



Difficulties in emotion regulation and suicide ideation and attempt in adolescent inpatients

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ABSTRACT

This study aimed to examine the concurrent relation between six dimensions of emotion dysregulation, proposed by Gratz and Roemer (2004), and suicide ideation and attempt in a large sample of psychiatric adolescent inpatients. A sample of 547 adolescent inpatients completed measures on dimensions of emotion dysregulation, psychiatric diagnoses, and suicidal ideation and attempt. Binary logistic regression analyses revealed that limited access to emotion regulation strategies, difficulties in impulse control, and mood disorder diagnosis, were significantly associated with past year suicidal ideation, covarying for other emotion dysregulation subscales, anxiety and externalizing diagnoses, sex, and age. However, difficulties in impulse control was not significantly related to suicide ideation when analyses were conducted separately by sex. Binary logistic regressions also revealed that past year suicidal ideation uniquely and significantly associated with lifetime attempt, covarying for sociodemographics, psychiatric diagnoses, and all emotion dysregulation subscales; these results held when analyses were also conducted separately by sex. Results indicating an association between perceived limited emotion regulation strategies and suicide ideation are consistent with existing research and suicide-focused theory. This finding may have some tentative benefit to informing clinical assessment and treatment of suicidal thoughts. Other findings are discussed.

1. Introduction

Suicide ideation and attempt are alarmingly prevalent in adolescent populations, with suicide as the second leading cause of death in youth aged 15–24 (CDC, 2015). In community samples, 19.4% of adolescents report a lifetime history of suicide ideation and 7.1% attempt (Lewinsohn et al., 1996), and suicide ideation and attempt prevalence rates are markedly higher in psychiatric inpatient youth: 41% of inpatients report past-year ideation and 31% a lifetime attempt history (Sharp et al., 2012). Elevated rates of ideation and attempt in inpatient adolescents are a significant concern, given that inpatient youth are at elevated risk for re-attempt in months (Brent et al., 1993) and years (Chung et al., 2017) post-discharge. Against this background, it remains important to understand malleable risk factors related to suicide ideation and attempt in this population, as this may inform intervention in months following psychiatric discharge and potentially mitigate suicide risk during a critical time for re-attempt.

Emotion dysregulation has been implicated as one process related to ideation and attempt among adolescents (Esposito et al., 2003; Weinberg and Klonsky, 2009), and has been successfully modified by clinical intervention (Goldstein et al., 2007). Gratz and Roemer (2004)

presented a comprehensive, six-factor model of emotion dysregulation, which underlies the Difficulties in Emotion Regulation Scale (DERS). Under this model, emotion dysregulation is conceptualized as impairments in an individual's ability to identify, accept, and recalibrate to one's immediate emotional and situational context; further, six distinct dimensions of emotion dysregulation were specified, including: 1) nonacceptance of emotional responses or distress [Nonacceptance], 2) difficulties engaging in goal-directed behaviors and strategies [Goals], 3) lack of emotional awareness [Awareness], 4) difficulties in impulse control [Impulse], 5) lack of emotional clarity [Clarity], and 6) limited access to ER strategies, including one's perceived deficit of effective emotion regulation strategies [Strategies] (Gratz and Roemer, 2004).

Theories of suicide-related phenomena and underlying emotion processes (Baumeister, 1990; Linehan, 1993; Selby et al., 2008; Williams, 2001) are aligned with the multidimensional approach to emotion dysregulation (Gratz and Roemer, 2004), and suggest that various aspects of emotion dysregulation play a role in suicidal ideation and behavior. Baumeister (1990) posited that suicide serves as a means to escape deficits in self-awareness and in acknowledging and validating negative affect. Related, the Cry of Pain model (Williams and Pollock, 2001; Williams, 2001) theorized that suicidal behavior is a

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reactive function in stressful situations where an individual perceives both defeat and no hope of resolution (Rasmussen et al., 2010); by this model, individuals engage in suicidal behavior when intense negative affect is experienced as intolerable (nonacceptance), and when they lack perceived strategies to appropriately regulate emotion and resolve the distressing situation (strategies; goals). BPD-derived theories (Linehan, 1993; Selby et al., 2008) also implicate nonacceptance of emotion and limited access to effective emotion regulation strategies in suicide-related behavior; for example, the emotion cascades model (Selby et al., 2008, 2009) suggests that individuals engage in dysregulated behavior, such as suicidal behavior, when intense negative affect and rumination escalate into an unbearable state, implicating deficits in effective emotion regulation strategies (strategies). Taken together, contemporary suicide-focused theories implicate specific domains of emotional nonacceptance, limited access to effective emotion regulation strategies, and lack of goal-directed behavior in impacting suicidal symptoms.

Empirical research in adolescents has begun to examine the link between suicidal symptoms and domains of emotion dysregulation proposed by Gratz and Roemer (2004). Limited access to ER strategies (Strategies), or the belief that, once upset, there are few ways to regulate emotions effectively (Gratz and Roemer, 2004) has been shown in multiple studies to be related to suicidal thoughts and behaviors. For example, Valois et al. (2015) revealed significant cross-sectional relations between low levels of emotional self-efficacy (i.e., low perceived ability to engage in effective coping strategies) and suicide attempt risk across racial groups in community adolescents. In addition, Weinberg and Klonsky (2009) showed that DERS Strategies had the strongest correlation to suicide ideation relative to other DERS domains, and Pisani et al. (2013) found that only the Strategies subscale remained a significant predictor of suicide attempt risk when it was included in the same model with the DERS clarity subscale, among community adolescents. Studies among young adults (Miranda et al., 2013; Rajappa et al., 2012) also point to DERS strategies as having a unique relation with suicidal thoughts. Specifically, Rajappa et al. (2012) demonstrated that DERS strategies uniquely predicted suicidal ideation, with all DERS subscales were entered concurrently as predictors and adjusting for depressive symptoms and mood and anxiety disorder diagnosis. Studies have also shown a relation between nonacceptance of emotion responses (Nonacceptance), conceptualized as negative reactions to one's own negative emotion(s) and distress (Gratz and Roemer, 2004), and suicide attempt and ideation among youth. For example, Linehan's (1993) work suggests that invalidation or rejection of one's own emotion state in the context of borderline personality pathology may increase risk for suicide. Work by Najmi et al. (2007) further suggests that adolescents' removal of internal thoughts and associated affect (i.e., nonacceptance) may explain the link between aversive emotional experiences and thoughts of suicide. In addition, DERS Nonacceptance has been shown to be related to suicide ideation among adolescents (Weinberg and Klonsky, 2009) and suicide attempts among young adults (Rajappa et al., 2012). Some empirical studies have also implicated the DERS Impulse scale, conceptualized as difficulties remaining in control of one's behavior when experiencing intense affect (Gratz and Roemer, 2004) in association with suicide risk. Two studies among adolescents have found that the DERS Impulse scale had the second strongest association with suicide ideation relative to the other five DERS scales (Weinberg and Klonsky (2009)) and found a unique relation between impulsive behavioral response to affect and suicide attempt in adolescent inpatients, relative to aspects of impulsivity linked to suicidal ideation (Auerbach et al., 2017). Taken together, empirical research most supports Strategies, Nonacceptance, and Impulse domains of emotion dysregulation as salient factors related to suicidal ideation and attempt in adolescents.

