THESIS

EXAMINING PERSONALITY DIMENSIONS, EMOTION DYSREGULATION, AND EMOTION REGULATION STRATEGIES AS PREDICTORS OF ENGAGEMENT IN HEALTH-RISK AND SELF-INJURIOUS BEHAVIORS

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ABSTRACT

EXAMINING PERSONALITY DIMENSIONS, EMOTION DYSREGULATION, AND EMOTION REGULATION STRATEGIES AS PREDICTORS OF ENGAGEMENT IN HEALTH-RISK AND SELF-INJURIOUS BEHAVIORS

Health-risk behaviors and self-injurious thoughts and behaviors (SITBs) have been associated with poor mental health outcomes, and some individuals seem more predisposed to engaging in these behaviors than others. However, the behavioral etiology of health-risk behaviors and SITBs is unclear. Emotion dysregulation, reliance on maladaptive emotion regulation strategies, and the personality dimensions sensation seeking, impulsivity, neuroticism, and conscientiousness (inversely), have all been implicated in maladaptive behaviors, but these constructs have not been evaluated simultaneously. In addition, most research to date has focused on one or a few outcome behaviors, and few studies have examined underlying mechanisms for engagement in different types of health-risk behaviors and SITBs. The current study used latent profile analysis (LPA) to identify classes of individuals based on personality and emotion dysregulation dimensions. Differential engagement in seven behaviors (non-suicidal self-injury, suicidal ideation, suicide attempt, disordered eating, drug use, heavy alcohol use, and unprotected sex), along with reliance on adaptive versus maladaptive emotion regulation strategies, were then evaluated across classes. Class membership was also evaluated as a moderator of the relations between emotion regulation strategies and each behavioral outcome. The LPA discerned three classes of participants. The Emotionally Regulated class displayed lowest levels of emotion dysregulation, impulsivity, neuroticism, and risk seeking and highest

levels of conscientiousness and experience seeking. The Urgency Inclined class had middle-range scores on all indicators, with notably elevated scores in positive and negative urgency compared to the Emotionally Regulated class. The Dysregulation Inclined class reported highest levels of emotion dysregulation, impulsivity, neuroticism, and risk seeking and lowest levels of conscientiousness and experience seeking. Classes were primarily derived by emotion dysregulation, urgency facets of impulsivity, and neuroticism. Engagement in outcome behaviors generally increased across the Emotionally Regulated, Urgency Inclined, and Dysregulation Inclined classes, and results suggest that different behavioral phenotypes may underlie engagement in SITBs and disordered eating versus substance use. Reliance on maladaptive emotion regulation strategies increased and adaptive strategies decreased significantly across classes with increasing emotional instability, suggesting that interventions targeting emotion regulation skills may be especially valuable for individuals in the Urgency Inclined and Dysregulation Inclined classes. There was no evidence for moderation between class membership and emotion regulation strategies in predicting outcome behaviors. Results extend previous literature that identifies emotion-related behavioral traits as salient antecedents to engagement in health-risk behaviors and SITBs. Elucidating heterogeneity among individuals who engage in maladaptive behaviors has important implications for interventions among populations at risk of experiencing associated negative outcomes.

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INTRODUCTION

Health-Risk and Self-Injurious Behaviors Among Young Adults

Health-risk and self-injurious behaviors involve inherent risks for health and well-being. Health-risk behaviors, also referred to as risky and risk-taking behaviors, are activities that expose an individual to increased risk for physical, emotional, economic, or social harm (Kann, 2001). While risk-taking can be adaptive in some situations (Crone & Dahl, 2012), it is often associated with behavioral problems, such as substance misuse, criminal activities, disordered eating, and sexual behaviors that result in sexually transmitted infections and unplanned pregnancy. Self-injurious thoughts and behaviors (SITBs) include non-suicidal self-injury (NSSI; socially unsupported intentional self-injury without intent to die), suicidal ideation (thinking about and/or planning for a suicide attempt), and suicide attempt (intentionally injuring oneself with intent to die; Nock, 2010). SITBs have also been associated with poor outcomes, including emotional distress, lower well-being, and subsequent death by suicide (Hamza, Stewart, & Willoughby, 2012; Paul, Tsypes, Ernhout, Eidlitz, & Whitlock, 2015). In addition to adversely impacting physical and mental health on their own, risk-taking and SITBs are also diagnostic criteria for a wide range of psychological disorders (e.g., substance use disorder, conduct disorder, borderline personality disorder; American Psychiatric Association, 2013).

Health-risk behaviors and SITBs are especially relevant to adolescents and young adults, since these age groups engage in risky activities at higher rates than other populations; risky behavior engagement generally increases linearly with age from early adolescence, peaks at young adulthood, and then decreases (Barrocas et al., 2011; Steinberg, 2008; Willoughby, Good, Adachi, Hamza, & Tavernier, 2014). Among young adults, college students may be particularly

susceptible to engagement in health-risk behaviors and SITBs (e.g., Bruffaerts et al., 2019 O'Malley & Johnston, 2002; Whitlock, Eckenrode, & Silverman, 2006). College counseling centers across the United States have experienced recent increases in both the rates of students seeking mental health services and in the severity of clients' presenting concerns (Brunner et al., 2018; Gallagher & Taylor, 2014). Moreover, national self-report data from college students indicate that rates of engagement in SITBs and use of certain substances (e.g., marijuana) have increased in the past ten years (American College Health Association, 2019; Center for Collegiate Mental Health, 2019). Thus, there is need for research that evaluates risk and protective factors for engagement in maladaptive behaviors in college student populations specifically. Although college students are generally considered to be convenience samples in academic literature, they were the target population for the current study.

Importantly, there is heterogeneity among individuals who engage in health-risk behaviors and SITBs. While these behaviors have the highest general frequency in adolescents and young adults, certain individuals seem more likely to experience negative outcomes from these behaviors than others (e.g., Crone, van Duijvenvoorde, & Peper, 2016; Klonsky & Olino, 2008). Individual differences influence the frequency and risk-level of engagement, and whether individuals develop compulsive dependency on unhealthy behaviors (e.g., O'Neil, Conner, & Kendall, 2011). Engagement in SITBs and health-risk behaviors appears to result from combinations of behavioral, biological, and socioenvironmental factors (Klonsky, May, & Saffer, 2016; Steinberg, 2008; Willoughby et al., 2014). Many behavioral dimensions have been implicated in these outcomes, including emotion dysregulation, emotion regulation strategy deficits, the personality traits sensation seeking, impulsivity, emotional instability (i.e., neuroticism), and conscientiousness (inversely), and other psychological constructs. Notably,

multiple personality and emotion traits tend to cluster in profiles when predicting health-risk behavior engagement (Hakulinen et al., 2015). Thus, personality and emotion dimensions should be accounted for simultaneously when assessing risk and resiliency factors for SITBs and risk-taking behaviors. Health-risk behavior is also likely related to perceived rewards, associated risks, and risk-reward trade-offs (Crone et al., 2016); personality and emotion dimensions may synergistically influence reward anticipation, processing, and valuation of risk-taking behaviors (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Conner, Hellemann, Ritchie, & Noble, 2010; Cooper, Agocha, & Sheldon, 2000; Nigg & Nagel, 2016).

Behavioral endophenotypes can follow paths of equifinality, in which different behavioral profiles predict the same outcome, or multifinality, in which the same behavioral profile contributes to multiple outcomes (Cicchetti & Rogosch, 1996). To date, most research supports the theory of multifinality for different classes of health-risk behaviors and SITBs. Genomic research using polygenic risk methods suggests that overlapping genetic risk factors confer vulnerability to multiple types of substance use (e.g.,Vink et al., 2014). In addition, the same personality traits have predicted engagement in different categories of health-risk behaviors (Caspi et al., 1997; Zuckerman & Kuhlman, 2000). For example, impulsive tendencies during childhood have been associated with subsequent development of a wide range of psychopathological symptoms, and several contextual factors appear to influence how impulsivity influences behavior later in life (Neuhaus & Beauchaine, 2013). There is also evidence for overlapping risk factors and collinearity between many of these behaviors. For example, NSSI (Hamza et al., 2012; Paul et al., 2015) and substance misuse (e.g., Schneider, 2009) have both been identified as salient predictors of subsequent suicidal behavior. However, it is unclear if unique profiles of both personality and emotion dimensions equally predict a

broad range of SITBs and health-risk behaviors. For example, the same combination of behavioral phenotypes may equally predict engagement in substance misuse, risky sexual behavior, NSSI, and suicide attempt, with socioenvironmental factors (e.g., peer exposure to different behaviors) influencing the behaviors in which an individual engages. Alternatively, certain risk factors may be more important for certain behaviors. For example, specific profiles of personality and emotion dysregulation traits may increase likelihood for engagement in only certain types of health-risk and/or self-injurious behavior. While several studies have jointly examined predictors of health-risk behaviors and SITBs (e.g., Prinstein, Boergers, & Spirito, 2001), to my knowledge, no previous research has simultaneously examined these outcome behaviors in relation to personality and emotion dysregulation dimensions. Identifying subgroups of individuals with higher likelihood of engaging in certain versus all types of health-risk behaviors and SITBs may elucidate complex interactions between risk and protective factors for these outcomes.

Personality Dimensions, Health-Risk Behaviors, and SITBs

Sensation seeking, a construct closely related to the personality trait novelty seeking, is a personality dimension that is associated with inclination towards risky and/or new experiences (Zuckerman, 1994, p. 463; Conner, In Prep). Current conceptualizations of sensation seeking include two separate but related constructs: risk seeking, which is propensity towards engaging in high-risk behaviors, and experience seeking, which is the propensity to seek new, unfamiliar experiences (Conner, In Prep.; Conner & Henson, 2011). Sensation seeking has been positively correlated with initial engagement in numerous health-risk behaviors, including, but not limited to, substance misuse (Zuckerman, 2007), heavy episodic alcohol use (Cyders, Flory, Rainer, & Smith, 2009), sexual risk-taking (Hoyle, Fejfar, & Miller, 2000), number of NSSI methods

(Knorr, Jenkins, & Conner, 2013), risky driving (Arnett, 1990, 1992), and criminal behavior (Horvath & Zuckerman, 1993). Although few studies have examined relations between sensation seeking and suicidal behavior, positive associations between sensation seeking and SITBs have been observed (Ortin, Lake, Kleinman, & Gould, 2012), and experience seeking has differentiated subgroups of individuals with ideation who did versus did not attempt suicide (Bolognini et al., 2002). Individuals who are high in sensation seeking seem to perceive higher rewards and fewer negative consequences from engagement in health-risk behaviors (Zuckerman, 2007). Importantly, while sensation seeking has predicted the lifetime presence of numerous risky behaviors, it has been negatively associated with repeated engagement in these activities (Cyders et al., 2009; Smith, Fischer, Cyders, Annus, & Spillane, 2007); for individuals high in sensation seeking, the perceived rewards for different behaviors may decrease when the experience is no longer novel. Thus, other behavioral dimensions are likely involved in repeated and compulsive engagement in health-risk behaviors and SITBs.

Impulsivity is another personality trait that has established associations with increased engagement in risk-taking behavior and SITBs (Klonsky et al., 2016; Whiteside & Lynam, 2001). Generally, impulsivity is defined as the inclination to act rashly without deliberate forethought and to prioritize immediate rewards over long-term goals (Whiteside & Lynam, 2001). Trait impulsivity has high heritability (Lejuez et al., 2010), and it has been positively associated with most types of health-risk behaviors. While sensation seeking predicts the lifetime presence of risk-taking behaviors, impulsivity is typically associated with repeated and more frequent engagement (Belin, Mar, Dalley, Robbins, & Everitt, 2008; Cyders et al., 2009; Dalley, Everitt, & Robbins, 2011). High levels of impulsivity have predicted subsequent compulsive substance use (Belin et al., 2008; Dalley et al., 2011), repeated risky sexual behaviors (Charnigo

et al., 2013; Curry et al., 2018; Zapolski, Cyders, & Smith, 2009), food addiction (Pivarunas & Conner, 2015), compulsive buying (Billieux, Rochat, Rebetez, & Van der Linden, 2008), and recurring NSSI (Glenn & Klonsky, 2010; Lockwood, Daley, Townsend, & Sayal, 2017). Impulsivity has also frequently been conceptualized as a risk factor for suicidal behaviors. Only a subset of individuals who report experiencing ideation have attempted suicide, and impulsivity may distinguish between individuals who ideate only versus ideate and attempt (e.g., Mann, Waternaux, Haas, & Malone, 1999). High levels of impulsivity may increase the likelihood of acting on urges, providing a mechanism for the transition from suicidal ideation to attempt (see review by Klonsky et al., 2016). However, there is debate in the literature about the role of impulsivity in attempted suicide. Some studies report non-significant impulsivity differences between individuals who ideate only versus ideate and attempt (e.g., Klonsky & May, 2010). Further, impulsivity has not always emerged as a salient predictor of attempted suicide (e.g., Anestis, Soberay, Gutierrez, Hernandez, & Joiner, 2014). Nonetheless, individuals who report suicidal ideation and/or attempt(s) appear to have higher levels of trait impulsivity than those who deny lifetime presence of any suicidality, corroborating impulsivity as a clinical correlate of SITBs (Klonsky et al., 2016).

Impulsivity is a heterogeneous dimension that can take multiple forms (Dick et al., 2010). Most frequently, impulsivity is divided into cognitive-based traits, related to initiating behaviors without foresight and struggling to complete tasks, and mood-based traits, which involve rash behavior when experiencing an intense positive or negative emotion (Whiteside & Lynam, 2001). Several studies suggest that mood-driven impulsivity dimensions, referred to as negative and positive urgency, confer higher vulnerability to problematic engagement in health-compromising behaviors than cognitive-based impulsivity dimensions (Anestis, Selby, & Joiner,

2007; Cyders & Smith, 2008; Deckman & DeWall, 2011; Smith et al., 2007; Stautz & Cooper, 2013; Verdejo-Garcia, Bechara, Recknor, & Perez-Garcia, 2007; Zapolski et al., 2009). However, other studies implicate combinations of cognitive and mood-based impulsivity traits in different behavioral outcomes (Bachoo, Bhagwanjee, & Govender, 2013; Billieux et al., 2008; Curry et al., 2018). For example, in a review, mood-based traits were more predictive of lifetime presence of NSSI, while cognitive traits had stronger associations with more frequent NSSI (Lockwood et al., 2017). Thus, specific endophenotypes of impulsivity and other dispositional traits may interact to contribute to discrete outcomes.

