | | |
| 3. ASPD Egocentricity | .33** | .28** | — | | | | | | | | | | |
| 4. ASPD Antisocial Behaviors | .47** | .38** | .50** | — | | | | | | | | | |
| 5. ASPD Stimulus Seeking | .36** | .32** | .50** | .52** | — | | | | | | | | |
| 6. ASPD Total | .48** | .41** | .77** | .84** | .84** | — | | | | | | | |
| 7. NSSI Frequency | .08* | .07** | .08* | .08* | .06 | .09* | — | | | | | | |
| 8. DT | -.07* | -.03 | -.11** | -.14** | -.06 | -.12** | -.10** | — | | | | | |
| 9. BPD Negative Relationships | .22** | .03 | .19** | .30** | .20** | .29** | .08* | -.36** | — | | | | |
| 10. BPD Self-Harm | .29** | .29** | .37** | .50** | .47** | .55** | .08* | -.25** | .36** | — | | | |
| 11. BPD Affective Instability | .36** | .04 | .22** | .33** | .20** | .30** | .11** | -.36** | .57** | .40** | — | | |
| 12. BPD Identity Problems | .19** | .02 | .22** | .25** | .21** | .28** | .07* | -.45** | .60** | .36** | .59** | — | |
| 13. BPD Total | .33** | .10** | .31** | .43** | .33** | .44** | .10** | -.45** | .82** | .64** | .83** | .83** | — |

Note. BPD = Borderline Personality Disorder; ASPD = Antisocial Personality Disorder; DT = Distress Tolerance; NSSI = Non-suicidal self injury.

* $p < .05$. ** $p \leq .001$.

T-tests by Sex

T-tests were used to explore any sex differences in our study variables (see Table 3). Results indicated that male students reported significantly higher scores on ASPD, binge drinking, and aggression compared to female students. Male and female students did not significantly differ based on NSSI frequency, DT, or BPD.

Table 3: T-tests for Study Variables by Sex

| <u>Variables</u> | <u>Male</u> | <u>Female</u> | <u>t value</u> | <u>p</u> |
|-------------------------|---------------|---------------|----------------|-----------|
| | <u>M (SD)</u> | <u>M (SD)</u> | | |
| DT | 50.73 (11.56) | 50.79 (11.74) | -0.06 | 0.956 |
| ASPD Total | 33.42 (10.44) | 26.75 (9.18) | 8.25 | < 0.001** |
| BPD Total | 22.98 (9.75) | 22.16 (10.77) | -0.20 | 0.840 |
| Binge Drinking Episodes | 3.83 (4.71) | 2.30 (3.60) | 4.69 | < 0.001** |
| NSSI Frequency | 0.13 (0.89) | 0.22 (1.33) | -0.85 | 0.395 |
| Aggression Total | 19.99 (6.37) | 14.43 (5.13) | 11.88 | < 0.001** |

Note. DT = Distress Tolerance; ASPD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; NSSI = Non-suicidal self injury.

* $p < .05$. ** $p < .001$.

Tests of the Hypothesized Model¹

The measurement model of latent constructs demonstrated good fit. All indicators loaded acceptably onto their respective latent constructs (i.e., BPD, ASPD, DT, aggression). The standardized estimates for the relationship of the individual BPD subscales to the BPD latent factor ranged from .53 to .76, while the standardized

¹ Follow up analyses were conducted to test the hypothesized model running each predictor separately with all outcomes. Results were the same as when the predictors were all in the model with all outcomes; BPD and ASPD are related to all outcomes, while DT is not related to outcomes when modeled on its own.

estimates for the relationship of the ASPD subscales to the latent ASPD factor ranged from .63 to .74. Similarly, estimates of parcel loadings onto the overall aggression factor ranged from .60 to .83. The model demonstrated good fit; $X^2(106) = 450.94, p < 0.001$, CFI = .95, RMSEA = .06.

ASPD was significantly and positively related to binge drinking ($\beta = .58$) and aggression ($\beta = .34$), but ASPD was not significantly related to NSSI ($\beta = .06$). BPD was significantly and negatively related to binge drinking ($\beta = -.08$) and positively related to aggression ($\beta = .49$), but BPD was not significantly related to NSSI ($\beta = .05$). DT was not significantly related to any outcome variables (see Figure 1).

Regarding relationships between predictors, DT was significantly and negatively related to ASPD ($\beta = -.16$) and BPD ($\beta = -.53$). ASPD and BPD were significantly and positively related ($\beta = .51$). None of the relationships between binge drinking, NSSI, and aggression were significant when all variables were modeled together.

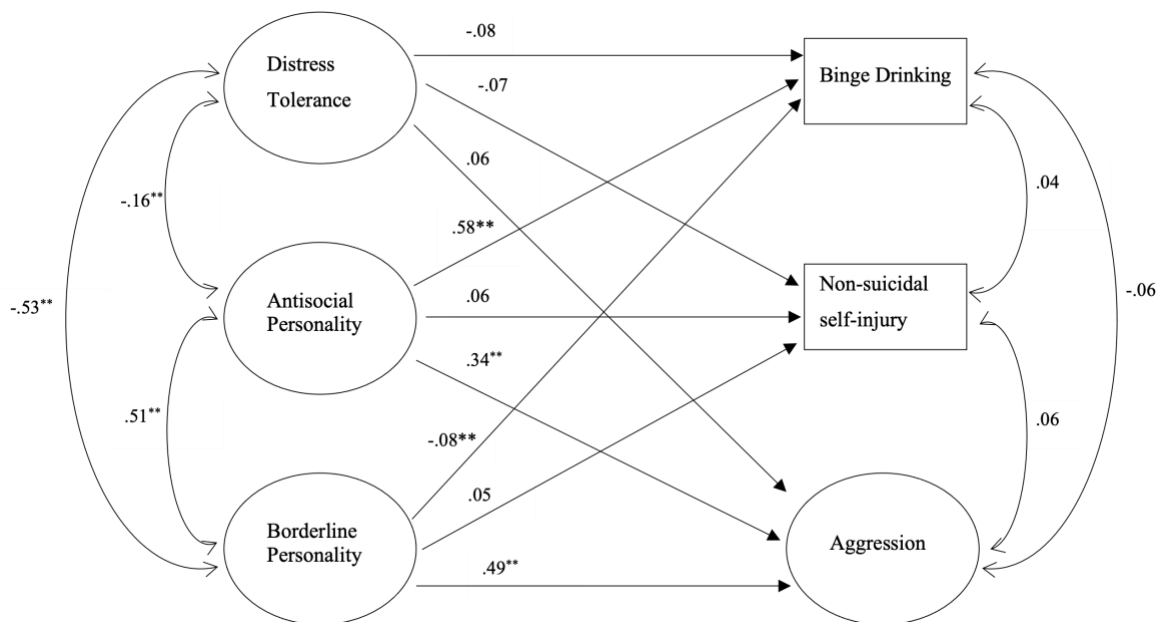


Figure 1: Hypothesized Model

Note: All paths represent standardized coefficient.