To our knowledge, few studies have concurrently examined all six emotion dysregulation domains as put forward by Gratz and Roemer (2004) in relation to suicidal thoughts and behaviors, and only one was

conducted in an adolescent sample. First, Weinberg and Klonsky (2009) validated the six-factor structure of emotion dysregulation proposed by Gratz and Roemer, and revealed significant associations between suicide ideation and all DERS subscales, with the exception of awareness, in community adolescents. Correlations between DERS subscales of Strategies, Impulse, and Nonacceptance and suicide ideation were highest (Weinberg and Klonsky, 2009). Second, Rajappa et al. (2012) evaluated differences in emotion dysregulation, as measured by the six DERS domains, between young adults with suicide ideation and/or attempt histories, finding that Strategies was significantly related to current suicide ideation, and that multiple attempters differed in Strategies and Nonacceptance of emotional responses relative to those with no suicide ideation or attempts.

Empirical work has not yet completed a focused investigation of the multidimensional conceptualization of emotion dysregulation (Gratz and Roemer 2004), relative to suicidal ideation and behavior in adolescents in psychiatric settings. While multimethod research has investigated other markers of emotion regulation (e.g., neural correlates of emotion regulation; Miller et al., 2018) and adolescent suicide-related experiences, no studies have concurrently investigated difficulties in perceived abilities to identify, accept, and regulate affect (as put forth by Gratz and Roemer 2004), relative to suicidal ideation and attempt in psychiatric adolescents. Failure to examine the individual and differential effects of emotion dysregulation components on suicidal ideation and behavior in this population precludes a nuanced understanding of specific affective processes related to suicidal ideation and attempt amongst psychiatric youth. It also prevents a specialized understanding of which particular perceived emotion regulation deficits more saliently associate with suicidal thoughts and behaviors. This examination may shed light on affective targets for clinical interventions for suicidal youth. This could further benefit clinical care of suicidal symptoms in acute settings, such that uniquely identified domains of emotion dysregulation could be specifically targeted and prioritized in time-limited adolescent inpatient stays.

Against this background, the present study aimed to fill this critical literature gap by cross-sectionally examining the relation between the six domains of emotion dysregulation proposed by Gratz and Roemer (2004) and suicidal ideation and attempt in a large sample of psychiatric adolescent inpatients, while covarying for relevant constructs (age, sex, and multiple psychiatric diagnoses). Extending previous work, the current study presents a novel first look at how perceived difficulties with emotion regulation [i.e., in identifying, accepting, or regulating behavior in response to emotion] differentially associate with suicidal thoughts and behaviors in a high-risk group of psychiatric adolescents; moreover, these associations will be demonstrated while accounting for the effects of multiple psychiatric disorders and demographic factors. Of note, our study was informed by the methodological approach of Rajappa et al. (2012), Harris et al. (2018), and Weinberg and Klonsky (2009), which examined dimensions of the DERS relative to suicidal ideation and attempt, including covariates of psychiatric diagnosis (Harris et al., 2018; Rajappa et al., 2012) and socio-demographic characteristics (Harris et al., 2018). Given that mood and anxiety disorders are characterized by emotion dysregulation (e.g., Campbell-Sills et al., 2006; Hofmann et al., 2012) and suicidal thoughts and behaviors are common in these disorders (Kessler et al., 1999; Nock et al., 2008a), the current study covaried for Mood Disorder and Anxiety Disorder diagnosis, in addition to relevant sociodemographic characteristics. Externalizing Disorder diagnosis was also included as a covariate in primary analyses, given that externalizing psychopathology has been prominently linked to suicidal behavior (Verona et al., 2004). Based on findings by Weinberg and Klonsky (2009) and Rajappa et al. (2012), we expected that the DERS Nonacceptance and Strategies would share significant associations with suicidal ideation and attempt among psychiatric inpatient adolescents. Positive findings would indicate that nonacceptance of one's own affective response and lack of perceived access to effective regulatory strategies may be

important targets for suicide-focused intervention before and following inpatient discharge.

2. Methods

2.1. Participants

784 consecutive admissions to an inpatient unit of a private psychiatric facility were approached for consent. The treatment facility is located in a large Metropolitan city and provides multi-week stabilization and clinical care to adolescents with psychiatric disorders and relatively severe comorbid conditions. Inclusion criteria were as follows: a) participant must be between the ages of 12 and 17 years of age, b) absent of a psychotic disorder or intellectual disability, and c) English-speaking. Of those admitted, 52 declined, 3 assessments began and then revoked consent, 3 were admitted prior to IRB study approval, 17 were discharged prior to study completion, 26 were excluded (24 for psychosis, 2 for unspecified reasons during assessment), 45 were ineligible for study completion due to not meeting inclusion criteria specified above, 81 did not fully complete main study measures (i.e., diagnostic interviews, self-report-based measures), and 10 were excluded for other reasons, leaving a full sample of $N = 547$ inpatient adolescents ($M_{age} = 15.36$ years, $SD = 1.44$) who met full inclusion criteria. The full sample was 63.4% female ($n = 348$), 6.2% was Hispanic, and racial breakdown was as follows: 77.6% Caucasian ($n = 426$), 3.3% Asian, 1.6% African–American, 5.6% Multiracial, 0.2% American Indian or Alaskan Native, and 12.7% did not specify. Per record of psychiatric diagnosis determined by treatment team, the most common psychiatric DSM-IV diagnoses were mood disorders (82.0%), anxiety disorders (70.1%), and substance use disorders (35.7%).