There has been some debate about the temporal relations among sensation seeking, impulsivity, and health-risk activities. In some studies, alcohol and/or substance use may have triggered impulsive or sensation seeking behaviors (Ersche, Turton, Pradhan, Bullmore, & Robbins, 2010; Goldstein & Volkow, 2002), while other studies implicate these traits as causally predictive of behavioral outcomes (Dalley et al., 2011; Zuckerman, 2007). For example, impulsivity has predicted subsequent alcohol misuse and shares genetic risk profiles with alcohol and substance dependence (see review by Dick et al., 2010). In addition, there is inconsistency in the literature regarding the relation between sensation seeking and impulsivity. Sensation seeking has been categorized as a sub-dimension of impulsivity (Whiteside & Lynam, 2001). However, these two dimensions have different behavioral components, follow different developmental trajectories, and likely have distinct underlying neural mechanisms (Steinberg et al., 2008). Thus, impulsivity and sensation seeking are assessed as separate constructs in the current study.

In addition to impulsivity and sensation seeking, certain Big Five personality traits have been implicated in propensity towards risk-taking behaviors (Raynor & Levine, 2009; Vollrath, Knoch, & Cassano, 1999). The five-factor model of personality has been replicated in numerous

factor analytic studies to include five dimensions: neuroticism (also referred to as emotional stability), the proneness to experience negative emotions; openness to experience, the tendency to think creatively and enjoy new experiences; agreeableness, the inclination towards cooperation and compassion; extraversion, the tendency to gain energy and positivity from social interactions; and conscientiousness, the propensity towards goal-directed behaviors (Digman, 1990). Though there is some inconsistency in the literature (e.g., Vollrath & Torgersen, 2002), in general, individuals with high scores in neuroticism, openness, and extraversion (except in SITBs), and low scores in conscientiousness and agreeableness seem to engage in more health-risk and self-injurious behaviors (Chioqueta & Stiles, 2005; Cooper et al., 2000; Schmitt, 2004; Schmitt & Shackelford, 2008; Vollrath, Knoch, & Cassano, 1999; Vollrath & Torgersen, 2002; You, Lin, Xu, & Hu, 2016). In addition, Big Five personality dimensions seem to differentially predict engagement in different health-risk behaviors. For example, these traits were more predictive of behaviors associated with rebelliousness than thrill-seeking (Gullone & Moore, 2000). Given more consistent associations between neuroticism and conscientiousness in predicting health-risk behaviors and SITBs in previous literature (e.g., Bogg & Roberts, 2004; Lahey, 2009; Velting, 1999; You et al., 2016), along with parsimony considerations, only these two Big Five dimensions were examined in the present study.

Big Five personality dimensions may also interact with facets of impulsivity and sensation seeking (Cooper et al., 2000; Settles et al., 2012; Trobst, Herbst, Masters, & Costa, 2002). Impulsivity moderated relations between both neuroticism and extraversion and risky behaviors; individuals with higher impulsivity were more likely to engage in health-risk behaviors in response to negative affect if they were high in neuroticism, and in response to positive affect if they were high in extraversion (Cooper et al., 2000). Individuals with high

neuroticism, low conscientiousness, and low agreeableness who had higher impulsive tendencies were also more likely to engage in risky sexual behavior (Trobst et al., 2002). In another study, high scores in negative urgency were associated with high neuroticism, low conscientiousness, and low agreeableness (Settles et al., 2012). Distinct combinations of Big Five, impulsivity, and sensation seeking dimensions may contribute to risk and protective factors for unsafe behaviors.

Emotion Regulation Strategies, Health-Risk Behaviors, and SITBs

Emotion regulation is a set of processes by which an emotional experience is modulated, either automatically without conscious control (referred to as implicit emotion regulation) or through intentional action (referred to as explicit emotion regulation) (Gross, 2015; Gyurak, Gross, & Etkin, 2011). Emotion regulation has an inherently adaptive element in which individuals attempt to shape their emotional experience, often to reduce distress or enhance positive emotions (Beauchaine, 2015; Gross & Barrett, 2011). These processes involve valuation of emotional stimuli as either negative or positive, which leads to activating a goal in response to this valuation (Gross, 2015). Emotion regulation is often studied in the context of emotion regulation strategies, which include behavioral (e.g., changing a situation), affective (e.g., expressive suppression), or cognitive (e.g., re-appraising a situation) methods of attempting to regulate one's emotional experience (Gross, 2015). Numerous strategies have been implicated as risk or resilience factors for psychopathology (Aldao et al., 2010). Depending on when they occur temporally in relation to an internal or external stimulus, emotion regulation strategies can be antecedent-focused, regulating an emotional experience before it has fully developed, or response-focused, in which an emotional experience is regulated after it has fully developed (Gross, 1998; Gross & John, 2003). Antecedent-focused strategies are generally considered more adaptive than response-focused strategies because they can reframe a negative emotional

response before it becomes distressing (Gross, 2001; Gross & John, 2003; Silvers, Buhle, & Oschner, 2012). Importantly, individuals may engage different emotion regulation strategies when modulating responses to approach (e.g., anger) versus avoidance (e.g., fear) emotions, since these two regulatory systems may have distinct underlying mechanisms (Carver, 2006; Fox, Henderson, Perez-Edgar, & White, 2008). In addition, emotion regulation strategies may synergistically influence each other when used in combination (e.g., Lyubomirsky, Tucker, Caldwell, & Berg, 1999), suggesting benefits to examining multiple emotion regulation strategies in research studies. While self-report measures of emotion regulation strategies may be confounded by variance in participants' ability to identify internal emotional experiences, psychometric scales generally measure dispositional tendencies for strategies as opposed to use in specific contexts, making these interpretations more generalizable to behaviors across time (Aldao et al., 2010).

Higher reliance on certain cognitive emotion regulation strategies has been implicated in psychopathology and negative outcomes (Berking et al., 2008; Silvers et al., 2012; Taylor & Liberzon, 2007). While the relative adaptiveness of certain emotion regulation strategies can vary across contexts (Aldao & Nolen-Hoeksema, 2012a, 2012b; Barrett, 2013; Gross, 2015), some strategies have consistently been associated with internalizing and/or externalizing symptoms, mental disorders, and suicidal behaviors (Aldao & Nolen-Hoeksema, 2010; Cole, Michel, & Teti, 1994; Gross & Jazaieri, 2014; Rogers & Joiner, 2017). To date, more literature has examined cognitive emotion regulation strategies in the context of internalizing than externalizing dimensions (Aldao et al., 2010). Self-blame, catastrophizing, rumination, suppression, positive re-appraisal (inversely), and acceptance (inversely) have been significantly associated with depression and anxiety (e.g., Campbell-Sills, Barlow, Brown, & Hofmann, 2006;

Garnefski & Kraaij, 2007, 2012; Garnefski, Teerds, Kraaij, Legerstee, & van den Kommer, 2004; Potthoff et al., 2016; Schafer, Naumann, Holmes, Tuschen-Caffier, & Samson, 2017). In studies with specific focus on externalizing behaviors, rumination has been associated with NSSI, heavy episodic alcohol use, and binge eating (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). When examined as simultaneous predictors, rumination was significantly associated with NSSI, while catastrophizing was not (Selby, Anestis, & Joiner, 2008). Lower utilization of cognitive emotion regulation strategies in general was also associated with higher rates of unprotected sex (Chen, Yao, & Xin, 2018).

Interestingly, strategies that are often considered maladaptive, including rumination, suppression of thoughts and/or emotional expression, and behavioral and experiential avoidance, were more related to psychopathology than the adaptive strategies re-appraisal, acceptance, and problem-solving (Aldao & Nolen-Hoeksema, 2010, 2012b; Aldao et al., 2010). Thus, lack of adaptive strategies may be less harmful than the presence of maladaptive strategies in emotion regulation (Aldao & Nolen-Hoeksema, 2010; Aldao et al., 2010). In a meta-analysis, depression and anxiety diagnoses had stronger associations with broad use of regulation strategies than eating disorders and substance use (Aldao et al., 2010). Cognitive emotion regulation's relation to internalizing versus externalizing behaviors may be different; some externalizing actions may serve as self-soothing methods to regulate high levels of internalizing symptoms, thereby reducing engagement in other strategies (Selby et al., 2008; Selby & Joiner, 2013). For example, disordered eating (Arnow, Kenardy, & Agras, 1995), substance use (O'Neil et al., 2011), and NSSI (Klonsky & Olino, 2008) have all been hypothesized to serve as coping mechanisms for anxiety. Nonetheless, cognitive emotion regulation strategies have been significantly associated with maladaptive behavioral outcomes. However, to my knowledge, no studies have examined

the contributions of multiple cognitive emotion regulation strategies to different types of health-risk behaviors and SITBs.

Emotion Dysregulation, Health-Risk Behaviors, and SITBs

In contrast to emotion regulation, which has an integral goal-oriented component, emotion dysregulation includes affective processes that interfere with healthy emotion regulation (*Oxford Handbook of Emotion Dysregulation*, 2019). Emotion dysregulation is closely related to trait impulsivity and trait anxiety (Beauchaine, 2015), and it encompasses multiple constructs, including heightened emotion reactivity, reduced emotion awareness (alexithymia), inappropriate and/or blunted affect, non-acceptance of emotional responses, prolonged negative emotionality, and limited ability to engage regulatory processes (Cole et al., 1994; Gratz & Roemer, 2004; Macklem, 2008). Dysregulation can involve both over- and under-regulation of emotional processes (Cole et al., 1994). Several studies have reported associations between emotion dysregulation and negative behavioral outcomes, and emotion dysregulation is considered to be a vulnerability factor for a wide range of psychopathologies, including borderline personality disorder (Glenn & Klonsky, 2009), psychosis spectrum disorders (Wallace & Docherty, In Press), and anxiety disorders (Mennin, Heimberg, Turk, & Fresco, 2005; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005), among others (*Oxford Handbook of Emotion Dysregulation*, 2019). Both behavioral (e.g., van Rijn et al., 2011) and physiological (e.g., Weilgus, Aldrich, Mezulis, & Crowell, 2016) measures of emotion dysregulation have predicted subsequent psychopathological symptoms.

In mental health literature, emotion dysregulation has most frequently been associated with SITBs (e.g., Heffer & Willoughby, 2018; Kranzler, Fehling, Anestis, & Selby, 2016; Rajappa, Gallagher, & Miranda, 2012), and NSSI is hypothesized to be used as a coping skill for

dysregulated emotional experiences (Peterson, Freedenthal, Sheldon, & Anderson, 2008). Emotion dysregulation has also been associated with disordered eating behaviors (Brockmeyer et al., 2014; Pivarunas & Conner, 2015), substance misuse (Wilens, Martelon, Anderson, Shelley-Abrahamson, & Biederman, 2013), and risky sexual behavior (Tull, Weiss, Adams, & Gratz, 2012). Emotionally dysregulated individuals may be more likely to experience negative outcomes from SITBs and health-risk behaviors. For example, negative consequences from marijuana use were more prevalent in individuals who reported higher dysregulation (Simons & Carey, 2002). Emotion dysregulation has also mediated relations between adverse life events and subsequent engagement in health-risk behaviors (Peh et al., 2017). Notably, emotion dysregulation is multi-factorial (Gratz & Roemer, 2004). While greater overall emotion dysregulation has been associated with engagement in multiple types of maladaptive behavior, certain emotion dysregulation dimensions have displayed stronger associations with the co-occurrence of SITBs and health-risk behaviors than others (e.g., substance misuse and NSSI; Buckholdt et al., 2015; Gratz & Tull, 2010).

Emotion dysregulation may closely interact with personality dimensions and emotion regulation strategies (Campbell-Sills et al., 2006; Fosatti, Gratz, Maffei, & Borroni, 2013; Velotti & Garafalo, 2015). For example, non-acceptance of negative emotional responses has been associated with increased reliance on suppression, which in turn increases negative emotionality (Campbell-Sills et al., 2006). Jointly examining personality and emotion dysregulation as predictors of mental well-being improved predictive power compared to models that only tested one type of behavioral phenotype (Stanton, Rozek, Stasik-O'Brien, Ellickson-Larew, & Watson, 2016). Nonetheless, few psychopathology studies have examined interactions between emotion dysregulation and personality (e.g., Weiss, Tull, Anestis, & Gratz, 2013), and these interrelations

have been examined even less in health-risk behavior literature (e.g., Conner, Parnes, Pearson, & Marijuana Outcomes Study Team, Under review). While emotion dysregulation constructs have been jointly examined with other behavioral dimensions, their connections with both emotion regulation strategies and personality dimensions in the context of different health-risk behaviors are unclear.

Relative Stability of Personality, Emotion Dysregulation, and Emotion Regulation Dimensions

Personality dimensions have high heritability and present early in development (Jang, Livesley, & Vernon, 1996). While personality dimensions can change over time (Roberts, Walton, & Viechtbauer, 2006), they are considered stable psychological constructs and the magnitude of individual differences between people typically remains consistent across the lifespan (Roberts, Caspi, & Moffitt, 2001). Similar to personality traits, individual differences in emotion dysregulation constructs, many of which overlap with temperament conceptualizations, are considered to be enduring over time (Brown, 2007; Calkins & Keane, 2004; Fracasso, Porges, Lamb, & Rosenberg, 1994; Gratz & Roemer, 2004; Rettew & McKee, 2005). Given their relative stability, emotion dysregulation and personality dimensions may synergistically interact in conferring vulnerability to maladaptive internalizing and externalizing behaviors (Stanton et al., 2016).