* $p < .05$. ** $p < .001$.

Multigroup (Sex) Model Findings

As there were mean differences for sex between our variables of interest, a multigroup SEM analysis was conducted to test the hypothesized model fit by sex. The first step in the analyses was the construction of the baseline model, which consisted of the same variables in the hypothesized model (i.e., DT, ASPD, BPD, binge drinking, NSSI, and aggression). All variables in the baseline model were unconstrained. Next, measurement weights for male and female students were estimated and compared.

There was not a significant change in X^2 when comparing the constrained and unconstrained measurement models; $X^2(229) = 602.17, p < 0.001, CFI = .94, RMSEA = .05$. However, when the paths between the predictor and outcome variables were constrained to be equal across males and females, there was a significant change in X^2 ;

CMIN = 201.91, $p = <.001$. This indicates that the estimates of the relationships between DT, ASPD, and BPD were significantly different for males and females. Given the exploratory nature of the multigroup analyses, we opted to describe differences in relationships between constructs by sex, rather than statistically test these pathway differences (i.e., Wald test, critical ratio of differences). For example, regarding predictor variables, the relationships between DT and BPD, between DT and ASPD, as well as between ASPD and BPD were negatively related for both females and males. Regarding outcomes, ASPD was positively related to binge drinking as well as aggression for both females and males. BPD was also positively related to aggression for both females and males. However, DT was significantly and negatively related to binge drinking and positively related to aggression for females but not for males. Lastly, BPD was significantly and negatively related to binge drinking for females but not for males. Table 4 provides the model fit parameters for all models. Figure 2 provides the structural weights for the multigroup model.

Table 4: Multigroup Model Fit Statistics

| <u>Model</u> | <u>DF</u> | <u>X²</u> | <u>X² p value</u> | <u>CMIN</u> | <u>RMSEA</u> | <u>CFI</u> |
|-----------------------------------|-----------|----------------------|------------------------------|-------------|--------------|------------|
| Unconstrained Full Model | 212 | 581.31 | 0.000 | | 0.047 | 0.943 |
| Constrained Measurement Model | 229 | 602.17 | 0.233 | 20.860 | 0.045 | 0.943 |
| Constrained Full Structural Model | 249 | 783.22 | 0.000 | 201.910 | 0.052 | 0.918 |

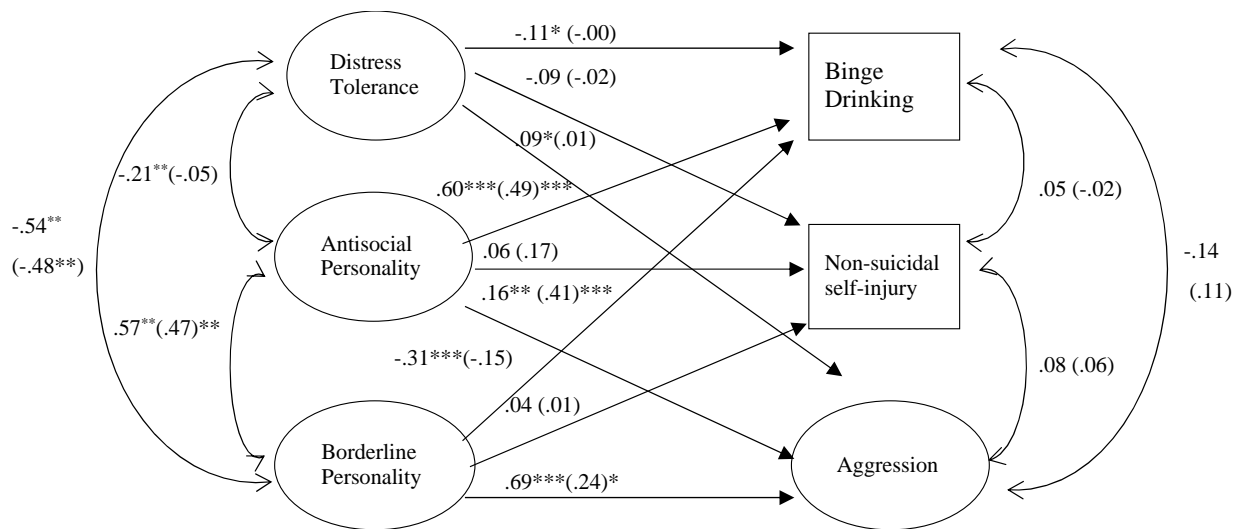


Figure 2: Multigroup (Sex) Model

Note. All paths represent standardized coefficient. Groups are represented as Females (Males).

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

Discussion

The purpose of this study was to gain a better understanding of the relationship of ASPD, BPD, and DT with binge drinking, NSSI, and aggressive behavior. The study utilized SEM to explore these relationships in a large undergraduate sample. Results partially supported the study hypotheses.

The hypothesized model demonstrated a good fit to the data. The results of the present study support the hypothesis that there are positive relationships between BPD and ASPD to risky behaviors (i.e., binge drinking, NSSI, and aggression).

When exploring our hypothesized model taking all variables into account, our hypothesis that DT would account for unique variance in risky behaviors above and beyond BPD and ASPD was not supported. Specifically, ASPD and BPD had opposite relationships with binge drinking when all variables were taken into account, such that

ASPD was still positively related to binge drinking but BPD was negatively related. Of note, the correlations between these variables were small, given the large sample size. This may be statistical suppression, which may be especially likely in the face of small bivariate correlations. Additionally, both ASPD and BPD's positive relationship with aggression was maintained. Although there were significant bivariate correlations between BPD and ASPD with NSSI, there were no significant findings in the model when all predictors were entered together. Additionally, when all predictors were entered together, DT was not related to any of the outcomes. As such, the hypothesis that DT would account for unique variance in the behavioral outcomes over and above BPD and ASPD features was not supported. The effects of BPD, ASPD, and NSSI were likely washed out due to how small the bivariate relationships were in magnitude, even with the large sample size. It may also be that there is some other shared feature of BPD and ASPD that is accounting for the relationship between these personalities and risky behaviors, such as impulsivity.