2.2. Procedures

Study protocol complied with the institutional review board. On admission to the psychiatric inpatient unit, parents of those admitted were first approached for consent. Of those providing consent, adolescents were approached for study assent within one day of their initial admission. Adolescents providing assent completed assessments within two weeks with trained doctoral-level clinical psychology students, research assistants, or clinicians. Assessments were completed privately on the unit.

2.3. Materials

2.3.1. Sociodemographics

Biological sex, age, and race were collected via a standard sociodemographic questionnaire and per administrative intake. Race was coded dichotomously (1 = Caucasian; 0 = non-Caucasian) for study analyses, given the highly limited number of individuals identifying as American Indian or Alaskan Native, African–American, Asian, Multiracial or unspecified.

2.3.2. Emotion dysregulation

The Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer, 2004) is a 36-item self-report measure that was used to assess multiple dimensions of emotion dysregulation. Participants respond to all items on a 5-point Likert-scale (1 = ‘almost never’ [0–10%], 5 = ‘almost always’ [91–100%]), with higher scores indicating greater difficulties in emotion regulation. The DERS assesses both overall emotion dysregulation and six dimensions of emotion dysregulation, including: a) Nonacceptance of emotional responses (Nonacceptance; 6 items; e.g., “When I’m upset, I become embarrassed for feeling that way”), b) Difficulties engaging in goal-directed behaviors (Goals; 5 items; e.g., “When I’m upset, I have difficulty getting work done”), c) Impulse control difficulties (Impulse; 6 items; e.g., “When I’m upset, I become out of control”), d) Lack of emotional awareness (Awareness; 6

items; e.g., “When I’m upset, I acknowledge my emotions”; reverse coded), e) Limited access to emotion regulation strategies (Strategies; 8 items; e.g., “When I’m upset, I believe that there is nothing I can do to make myself feel better”), and f) Lack of emotional clarity (Clarity; 5 items; e.g., “I have no idea how I am feeling”; Gratz and Roemer, 2004, p. 48). Scores on each dimension were tabulated by summing the respective items. The DERS has demonstrated adequate reliability and validity in community youth (Neumann et al., 2009), and empirical support has been evidenced for its six-factor structure in psychiatric adolescents (Perez et al., 2012), community youth (Weinberg and Klonsky, 2009), and young adults (Gratz and Roemer, 2004). Cronbach’s alpha ranged from 0.86 to 0.92 for DERS subscales, with awareness being the lowest and strategies the highest.

2.3.3. Suicide ideation and attempt

The Computerized Diagnostic Interview Schedule for Children (CDISC; Shaffer et al., 2000) was used to assess past year suicidal ideation and lifetime suicide attempt. The CDISC is a structured, diagnostic interview developed to capture DSM-IV psychiatric disorders in youth aged 9–17 (Shaffer et al., 2000). The CDISC is administered by a trained interviewer who completes a series of fully structured, computerized prompts, each related to DSM-IV psychiatric disorders. In the Major Depressive Disorder (MDD) module, past year suicidal ideation and lifetime suicide attempt are assessed (e.g., “Have you ever, in your whole life, tried to kill yourself or made a suicide attempt?”; Shaffer et al., 2000). Suicidal ideation and attempt were coded dichotomously for the presence or absence of the ideation or behavior (0 = ideation/attempt absent; 1 = ideation/attempt present) and were utilized by the current study. The CDISC has been utilized in a breadth of clinical and research settings, with psychometric properties established in both community and psychiatric youth (Johnson et al., 2006; Shaffer et al., 2000; Sharp et al., 2012). Previous empirical work has also utilized dichotomous suicide-related variables from the CDISC in order to assess suicidal ideation and attempt in psychiatric adolescents (e.g., Sharp et al., 2012).

2.3.4. Psychiatric diagnoses

The Computerized Diagnostic Interview Schedule for Children (CDISC; Shaffer et al., 2000) was also used to assess for presence of Mood Disorder diagnosis, Anxiety Disorder diagnosis, and Externalizing Disorder diagnosis. As aforementioned, the CDISC is a structured, diagnostic interview developed to capture DSM-IV psychiatric disorders in youth (Shaffer et al., 2000), and is administered by a trained assessor to determine presence of specific DSM-IV psychiatric disorders. In the current study, presence of any Mood Disorder diagnosis was utilized in the current study as a covariate in primary regression analyses, and was coded dichotomously (0 = absent; 1 = present); Mood Disorder was qualified as meeting for Major Depressive Disorder, Dysthymia, Hypomania, and/or Mania, on the CDISC. The presence of any Anxiety Disorder diagnosis was utilized in the current study as a covariate, and was qualified as meeting for Posttraumatic Stress Disorder, Generalized Anxiety Disorder, Separation Anxiety Disorder, Specific Phobia, Social Phobia, Obsessive Compulsive Disorder, Panic Disorder, and/or Agoraphobia on the CDISC. Lastly, the presence of any Externalizing Disorder diagnosis was utilized in the current study as a covariate, and was qualified as meeting for Attention-Deficit/Hyperactivity Disorder, Oppositional Defiant Disorder, and/or Conduct Disorder on the CDISC. The CDISC is a psychometrically sound, widely-used interview-based measure of psychiatric disorder in children and adolescents.