In contrast, although emotion regulation traits appear to have some genetic liability (Hawn, Overstreet, Stewart, & Amstadter, 2015), emotion regulation strategies seem to be more plastic throughout the lifespan than personality and emotion dysregulation. Skills-based behavioral therapies, including cognitive behavioral therapy (Beck, 2011), acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 1999), and dialectical behavior therapy

(Linehan, 2014) target emotion regulation strategies, and increasing reliance on adaptive strategies can occur in relatively short periods of time (Berking et al., 2008). Thus, cognitive emotion regulation strategies appear more amenable to change across the lifespan, and more stable, trait-based constructs may influence how easily and effectively individuals can employ different strategies. Thus, reliance on different emotion regulation strategies may vary across personality and emotion dysregulation profiles, and these more stable traits may influence how effective different emotion regulation strategies are at reducing maladaptive behaviors.

Current Study

Personality, emotion dysregulation, and emotion regulation strategies have all been implicated in health-risk and self-injurious behaviors, and there is heterogeneity among individuals who engage in these behaviors. However, personality and emotion dysregulation dimensions have not been jointly assessed to evaluate behavioral multifinality and equifinality across different types of health-risk behaviors and SITBs. In addition, interaction effects between emotion regulation strategies, emotion dysregulation, and personality have not been examined in the context of health-risk behaviors and SITBs. The current study aimed to (1) identify distinct subgroups of individuals based on multiple personality and emotion dysregulation dimensions, (2) examine how reliance on different emotion regulation strategies and engagement in different forms of SITBs and health-risk behaviors vary across discerned subgroups, and (3) examine subgroup membership as a potential moderator of the relations between emotion regulation strategies and outcome behaviors. Based on previous literature, three hypotheses were tested.

Hypothesis 1: Distinct classes of personality and emotion dysregulation dimensions would be identified.

Hypothesis 2: Discerned classes of personality and emotion dysregulation dimensions would differentially predict reliance on emotion regulation strategies and engagement in health-risk behaviors and SITBs. Specifically, I hypothesized that classes of individuals with higher levels of emotion dysregulation, impulsivity, sensation seeking, and neuroticism, and lower levels of conscientiousness would (a) have greater likelihood of reporting engagement in SITBs and health-risk behaviors and (b) report higher reliance on maladaptive strategies and lower reliance on adaptive emotion regulation strategies.

Hypothesis 3: Emotion regulation strategies would differentially predict engagement in SITBs and health-risk behaviors, and these relations would be moderated by class membership.

Hypothesis 3a: Since psychopathology literature suggests that adaptive strategies are less influential than maladaptive strategies (e.g., Aldao & Nolen-Hoeksema, 2010; Aldao et al., 2010), I hypothesized that higher reliance on maladaptive strategies would positively predict engagement in SITBs and health-risk behaviors to a greater degree than adaptive strategies negatively predicted these outcomes.

Hypothesis 3b: Across classes, I hypothesized that subgroups with higher levels of emotion dysregulation, impulsivity, sensation seeking, and neuroticism, and lower levels of conscientiousness would display (a) larger positive effects of maladaptive emotion regulation strategies on outcome behaviors, and (b) smaller negative effects of adaptive strategies on outcome behaviors.

Testing these hypotheses explicates complex relations among personality dimensions, emotion dysregulation, and emotion regulation strategies. In addition, these analyses contribute

to literature on how heterogeneity in behavioral phenotypes is related to engagement in different types of SITBs and health-risk behaviors. Evaluating how personality and emotion dysregulation influence relations between emotion regulation strategies and maladaptive behaviors may inform prevention and early-targeted intervention efforts for groups at risk for developing dependence on health-risk behaviors and SITBs.

METHODS

Participants and Procedures

Undergraduate students at a Colorado university (N = 1007) completed a cross-sectional, online survey that included several measures of personality, emotion dysregulation, emotion regulation strategies, and self-injurious and health-risk behavior engagement. Participants were randomly sampled from introductory or research methods psychology courses in the Fall semester of 2018 and received research credit for their participation. Study inclusion criteria included fluency in English and being at least 18 years old. Self-identified sample characteristics are presented in Table 1. The survey was completed in a computer lab that was supervised by trained research assistants and included six computers; each individual computer station had privacy in order to promote participants' level of comfort in responding honestly to survey questions. In total, the survey took approximately 60 minutes to complete.

Table 1. Self-reported sample characteristics

Identity	%
Female sex identity ("do not wish to respond")	64.5 (0.4)
Female gender identity (non-binary)	64.2 (1.4)
Heterosexual	85.3
Race	
American Indian or Alaska Native	1.3
Asian	4.4
Black or African American	1.8
Native Hawaiian or Other Pacific Islander	0.1
White	82.2
Multiracial	7.1
"Do not wish to respond"	3.2
Ethnicity	
Hispanic or Latino	19.3
Not Hispanic or Latino	78.2
"Do not wish to respond"	2.5
Mean age in years (± *SD*)	19.48 (2.14)

Measures

Personality dimensions.

Sensation seeking was measured with the Sensation Seeking Personality Type Scale (SSPT; Conner, In Prep.; Conner & Henson, 2011). This 10-item scale measures two distinct constructs of sensation seeking, both of which had acceptable to good internal consistency in these data: Experience Seeking (five items; Cronbach's $\alpha = 0.77$) and Risk Seeking (five items; Cronbach's $\alpha = 0.86$). All SSPT questions were assessed on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The Experience Seeking subscale measures participants' inclination to seek novel experiences (e.g., "'I think it is important to try as many new things as I can"). The Risk Seeking subscale assesses participants' inclination towards physical, psychological, legal, and/or social risks (e.g. "I do things even if I know that doing them will get me in trouble").

Four dimensions of impulsivity were measured with the Negative Urgency, Lack of Premeditation, Lack of Perseverance, Sensation Seeking, and Positive Urgency Impulsive Behavior scale (UPPS-P; Cyders et al., 2007; Whiteside & Lynam, 2001). All UPPS-P subscales have demonstrated good psychometric properties (Cyders et al., 2007; Whiteside & Lynam, 2001) and internal consistency was good to excellent for each subscale. For each item, participants indicated how much they believe a statement applies to them using a 4-point Likert scale, where 1 = "agree strongly" and 4 = "disagree strongly." The Negative Urgency subscale of the UPPS-P measures the tendency for strong impulses when experiencing negative emotion (12 items; Cronbach's $\alpha = 0.88$; e.g., "When I feel rejected, I will often say things that I later regret"). In contrast, the Positive Urgency subscale assesses the tendency towards uninhibited behavior while experiencing positive emotion (14 items; Cronbach's $\alpha = 0.91$; e.g., "When I am

very happy, I can't seem to stop myself from doing things that can have bad consequences"). Lack of Premeditation measures the inclination to neglect consideration of consequences before engaging in a behavior (11 items; Cronbach's $\alpha = 0.83$; e.g., "I usually think carefully before doing anything"). The Lack of Perseverance subscale measures participants' ability to stay focused on tasks that are long, challenging, and/or boring (10 items; Cronbach's $\alpha = 0.85$; e.g., "I finish what I start"). While the UPPS-P also includes a sensation seeking subscale, I used the SSPT for this trait instead; sensation seeking is conceptualized as distinct from the different forms of impulsivity (see introduction), and the SSPT is considered to have superior construct validity.

Two Big Five personality dimensions, Conscientiousness and Emotional Stability (Neuroticism), were assessed with the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003). The TIPI includes five two-item subscales, each of which corresponds to one Big Five personality trait. Each question stems from "I see myself as" followed by a pair of trait descriptors ("anxious, easily upset" and "calm, emotionally stable" for Emotional Stability and "dependable, self-disciplined" and "disorganized, careless" for Conscientiousness). Participants responded on a 7-point Likert scale in which 1 = "disagree strongly" and 7 = "agree strongly." The TIPI is designed to be a very brief measure of personality that emphasizes content validity over reliability; internal consistency values for the TIPI were low in these data, but this was expected given the use of two items to capture entire personality dimensions (Conscientiousness Cronbach's $\alpha = 0.50$; Emotional Stability Cronbach's $\alpha = 0.69$; Gosling et al., 2003). Despite its small number of items, this scale has demonstrated adequate test-retest reliability (mean $r = 0.72$) and its convergent correlations with other Big Five measures range from 0.65 to 0.87 (Gosling et al., 2003).

Emotion dysregulation.

Emotion dysregulation dimensions were measured with the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a 36-item measure that includes subscales for six distinct facets of emotion dysregulation. All questions in the DERS ask participants to respond to statements on a 5-point Likert scale, in which 1 = "almost never" and 5 = "almost always." Internal consistency values for the DERS ranged from good to excellent in this sample. Lack of Emotional Awareness measures participants' inclination to acknowledge their emotional experience (6 items; Cronbach's $\alpha = 0.84$; e.g., "I pay attention to how I feel"). Lack of Emotional Clarity assesses one's ability to identify which emotions they experience (5 items; Cronbach's $\alpha = 0.85$; e.g., "I have no idea how I am feeling"). The Non-Acceptance of Emotional Responses subscale measures the tendency to reject and/or have negative emotional reactions to distress (6 items; Cronbach's $\alpha = 0.91$; e.g., "When I'm upset, I feel ashamed with myself for feeling that way"). Difficulties Engaging in Goal-Directed Behavior measures difficulty completing tasks and concentrating while experiencing emotional distress (5 items; Cronbach's $\alpha = 0.89$; e.g., "When I'm upset, I have difficulty getting work done"). The Impulse Control Difficulties subscale asks questions about disinhibited behaviors while experiencing emotional distress (6 items; Cronbach's $\alpha = 0.88$; "When I'm upset, I become out of control"). Limited Access to Emotion Regulation Strategies includes items about self-efficacy for regulating emotions while distressed (8 items; Cronbach's $\alpha = 0.91$; e.g., "When I'm upset, I believe that wallowing in it is all I can do"). Importantly, this subscale does not explicitly measure types of regulation strategies.

Emotion regulation strategies.

Participants' reliance on nine different cognitive emotion regulation strategies was assessed with the 36-item Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski & Kraaij, 2007; Garnefski, Kraaij, & Spinhoven, 2001). Questions were assessed on a 5-point Likert scale ranging from 1 = "almost never" to 5 = "almost always." For each item, participants indicated how frequently the statement applied to them after or while experiencing a "stressful or threatening" event (Garnefski, Kraaij, & Spinhoven, 2002); the CERQ aims to measure responses to anxiety situations, and may therefore provide a more accurate representation of emotion regulation tendencies for avoidance emotions than for approach emotions (see introduction). The CERQ has good factorial validity and its psychometric properties have been tested in adolescent (Garnefski et al., 2001) and adult (Garnefski & Kraaij, 2007) samples. CERQ internal consistency values in these data ranged from acceptable to good. All nine subscales of the CERQ include four items. The Self-blame subscale measures the tendency blame oneself for negative experiences (Cronbach's $\alpha = 0.82$; e.g., "I feel that I am the one to blame for it"). Blaming Others refers to blaming other people and/or the environment for negative experiences (Cronbach's $\alpha = 0.75$; e.g., "I feel others are to blame for it"). Catastrophizing measures the tendency to emphasize the negativity of a distressing experience (Cronbach's $\alpha = 0.70$; e.g., "I often think that what I have experienced is the worst that can happen to a person"). The Rumination subscale measures compulsively focusing on the feelings associated with the negative experience (Cronbach's $\alpha = 0.70$; e.g., "I dwell upon the feelings the situation has evoked in me"). Positive Refocusing measures the propensity to think about other, positive things instead of the negative experience (Cronbach's $\alpha = 0.81$; e.g., "I think of something nice instead of what has happened"). The Positive Reappraisal subscale measures participants' tendency to reframe the event in a positive light (Cronbach's $\alpha = 0.86$; e.g., "I think

I can learn something from the situation"). Acceptance gauges thoughts of resigning oneself to what they experienced (Cronbach's $\alpha = 0.79$; e.g., "I think that I must learn to live with it"). Refocus on Planning assesses the frequency of thinking about solution-focused steps to address the negative experience (Cronbach's $\alpha = 0.78$; e.g., "I think about how to change the situation"). Putting into Perspective refers to thoughts of comparing the magnitude of the event to previous experiences and the experiences of others (Cronbach's $\alpha = 0.78$; e.g., "I think that it hasn't been too bad compared to other things").

Health-risk and self-injurious behaviors.

Seven types of health-risk and/or self-injurious behaviors were examined as outcome variables: having engaged in NSSI multiple times, lifetime presence of serious suicidal ideation, lifetime presence of attempting suicide, past 6-month engagement in daily disordered eating behaviors, past 12-month engagement in unprotected sexual intercourse, past 30-day heavy alcohol use, and lifetime presence of using illicit substances that are relatively uncommon in college student samples. All behavioral outcome variables were binary.

NSSI was assessed with the Form and Function of Self-Injury Scale (FAFSI; Jenkins, Conner, McCloskey, & Alloy, Submitted), a measure that includes lifetime prevalence, age at onset, frequency, and recency of 12 types of self-injurious behavior: cutting, burning, scratching or abrading skin to draw blood, skin-carving, swallowing poisonous and/or dangerous substances, pinching, biting, hair-pulling, banging a body part against a hard object, hitting or punching, poking a body part with a sharp object, inserting objects under finger/toenails or skin, and an open text-entry "other" option. The FAFSI has previously demonstrated good internal consistency (Cronbach's $\alpha = 0.83$; Jenkins et al., Submitted). One FAFSI item was used in these analyses: "how many times in your life have you hurt yourself on purpose?" Participants who

reported having engaged in NSSI more than one time were coded as 1, while participants who reported engaging in NSSI once or never were coded as 0. This outcome was selected because engaging in NSSI multiple times is often indicative of more severe distress and NSSI behavior (Nock & Prinstein, 2004; Brunner et al., 2007).