The exploratory multigroup comparison of these relationships based on sex helps better understand these findings. Results from the multigroup model comparison revealed that DT is related to aggression and binge drinking above and beyond ASPD and BPD for females but not for males. Taken together, the study findings indicate that ASPD and BPD contribute substantially to risky behavior, and that DT appears to contribute to these behaviors but primarily for females. Of note, the strength of this relationship is small (i.e., significant at $p = .09$). This pattern of results may be explained by the idea that

males and females use different emotion regulation strategies (Zimmermann & Iwanski, 2014).

The study results are consistent with theoretical work, such as Linehan's (1993) biosocial model of BPD and Kahneman's (2011) System 1 and System 2 theory. For example, Linehan's biosocial theory (1993) originally focused on females with BPD in the development of the theory and DBT treatment model. This is particularly relevant for our study finding that DT contributes to aggression and binge drinking for females but not for males. More specifically, the study finding supports Linehan's (1993) idea that females with difficulties with distress tolerance tend to handle such distress in a maladaptive and non-skillful way, such as by engaging in risky behaviors. This is also supportive of the gender differences seen in emotion regulation strategies, as described by Zimmerman and Iwanski (2014).

Kahneman's (2011) System 1 and System 2 theory also helps to explain the underlying thought process for these findings. One conceptualization is that when females with poor distress tolerance are in emotional distress, they may be using more System 1 type thinking, the faster and more automatic decision-making process, which leads them to engage in more risky behaviors to quickly reduce painful emotions (Kahneman, 2011). However, it is not as clear why this relationship did not hold up for males, as they also engage in System 1 type thinking. This may be due to binge drinking and aggression being more common and socially acceptable for males than females as developed out of gender roles or socialization (e.g., Saarni et al., 2006). Moreover, males tend to engage in more avoidance coping strategies than females, therefore behaviors

such as binge drinking may be utilized by males more often than females as a way to avoid negative emotions, regardless of the intensity of such emotions (e.g., Zimmermann & Iwanski, 2014). It may also be that males are then using these maladaptive coping skills in a wider variety of contexts than females, while females may be using these behaviors more often when they are experiencing a high intensity emotion. Similarly, the relationship between ASPD and the outcomes of the present study showed fewer sex differences than BPD with study outcomes. For example, the difference in magnitude was stronger for aggression, where the coefficient was much higher for males than females. Such findings may be explained by the social acceptability of more aggressive or externalizing behaviors for males than females (as noted above).

The present study represents an initial attempt to address the relationship between BPD, ASPD, and DT with risky behaviors. Future research examining these relationships may shed light on other factor that may be contributing to a heightened risk for engaging in risky behaviors, such as emotion regulation strategies or impulsivity, above what is inherently present in these personality traits. Additionally, future research is encouraged to further examine these relationships while exploring potential gender differences.

In terms of clinical implications, it is important to consider the context of these findings in different samples. For example, the current study may be particularly relevant for justice-involved populations or clinical populations who are already at higher risk of engaging in maladaptive or risky behaviors. These samples may differ from the current study's undergraduate sample, as both clinical and justice-involved populations are likely to have higher levels of BPD and ASPD symptoms and risky behaviors and less DT than

the undergraduate sample (e.g., Gardner & Qualter, 2009; Morey, 1991; 2007). These populations tend to not only have higher symptomology but also tend to be in environments or situations where there is potentially more frequent stressors or risk. It may also be that, for justice-involved people in particular, there is inherent risk to act on distressing emotions in an aggressive way due to the correctional context and more apparent consequences for such behavior, which may foster more Systems 2 or rational thinking, and may punish or lessen the engagement in aggressive behavior. Additionally, clinical and justice-involved populations may have more access to psychology services and programming, particularly when in distress, and therefore may utilize such services when in distress instead of engaging in maladaptive coping. Moreover, similar to Linehan (1993), this would not only have treatment implications in terms of developing healthy coping skills but would also then reinforce the use of these skills, making such behavior more likely in future times of distress. On the other hand, it may be that engaging in NSSI when in distressing situations could be more likely in a correctional context, regardless of long-term consequences. Access to the means needed to engage in NSSI as a way of affect regulation is more common than some other types of maladaptive coping strategies available in these contexts (e.g., binge drinking). As such, the current study findings may be particularly relevant for these populations in terms of treatment implications. Accessibility of programming focused on developing adaptive distress tolerance skills and focused on long-term goals and consequences of behavior may be particularly beneficial for clinical and justice-involved populations. Exploring the study

findings in these populations may help clarify the underlying variable(s) that may be accounting for the findings and further inform treatment.

There are limitations of this study. For example, the current sample is a college student sample with scores that did not come close to the possible range of high scores on the main personality measures (i.e., PAI BPD and PAI ASPD). Some of the key outcomes had relatively low endorsement of the personality traits as well, which makes it difficult to find significant relationships between these personality traits and our outcomes. Additionally, the PAI BPD and ASPD subscales were used to create the BPD and ASPD latent variables, respectively. The four-factor structure of the BPD scale originally proposed by Morey (1991; 2007) does not fit as well in nonclinical samples as it did in the development study. For example, some studies have identified a different factor structure of BPD in an undergraduate sample (e.g., Jackson & Trull, 2001), whereas other community samples have found a fair-fitting four-factor structure after modifying the PAI items, (e.g., Gardner & Qualter, 2009). However, our structural models were a good fit to the data, and the respective factors loaded at moderate to high levels on the overall BPD latent variable. It may be useful to explore the present study's research questions using count variables of the totality of PAI BPD items instead of using the established PAI BPD subscales to create a BPD latent variable.

The current study provides empirical evidence to the personality and DT literature regarding the contribution of DT, ASPD, and BPD to risky behavior. Specifically, the study findings suggest that ASPD and BPD contribute substantially to risky behavior, and that DT appears to contribute to these behaviors primarily for females, but not for males.

CHAPTER THREE: RISK PROFILES BETWEEN GROUPS OF PEOPLE THAT SELF INJURE

Non-suicidal self-injury (NSSI) is defined as the intentional and direct act of damaging one's own bodily tissue without intent of suicide (Klonsky & Muehlenkamp, 2007). Some examples of NSSI are cutting, scratching, burning, or hitting oneself. Theoretical and empirical studies help explain the motives that people endorse for engaging in NSSI. Specifically, Nock and Prinstein's (2004, 2005) Four Functions model categorizes one's motivation to self-injure into four functions. These four functions are classified based on positive reinforcement, negative reinforcement, and whether the act is automatic (intrapersonal) or social (interpersonal) in nature. As such, the function of NSSI can be broadly described as being maintained by the following: 1) automatic positive reinforcement (i.e., self-punishment), 2) automatic negative reinforcement (i.e., to reduce negative emotions), 3) social positive reinforcement (i.e., to gain attention or acquire material goods), or 4) social negative reinforcement (i.e., to escape social demands or responsibilities; Nock & Prinstein, 2004; 2005). The most commonly cited motive for NSSI is affect regulation, with the second most commonly cited being self-punishment (e.g., Klonsky, 2007).