2.4. Data analytic approach

Descriptive statistics were conducted to examine characteristics of main study variables (DERS subscales, CDISC suicide ideation and attempt variables) and sociodemographic characteristics (age, sex, race). Bivariate correlations, independent sample *t*-tests, and chi-square

analyses were conducted to examine the relations between socio-demographic variables (age, sex, race), CDISC psychiatric diagnoses (Mood Disorder, Anxiety Disorder, Externalizing Disorder), and main study variables (DERS subscales, CDISC ideation and attempt). Two binary logistic regression analyses were conducted to examine the concurrent relations between six dimensions of emotion dysregulation (i.e., nonacceptance, awareness, clarity, impulse, goals, and strategies) and potential covariates (age, sex, CDISC Mood Disorder diagnosis, CDISC Anxiety Disorder diagnosis, and CDISC Externalizing Disorder diagnosis), on past year suicidal ideation and lifetime suicide attempt. CDISC past year suicidal ideation was also included as a covariate in the regression model predicting lifetime suicide attempt, given that suicidal ideation is a documented correlate and risk factor for suicide attempts (Nock et al., 2008a, b). Race was not included as a covariate in logistic regression models due to its lack of significant relations to DERS subscales or CDISC suicide ideation or attempt in bivariate analysis. In each regression, predictors entered included the six DERS subscales, sex, age, CDISC Mood Disorder diagnosis, CDISC Anxiety Disorder diagnosis, CDISC Externalizing Disorder diagnosis, and in the model predicting lifetime suicide attempt, CDISC past year suicidal ideation was also a predictor. Outcome variables entered in separate regressions were CDISC past year suicide ideation and lifetime suicide attempt. Data analyses were conducted in IBM SPSS Statistical Software (Version 21.0.0).

3. Results

3.1. Missing data

As described above, of 784 consecutive admissions, 156 did not consent or meet study criteria, or were discharged before completing the study, leaving 628 teens who completed measures. Of these 628 adolescents, 81 did not have complete data on the DERS and CDISC and were not included in the present analyses. The 81 individuals excluded from primary study analyses did not significantly differ from the 547 participants included in the sample on sex ($\chi^2(1, N = 628) = 0.007, p = .934$) or race ($\chi^2(1, N = 628) = 2.122, p = .145$), though did significantly differ on age ($t = -3.304; df = 626; p = .001$), such that the 81 excluded are significantly younger.

3.2. Preliminary analyses

Descriptive statistics for all continuous variables (i.e., age, DERS subscales) are reported in Table 1. For the DERS, mean subscale scores were highest for strategies ($M = 24.49$), goals ($M = 18.31$), and awareness ($M = 18.00$). For dichotomous CDISC suicide ideation and attempt variables, frequencies were as follows: 57.4% reported suicidal ideation in the past year, and 45.7% reported a suicide attempt in their lifetime. Cross tab analyses revealed that 202 participants (36.8%) report no past year ideation or lifetime attempt, 96 (17.5%) report ideation and no attempt, 32 (5.8%) report attempt but no ideation, and 219 (39.9%) report both suicide ideation and attempt.

Table 1
Descriptive statistics for continuous study variables.

Study variable	Mean	Standard deviation	Range
Age (years)	15.36	1.44	12–17
DERS Nonacceptance	15.35	7.09	6–30
DERS Goals	18.31	5.19	5–25
DERS Impulse	15.86	6.79	6–30
DERS Awareness	18.00	5.89	6–30
DERS Strategies	24.49	8.94	8–40
DERS Clarity	14.50	5.19	5–25

Note: DERS = Difficulties in Emotion Regulation Scale; DERS Subscales are listed in the above table.

3.3. Sociodemographic variables and DERS subscales

Relations were examined between sociodemographic variables (i.e., age, sex, race) and DERS subscales. Bivariate correlations were conducted to determine if significant relations existed between age and DERS subscales; age was only significantly related to one of the DERS subscales, awareness ($r = -0.092; p = .031$), such that younger age was significantly related to greater impairment in awareness. Age was not significantly related to any other DERS subscales in bivariate analyses. Independent sample *t*-tests were conducted to determine if significant differences existed between sex on each of the DERS subscales; sex significantly differed across the following DERS subscales: non-acceptance ($t = 3.640; df = 547; p < .001$), impulse ($t = 3.452; df = 547; p = .001$), strategies ($t = 4.327; df = 547; p < .001$), and clarity ($t = 3.125; df = 547; p = .002$), such that females demonstrated higher levels of emotion dysregulation on each of these subscales. Independent sample *t*-tests were conducted to determine if significant differences existed across race (Caucasian, non-Caucasian) on each of the DERS subscales; no significant differences were yielded.

3.4. Sociodemographic variables and CDISC suicide ideation and attempt variables

Relations were examined between sociodemographic variables (i.e., age, sex, race) and CDISC past year suicide ideation and lifetime suicide attempt. Independent sample *t*-tests revealed no significant age differences between those endorsing CDISC suicide ideation and attempt variables, and those non-endorsing. Chi square analyses revealed significant sex differences on past year suicide ideation, $\chi^2(1, N = 549) = 6.588, p = .010$, and lifetime suicide attempt, $\chi^2(1, N = 549) = 4.476, p = .034$, such that females were more likely to endorse ideation and attempt. Chi square analyses revealed no significant racial differences between those endorsing CDISC past year suicide ideation and lifetime attempt, and those non-endorsing.

3.5. CDISC psychiatric disorder diagnoses and main study variables

Bivariate relations were examined between particular CDISC disorder diagnoses, including Mood Disorder diagnosis, Anxiety Disorder diagnosis, Externalizing Disorder diagnosis (all coded: 0 = absent disorder; 1 = disorder present), CDISC suicide ideation and attempt variables, and all DERS subscales. Bivariate correlations (depicted in Table 2) revealed that CDISC Mood Disorder diagnosis presence was significantly related with both past year suicidal ideation and lifetime suicide attempt). CDISC Anxiety Disorder and Externalizing Disorder diagnosis presence were also significantly related to past year suicide ideation and lifetime attempt. All three CDISC psychiatric disorder diagnoses examined (Mood, Anxiety, Externalizing) shared significant, positive bivariate relations with a number of DERS subscales (see Table 2).

Cumulatively, analytic findings of bivariate analyses between sociodemographic variables (age, sex, race), CDISC psychiatric diagnoses, and main study variables (DERS subscales, CDISC suicide ideation and attempt variables) reveal significant relations between two sociodemographic covariates (age, sex), presence of any CDISC Mood Disorder, Anxiety Disorder, and Externalizing Disorder diagnosis, and main study variables. In light of these findings, sex, age, and three CDISC diagnoses (Mood Disorder diagnosis, Anxiety Disorder diagnosis, and Externalizing Disorder diagnosis) were included as covariates in all binary logistic regression analyses to avoid potential third variable effects.

3.6. Regression analyses

Two binary logistic regressions were conducted to test the concurrent relation of DERS subscales (nonacceptance, goals, impulse,

Table 2
Bivariate correlation matrix.