Lifetime presence of serious suicidal ideation was measured with the item "have you ever seriously considered taking your own life?" Participants who responded "yes, within the last year" or "yes, more than a year ago" were coded as 1, while those who selected "no, never" were coded as 0.

Lifetime presence of attempted suicide was assessed with the question "have you ever attempted to take your own life?" Responses of "yes, within the last year" or "yes, more than a year ago" were coded as 1 while participants who responded "no, never" were coded as 0.

Disordered eating was measured with the Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982). The EAT-26 is a 38-item measure that is designed to screen individuals for risk of an eating disorder; while the scale alone cannot be used to assign diagnoses, high scores indicate that individuals would likely benefit from consulting with a mental health and/or medical professional. The EAT-26 has demonstrated good psychometric properties (Garner et al., 1982; Mintz & O'Halloran, 2000). The disordered eating variable was computed from three behavioral questions in Part C of the EAT-26: "In the past six months have you: (A) gone on eating binges where you feel that you may not be able to stop?, (B) ever made yourself sick (vomited) to control your weight or shape?, and (C) ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?" Participants responded on a 6-point Likert scale in which 0 = "never" and 6 = "once a day or more." Participants were coded as 1 if

they reported engaging in daily disordered eating in the past 6-months (i.e., responded 6 to any of these three items), and 0 if they did not.

Self-reported engagement in substance use and risky sexual behavior was measured with the Risky Behavior Inventory (RBI; Conner, In Prep.). The RBI assesses lifetime history of a wide variety of health-risk behaviors, as well as the frequency, recency, and extent of engaging in each endorsed behavior.

Risky sexual behavior was assessed with the items "how many times in the last 12 months have you had unprotected vaginal intercourse?" and "how many times in the last 12 months have you had unprotected anal intercourse?" Participants who reported engaging in any past 12-month unprotected vaginal or anal intercourse were coded as 1, while individuals who denied these behaviors were coded as 0. Prior to completing these items, participants were provided with the following definitions for unprotected sex: "For females, unprotected sex involves engaging in sexual acts or behavior without the use of a condom AND also without the use of hormonal contraception (i.e., birth control pills, the patch, the ring, IUD, etc.). For males, unprotected sex involves engaging in sexual acts or behavior without the use of a condom AND also without the knowledge of your partner's use of hormonal contraception (i.e. birth control pills, the patch, the ring, IUD, etc.); put another way, this means having no protection from pregnancy or sexually transmitted infection (STI)."

Heavy alcohol use was measured with the item "in the past 30 days, how many times have you consumed five or more drinks (if you are male) or four or more drinks (if you are female) on one drinking occasion?" These levels of alcohol consumption define criteria for binge drinking, and binge drinking five or more days within a 30-day period constitutes "heavy alcohol use" (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2019a). Participants who

reported binge drinking five or more times in the past month were coded as 1, while participants who reported less frequent or no past 30-day binge drinking were coded as 0.

The substance use variable was adapted from the items “have you ever used: cigarettes, tobacco in a non-cigarette form, electronic cigarettes, marijuana, ecstasy (i.e., MDMA, X, MDA, Molly, rolls, etc.), hallucinogens (i.e., acid, LSD, "magic mushrooms", psilocybin, DMT, mescaline, peyote, 2CI, 2CB, etc.), ketamine/special K, heroin, pills/prescription drugs not for medical reasons but to get high, cocaine, crack, methamphetamine (i.e., meth, crystal ice, crank, ice, etc.), inhalants or huffed anything in order to get high (e.g. "whip-its" nitrous, poppers, freon, glue, gasoline, paint, nitrates, paint thinner, spray cans, etc.), or a substance not yet mentioned to get high? (text entry for ‘please specify other substance’).” Participants were coded as 1 if they reported having ever recreationally used ketamine, heroin, pills/prescription drugs, cocaine, crack, methamphetamine, inhalants, or a substance not listed in the survey. Participants were coded as 0 if they denied lifetime use of these substances. Alcohol, marijuana, tobacco, hallucinogens, and ecstasy were excluded from this outcome variable because, although they can have serious negative health effects (e.g., Talhout et al., 2011), these substances have relatively high use prevalence among college students, both nationally (Johnston et al., 2016; Lipari & Jean-Francois, 2016) and in the current sample (88.6% reported alcohol use, 65.6% reported marijuana use, 50.5% reported tobacco use, 16.4% reported hallucinogen use, and 9.6% reported ecstasy use). Moreover, these less commonly used substances have been associated with more severe substance use and adverse health outcomes (e.g., Degenhardt & Hall, 2012).

Statistical Analysis

All analyses were completed in R version 3.5.0 (R Core Team, 2018) and MPlus version 8.0 (Muthén & Muthén, 1998-2018). Participants who completed less than 60% of the survey

battery were excluded from analyses (n = 16). The internal consistency of each psychometric subscale was measured with Cronbach's α values using the psych package (Revelle, 2017). Prior to analyses, missing data mechanisms were assessed using the BaylorEdPsych package (Beaujean, 2012) and data were determined to be Missing Completely at Random (MCAR; p = 0.793). Descriptive statistics and distributions were examined for all variables in order to test assumptions of normality. Since engagement in health-risk behaviors and SITBs was relatively rare in this sample, binary outcomes were unbalanced and models in MPlus were specified using Maximum Likelihood Estimation with Robust Standard Errors and Chi-square (MLR; Muthén & Muthén, 1998-2018). MLR is advised when data are MCAR and include non-normal distributions (Muthén & Asparouhov, 2002). Given the number of statistical tests performed, alpha was set to $p < 0.01$ in order to minimize risk for Type I errors.

Hypothesis 1: Latent class analysis of personality and emotion dysregulation dimensions.

To test hypothesis 1, Latent Profile Analysis (LPA), a type of Latent Class Analysis (LCA), was used to discern latent classes of participants based on measured personality and emotion dysregulation dimensions. Subscales of the SSPT, UPP-P, TIPI, and DERS were tested as class indicators (Figure 1). LPA is a type of mixture model that aims to classify participants into classes based on responses to multivariate continuous data. In addition, LPA and all LCA's are person-centered analyses. Compared to variable-centered analyses that focus on relations between variables, person-centered analyses evaluate how variables group across individuals. Though person- and variable-centered methods often complement one another, person-centered models are favorable when the target population is assumed to be heterogeneous with respect to the relations among variables (Masyn, 2013). Individuals were grouped into classes based on

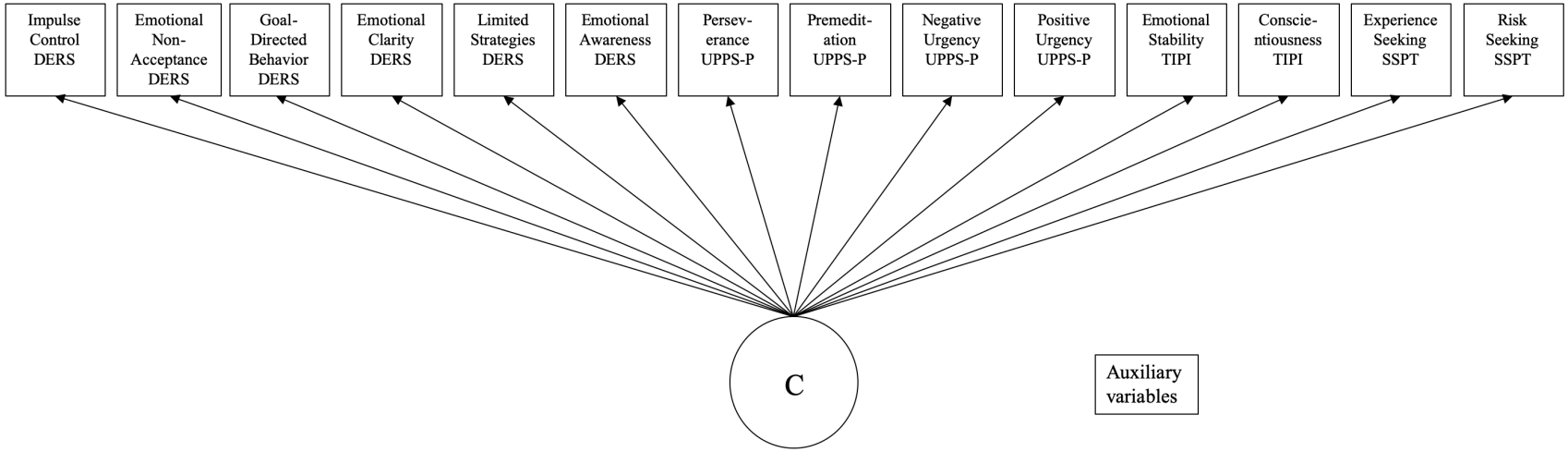

Figure 1. Latent profile analysis of emotion dysregulation and personality dimensions. Class indicators were subscales of the DERS, UPPS-P, TIPI, and SSPT. Self-injurious and health-risk behaviors, emotion regulation strategies, and sex were included as auxiliary variables.

probability; participants were grouped with other individuals that had similar responses to each personality and emotion dysregulation subscale. To identify the best-fitting model, I ran one-through five-class models in MPlus. Model fit for each class model was assessed with four fit indices: probabilities for each participants' most likely latent class membership (Average Latent Class Probability; ALCP), corrected Bayesian Information Criterion (BIC), Lo-Mendell-Rubin likelihood ratio test of model fit (LMR), and entropy values (Muthén & Muthén, 2000). For ALCP, values ≥ 0.90 are indicative of good class fit. Entropy values measure the model's classification quality, and higher values (on a scale of 0 to 1) are more favorable. Lower corrected BIC values are preferred, as this indicates a more parsimonious model with fewer latent classes. In contrast, LMR ensures that the model is not too parsimonious by comparing the model with *k* classes to the next model with *k*-1 classes; a significant LMR p-value suggests that the *k* class model is a better fit than the *k*-1 model.

Confirmatory factor analysis of emotion regulation strategies.

Before testing hypothesis 2, the nine cognitive emotion regulation strategies measured by the CERQ were grouped into two variables: adaptive and maladaptive strategies. Previous studies have demonstrated associations between certain CERQ subscales and negative mental health and behavioral outcomes (see introduction). Confirmatory Factor Analysis (CFA) was employed to test if an underlying structure existed between adaptive and maladaptive strategies in the current data. Factor analysis aims to uncover underlying latent structure that may cause some variables to covary. Scores on each of the nine CERQ subscales were evaluated with CFA using maximum likelihood extraction and oblique, geomin rotation (Costello & Osborne, 2005). Oblique rotation is preferred when factors are expected to correlate (Field, Miles, & Field, 2012). Factor loadings represent the strength of the relation between each individual variable (CERQ

subscale score) and its underlying factor. While factor loadings ≥ 0.162 are viewed as significant for sample sizes of 1000 or more (Field et al., 2012), in general, loadings ≥ 0.71 are considered excellent, ≥ 0.55 are considered good, and loadings ≤ 0.32 are considered poor (Comrey & Lee, 1992). When conducting the CFA, the variance on the first item was freed and the factor variance was then fixed at one; this allowed the first item to freely load onto the assigned factor.

Based on mental health and behavioral associations reported in previous literature, I tested the following CFA: Positive Refocusing, Positive Reappraisal, Acceptance, Refocus on Planning, and Putting into Perspective loading onto adaptive strategies (Factor 1), and Catastrophizing, Rumination, Blaming Others, and Self-Blame loading onto maladaptive strategies (Factor 2) (Garnefski et al., 2001; Garnefski et al., 2004, Garnefski & Kraaij, 2007, 2012). Three fit indices were used to evaluate model fit for the CFA: Model χ^2, Standardized Root Mean Square Residual (SRMR), and Comparative Fit Index (CFI). For the χ^2 test, good model fit is indicated when the ratio of the χ^2 statistic to degrees of freedom is less than two (Tabachnick & Fidell, 2013, p. 755), and a non-significant test statistic denotes a perfect model fit to the sample (Hu & Bentler, 1999). The χ^2 test is sensitive to sample size; the likelihood of having a significant test statistic increases with sample size, such that poor models with small sample sizes can produce non-significant χ^2 statistics, while good-fitting models with large samples can have significant χ^2 tests. According to Hu and Bentler (1999), values ≥ 0.90 indicate good fit and values ≥ 0.95 indicate excellent fit for CFI, and values < 0.08 represent good fit for SRMR (Hu & Bentler, 1999; Tabachnick & Fidell, 2013, p. 725). Using the factor structure from the CFA, two continuous variables for emotion regulation strategies were created by averaging scores of their respective subscales: adaptive strategies and maladaptive strategies.

Hypothesis 2: Examining distal outcome variables between latent classes.

To test hypothesis 2, the seven health-risk and self-injurious behavior variables, the two adaptive and maladaptive emotion regulation strategy variables, and self-reported sex identity were tested as distal auxiliary outcome variables in the LPA described above (Figure 1). The goal of this analysis was to determine whether discerned classes of personality and emotion dysregulation dimensions differentially predicted these outcomes (i.e., whether certain outcomes were more likely for certain classes of participants). The auxiliary variable method employed depended on the outcome variable. The 3-step BCH method was used for the two continuous emotion regulation strategy variables (adaptive and maladaptive strategies). The BCH method is preferred when an auxiliary variable is continuous, and when the variance of the auxiliary outcome may vary across classes (Asparouhov & Muthén, 2014; Asparouhov & Muthén, 2018; Vermunt, 2010). The DCAT approach was used for sex and the binary behavioral outcome variables; DCAT is preferred when auxiliary variables are categorical (Lanza et al., 2013; Asparouhov & Muthén, 2014; Asparouhov & Muthén, 2018). Both the BCH and DCAT methods are designed to protect against class membership shifts in response to the inclusion of auxiliary variables (Asparouhov & Muthén, 2018). For all auxiliary variables, pairwise and global comparisons across classes were conducted with Wald χ^2 tests.