There are several common correlates of NSSI behavior. For example, people that experience more depressive and anxiety symptoms are more likely to engage in NSSI behavior (Andover et al., 2005; Klonsky & Muehlenkamp, 2007; Klonsky et al., 2003;

Ross & Heath, 2002). Negative emotionality and self-derogation are also factors that contribute to NSSI behavior, such that individuals who experience more painful emotions and anger or dislike towards themselves they are more likely to engage in NSSI (e.g., Klonsky & Muehlenkamp, 2007).

Research has also shown that self injury tends to reduce negative affect states, which helps clarify the motivation for engaging in such behavior. For example, studies have shown that NSSI often co-occurs with affect states of anger, loneliness, depressed, and frustration, which are reduced after self injury (e.g., Laye-Gindhu & Schonert-Reichl, 2005). Given that affect regulation and self-punishment are common motives for NSSI, it makes sense that self-injury may be used as a method for alleviating the experience of distress (e.g., Klonsky, 2007).

Given that NSSI is often used as an affect regulation strategy, multiple studies have identified other maladaptive affect regulation strategies as correlates of NSSI (e.g., Pak et al., 2021). However, there is less information available on behavioral strategies such as aggression in individuals who self-injure. The goal of this study is to replicate previously documented latent classes of individuals who engage in NSSI and to examine differences between those classes in alcohol use and aggression.

Theoretical and Empirical Evidence for Self-Harm Groups

Previous studies have explored various characteristics of individuals who self-injure. Research using Latent Class Analysis (LCA) models support different self-harm groupings. For example, Klonsky and Olino (2008) identified four NSSI groups of young adults with a history of NSSI behaviors based on the following indicators: motives for

NSSI (i.e., social vs. automatic), method (e.g., cutting, biting, burning), and other contextual features (e.g., engaging in NSSI alone or with others). Most participants were grouped into one of two classes characterized by fewer NSSI-related behaviors and fewer overall clinical symptoms (Klonsky & Olin, 2008). A third class (11% of participants) reported a variety of NSSI behaviors, endorsed both social and automatic motives, and reported high levels of anxiety. A fourth class (11% of participants) reportedly engaged in NSSI alone, endorsed automatic functions, and reported high suicidality (Klonsky & Olin, 2008).

Other research utilizing LCA and LPA generally support the notion that there are classes of individuals that engage in NSSI that differ in terms of risk and functionality. For example, Whitlock et al. (2008) utilized LCA analyses to group a sample of 2100 college students into three classes based on frequency, method, and severity of NSSI behavior. The first class was composed of one method of superficial NSSI behavior and “moderate” lifetime incidents (more than 11 incidents), the second class was composed of males who use between 1 and 3 NSSI methods, with low lifetime incidents. Lastly, the third class was mostly females with more than 3 NSSI methods, more lethality, and more lifetime incidents (Whitlock et al., 2008).

Dhingra et al. (2016) used LCA analyses to group a sample of 1809 adults into classes based on the following indicators: suicidal ideation, suicide gesture, suicide attempts, thoughts of NSSI, and NSSI behavior. Results revealed three classes based on the above categories. The first class was composed of a group of low frequency of NSSI thoughts and behaviors (25.8%), a second class composed of NSSI and suicidal ideation

(25%) and the last class was composed of suicidal behaviors (29.2%; Dhingra et al., 2016).

Hamza and Willoughby (2013) utilized LCA analyses to group a sample of 439 adults with histories of NSSI behavior into three classes based on various NSSI characteristics (e.g., lifetime frequency, most recent time) and suicidal behavior (e.g., lifetime suicidal ideation, lifetime attempts). The first class was composed of a low risk group of low frequency of NSSI behaviors and low risk for suicidal behaviors. The second class was composed of more frequent NSSI but low risk for suicidal behaviors. The third group was a high frequency of NSSI behaviors and a high risk for suicidal behaviors (Hamza & Willoughby, 2013).

Behavioral Differences Between NSSI Classes

Prior research on classes or groups of people who engage in NSSI indicate that these classes experience different outcomes related to conditions such as depression and suicide risk. However, there is less information in the empirical literature regarding how these classes differ on other behavioral outcomes, such as alcohol use (e.g., Bresin & Mekawi, 2020) and aggression (e.g., Sorgi et al., 2020). For example, factors such as motives for self-harm and frequency of self-harm distinguish groups of people who engage in NSSI on suicidal behavior and depression levels (e.g., Klonsky & Olin, 2008). Specifically, Dhingra et al. (2016) compared their three LCA classes (i.e., low frequency of self-injurious thoughts and behaviors; NSSI and suicidal ideation; suicidal behaviors) of 1809 adults on various factors. Results indicated that compared to the suicidal behavior group, the NSSI behavior and ideation group had less feelings of entrapment,

fearlessness about death, exposure to others' NSSI or suicidal behaviors, and more levels of goal disengagement and agitation (Dhingra et al., 2016).

Hamza and Willoughby (2013) also compared their three LCA classes of adults with NSSI history based on clinical outcomes. Results revealed that the more frequent NSSI/high risk for suicidal behaviors group reported significantly more suicidal ideation, suicide attempts, and suicide risk compared to both the low NSSI frequency/low suicide risk group and moderate NSSI frequency/low suicide risk group (Hamza & Willoughby, 2013). Moreover, Hamza and Willoughby (2013) also compared classes based on “as “psychosocial impairment,” which they defined with a group of measures general wellbeing (e.g., emotion regulation, depression, self-esteem, social anxiety, behavioral inhibition), friendship quality, parental relationships, and illegal behavior. Results also revealed the same pattern of findings, such that the more frequent NSSI/high risk for suicidal behaviors group reported significantly more “psychosocial impairment” compared to both the low NSSI frequency/low suicide risk group and moderate NSSI frequency/low suicide risk group (Hamza & Willoughby, 2013).