	CDISC Mood	CDISC Anx.	CDISC Ext.	CDISC SI	CDISC SA	DERS Non.	DERS Goals	DERS Imp.	DERS Aware.	DERS Strat.	DERS Clarity
CDISC Mood	–										
CDISC Anx.	0.363**	–									
CDISC Ext.	0.130**	0.094*	–								
CDISC SI	0.505**	0.275**	0.122**	–							
CDISC SA	0.270**	0.113**	0.093*	0.554**	–						
DERS Non.	0.416**	0.324**	0.109*	0.347**	0.214**	–					
DERS Goals	0.352**	0.270**	0.214**	0.298**	0.159**	0.400**	–				
DERS Imp.	0.201**	0.195**	0.280**	0.180**	0.135**	0.413**	0.569**	–			
DERS Aware.	0.190**	0.062	0.088*	0.160**	0.127**	0.304**	0.083	0.182**	–		
DERS Strat.	0.495**	0.331**	0.185**	0.415**	0.253**	0.652**	0.695**	0.647**	0.207**	–	
DERS Clarity	0.384**	0.248**	0.166**	0.292**	0.161**	0.499**	0.357**	0.363**	0.572**	0.503**	–

Note: Data are bivariate correlations. All CDISC variables are dichotomous (0 = absent; 1 = present). CDISC Mood = CDISC mood disorder diagnosis presence; CDISC Anx. = CDISC anxiety disorder diagnosis presence; CDISC Ext. = CDISC externalizing disorder diagnosis presence; CDISC SI = CDISC past year suicidal ideation; CDISC SA = CDISC lifetime suicide attempt; DERS Non. = DERS nonacceptance subscale; DERS Goals = DERS goals subscale; DERS Imp. = DERS impulse subscale; DERS Aware. = DERS awareness subscale; DERS Strat. = DERS strategies subscale; DERS Clarity = DERS clarity subscale.

* $p < .05$ (two-tailed).

** $p < .01$ (two-tailed).

awareness, strategies, clarity) and potential covariates (age, sex, CDISC Mood, Anxiety, and Externalizing Disorder diagnosis) on past year suicide ideation and lifetime suicide attempt in separate analyses. Regression analyses were conducted with $N = 547$ participants included in the full sample. Predictor variables entered in each binary logistic regression analysis included: all six DERS subscales (non-acceptance, goals, impulse, awareness, strategies, clarity), age, sex, and presence of CDISC Mood Disorder diagnosis, Anxiety Disorder diagnosis, and Externalizing Disorder diagnosis. Outcome variables entered were CDISC past year suicide ideation and lifetime suicide attempt in separate regressions. Prior to main study analyses, formal detection-tolerance and variance inflation factor (VIF) were used to assess multicollinearity. There was no evidence for multicollinearity. A correlation matrix is shown in Table 2 to depict bivariate level relations between CDISC psychiatric diagnoses included as covariates and main study variables in regression models. Bivariate relations for notable sociodemographic variables are discussed in the above sections.

Full results of the binary logistic regression analyses are depicted in Table 3. In the regression with past year suicide ideation as dependent variable, the logistic regression model was statistically significant, $\chi^2(11) = 183.001$, $p < .001$, with two DERS subscales emerging as significant: strategies ($\beta = 0.065$; $SE = 0.022$; $p = .003$, $OR = 1.067$), such that higher levels of limited access to ER strategies were associated with increased likelihood of suicide ideation in the past year; and impulse ($\beta = -0.048$; $SE = 0.022$; $p = .029$, $OR = 0.953$), such that greater difficulties in impulse control was associated with the absence of suicidal ideation; presence of CDISC Mood Disorder diagnosis was also significant ($\beta = 1.581$; $SE = 0.233$; $p < .001$, $OR = 4.861$), with presence of any CDISC Mood Disorder diagnosis associated with increased likelihood of suicide ideation in the past year. In the regression with lifetime suicide attempt as dependent variable, the logistic regression model was statistically significant, $\chi^2(12) = 191.512$, $p < .001$, with only CDISC past year suicidal ideation emerging as significant ($\beta = 2.748$; $SE = 0.273$; $p < .001$, $OR = 15.605$), such that presence of suicidal ideation was associated with greater likelihood of lifetime suicide attempt; in this model, no other predictor variables were significant.

3.7. Post-hoc analyses

Multiple post-hoc analyses were conducted based on primary logistic regression findings. First, given that significant sex differences existed for multiple main study variables (CDISC past year suicide ideation, CDISC lifetime suicide attempt, and certain DERS subscales), we elected to conduct additional post-hoc binary logistic regression

Table 3
Binary logistic regression analyses summary.

Variable	B (SE)	Odds ratio	p	R ²
<i>CDISC Past Year Suicide Ideation</i>				
Gender	0.030 (0.227)	1.030	.895	
Age	-0.102 (0.075)	0.903	.174	
CDISC Mood Dx.	1.581** (0.233)	4.861	<.001	.284
CDISC Anxiety Dx.	0.344 (0.225)	1.410	.126	
CDISC Externalizing Dx.	0.273 (0.222)	1.314	.219	
Nonacceptance	0.026 (0.020)	1.026	.209	
Goals	0.021 (0.029)	1.021	.472	
Impulse	-0.048* (0.022)	0.953	.029	
Awareness	0.018 (0.022)	1.018	.414	
Strategies	0.065** (0.022)	1.067	.003	
Clarity	-0.001 (0.029)	0.999	.983	
<i>CDISC Lifetime Suicide Attempt</i>				
Gender	-0.256 (0.231)	0.774	.268	
Age	0.060 (0.075)	1.062	.427	
CDISC Mood Dx.	-0.103 (0.284)	0.902	.716	
CDISC Anxiety Dx.	-0.350 (0.244)	0.705	.152	
CDISC Externalizing Dx.	0.175 (0.223)	1.191	.432	
CDISC SI	2.748** (0.273)	15.605	<.001	.923
Nonacceptance	0.002 (0.020)	1.002	.923	
Goals	-0.025 (0.030)	0.976	.410	
Impulse	0.015 (0.022)	1.015	.481	
Awareness	0.024 (0.022)	1.024	.278	
Strategies	0.018 (0.022)	1.019	.408	
Clarity	-0.023 (0.029)	0.977	.415	

Note: All dependent variables are dichotomous CDISC suicide ideation and attempt variables. CDISC Mood Dx. = Presence of any mood diagnosis on the CDISC. CDISC Anxiety Dx. = Presence of any anxiety diagnosis on the CDISC. CDISC Externalizing Dx. = Presence of any externalizing diagnosis on the CDISC. Nonacceptance = DERS nonacceptance subscale, Goals = DERS goals subscale, Impulse = DERS impulse subscale, Awareness = DERS awareness subscale, Strategies = DERS strategies subscale, Clarity = DERS clarity subscale. Cox & Snell R squared values are reported for each regression model.