Hypothesis 3: Evaluating latent class membership as a moderator of the relations between distal outcome variables.

To test hypothesis 3, class membership from the LPA was evaluated as a moderator of the relations between emotion regulation strategies and behavioral outcomes (Figure 2). Logistic regressions within each latent class were estimated in MPlus using saved BCH weights according to Asparouhov & Muthen (2018) and McLarnon and O'Neill (2018). Class

membership was not observed or assigned directly, but was inferred by the original LPA. This model is similar to a multigroup analysis, in which the explanatory power of causal models are compared across different, categorical groups of participants. Significant interaction effects are indicated if the estimates for each logistic regression significantly differ between classes, as determined through pairwise comparisons of unstandardized regression coefficients (i.e., simple slopes). Within each class, fourteen binary logistic regressions were conducted: the adaptive and maladaptive emotion regulation strategy scores were regressed onto each of the seven self-injurious and health-risk behavior outcomes. Models were all tested one at a time. In addition, binary logistic regressions between the adaptive and maladaptive emotion regulation strategy variables and each behavioral outcome were tested in the full sample in RStudio in order to examine global versus within-class effects.

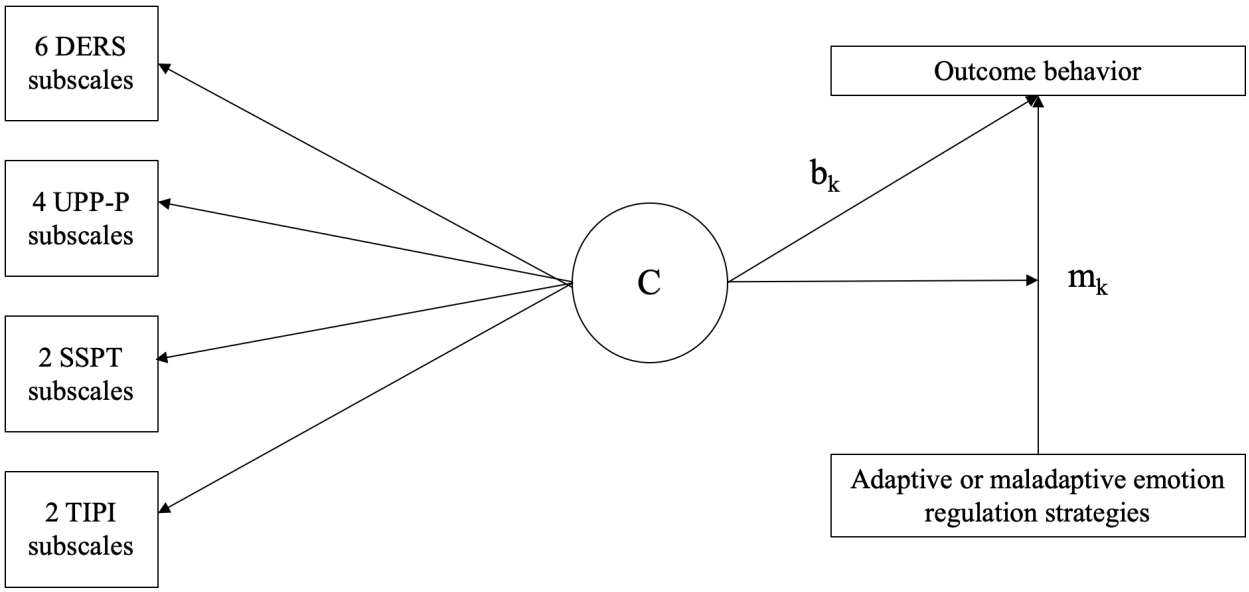

Figure 2. Model with class membership moderating the relations between emotion regulation strategies and outcome behaviors. C represents class membership weights derived from the LPA. k values represent coefficients that vary between classes. m_k and b_k represent the slopes and intercepts for the regressions of outcome behaviors on emotion regulation strategies that vary across classes, respectively (McLarnon & O'Neill, 2018).

RESULTS

Descriptive statistics and univariate distributions for each psychometric subscale score are presented in Table 2, and all met assumptions of normality. Table 3 includes frequency statistics for the seven behavioral binary outcome variables.

Table 2. Descriptive statistics for all psychometric scales

Measure	*M* (*SD*)	Skew	Kurtosis
CERQ			
Acceptance	10.23 (2.75)	-0.01	-0.86
Catastrophizing	8.25 (3.11)	0.79	0.46
Other-Blame	7.51 (2.32)	0.82	1.92
Positive Reappraisal	13.53 (3.94)	-0.13	-0.84
Positive Refocusing	9.84 (3.49)	0.54	-0.08
Putting into Perspective	13.48 (3.61)	-0.02	-0.76
Refocus on Planning	12.67 (3.55)	0.03	-0.66
Rumination	5.33 (1.96)	0.51	-0.32
Self-Blame	10.96 (3.58)	0.69	-0.23
DERS			
Difficulties Engaging in Goal-Directed Behavior	14.54 (4.84)	0.20	-0.79
Impulse Control Difficulties	10.94 (4.48)	1.30	1.79
Lack of Emotional Awareness	14.76 (4.85)	0.49	-0.15
Lack of Emotional Clarity	11.15 (3.81)	0.79	0.37
Limited Access to Emotion Regulation Strategies	16.82 (6.78)	0.89	0.23
Non-Acceptance of Emotional Responses	13.25 (5.77)	0.91	0.09
UPPS-P			
Lack of Perseverance	19.20 (4.92)	0.28	-0.46
Lack of Premeditation	20.94 (4.85)	0.40	0.36
Negative Urgency	27.58 (6.75)	0.05	-0.42
Positive Urgency	27.15 (7.53)	0.50	-0.38
SSPT			
Experience Seeking	13.40 (4.23)	-0.48	0.25
Risk Seeking	19.55 (3.14)	0.11	-0.42
TIPI			
Conscientiousness	10.71 (2.32)	-0.57	-0.20
Emotional Stability	8.78 (2.90)	-0.14	-0.82

Table 3. Frequency statistics for binary health-risk and self-injurious behavior variables

Item	*N* yes (%)	*N* no (%)
Engaged in NSSI multiple times	277 (27.6)	726 (72.4)
Lifetime presence of serious suicidal ideation	269 (26.8)	736 (73.2)
Lifetime presence of suicide attempt	120 (12.0)	882 (88.0)
Lifetime presence of uncommon illicit substance use	223 (23.5)	726 (76.5)
Past 6-month daily disordered eating	217 (22.0)	771 (78.0)
Past 12-month unprotected sexual intercourse	355 (35.7)	639 (64.3)
Past 30-day heavy alcohol use	214 (21.4)	786 (78.6)

Note. NSSI = non-suicidal self-injury.

Hypothesis 1: Latent Class Analysis of Personality and Emotion Dysregulation Dimensions

Fit statistics for the 1- through 5- class models are presented in Table 4. The 3-class solution was selected as the best-fitting model based on multiple fit indices and theoretical considerations. Although the LMR test suggested that the 4-class model was an improvement to the 3-class solution (indicated by a significant *p* value), higher ALCP, the parsimony principle (Maysn, 2013), and the amount of overlap between indicators across classes (i.e., more differentiation between indicators in the 3-class model) (Muthén, 2003; Morgan, 2015; Nylund-Gibson & Choi, 2018) suggested that the 3-class solution was preferred. The percent of participants with most likely membership for each class was relatively even in the 3-class model, with 31.7% of the sample in class 1, 46.2% in class 2, and 22.1% in class 3 (Table 4). The estimated means and standard deviations for all indicators are presented in Table 5, and Figure 3 shows the means for each indicator by class. Cohen's *d* effect sizes for the differences in the means of each indicator between classes are presented in Table 6 and Figure 4. Classes were primarily discerned by emotion dysregulation, Negative and Positive Urgency, and Emotional Stability (Figure 3), and effect sizes for these indicators between classes were generally large. Effect sizes for Risk Seeking, Conscientiousness, and Emotional Stability ranged from small to large. The Experience Seeking subscale of the SSPT appeared to make the smallest contribution

Table 4. Latent profile analysis model fit statistics for the 1- through 5- class models

Model	1-Class	2-Class	**3-Class**	4-Class	5-Class
LMR		< 0.0001	**< 0.0001**	0.0001	0.6424
BIC	79646.114	76801.033	**75986.133**	75526.653	75240.995
Entropy		0.892	**0.842**	0.850	0.862
ALCP		0.957-0.974	**0.913-0.958**	0.882-0.947	0.882-0.939
N Per Class					
Class 1	1007	664	**319**	335	134
Class 2		343	**465**	336	348
Class 3			**223**	158	311
Class 4				178	156
Class 5					58

Table 5. Estimated indicator means and standard deviations for each class

	Class 1: Emotionally Regulated		Class 2: Urgency Inclined		Class 3: Dysregulation Inclined	
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*
DERS						
Difficulties Engaging in Goal-Directed Behavior	10.82	3.73	14.84	3.73	19.30	3.73
Impulse Control Difficulties	7.76	3.11	10.40	3.11	16.49	3.11
Lack of Emotional Awareness	12.19	4.36	15.00	4.36	17.91	4.36
Lack of Emotional Clarity	8.56	2.91	10.91	2.91	15.30	2.91
Limited Access to Emotion Regulation Strategies	11.53	4.09	15.93	4.09	26.21	4.09
Non-Acceptance of Emotional Responses	9.79	4.42	12.45	4.42	19.80	4.42
UPPS-P						
Lack of Perseverance	15.99	4.27	19.90	4.27	22.40	4.27
Lack of Premeditation	18.97	4.66	21.85	4.66	21.88	4.66
Negative Urgency	20.96	4.62	29.11	4.62	33.90	4.62
Positive Urgency	21.20	6.35	29.10	6.35	31.19	6.35
SSPT						
Experience Seeking	19.87	3.11	19.73	3.11	18.78	3.11
Risk Seeking	11.92	4.11	14.03	4.11	14.26	4.11
TIPI						
Conscientiousness	12.01	2.13	10.32	2.13	9.68	2.13
Emotional Stability	10.80	2.26	8.87	2.26	5.78	2.26

Note. Since this was an LPA (as opposed to a Finite Mixture Model), the variances of the indicators of each class were fixed. For emotional stability, lower values indicate higher levels of neuroticism.

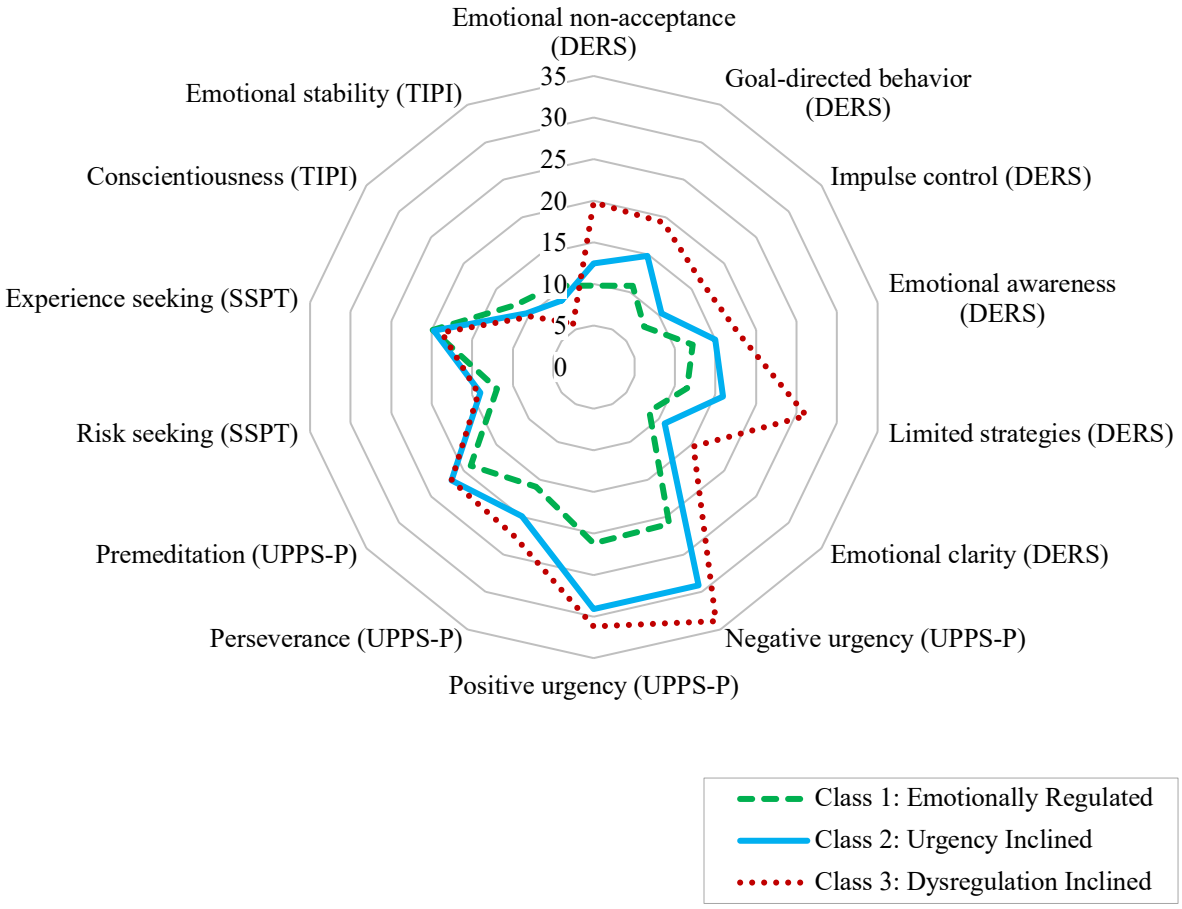

Figure 3. Mean scores for all emotion dysregulation and personality indicators by class. Indicator scores are not standardized across measures.