However, for those classes of people that self-injure, it is unclear how they may differ on other behavioral outcomes. For example, aggressive behavior and binge drinking are risky behaviors that also coincide with self-injurious behavior (Klonsky & Muehlenkamp, 2007; Sorgi et al., 2020). In a large meta-analysis ($N = 141, 669$), there was a significant positive association between NSSI and alcohol use (Bresin & Mekawi, 2020). Additionally, that study noted that the association between these two behaviors was larger for young adults and adolescents (Bresin & Mekawi, 2020). There is less

literature on the relationship between NSSI and aggression towards others. However, there is evidence that a subset of individuals with NSSI also engage in physical aggression, or a ‘dual harm’ (self and other) aggression (Shafti et al., 2021). Researchers have hypothesized that individuals who self-injure may also drink or aggress towards others as another emotion regulation tool, or due to a shared variable such as impulsivity (Hasking et al., 2020; Shafti et al., 2021; Sorgi et al., 2020). There is a dearth of information on how the latent classes previously identified in the self-harm literature differ in their use of alcohol and aggression.

Purpose and Hypotheses

The goals of Study 2 are twofold: Part 1 will attempt to replicate the class distinctions found in previous LCA and LPA analyses of individuals who self-injure, then Part 2 will compare these classes on validators related to alcohol use and aggression. The purpose of Part 1 is to explore whether or not our study replicates the findings from other studies of groupings of people who have ever self-injured. An LPA will be conducted with similar indicators as found in prior studies, such as age of onset, frequency, type, and motives for self-harm, in attempt to replicate the findings from other studies of different groups of people that self-harm. It is hypothesized that Part 1 will replicate previous findings with the identified indicators.

Building on the classes of self-injurers from the LPA in Part 1, Part 2 aims to answer how these groups of people who have ever self-injured differ in terms of other outcomes that researchers have not typically explored. Although previous literature has established a positive relationship between traits such as negative urgency, distress

tolerance, and NSSI, there is a dearth of information on whether or not groups of people who engage in NSSI exhibit differences in impulsive behaviors. For example, do individuals who engage in more frequent and more types of self-injury tend to engage in more frequent and varied impulsive behaviors? Part 2 attempts to fill this research gap by exploring meaningful distinctions based on certain risky behaviors between people that have ever engaged in NSSI behavior. Behavioral outcomes such as impulsivity, distress tolerance, binge drinking, and aggression will be added as validators of previously identified classes of people who self-injure.

Based on the studies using LCA and LPA for NSSI groupings, it is hypothesized that we will obtain three classes of people that self-injure based on age of onset, frequency, type, and motives for NSSI. Additionally, it is hypothesized that people who engage in more frequent self-harm will engage in other types of risky, externalizing behaviors (binge drinking, aggressive behavior) as they may have lower impulse control. In a similar notion, people who engage in self injurious behavior also impulsively relieve distress in other ways (aggressive behavior, binge drinking) due to lower impulse control. It may also be that people sort out into different groupings based on motives, such as if people have more affect regulation motives they may engage in more of the externalizing behaviors.

Method

Participants

Data was drawn from the same sample of undergraduate college students as described in Study 1. Of the total sample, 150 participants reportedly engaged in NSSI at

some point in their life, and 35 participants reportedly engaged in NSSI in the past month. The 150 individuals who reported lifetime NSSI made up the sample for this study. In this group, participants ranged in age between 17 to 36 years, with the mean age of participants being 19.41 years ($SD = 2.26$). Participants ranged between 1 and 5 years of college-level schooling, with the majority (56.3%) being first-year undergraduate students. A total of 72.7% identified themselves as female, while 26.6% identified themselves as male, and one participant did not identify as either male or female. The majority of the sample (82.5%) identified themselves as white, while 4.5% identified themselves as Black, and 6.5% identified themselves as Asian-American, and 2.6% Hispanic or Latino/a or another ethnicity.

Regarding mental health treatment variables, a total of 10.3% of the sample reported ever participating in psychotherapy, with 2.0% currently in psychotherapy. A total of 8.8% of the sample reported ever taking psychiatric medication, with 3.4% currently taking psychiatric medication. A total of 2.0% of the sample reported a history of ever attempting suicide, with 0.6% reportedly attempting suicide in the past two months. Regarding the variables of particular interest for the current study, the frequency of lifetime instances of NSSI ranged from 1 to 267 acts, with the mean frequency of 2.98 acts ($SD=16.0$).

Materials and Procedure

Students were recruited from undergraduate psychology courses and earned research participation credit for completing the study. There were no eligibility criteria for this study and the university's Institutional Review Board approved all study

procedures. Students were given the option to participate in the current study, other research studies, or to complete alternative assignments for their participation credit. Students who volunteered to participate provided written informed consent then completed the study measures in groups of up to 30 students.

Measures

Demographics and History Questionnaire. Participants self-reported demographic information, such as age, ethnicity, year in school, and sex (“male”/“female”). Participants also self-reported their psychiatric history, including current and past psychotherapy experience and psychiatric medication use, as well as lifetime (“yes”/“no”) and past two-years suicide attempts (“yes”/“no”). Frequency of lifetime history of suicide attempts were also self-reported.

Distress Tolerance Scale (DTS; Simons & Gaher, 2005). The DTS is a 15-item self-report measure assessing distress tolerance. The DTS defines distress tolerance as “the capacity to experience and withstand negative psychological states” (p. 83). Specifically, scale items reflect four, first-order factors of the distress tolerance concept: 1) perceived ability to tolerate emotional distress (“Feeling distressed or upset is unbearable to me”); 2) subjective appraisal of distress (“My feelings of distress or being upset are not acceptable”); 3) attention being absorbed by negative emotions (“When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels”); and 4) regulation efforts to alleviate distress (“When I feel distressed or upset I must do something about it immediately”). Participants self-rated their agreement with items using a 5-point Likert scale, ranging from 1 (“strongly agree”) to 5 (“strongly

disagree”). High scores on the DTS indicate high tolerance for distress. A latent variable of distress tolerance was used as a predictor in this study.

Deliberate Self-Harm Inventory (DSHI; Gratz, 2001). The DSHI is a self-report measure assessing the frequency and type of NSSI behavior. The DSHI defines NSSI as the “deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage (e.g., scarring) to occur” (Gratz, 2001, p. 255). Participants were asked to self-report the number of times they engaged in 15 types of NSSI (e.g., cutting, burning, biting, carving, and banging head) during the past month. Frequency of each NSSI behavior summed was used as an outcome variable in analyses to represent the amount of NSSI behavior that occurred in the past month.

Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992). The BPAQ is a 29-item self-report measure assessing four different types of aggression. The four aggression dimensions include: 1) verbal aggression (e.g., “I have threatened people I know”), 2) physical aggression (e.g., “If someone hits me, I hit back”), 3) anger (e.g., “I flare up quickly, but get over it quickly”), and 4) hostility (e.g., “I wonder why sometimes I feel so bitter about things”). Participants were asked to self-report their agreement with items using a 5-point Likert scale, ranging from 1 (“Extremely uncharacteristic of me”) to 5 (“Extremely Characteristic of me”). High scores on the BPAQ indicate higher levels of aggression. A latent variable of aggression was used as an outcome variable in this study.

UPPS Impulsive Behavior Scale-Positive Urgency (UPPS-P; Whiteside & Lynam, 2001). The UPPS-P is a self-report measure assessing impulsivity. Participants rate their responses to 59 items on a 4-point scale ranging from 1 (“agree strongly”) to 4 (“disagree strongly”). The measure includes five impulsivity subscales: (lack of) premeditation ($\alpha = .85$), negative urgency ($\alpha = .88$), positive urgency ($\alpha = .88$), sensation-seeking ($\alpha = .91$), and (lack of) perseverance ($\alpha = .84$). Subscale scores were entered as validators. The subscale scores were calculated by taking the mean all of subscale items resulting in a subscale total score where a higher score indicates higher impulsivity.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a self-report measure assessing difficulties in emotion regulation. Participants rated how often each of the 36-items applies to them on a 5-point scale, ranging from 1 (“almost never”) to 5 (“almost always”). The DERS includes six subscales reflecting factors of difficulties with emotion regulation, including: 1) lack of emotional awareness (e.g., “I pay attention to how I feel,” reverse-scored); 2) lack of emotional clarity (e.g., “I have difficulty making sense out of my feelings”); 3) impulse control difficulties (e.g., “When I’m upset, I have difficulty controlling my behaviors.”); 4) difficulty engaging in goal-directed behavior when distressed (e.g., “When I’m upset, I have difficulty concentrating”); 5) non-acceptance of certain emotional responses (e.g., “When I’m upset, I become angry at myself for feeling that way); and 6) limited access to emotion regulation strategies when distressed (e.g., “When I’m upset, I believe that wallowing in it is all I can do”). For this study, a DERS total score was created by summing all subscales to reflect a broad variable reflecting difficulties in emotion regulation. Higher

scores reflect more difficulties in emotion regulation. The DERS total score was entered as a validator variable.

Functional Assessment of Self Mutilation (FASM; Lloyd et al., 1997). The FASM is a 22-item self-report measure that assesses the type, frequency, and function of NSSI. Only the motive items of the FASM was used for the purposes of this study. Participants were asked to self-report their agreement with items using a 4-point Likert scale, ranging from 0 (“never”) to 3 (“often”). Nock and Prinstein (2004) used CFA and reliability analyses to combine 21 of the FASM items into four subscales, which represent motives for NSSI. The four motives include: 1) automatic negative reinforcement (ANR; i.e., reduce aversive internal experiences), 2) automatic positive reinforcement (APR; i.e., to increase a wanted emotion), 3) social negative reinforcement (SNR; i.e., to avoid unwanted interpersonal demands or involvement), and 4) social positive reinforcement (SPR; i.e., to increase interpersonal rewards or attention). The four subscales were used as indicator variables in this study.

Timeline Follow Back (TLFB; Sobell and Sobell, 1992). The TLFB is a self-report measure assessing retrospective estimates of alcohol use. A daily calendar is used as a guide to more accurately assess one’s daily use beginning at the date of the interview retroactively for one month. For the current study, number of days binge drinking during the last 30 days (one month) was used as an outcome measure of alcohol misuse.

Data Analysis Plan

Part 1 utilized latent profile analysis (LPA) to examine how people who have ever engaged in NSSI cluster together based on frequency, type, age of onset, and motives for

NSSI. NSSI behaviors, such as the frequency of self-injury, type of self-injury, and age of onset (measured by the DSHI), and motives for NSSI (measured by the FASM) were entered as indicators of potential classes. Aggression (measured by the BPAQ), frequency of binge drinking episodes (measured by TLFB), distress tolerances scores (measured by the DTS), and impulsivity (measured by the UPPS-P) were entered as validators in Part 2. In our analyses, NSSI types were entered as binary variables, while NSSI frequency, binge drinking, and aggression were entered as continuous variables. Due to the binary and continuous indicators, we used latent profile analysis in Mplus version 7.0 to examine the latent class structure in this sample.

Using the abovementioned indicators, the most parsimonious number of latent class solutions was determined by analyzing two-, three-, four-, and five- class solutions, then comparing each model with the previous model. The final class solution was chosen based on a combination of factors including interpretability, class size, class distinction (i.e., entropy), and a variety of fit indices such as Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), sample-size adjusted-BIC (ABIC), and Vuong-Lo-Mendell-Rubin's likelihood ratio test (LMR LRT). Meaningful class solution have clinical interpretability, class sizes greater than 5.0% of the sample, larger entropy values, smaller fit indices (i.e., AIC, BIC, ABIC) in comparison to other solutions, and a significant LMR-LRT (i.e., $p < .05$).

In Part 2, we examined mean differences on aggression, binge drinking, DT, and impulsivity (validators) among the classes using independent sample t-tests.

Results

Latent Profile Analysis Findings

The models for two-, three-, four-, and five- class solutions were assessed based on age of first NSSI, NSSI frequency, type, and motives. See Table 5 for the model fit statistics for two- and three- class solutions. Based on the fit indices, the two-class solution was retained as the best fitting model. However, the two-class solution and the three-class solution were statistically similar, and the two-class solution was retained as it was determined to be the more clinically-applicable model, as described below.

Table 5: Study 2 Model Fit Statistics

| <u>Models</u> | <u>Class N</u> | <u>Entropy</u> | <u>AIC</u> | <u>BIC</u> | <u>ABIC</u> | <u>LMR LRT</u> | |
|---------------|----------------|----------------|------------|------------|-------------|----------------|----------------|
| | | | | | | <u>Value</u> | <u>p value</u> |
| 2 Class | 131, 19 | 0.994 | 1722.812 | 1780.014 | 1719.883 | 386.111 | 0.1061 |
| 3 Class | 9, 10, 131 | 0.998 | 1549.824 | 1628.101 | 1545.816 | 181.804 | 0.3129 |

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = Adjusted Bayesian Information Criterion; LMR LRT = Lo-Mendell-Rubin Likelihood Ratio Test.