* $p < .05$.

** $p < .01$.

analyses identical to those conducted with the full sample, separated by sex (i.e., in females only, and males only). Addition of these analyses will provide supplemental information on how facets of emotion dysregulation may relate to suicide ideation and attempt, differentially by sex. In females only (subsample of $n = 348$), we first conducted a post-hoc binary logistic regression with predictors of all six DERS subscales (nonacceptance, goals, impulse, awareness, strategies, clarity), age, and presence of CDISC Mood Disorder diagnosis, Anxiety Disorder diagnosis, and Externalizing Disorder diagnosis, and the outcome variable of CDISC past year suicidal ideation. The model was statistically

significant, $\chi^2(10) = 137.626$, $p < .001$, with the following as significant predictors: age, CDISC Mood Disorder diagnosis, and DERS strategies, such that younger female age, presence of Mood Disorder diagnosis, and higher levels of limited access to ER strategies were associated with increased likelihood of suicide ideation in the past year. In females only, we then conducted a post-hoc binary logistic regression with all of the same predictors (and additionally CDISC past year suicidal ideation), with the outcome variable as CDISC lifetime suicide attempt. Identical to results of the full sample, the model was statistically significant, $\chi^2(11) = 97.968$, $p < .001$, with only CDISC past year suicidal ideation emerging as a significant predictor. In males only (subsample of $n = 201$), we then conducted an identical post-hoc binary logistic regression with predictors of all six DERS subscales, age, and presence of CDISC Mood Disorder diagnosis, Anxiety Disorder diagnosis, and Externalizing Disorder diagnosis, and the outcome variable of CDISC past year suicidal ideation. The model was statistically significant, $\chi^2(10) = 57.308$, $p < .001$, with the following as significant predictors: CDISC Mood Disorder diagnosis and DERS strategies, such that presence of Mood Disorder diagnosis and higher levels of limited access to ER strategies were associated with increased likelihood of suicide ideation in the past year; these findings were consistent with the model in females only, with the exception of age being a significant predictor for females. In males only, we then conducted a post-hoc binary logistic regression with all of the same predictors (and additionally CDISC past year suicidal ideation), with the outcome variable as CDISC lifetime suicide attempt. Identical to results of the full sample and the model in females only, the males-only model was statistically significant, $\chi^2(11) = 100.923$, $p < .001$, with only CDISC past year suicidal ideation emerging as a significant predictor.

Second, given that DERS strategies was significantly positively related with CDISC past year suicidal ideation in primary regression analyses, and this held when examined post-hoc by sex, a receiving operating characteristic (ROC) curve analysis was conducted to examine the optimal threshold on the DERS strategies subscale for determining higher past year suicidal ideation, which is depicted in Fig. 1. Area under the curve (AUC) statistics were tabulated. Optimal threshold cut points for the DERS Strategies subscale were determined via analysis of graphical information and those maximizing sensitivity and specificity, such that we sought to identify the cut point leading to smallest distance from the upper left corner – in other words, maximizing specificity and sensitivity; this approach is common (Habibzadeh et al., 2016) and akin to that utilized by Stefansson et al. (2012). For the ROC curve on CDISC past year suicidal ideation, an optimal cut point of 22.50 on DERS Strategies was determined (AUC = 0.741; $p < .001$, 95% CI = 0.698, 0.783), and cut point of 22.50 had a sensitivity of 74.3% and specificity of 64.1%.

Third, given the evidenced and differential relations between CDISC suicidal ideation and attempt and domains of emotion dysregulation, we conducted additional post-hoc analyses to elucidate links between more proximal indicators of suicidal thoughts and behaviors, relative to aspects of emotion dysregulation. Specifically, we supplemented primary analyses by conducting post hoc *t*-tests to compare youth who reported suicidal ideation and attempt as reasons for psychiatric admission, to those without, on DERS subscales. Reason for psychiatric admission was obtained through an intake report with the clinical team, and was quantitatively and dichotomously recoded to specify those reporting ideation and attempt as reason for admission. Post-hoc independent sample *t*-tests revealed significant differences between those reporting ideation as a reason for psychiatric admission, and those not, such that the ideating group experienced greater difficulties on all emotion dysregulation subscales. In contrast, those reporting attempt as a reason for admission only experienced significantly greater differences on the DERS awareness, nonacceptance, and strategies subscales, relative to those who did not report attempt as a reason for admission. Given that this information came from a non-standardized assessment, results remain tentative and are included to augment primary findings

as how more proximal suicidal thoughts and behaviors link to emotion dysregulation domains.

4. Discussion

The present study took a multidimensional approach to evaluating specific components of emotion dysregulation, consistent with Gratz and Roemer's (2004) conceptualization, in relation to past year suicidal ideation and lifetime suicide attempt among adolescent inpatients, while covarying for sex, age, and presence of multiple psychiatric diagnoses. In the full sample, regression findings revealed significant relations between the DERS strategies subscale, DERS impulse subscale, CDISC Mood Disorder diagnosis, and past year suicidal ideation, while covarying for other DERS subscales, CDISC psychiatric diagnoses (Anxiety, Externalizing), sex, and age. Of the DERS subscales [strategies, impulse] significant in these analyses, it remains critical to note that only the DERS strategies subscale remained significantly related to past year ideation when examined separately in both males and females post-hoc. In all models examining lifetime suicide attempt as outcome (for the full sample, and males and females separately), CDISC past year suicidal ideation emerged as the sole variable significantly associated with lifetime attempt, alongside all other concurrently entered covariates. Considering both a-priori and post-hoc analyses, findings broadly indicated that having limited access to adaptive emotion regulation strategies and presence of a mood disorder diagnosis are associated with suicidal ideation in the past year. However, when past year suicidal ideation is considered concurrent to all other components of emotion dysregulation, psychiatric diagnoses and sociodemographic information, in relation to lifetime suicide attempt, suicidal ideation is only significantly associated with suicide attempt in psychiatric adolescents. Overall, the current study presents preliminary insight to how perceived difficulties with emotion regulation [e.g., in identifying, accepting, or regulating behavior in response to emotion] differentially associate with suicidal thoughts and behaviors in a high-risk group of psychiatric adolescents.