Table 6. Mean differences and effect sizes for indicators between classes

	Emotionally Regulated vs. Urgency Inclined		Urgency Inclined vs. Dysregulation Inclined		Emotionally Regulated vs. Dysregulation Inclined	
Measure	$M_{difference}$	*Cohen's d*	$M_{difference}$	*Cohen's d*	$M_{difference}$	*Cohen's d*
DERS						
Difficulties Engaging in Goal-Directed Behavior	4.01	1.07	4.47	1.20	8.48	2.27
Impulse Control Difficulties	2.64	0.85	6.09	1.95	8.73	2.80
Lack of Emotional Awareness	2.81	0.64	2.91	0.67	5.72	1.31
Lack of Emotional Clarity	2.35	0.81	4.39	1.51	6.73	2.31
Limited Access to Emotion Regulation Strategies	4.40	1.07	10.28	2.51	14.68	3.58
Non-Acceptance of Emotional Responses	2.66	0.60	7.35	1.66	10.01	2.26
UPPS-P						
Lack of Perseverance	3.91	0.92	2.50	0.58	6.41	1.50
Lack of Premeditation	2.88	0.62	0.03	0.01	2.91	0.62
Negative Urgency	8.15	1.76	4.79	1.04	12.94	2.80
Positive Urgency	7.90	1.24	2.09	0.33	9.99	1.57
SSPT						
Experience Seeking	-0.14	-0.04	-0.96	-0.31	-1.10	-0.35
Risk Seeking	2.11	0.51	0.23	0.06	2.34	0.57
TIPI						
Conscientiousness	-1.68	-0.79	-0.64	-0.30	-2.33	-1.09
Emotional Stability	-1.93	-0.85	-3.09	-1.37	-5.02	-2.22

Note. $M_{difference}$ represents the difference between the indicator means between classes, calculated by subtracting the lower class from the higher class. Cohen's *d* estimates represent effect sizes for mean differences between classes.

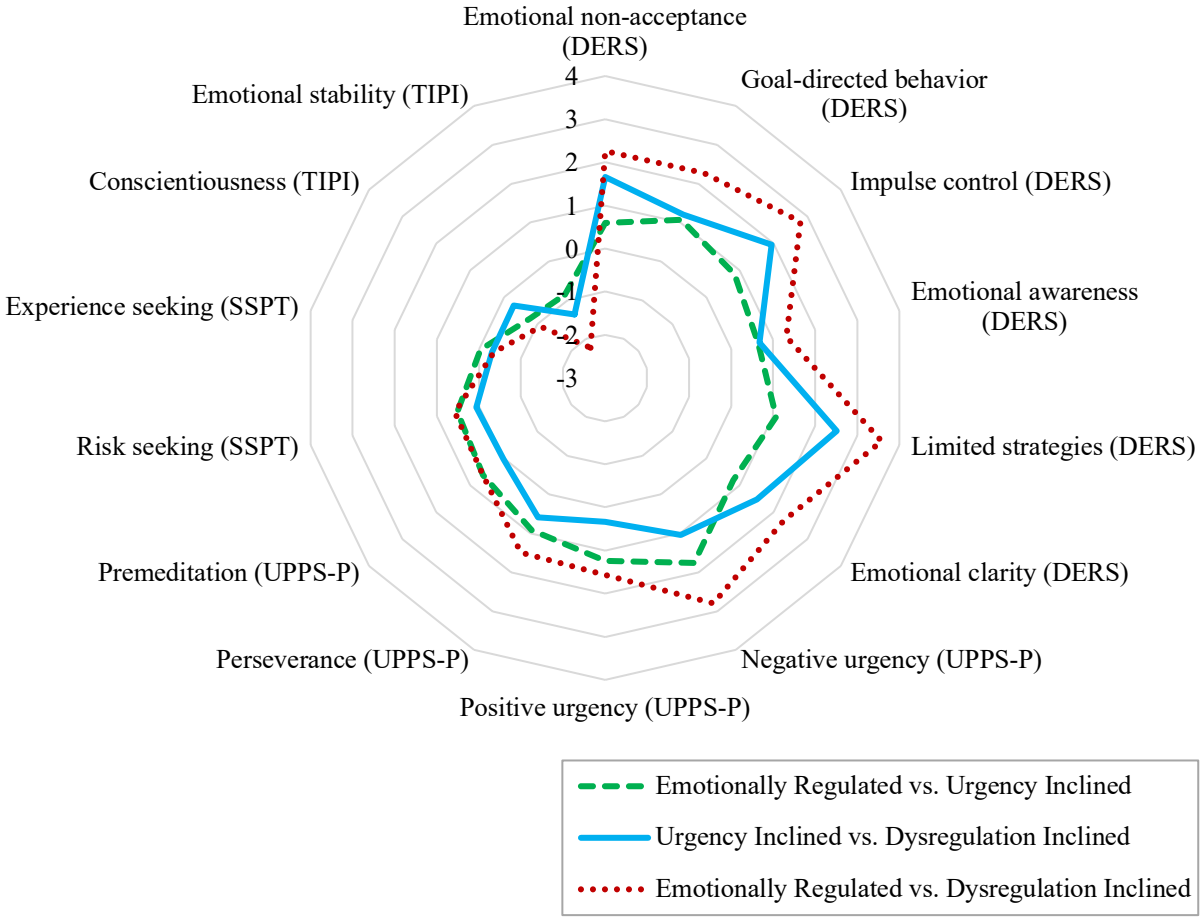

Figure 4. Cohen's *d* estimate effect sizes for mean differences in indicators across classes. Mean differences were calculated by subtracting the lower class from the higher class (i.e., mean scores for Urgency Inclined minus mean scores for Emotionally Regulated, Dysregulation Inclined minus Urgency Inclined, and Dysregulation Inclined minus Emotionally Regulated).

to class discernment.

The first class had comparatively lowest levels of all six emotion dysregulation dimensions, all four impulsivity dimensions, and Risk Seeking, and highest levels of Experience Seeking, Conscientiousness, and Emotional Stability (i.e., lower neuroticism). The second class had middle-range scores on all of the indicators, and displayed largest differences from the other classes in the urgency subscales of the UPPS-P. The third class displayed highest levels of emotion dysregulation, impulsivity, and Risk Seeking, and lowest levels of Experience Seeking, Conscientiousness, and Emotional Stability (i.e., higher neuroticism). Classes were labeled based on the mean differences and effect sizes for each construct between classes. Given lowest values on constructs associated with emotional instability (i.e., emotion dysregulation, neuroticism, and positive and negative urgency; see introduction) and highest levels of conscientiousness, the first class was called "Emotionally Regulated." Participants in the second class were characterized by mid-range scores on these same constructs, but were most discerned from the first class by higher scores in positive and negative urgency. Since this second class appeared to be relatively similar to the ES class, but with increased inclination to respond to intense emotions impulsively, it was labeled " Urgency Inclined." The third class globally displayed highest levels of all of the indicators that have been associated with emotional instability and had the lowest levels of conscientiousness, and was therefore labeled "Dysregulation Inclined."

Confirmatory Factor Analysis of Emotion Regulation Strategies

The CFA supported the decision to group CERQ subscales into two variables: adaptive and maladaptive strategies. Both the CFI and SRMR statistics suggested good model fit: CFI = 0.937 and SRMR = 0.043. The model χ^2 value was 154.481, with $p < 0.005$ and $df = 13$; although this test indicates poor fit, the χ^2 is sensitive to sample size (larger samples are more

likely to produce significant results) and the model was deemed acceptable since both the CFI and SRMR indicated good fit. Standardized factor loadings and explained variance for the CFA items are presented in Table 7, and all factor loadings ranged from acceptable to excellent. The adaptive emotion regulation strategies variable was created by averaging participants' scores on the Positive Reappraisal, Positive Refocusing, Putting into Perspective, and Refocus on Planning subscales. The maladaptive emotion regulation strategies variables was calculated by averaging the Catastrophizing, Rumination, and Self-Blame scores. The Acceptance and Blaming Others CERQ subscales were excluded from analyses since they had substantially lower factor loadings than other subscales (< 0.36) and model fit improved substantially when they were removed.

Table 7. Standardized CFA factor loadings and variance explained for the nine CERQ emotion regulation strategy subscales

Subscale	Loading (*SE*)	R^2
Factor 1: Adaptive strategies		
Positive Reappraisal	0.898 (0.014)	0.807
Positive Refocusing	0.529 (0.026)	0.280
Putting into Perspective	0.690 (0.019)	0.476
Refocus on Planning	0.790 (0.017)	0.624
Factor 2: Maladaptive strategies		
Catastrophizing	0.651 (0.028)	0.424
Rumination	0.807 (0.027)	0.651
Self-blame	0.605 (0.027)	0.366

Hypothesis 2: Examining Distal Outcome Variables Between Latent Classes

Examination of the distal outcome variables across classes indicated that emotion regulation strategies and likelihood of engagement in SITBs and health-risk behaviors significantly differed across classes. Means and standard errors for the adaptive and maladaptive emotion regulation strategy scores across classes are presented in Table 8. Sex and likelihood of engagement in each of the seven outcome behaviors across classes are shown in Table 9. Table 10 presents Wald χ^2 statistics and significance levels for the ten auxiliary variables across classes.

Table 8. Means and standard errors for emotion regulation strategy scores by class

	Class 1: Emotionally Regulated	Class 2: Urgency Inclined	Class 3: Dysregulation Inclined
	M (*SE*)	*M* (*SE*)	*M* (*SE*)
Adaptive emotion regulation strategies	13.978 (0.165)	12.178 (0.151)	10.536 (0.194)
Maladaptive emotion regulation strategies	6.553 (0.103)	8.168 (0.099)	10.473 (0.161)

Table 9. Sex and likelihood of engagement in each outcome behavior across latent classes

	Emotionally Regulated (*N* = 319)		Urgency Inclined (*N* = 465)		Dysregulation Inclined (*N* = 223)	
Outcome	*N* yes (%)	*N* no (%)	*N* yes (%)	*N* no (%)	*N* yes (%)	*N* no (%)
Female sex identity	215 (67.3)	104 (32.7)	272 (58.4)	193 (41.6)	165 (73.9)	58 (26.1)
NSSI	49 (15.3)	270 (84.7)	96 (20.7)	369 (79.3)	133 (59.7)	90 (40.3)
Suicidal ideation	38 (11.9)	281 (88.1)	100 (21.5)	365 (78.5)	132 (59.1)	91 (40.9)
Suicide attempt	17 (5.2)	302 (94.8)	43 (9.2)	422 (90.8)	61 (27.5)	162 (72.5)
Disordered eating	39 (12.1)	280 (87.9)	111 (23.8)	354 (76.2)	74 (33.0)	149 (67.0)
Heavy alcohol use	48 (15.0)	271 (85.0)	125 (26.8)	340 (73.2)	44 (19.7)	179 (80.3)
Substance use	40 (12.5)	279 (87.5)	140 (30.0)	325 (70.0)	58 (25.9)	165 (74.1)
Unprotected sex	104 (32.7)	215 (67.3)	175 (37.6)	290 (62.4)	81 (36.2)	142 (63.8)

Adaptive emotion regulation strategies decreased and maladaptive strategies increased across classes with increasing emotional instability. χ^2 differences in emotion regulation strategies were statistically significant for all class comparisons. Probability of female sex identity was greatest in the Dysregulation Inclined class and lowest in the Urgency Inclined class. This χ^2 statistic was significant between the Urgency Inclined and Dysregulation Inclined classes. Probability of having engaged in NSSI multiple times, lifetime presence of suicidal ideation, lifetime presence of suicide attempt, and past 6-month daily disordered eating all increased across the Emotionally Regulated, Urgency Inclined, and Dysregulation Inclined classes. These differences were statistically significant for NSSI and suicide attempt between the

Table 10. Wald χ^2 statistics and significance for auxiliary variables across latent classes of participants

Outcome	Omnibus test	Emotionally Regulated vs. Urgency Inclined	Urgency Inclined vs. Dysregulation Inclined	Emotionally Regulated vs. Dysregulation Inclined
Female sex identity	**10.746****	2.868	**10.645*****	2.066
NSSI	**113.127*****	2.402	**87.701*****	**101.142*****
Suicidal ideation	**121.423*****	**7.804****	**79.829*****	**116.779*****
Suicide attempt	**39.808*****	3.553	**26.490*****	**39.805*****
Disordered eating	**30.538*****	**12.996*****	**5.077***	**27.408*****
Heavy alcohol use	**9.575****	**9.569****	2.950	1.660
Substance use	**27.132*****	**22.907*****	0.846	**12.017*****
Unprotected sex	1.527	1.437	0.637	0.103
Adaptive emotion regulation strategies	**185.337*****	**56.475*****	**41.790*****	**183.692*****
Maladaptive emotion regulation strategies	**433.225*****	**112.676*****	**422.661*****	**139.509*****

Note. The BCH method was used for the two continuous emotion regulation strategy variables. The DCAT approach was used for sex and the binary behavioral outcome variables. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Urgency Inclined versus Dysregulation Inclined and Emotionally Regulated versus Dysregulation Inclined classes, and in all three class comparisons for suicidal ideation and disordered eating. Probability of having engaged in past 30-day heavy alcohol use, uncommon illicit substance use, and past 12-month unprotected sexual intercourse was highest in the Urgency Inclined class and lowest in the Emotionally Regulated class. χ^2 statistics for class comparisons were significant for heavy alcohol use between the Emotionally Regulated versus Urgency Inclined classes, and for uncommon substance use between the Emotionally Regulated versus Urgency Inclined and Emotionally Regulated versus Dysregulation Inclined classes. Likelihood of engagement in past 12-month unprotected sexual intercourse did not significantly vary across classes.