Two-Class Solution

As described in the model fit statistics in Table 5, for the two-class solution, Class 1 comprised 87.3% of the sample, whereas Class 2 was 12.7% of the sample. Overall, the model fit statistics demonstrated an acceptable model fit; there was high Entropy, low AIC, BIC, and ABIC values, but the LMR LRT was not significant. This suggests that there is some indication of acceptable model fit (e.g., high entropy) as well as some

indication that there is not improved fit with the two-class solution (i.e., the LMR LRT indicates that the two-class solution did not significantly improve over the one-class solution).

Three-Class Solution

As described in the model fit statistics in Table 5, for the three-class solution, Class 1 comprised 6.0% of the sample, whereas Class 2 was 6.0% of the sample, and Class 33 was 87.0% of the sample. Overall, the model fit statistics demonstrated a good model fit for the three-class solution. The three-class solution had lower BIC relative to the two-class solution, and had higher entropy. This suggests that there is a better model fit with the three-class solution than the two-class solution. However, the LMR indicated that there is no significant model improvement in fit with the three-class model compared to the two-class model.

Four- and Five-Class Solutions

The classes did not converge for the four- and five-class solutions. Neither the four- or five- class solution showed improvements in model fit. Additionally, both the four- and five- class solutions each had one class with a sample size of zero. As such, the statistics for the four- and five-class solutions are unable to be interpreted.

Best Model Fit – Two-Class Solution

There are somewhat mixed fit statistics regarding the differences in the one-class solution, the two-class solution and the three-class solution. As noted above, the two-class solution was retained over the one-class solution (i.e., no subgroups) even due to the lack of significant improved model fit (LMR LRT) due to the clinical interpretability of

the findings. As the two-class solution had clear clinical distinctions between low- and high-risk groups, assessing the findings as one single group, with no subgroups, although not statistically indicated, would not provide applicable clinical interpretation of findings. As such, a two-class solution was retained.

Regarding the fit between the two-class solution and three-class solution, the two-class solution had the highest entropy value, representing that this solution resulted in the most distinct classes of all models assessed. The information criterion values (AIC, BIC, ABIC) for the three-class solution showed slightly better fit compared to the two-class solution. For example, the BIC was similar for both the two-and three-class solutions, though the BIC was slightly higher for the three-class solution. The LMR LRT did not show significant model fit improvement from the two-to three-class solution ($p = .3129$). Moreover, the three-class solution essentially split Class 2 from the two-class solution into two groups to create the third class, with one class (Class 2 from the three-class solution) endorsing motives more highly and beginning to engage in NSSI at an older age than the other two classes. However, there were no other differences between these classes. Based on these factors, the two-class solution was retained to be the best fitting model with the following classifications: Low Risk and High Risk classes. See Table 6 for group differences on the indicator variables.

The Low Risk class (Class 1) was characterized by lower endorsement of NSSI motives, fewer types of NSSI, and contained the largest number of students. Of the 131 students in the Low Risk class, 19.9% engaged in self-harm in the past month with an average of 1.17 NSSI acts. Additionally, student's average age of NSSI onset was 13.40

years old (range = 5 – 18), they averaged 2.01 types of NSSI, and had relatively low endorsement of NSSI motives.

The High Risk class (Class 2) was characterized by more endorsement of NSSI motives and more types of NSSI. Of the 19 students in the High Risk class, 47.4% engaged in self-harm in the past month with an average of 2.16 NSSI acts. Additionally, student’s average age of onset was 13.89 years old (range = 8 – 18), they averaged 4.11 types of NSSI, and had stronger endorsement of NSSI motives. Of note, there were no significant differences in age of first NSSI or frequency of NSSI between classes.

Table 6: Study 2 Group Differences in NSSI Variables and Motives Endorsement

| <u>Indicators</u> | <u>Low Risk</u> | <u>High Risk</u> | <u>t-test</u> | |
|-------------------|----------------------------|---------------------------|---------------|-----------|
| | (N = 131) <i>M (SD)</i> | (N = 19) <i>M (SD)</i> | <i>t</i> | <i>p</i> |
| NSSI Age of Onset | 13.39 (3.40) | 13.89 (2.81) | 0.61 | 0.542 |
| NSSI Frequency | 1.17 (5.25) | 2.16 (2.89) | 0.80 | 0.423 |
| Motives | | | | |
| ANR | 0.17 (0.33) | 1.63 (0.70) | 15.09 | < 0.001** |
| APR | 0.15 (0.28) | 1.63 (0.70) | 16.82 | < 0.001** |
| SNR | 0.05 (0.15) | 0.59 (0.62) | 8.53 | < 0.001** |
| SPR | 0.04 (0.07) | 0.78 (0.48) | 16.77 | < 0.001** |
| NSSI Types | 2.01 (1.39) | 4.11 (2.88) ^b | 2.15 | 0.033* |

Note. NSSI = non-suicidal self injury; ANR = Automatic Negative reinforcement; APR = Automatic Positive Reinforcement; SNR = Social Negative reinforcement; SPR = Social Positive Reinforcement.

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

In Part 2, we examined mean differences between the Low Risk and High Risk groups on aggression, binge drinking, DT, and impulsivity (validators) using independent samples t-tests. Results indicated that the Low Risk group was characterized by lower anger, anxiety, depression than the High Risk group. The Low Risk and High Risk groups were not significantly different on aggression, binge drinking, DT, or any facet of impulsivity. Of note, the only validator that distinguished the two class solution was the emotions measured by the PANAS. See Table 7 for group differences on the indicator variables.

Table 7: Group Differences in Psychopathology, Impulsivity, DT, and Binge Drinking

| <u>Validators</u> | <u>Low Risk</u> | <u>High Risk</u> | <u>t-tests</u> | |
|-------------------|---|--|----------------|-----------|
| | (<i>N</i> = 131) <i>M</i> (<i>SD</i>) | (<i>N</i> = 19) <i>M</i> (<i>SD</i>) | <i>t</i> | <i>p</i> |
| Binge Drinking | 3.28 (4.26) | 2.26 (3.92) | 0.99 | 0.326 |
| Aggression | 18.09 (6.80) | 18.80 (7.78) | 0.42 | 0.677 |
| Emotions | | | | |
| Anger | 17.04 (6.22) | 22.68 (5.72) | 3.73 | < 0.001** |
| Anxiety | 14.85 (5.90) | 19.84 (7.10) | 3.36 | 0.001* |
| Depression | 14.16 (7.40) | 20.16 (8.51) | 3.24 | 0.002* |
| DT | 48.69 (11.87) | 44.16 (10.80) | 1.57 | 0.118 |
| Impulsivity | | | | |
| NU | 27.39 (6.94) | 28.71 (7.01) | 0.77 | 0.440 |
| PU | 44.01 (7.99) | 42.89 (7.96) | 0.57 | 0.569 |
| SS | 27.82 (7.52) | 29.37 (10.07) | 0.80 | 0.424 |
| PERS | 30.11 (4.80) | 29.92 (5.52) | 0.16 | 0.875 |
| PRE | 31.50 (5.57) | 32.66 (5.12) | 0.86 | 0.393 |

Note. NU = Negative Urgency; PU = Positive Urgency; SS = Sensation Seeking; PERS = (Lack of) Perseverance; PRE (Lack of) Premeditation; DT = Distress Tolerance.