Results indicating an association between perceived limited emotion regulation strategies and suicidal thoughts are consistent with existing research and suicide-focused theory. A significant relation between perceived limited access to effective regulatory strategies and suicidal ideation—both in the full sample, and by sex separately—converges with both adolescent and adult research using the DERS (Rajappa et al., 2012; Weinberg and Klonsky 2009). Present findings parallel those from a regression model by Rajappa et al. (2012), which demonstrated that the DERS strategies subscale significantly associated with suicidal ideation, while other DERS subscales and CDISC mood and anxiety diagnosis were entered as concurrent predictors. This finding, coupled with DERS strategies demonstrating the strongest correlation of all the subscales to suicidal ideation in community adolescents (Weinberg and Klonsky 2009), reinforces that perceived inability to cope with the emotional demands of a situation may be an especially salient factor in adolescent suicidal ideation. This is not surprising, given that limited beliefs in one's ability to cope have been linked to suicidal ideation (e.g., Valois et al., 2015), and suicidal thoughts may represent an alternative cognitive problem solving strategy for unbearable emotion, distressing situations, and the perceived lack of skills to manage this emotion and distress. This may be especially true in situations where stressors cueing the need for emotion regulation strategies are significant and ongoing (e.g., chronic interpersonal conflict, complex trauma). The idea that suicidal ideation may arise as a problem solving strategy in lieu of a lack of perceived regulatory strategies is well aligned with escapist models of suicide (e.g. Baumeister, 1990; Williams, 2001) and also with suicide-specific approaches, such as the Collaborative Assessment for Management of Suicidality (Jobes, 2012) and DBT for suicidal adolescents (Rathus and Miller, 2002). Both of these evidence-based treatments are premised in treating underlying emotion dysregulation impairments and problem

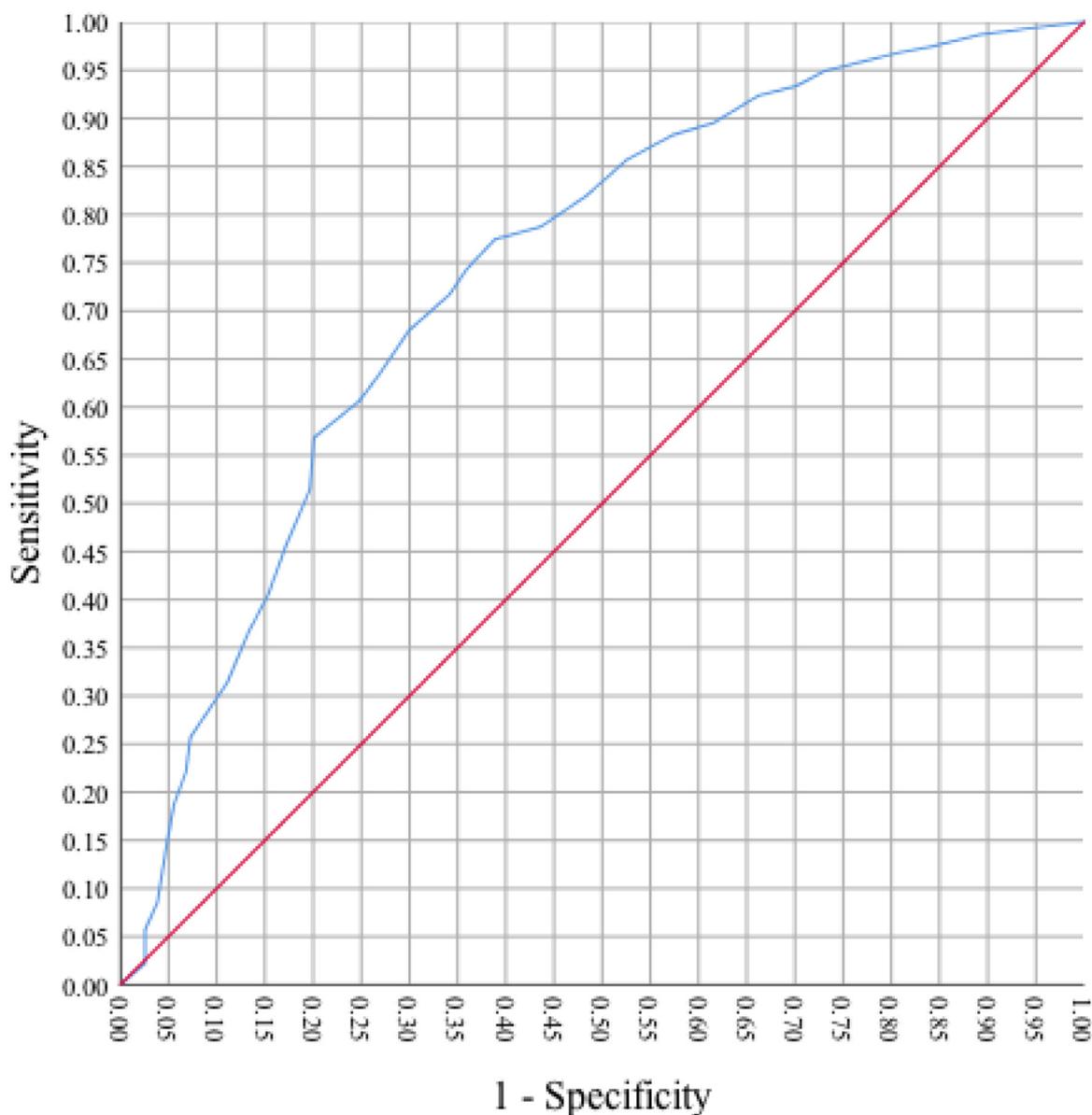


Fig. 1. ROC curve for CDISC past year suicidal ideation

Note: Fig. 1 depicts the ROC curve for DERS strategies subscale in prediction of CDISC past year suicidal ideation presence, AUC = 0.741.

solving deficits in order to mitigate suicide risk. Therefore, theoretical and empirical literature, as well clinical interventions for suicide, appear to converge with the current finding of limited access to effective regulatory strategies being one domain of emotion dysregulation particularly relevant to adolescent suicidal ideation. Additionally, and specific to the current study, is the result that the link between limited perceived emotion regulation strategies and suicidal ideation exists and is non-inherent to the presence of mood, anxiety, or externalizing disorder diagnoses (accounted for as covariates) in adolescent inpatients. This remains a critical finding, suggesting that lacking perceived emotion regulation strategies is not fully characterized by emotion dysregulation inherent to specific psychiatric diagnoses, and that non-diagnostic-inherent portions of limited access to strategies associate with suicidal ideation in adolescent inpatients.