Hypothesis 3: Evaluating Latent Class Membership as a Moderator of the Relations Between Distal Outcome Variables

Binary logistic regression results for adaptive and maladaptive emotion regulation strategies predicting outcome behaviors, both in the full sample and within each class, are presented in Table 11. In the full sample, higher scores on maladaptive emotion regulation strategies significantly predicted increased odds of having engaged in NSSI, suicidal ideation, suicide attempt, and disordered eating, while higher scores on adaptive strategies predicted significantly lower odds of having engaged in the three SITBs. The effect sizes for each regression coefficient were larger for the maladaptive strategy models than the adaptive strategy models. Compared to regressions conducted in the full sample, few direct effects were significant at $p < 0.01$ within each class, possibly due to power constraints from smaller subsample sizes of each class. Within the Emotionally Unstable class, maladaptive strategies significantly predicted increased odds of suicidal ideation, while adaptive strategies predicted significantly lower odds of suicidal ideation. Difference tests that evaluated class membership as a moderator of the relations between emotion regulation strategies and each outcome behavior are presented in Table 12. These analyses evaluated whether the differences between estimates for class-specific regressions of outcome behaviors on emotion regulation strategies were significantly different from zero. At $p < 0.01$, no difference tests were statistically significant. Thus, there was no evidence of moderation in the current study.

Table 11. Binary logistic regressions for emotion regulation strategies predicting outcome behaviors in the full sample and within each latent class.

	Full Sample				**Class 1: Emotionally Regulated**				**Class 2: Urgency Inclined**				**Class 3: Dysregulation Inclined**			
		95% CI for Odds Ratio				95% CI for Odds Ratio				95% CI for Odds Ratio				95% CI for Odds Ratio		
	B(*SE*)	Lower	OR	Upper	*B*(*SE*)	Lower	OR	Upper	*B*(*SE*)	Lower	OR	Upper	*B*(*SE*)	Lower	OR	Upper
Maladaptive strategies																
NSSI	**0.229*** (0.031)**	**1.183**	**1.257**	**1.338**	-0.051 (0.101)	0.780	0.950	1.157	0.019 (0.064)	0.898	1.019	1.156	0.100 (0.062)	0.978	1.105	1.249
Suicidal ideation	**0.294*** (0.033)**	**1.260**	**1.343**	**1.433**	-0.148 (0.124)	0.676	0.863	1.101	**0.153* (0.069)**	**1.018**	**1.165**	**1.333**	**0.185*** (0.065)**	**1.059**	**1.203**	**1.367**
Suicide attempt	**0.249*** (0.040)**	**1.187**	**1.284**	**1.390**	0.066 (0.158)	0.783	1.068	1.456	0.066 (0.076)	0.921	1.068	1.239	0.121 (0.075)	0.974	1.128	1.307
Disordered eating	**0.131*** (0.032)**	**1.070**	**1.140**	**1.215**	0.111 (0.129)	0.869	1.118	1.438	-0.021 (0.068)	0.857	0.979	1.119	0.078 (0.069)	0.945	1.082	1.238
Heavy alcohol use	0.040 (0.033)	0.975	1.041	1.110	0.044 (0.113)	0.838	1.045	1.305	-0.088 (0.067)	0.804	0.916	1.043	**0.179* (0.080)**	**1.022**	**1.195**	**1.399**
Substance use	-0.012 (0.033)	0.925	0.988	1.054	**-0.375* (0.177)**	**0.486**	**0.688**	**0.974**	-0.124 (0.071)	0.768	0.883	1.015	-0.062 (0.076)	0.809	0.939	1.091
Unprotected sex	-0.022 (0.029)	0.924	0.978	1.035	-0.028 (0.096)	0.806	0.972	1.174	**-0.146* (0.062)**	**0.766**	**0.864**	**0.976**	0.036 (0.067)	0.910	1.037	1.183
Adaptive strategies																
NSSI	**-0.156*** (0.025)**	**0.814**	**0.856**	**0.899**	-0.059 (0.071)	0.820	0.942	1.084	-0.053 (0.052)	0.856	0.948	1.050	-0.089 (0.055)	0.821	0.915	1.020
Suicidal ideation	**-0.169*** (0.026)**	**0.802**	**0.844**	**0.888**	-0.023 (0.081)	0.834	0.977	1.145	-0.029 (0.049)	0.882	0.972	1.070	**-0.158 ** (0.059)**	**0.761**	**0.854**	**0.957**
Suicide attempt	**-0.133*** (0.034)**	**0.818**	**0.875**	**0.936**	-0.094 (0.110)	0.733	0.910	1.129	0.011 (0.077)	0.870	1.011	1.174	-0.056 (0.060)	0.841	0.946	1.064
Disordered eating	**-0.064* (0.026)**	**0.890**	**0.938**	**0.988**	-0.010 (0.086)	0.837	0.990	1.171	0.008 (0.046)	0.922	1.008	1.102	-0.022 (0.061)	0.868	0.979	1.103
Heavy alcohol use	-0.026 (0.026)	0.925	0.974	1.026	0.019 (0.063)	0.900	1.019	1.154	0.033 (0.041)	0.954	1.033	1.119	0.141 (0.084)	0.737	0.868	1.023
Substance use	-0.030 (0.025)	0.922	0.971	1.021	0.024 (0.082)	0.872	1.024	1.202	0.048 (0.041)	0.968	1.049	1.137	-0.050 (0.062)	0.843	0.951	1.074
Unprotected sex	0.002 (0.022)	0.959	1.002	1.047	0.077 (0.054)	0.988	1.080	1.201	0.037 (0.039)	0.973	1.038	1.120	**-0.120* (0.063)**	**0.800**	**0.887**	**1.003**

Note. Logistic regressions within each latent class were estimated using saved BCH weights according to Asparouhov & Muthen (2014) and McLarnon and O'Neill (2018). *B* estimates represent logits for the odds of each outcome given a 1-unit increase in the emotion regulation strategy predictor variable. *OR* values represent odds ratios in the metric of odds. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.005$.

Table 12. Difference tests to evaluate class membership as a moderator of the relations between emotion regulation strategies and outcome behaviors.

	Emotionally Regulated vs. Urgency Inclined *B* (*SE*)	Urgency Inclined vs. Dysregulation Inclined *B* (*SE*)	Emotionally Regulated vs. Dysregulation Inclined *B* (*SE*)
Maladaptive strategies:			
NSSI	0.070 (0.120)	0.081(0.090)	0.151 (0118)
Suicidal ideation	**0.301* (0.151)**	0.032 (0.099)	**0.333* (0.140)**
Suicide attempt	0.000 (0.185)	0.055 (0.113)	0.055 (0.174)
Disordered eating	-0.132 (0.154)	0.100 (0.101)	-0.033 (0.146)
Alcohol use	-0.133 (0.139)	**0.267* (0.108)**	0.134 (0.138)
Substance use	0.250 (0.201)	0.062 (0.108)	0.312 (0.193)
Unprotected sex	-0.118 (0.121)	**0.182* (0.095)**	0.064 (0.117)
Adaptive strategies:			
NSSI	0.006 (0.094)	-0.035 (0.079)	-0.029 (0.090)
Suicidal ideation	-0.006 (0.101)	-0.129 (0.079)	-0.135 (0.099)
Suicide attempt	0.105 (0.144)	-0.066 (0.101)	0.039 (0.125)
Disordered eating	0.018 (0.103)	-0.030 (0.079)	-0.011 (0.105)
Alcohol use	0.014 (0.080)	-0.174 (0.095)	-0.160 (0.105)
Substance use	0.025 (0.097)	-0.098 (0.077)	-0.074 (0.102)
Unprotected sex	-0.040 (0.071)	**-0.157* (0.076)**	**-0.197* (0.083)**

Note. Estimates represent the difference between unstandardized regression coefficients (simple slopes) for pairwise comparisons between the three latent classes of participants. A significant *p*-value indicates that the difference between the two slopes was significantly different from zero. *B* estimates are in the metric of logits.* $p < 0.05$.

DISCUSSION

The current study employed LPA to discern subgroups of individuals based on emotion dysregulation and personality dimensions. While several previous studies have examined these constructs in relation to maladaptive behaviors, to date, few studies have jointly examined these behavioral phenotypes in the same statistical models (e.g., Rahm-Knigge, Prince, & Conner, 2018). Results identified empirically-derived classes of individuals and suggested that certain classes have greater risk for engagement in health-risk and self-injurious behaviors and rely more heavily on maladaptive versus adaptive emotion regulation strategies. Use of person-centered analyses contributes to understanding of how heterogeneity in behavioral phenotypes may be related to risk for maladaptive outcomes.

The prevalence of health-risk behaviors and SITBs in the current sample was notable. Although the seven outcome behaviors had relatively rare occurrences in the sample, frequencies of these behaviors were unexpectedly high for a community population. For example, 12% of the sample reported having ever attempted suicide compared to 0.6% of adults in the United States (American Foundation for Suicide Prevention, 2019), and 21.4% of the sample reported past 30-day heavy alcohol use compared to 7.0% of adults in the United States (Table 3; NIAAA, 2019b). This suggests that many college students are experiencing significant levels of distress. College students are traditionally considered convenience samples in psychology literature, and many academic journals have recently stopped accepting most manuscripts that utilize college student samples. While limited generalizability of results certainly makes these samples nonideal for many research questions, data from the current study and national college student health assessments suggest that college students may be more vulnerable to engagement in health-risk

behaviors and SITBs than the general adult population (e.g., American College Health Association, 2019; Center for Collegiate Mental Health, 2019). Thus, there is need for research that focuses on the etiology, prevention, intervention, and harm reduction of maladaptive behaviors in college student samples specifically.

The first goal of this study was to discern subgroups of participants based on six emotion dysregulation dimensions and the personality traits impulsivity, sensation seeking, neuroticism, and conscientiousness, all of which have been implicated in health-risk behaviors and SITBs (see introduction). The LPA identified the three-class solution as the best-fitting model for participants' responses to these behavioral measures, providing support for hypothesis 1. Each class was distinguished by a unique profile of scores on emotion dysregulation and personality measures. The Dysregulation Inclined class was characterized by higher levels of all six emotion dysregulation dimensions, all four impulsivity dimensions, neuroticism, and risk seeking, and lower levels of conscientiousness and experience seeking. An opposite pattern emerged in the Emotionally Regulated class, with lower scores in emotion dysregulation, impulsivity, and neuroticism, and higher scores in conscientiousness and experience seeking. The Urgency Inclined class was characterized by scores in the middle of the other classes' values, with substantially higher positive and negative urgency scores than the Emotionally Regulated Class. Thus, risk factors for maladaptive behaviors increased across classes from Emotionally Regulated to Dysregulation Inclined, with the Dysregulation Inclined class having greatest levels of behavioral constructs that have previously been associated with increased risk for health-risk behaviors and SITBs. Importantly, emotion-related constructs, including emotion dysregulation, negative urgency, and neuroticism, made the largest contributions to class discernment (Tables 5 and 6; Figure 3). There may be some collinearity in the content of these measures. For example,

the Negative Urgency subscale of the UPPS-P measures inclination towards rash action when experiencing elevated negative emotion (Cyders & Smith, 2008), and the Impulse Control Difficulties subscale of the DERS similarly measures difficulty controlling behavior when experiencing emotional distress (Gratz & Roemer, 2004). Nonetheless, it is noteworthy that emotion-related constructs differentiated class membership above and beyond the cognitive dimensions of impulsivity (Lack of Perseverance and Lack of Premeditation), conscientiousness, and sensation seeking.

Engagement in health-risk behaviors and SITBs varied significantly across classes. Overall, engagement in all seven outcome behaviors was greater in the Urgency Inclined and/or Dysregulation Inclined classes, providing support for multifinality of different health-risk and self-injurious behaviors. With the exception of experience seeking, which made the smallest contribution to class discernment, results corroborated previous literature that identified all of the class indicators as risk and/or protective factors against maladaptive behaviors (see introduction). Interestingly, SITBs and disordered eating displayed different patterns across classes than substance use and risky sexual behavior. Likelihood of engagement in SITBs and disordered eating increased substantially across classes from Emotionally Regulated to Dysregulation Inclined, while the substance use and risky sex outcomes had greatest likelihood in the Urgency Inclined class and second-highest likelihood in the Dysregulation Inclined class (Tables 9 and 10). Thus, results from this analysis step provided partial support for hypothesis 2a. Since classes were primarily derived by emotion-related constructs, results suggest that emotion dysregulation issues, urgency, and neuroticism are more central to risk for engagement in SITBs and disordered eating than to risk for substance use. Previous studies have also suggested that, in general, emotion-based behavioral constructs have stronger relations to health-risk behaviors and

mental health issues than constructs that are more cognitively based (e.g., Pivarunas & Conner, 2015; Rahm-Knigge et al., 2018; Weiss et al., 2013). These findings extend previous literature that indicates that emotion dysregulation and mood-based components of impulsivity are core vulnerability factors for engagement in SITBs (e.g., Crowell & Kaufman, 2016; Rajappa et al., 2012; Zapolski et al., 2009) and certain types of disordered eating (e.g., binge-purge behaviors: Haedt-Matt & Keel, 2011; Racine & Wildes, 2013); increases in emotion dysregulation, impulsivity, and neuroticism across classes were associated with linear increases in risk for these outcomes. The substance use variable presentations across classes suggest that risk for substance use increases above "low" levels of emotion dysregulation, urgency, and neuroticism, and remains fairly constant after that. Engagement in past 12-month unprotected sex did not significantly vary across classes; this indicates that the emotion-based dimensions investigated in this study did not confer increased risk for engagement in risky sexual behavior in our sample, contrasting with previous literature that identified emotion dysregulation and urgency as salient predictors of risky sex outcomes (e.g., Rahm-Knigge et al., 2018; Tull et al., 2012).