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

Discussion

The purpose of this study was twofold: 1) explore whether our undergraduate sample replicates the class distinctions found in previous LCA and LPA analyses of individuals who self-injure; and 2) gain a better understanding of how these groups of people who have ever self-injured differ in terms of other outcomes that researchers have not typically explored (e.g., risky behaviors, aggression, psychopathology, DT). The study used Mixture modeling and independent sample t-tests to explore these relationships in a sample of undergraduate students with a history of NSSI behavior. Results partially supported the study hypotheses.

Part one used mixture modeling to classify undergraduate students with a history of self-injuring based on NSSI factors (e.g., frequency, type, age of first time) and motives for NSSI behaviors. Part One results partially replicated previous LCA and LPA studies of NSSI groupings and supported study hypotheses. The present study obtained two classes of people that self-injure based on commonly identified NSSI factors, including age of onset, frequency, type, and motives for NSSI). Previous LCA and LPA have found three-classes using similar indicators (e.g., Dhingra et al., 2016; Whitlock et al., 2008). The current study retained the two-class solution over the one-class solution (i.e., no subgroups) even due to the lack of significant improved model fit (LMR LRT) as the clinical application of the findings when split into classes is more impactful and relevant than it is for a model with no subgroups. For example, the two-class solution had clinical implications between our low- and high-risk groups. Interpreting the findings in two

distinct classes would allow for a clearer understanding and application of preventative interventions for NSSI behavior.

Additionally, the model fit for both the two-class and three-class solution in the present study fit the data well. However, the three-class solution essentially split Class 2 into two groups, with one group endorsing motives more highly and beginning to engage in NSSI at an older age than the other two classes. However, there were no differences between Class 2 and Class 3 on any of the validators in the three-class solution. As such, it appeared to be more clinically meaningful to have the two-class solution, as the validators showed differences between the two classes.

Furthermore, the hypotheses were partially supported that there would be groups classified based on NSSI risk and levels of risky behavior. The present study indicated two groups of people that self-injure, a Low Risk group and a High Risk group. The Low Risk group endorsed NSSI motives to a lesser extent, engaged in fewer types of NSSI, and contained the largest number of students. Of note, though these group differences are statistically significant, the functional difference between groups is relatively small. Age of first NSSI and frequency of NSSI behavior did not significantly differ between the risk groups, which is opposite of what previous research has shown. For example, studies show that more frequent NSSI is more often seen in the higher risk groups (e.g., Hamza & Willoughby, 2013; Whitlock et al., 2008). Of note, most studies do not use college student samples, other than Whitlock and colleagues (2008), who did not assess frequency of NSSI behavior in the last month but assessed number of lifetime NSSI incidents. Such differences may account for the differences seen in the present study

results. Regarding motives, The High Risk group endorsed NSSI motives to a larger extent s and engaged in more types of NSSI. For example, the High Risk group endorsed significantly more automatic negative reinforcement (ANR) motives, automatic positive reinforcement (APR), social negative reinforcement (SNR), and social positive reinforcement. (SPR) motives.

Part 2 used independent sample t-tests to determine how the classes differ based on psychopathology, risky behavior, DT, and impulsivity. Results provided partial support for the study hypotheses. Results indicated that the High Risk group tended to have more psychopathology, such as anger, anxiety, and depression, but there were no significant differences between groups for risky behaviors such as binge drinking or aggression, DT, or impulsivity. The only differences found between the Low Risk and High Risk groups were the NSSI motives, types, and emotions. Thus, the only validator that distinguished the two-class solution was the psychological symptoms. Such findings are similar to previous research using LCA to classify grouping based on NSSI behavior (e.g., Hamza & Willoughby, 2013; Klonsky & Olino, 2008). More specifically, in line with prior research, the current study findings indicated groupings of low and high risk participants, specifically in terms of symptoms of psychopathology (e.g., depression). Though the current study aimed to extend prior research and explore how these groups differ in terms of other risky behaviors (e.g., binge drinking and aggression), there were no significant group differences for such risky behaviors.

In terms of clinical implications, it is important to consider the context of these findings in different samples. For example, the current study may be particularly relevant

for college student samples, or samples of community members, that may be at higher risk (e.g., binge drinking) in terms of the clinical implications for prevention. Prevention efforts for future psychological symptoms and NSSI behavior may be useful based on the current study. The study findings suggest that college students that engage in more methods of self injurious behavior also endorse more and different motivations for engaging in such behavior and still self-report stronger negative emotions. This suggests that it may be useful to prevent future NSSI behavior and other risky behaviors if prevention efforts are put in place that help students develop and maintain more adaptive coping strategies to be able to sit with negative emotions without acting on such emotions.

There are limitations of this study. For example, the LPA model fit statistics for the current study indicated that our model did not significantly improve based on adding subgroups (i.e., two-class solution). However, due to clinical interpretation of the findings, the two-class solution was retained for the current study. Although we believe that the study findings have more clinical implications when interpreted as a two-class solution, with low- and high-risk groupings, the statistics for model-fit suggests that a model with no subgroups may fit the data best. Moreover, it would be helpful to examine the validator variables in a clinical sample, instead of an undergraduate sample in order to explore how these factors may play a role in NSSI and maladaptive behaviors in a more at-risk sample. Additionally, our sample is composed of mostly White, first-year undergraduates. Therefore, the generalizability of the findings is somewhat limited to those demographics. The literature is mixed on racial differences and NSSI behavior

(e.g., Whitlock et al., 2008); thus, further exploration of any differences in demographic characteristics would be a helpful contribution to the prevention and treatment literatures.

The current study provides empirical evidence of low risk and high risk group differences in a sample of undergraduate students with a history of self-injurious behavior. The high risk group was more likely to endorse more motives, NSSI types, and psychopathology than the low risk group. The findings contribute to a better understanding of differences in motivation for engaging in NSSI behavior, which may help tailor prevention and intervention efforts for such behavior. Clinical efforts can be made to help people with a history of NSSI to develop and maintain more adaptive distress tolerance skills in order to reduce psychological symptoms and reduce risk for future NSSI and maladaptive behaviors.

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