The proportion of individuals who identified as having female versus male sex identity also varied across classes. While all three classes had a higher percentage of female than male participants, the Dysregulation Inclined class was characterized by a significantly higher proportion of females than the Urgency Inclined class. Interestingly, within these two classes that had elevated engagement in maladaptive behaviors, the prevalence of different outcomes appeared to align with sex norms for these behaviors. While substance misuse tends to be more prevalent among males than females (e.g., American Psychiatric Association, 2013), NSSI, suicidal ideation, non-lethal suicide attempts (e.g., Fox, Millner, Mukerji, & Nock, 2018), and disordered eating (e.g., Hudson, Hiripi, Pope, & Kessler, 2007) are generally more common

among females. Correspondingly, the Urgency Inclined Class that had a higher proportion of male participants displayed higher levels of substance use and lower levels of SITBs and disordered eating than the Dysregulation Inclined Class. These class differences were significant for SITBs and disordered eating, but not for substance use. Nonetheless, identity characteristics of each class may have influenced differential engagement in health-risk behaviors and SITBs.

Notably, logistic regressions predicting risk for outcome behaviors in the full sample from adaptive and maladaptive emotion regulation strategies found that emotion regulation strategies predicted SITBs and disordered eating more than substance use and risky sex variables (Table 11). Maladaptive emotion regulation strategies were significantly, negatively associated with disordered eating and SITBs, but not with substance use and risky sex. Correspondingly, greater scores in adaptive strategies were associated with significantly lower odds of engagement in SITBs, but not the other outcome behaviors. Effect sizes were larger for maladaptive strategies than adaptive strategies, providing support for hypothesis 3a and previous literature suggesting that maladaptive strategies have larger influences on behavioral outcomes than adaptive strategies (Aldao & Nolen-Hoeksema, 2010; Aldao et al., 2010). These results provide further support for clustering patterns of SITBs with disordered eating compared to substance use and risky sexual behavior. Findings also suggest that emotion regulation strategies, like other emotion-based constructs, are more salient risk and protective factors for SITBs and disordered eating than for substance use and risky sexual behavior.

The maladaptive and adaptive emotion regulation strategy variables also varied significantly across classes. Reported reliance on maladaptive strategies increased and adaptive strategies decreased significantly across classes with increasing emotional instability, and these differences were statistically significant for all class comparisons (Tables 8 and 10). Thus, this

analysis step provided support for hypothesis 2a. Since the DERS subscale Limited Access to Emotion Regulation Strategies had the largest effect size across classes among the emotion dysregulation and personality indicators, associations between class membership and the emotion regulation strategy variables would be expected. Hence, it is reassuring that this pattern emerged in reported results. Nonetheless, neither the DERS nor the personality indicators measured use of different emotion regulation strategies, and there does not appear to be overlapping content validity between the indicator measures and the CERQ. Results suggest that stable, trait-based behavioral dimensions influence individuals' general use of adaptive versus maladaptive emotion regulation strategies. Individuals in the Urgency Inclined and Dysregulation Inclined classes appeared to rely more heavily on maladaptive strategies and may struggle to engage adaptive regulation strategies. This makes sense given that many strategies that are generally considered to be adaptive require active engagement of the pre-frontal cortex (e.g., reappraisal; Braunstein, Gross, & Ochsner, 2017); higher-order cognitive thinking can be challenging during emotional distress, which individuals in the Urgency Inclined and Dysregulation Inclined classes may be more likely to experience. In parallel, participants in the Emotionally Regulated class appeared to use more adaptive than maladaptive emotion regulation strategies for dealing with emotional distress, which may serve as an additional protective factor against engagement in health-risk behaviors and SITBs. Reliance on different emotion regulation strategies can be malleable over time. Strategies that were previously used only explicitly (i.e., requiring conscious effort) can become more implicit (i.e., automatic) over time through skills practice (Gyurak et al., 2012). Thus, emotion regulation strategies may be an important target for preventions and interventions for health-risk behaviors and SITBs, supporting continued implementation of cognitive-behavioral therapies that focus on emotion regulation skills (e.g.,

Linehan, 2014). These interventions may be most beneficial for individuals who display high levels of emotion dysregulation, neuroticism, impulsivity, and risk seeking.

The current study also contributes to literature on the utility and structure of the CERQ. Although psychometric evaluation of this emotion regulation strategy measure was not an initial goal of this study, results from the CFA may inform future uses for this scale. The Acceptance and Blaming Others subscales of the CERQ did not load onto the adaptive and maladaptive strategy factors, suggesting that the relative adaptiveness of these strategies may vary more across contexts than the other subscales of the CERQ. Further, these two subscales may have weaker relations to behavioral outcomes than the other strategies measured by the CERQ; the Acceptance and Blaming Others subscales have previously demonstrated inconsistent associations with negative mental health outcomes, possibly due to less specific construct validity (e.g., Martin & Dahlen, 2005; Ireland et al., 2017). To my knowledge, no previous study has employed factor analysis to collapse emotion regulation strategy subscales into adaptive and maladaptive variables. The CFA supported the decision to group CERQ subscales into two variables, which allowed for general assessment of relations between emotion regulation strategies, more stable trait-based behavioral phenotypes, and outcome behaviors without sacrificing model parsimony. While this reduced specificity and contextual utility for understanding how individuals were impacted by use of single strategies (Aldao & Nolen-Hoeksema, 2012a, 2012b), the adaptive and maladaptive strategy variables significantly varied across classes and predicted engagement in SITBs and disordered eating in the full sample. As discussed in the introduction, presence of any maladaptive strategies appears to strongly influence health-risk behaviors and psychopathology and, frequently, adaptive strategies appear to reduce risk for negative outcomes only in the absence of maladaptive strategies (Aldao &

Nolen-Hoeksema, 2010; Aldao et al., 2010). Hence, there may be utility in using this methods approach in future studies that aim to examine general emotion regulation strategy trends and/or involve parsimony constraints for statistical analyses.

This study also employed novel moderation analyses that evaluated interactions between class membership and emotion regulation strategies in predicting health-risk and self-injurious behaviors. Not only has this analysis approach been rarely utilized in psychology literature (e.g., Asparouhov & Muthen, 2018; McLarnon & O'Neill, 2018), but to my knowledge, it also has not been used in studies on health-risk behaviors and SITBs. At a significance threshold of $p < 0.01$, there was no evidence for moderation by class in the current study, and hypothesis 3b was not supported. At $p < 0.05$, the regressions of suicidal ideation on maladaptive strategies differed between the Emotionally Regulated versus Urgency Inclined and Emotionally Regulated versus Dysregulation Inclined classes, heavy alcohol use on maladaptive strategies differed between the Urgency Inclined versus Dysregulation Inclined classes, unprotected sex on maladaptive strategies differed between the Urgency Inclined versus Dysregulation Inclined classes, and unprotected sex on adaptive strategies differed between the Urgency Inclined versus Dysregulation Inclined and Emotionally Regulated versus Dysregulation Inclined classes. However, given the number of statistical tests performed, estimates with $p < 0.05$ were not interpreted as significant and the directions of these effects were not interpreted. Power constraints may have limited my ability to detect significant effects in this analysis step. The required sample size for detecting interaction effects can be up to nine times larger than the sample size needed to detect nonadditive main effects (e.g., Wahlsten, 1991); the smaller subsample size of each class may have precluded sufficiently-powered moderation analyses, making Type II errors plausible. The Dysregulation Inclined class was the only class that

displayed significant relations between emotion regulation strategies and a behavioral outcome: maladaptive strategies significantly predicted increased odds of suicidal ideation, while adaptive strategies significantly predicted reduced odds of suicidal ideation (Table 11). This effect was larger for maladaptive strategies, providing additional support for hypothesis 3a. Previous literature has also demonstrated associations between emotion regulation strategies and suicidal behavior (e.g., Ong & Thompson, 2018). Reported results suggest that increasing the ability to engage adaptive strategies and reducing reliance on maladaptive strategies may be especially important protective factors against suicidal ideation among individuals with greater emotion dysregulation, urgency, and neuroticism. Nonetheless, potential power constraints due to small class size and rare outcome behaviors render these results speculative, and replication in a larger sample and/or clinical population is warranted.

Limitations and Future Directions

Results from the current study should be interpreted in the context of several limitations. First, statistical models only included behavioral constructs that have established associations with mental health issues. Reported analyses did not include non-behavioral variables that have been implicated in health-risk behaviors and SITBs. Engaging in risk-taking behavior is highly context dependent (Beauchaine, 2015; Christopherson & Conner, 2012; Crone et al., 2016), and many additional constructs, such as traumatic experiences (Roche, Kroska, Miller, Kroska, & O'Hara, 2018), social support (Reininger, Perez, Aguirre Flores, Chen, & Rahbar, 2012), and normative beliefs (Borsari & Carey, 2003) appear to influence relations between genetic and behavioral predispositions and outcomes. Other constructs, such as mindfulness, have been shown to influence reliance on different emotion regulation strategies (Farb, Anderson, Irving, & Segal, 2014). Identity constructs also have established relations with mental health and

behavioral outcomes, and the prevalence of health-risk behaviors and SITBs varies across identity groups (e.g., Fox et al., 2018). While this study included sex as an auxiliary outcome variable, analyses did not control for sex or other identity constructs (e.g., ethnicity, sexual orientation, gender identity, socioeconomic status, age, etc.). In addition, this study only included select cognitive emotion regulation strategies. While the strategies measured by the CERQ have demonstrated clear associations with mental health dimensions, there is robust evidence that many other strategies also contribute to behavioral outcomes (e.g., thought and expressive suppression, emotional and experiential avoidance, etc.; Aldao et al., 2010; Butler et al., 2003; Rawal, Park, & Williams, 2010). Future studies that examine environmental variables and other previously implicated psychological and identity constructs, along with personality, emotion dysregulation, and a broader range of emotion regulation strategies, may provide a more global understanding of the etiology of health-risk behaviors and SITBs.

Second, this study examined lifetime or recent presence of different SITBS and health-risk behaviors and did not measure lifetime frequency, severity, or dependence on these behaviors. Frequent and/or severe engagement in health-risk and self-injurious behaviors may have different underlying behavioral and environmental etiology than initial and recent engagement. Measures of higher lifetime frequency and dependence on unhealthy behaviors may have more clinical salience than initial and recent engagement, since these individuals are more likely to experience negative outcomes. Moreover, most health-risk behaviors and SITBs are multifactorial, involving multiple causes and different symptom presentations (e.g., Mitchell, Wolf, Reardon, & Miller, 2014; Rahm-Knigge, et al., 2018). Although use of single-item variables for each outcome behavior allowed for examination of a broad range of health-risk behaviors and SITBs while maintaining reasonable model parsimony, this measurement method

also limited the reliability of each behavioral measure. Future research that accounts for the multifactorial structure of different maladaptive behaviors may further elucidate the underlying mechanisms for these outcomes. Further, analyses did not include the number of outcome behaviors that participants engaged in; evaluating comorbid engagement in multiple types of health-risk and self-injurious behaviors may increase understanding of risk factors for breadth of participation in maladaptive behaviors.

Third, analyses did not control for information on participants' current and past psychiatric diagnoses and symptom dimensions, which can affect behavioral outcomes in those at risk for engaging in SITBs and health-risk activities (e.g., ADHD: Flory, Molina, Pelham, Gnagy, & Smith, 2006). Moreover, data were collected from a convenience sample of undergraduate psychology students that predominantly identified as European-American, cisgender, and heterosexual. Thus, results may have limited generalizability to populations with non-dominant identities. Collecting diagnostic information in future undergraduate samples and/or targeting clinical samples could increase generalizability to clinical populations who are more at-risk for negative mental health outcomes.

Fourth, this study used cross-sectional self-report survey data. Participants may over- or under-report their engagement in health-risk behaviors and SITBs. Although the current study demonstrates clear associations between behavioral phenotypes, health-risk behaviors, and SITBs, within-subjects' change was not tracked over time and causal relations between variables cannot be established. Early tempermental factors appear to contribute risk for maladaptive behaviors and psychopathology symptom dimensions later in life (Crowell & Kaufman, 2016). A longitudinal study that measures individuals across development would better assess the temporal relations between personality and emotion (dys)regulation phenotypes and behavioral

outcomes. Moreover, integrating biological and behavioral measures, in addition to self-report survey measures, would increase understanding of developmental antecedents to engagement in maladaptive behaviors (Crowell & Kaufman, 2016).

Fifth, low power due to the relatively small class sizes and infrequent behavioral outcomes may have made Type II errors likely in the moderation model. Replication of this analysis step with a larger sample would help clarify relations between emotion regulation strategies, health-risk behaviors, and SITBs, and how these relations may vary across classes derived from more stable trait-based dimensions.

Conclusions

Notwithstanding the limitations noted above, the current study successfully identified subgroups of individuals with heightened risk for engagement in health-risk behaviors and SITBs. Reported results corroborate and extend previous literature that identified emotion dysregulation, impulsivity, risk seeking, neuroticism, and conscientiousness as important antecedents to engagement in maladaptive behaviors. Specifically, results suggest that emotion-related phenotypes, including emotion dysregulation, urgency, and neuroticism, confer greater vulnerability to health-risk and self-injurious behaviors than cognitive dimensions of impulsivity, sensation seeking, and conscientiousness. The high prevalence of health-risk behaviors and SITBs in the current sample suggests that college students are particularly susceptible to these outcomes, encouraging continued research on maladaptive behaviors and associated negative consequences in college student samples specifically. Importantly, results also suggest that different behavioral phenotypes may underlie engagement in SITBs and/or disordered eating versus substance use; likelihood for both sets of behaviors increased above low levels of emotion dysregulation and personality risk factors, but risk for SITBs and disordered eating appears to

have a stronger linear relation to increasing severity of stable emotion-based dimensions. Differential reliance on adaptive and maladaptive emotion regulation strategies across classes suggests that emotion regulation strategy skills-based interventions are likely to be especially valuable for individuals with greater emotion dysregulation, urgency, neuroticism, and risk seeking, and may reduce engagement in health-risk behaviors and SITBs. Reported analyses represent the most comprehensive examination of associations between personality, emotion dysregulation, emotion regulation strategies, and a wide range of health-risk and self-injurious behaviors conducted in a single study. Elucidating how heterogeneity in behavioral phenotypes influences engagement in health-risk behaviors and SITBs contributes to understanding of why certain individuals have elevated risk for experiencing negative outcomes.

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