In models examining past year suicidal ideation, multiple additional findings remain important to discuss. First, in all models examining past year suicidal ideation as outcome, presence of mood disorder diagnosis presence emerged as significantly associating with suicidal ideation, alongside all other concurrent diagnostic and demographic covariates.

This finding, holding across both the full sample and by sex separately, is consistent with a robust literature base linking mood disorders to suicidal thoughts and behaviors (e.g., Kessler et al., 1999). Secondly, and in contrast with Weinberg and Klonsky (2009), impulse control difficulties shared a significant negative association with suicidal ideation in the full sample, indicating that greater difficulties in impulse control was associated with the absence of suicidal ideation. This finding is contrary to existing work (e.g., Auerbach et al., 2017) and warrants replication.

In regards to suicidal behavior, findings across models utilizing the full sample and by sex (females, males only) consistently revealed that CDISC past year suicidal ideation was solely and significantly associated with lifetime suicide attempt, and this finding persisted while covarying for sociodemographic information, psychiatric diagnoses (mood, anxiety, externalizing), and domains of emotion dysregulation. Collectively, this indicates that aspects of emotion dysregulation are not significantly related to suicide attempts, beyond their relation with suicidal thinking. This finding is not entirely surprising—a large existing literature base identifies suicidal ideation as a noted risk factor of

suicide attempt (e.g., Kessler et al., 1999). Although the current study is cross-sectional, and cannot speak to temporality of relations between domains of emotion dysregulation, suicidal ideation, and attempt, it appears that specific domains of emotion dysregulation (i.e., limited access to perceived effective means of regulating affect) may share a unique association with past year suicide ideation, and that suicide ideation in turn powerfully associates with lifetime suicide attempt. In this sense, perhaps having limited access to effective emotion regulation strategies is not unimportant in risk for lifetime attempt, but is potentially subsumed and enacted through a dynamic relation with suicide ideation (e.g., suicidal thinking being complexly intertwined with longstanding beliefs about not having effective ways to manage affect and subsequent desire for suicide death). However, and as stated, the current study does not have the temporal design to investigate this hypothesis. This remains a critical question and important topic for future research that may be addressed with ecological momentary assessment.

In contrast to the aforementioned relations, the DERS domains of goals, clarity, awareness, and nonacceptance were not statistically significant in associating with suicidal ideation and attempt, after covarying for other DERS subscales, CDISC psychiatric diagnosis (mood, anxiety, externalizing), and sociodemographic variables. In other words, these results suggest that deficits in emotional awareness, emotional clarity, nonacceptance of emotion states, and problems engaging in goal-directed behavior do not share significant associations with suicidal thoughts and behaviors, when other domains of emotion dysregulation are accounted for. Perhaps it is not that these emotion dysregulation domains do not associate with suicidal thoughts and behaviors – rather, lack of emotion clarity and awareness, issues engaging in goal-directed behavior and impulse control, and non-acceptance of one's own emotions may have negligible associations with suicidal ideation and attempt, when other DERS domains, certain psychiatric diagnoses, and suicidal thoughts are accounted for. This explanation is reinforced by the fact that all DERS subscales shared significant bivariate correlations with suicidal ideation and attempt, though most domains became non-significant when psychiatric diagnoses and other constructs were accounted for in regression models. Cumulatively, our findings generally indicate that perceived lack of emotion regulation strategies may most saliently associate with suicidal thoughts, relative to other dimensions of emotion dysregulation posited by Gratz and Roemer (2004). This finding is important, given that one implication is acute inpatient interventions for suicidal ideation in youth may benefit from bolstering pragmatic skills for regulating intense negative affect, and situations which elicit distress and perceived inadequacy to cope.

4.1. Limitations

Several limitations to the findings of the present study should be noted and represent important areas for future research. First, cross-sectional data was obtained for the current study, which precludes our understanding of causal relationships between emotion dysregulation and suicide ideation and attempt. Second, although a well-validated and widely implemented diagnostic interview was used to capture suicide ideation and attempt, suicide outcome variables on this measure were dichotomous in nature and limited our study to binary outcomes; continuous item-level data on suicide ideation (e.g., severity, frequency), intent, and attempt behavior were not available from this measure. Third, data on emotion dysregulation was captured in days immediately following inpatient admission; it is possible that adolescents' report of emotion dysregulation at this time could be impacted by proximal factors related to their admission (e.g., crisis situation, interpersonal conflict, recent/ongoing mood-related episodes). Fourth, the sample is composed of predominantly Caucasian individuals, potentially limiting our ability to extend these findings to adolescents of other racial groups. Fifth, and also related to sociodemographic

makeup, the current study did not have data available on self-identified gender identity, which precluded inclusion and investigation of this variable in primary study analyses. Sixth, future research would benefit from examining neurobiological mechanisms which may underlie and potentially moderate relations between domains of emotion dysregulation and suicide ideation in adolescents; indeed, adolescence is a time of significant neurobiological development (Dahl, 2004) which may interact with emotion regulation abilities to predict suicidal symptoms. One specific way future research may achieve this is by examining the role of pubertal development on evidenced relations between facets of emotion dysregulation and suicidal ideation. Although the current study does not have data available on pubertal development for the full sample to examine this, it remains an important next step for future research on emotion dysregulation and suicide ideation and attempt. Seventh, an additional limitation of the current study is that individuals excluded from data analyses due to missing data on study measures were significantly younger than participants with complete data; to this end, findings of primary regression analyses may not generalize to those excluded adolescents of younger developmental age. Lastly, the current study may have been susceptible to potential selection bias, given that the sample included patients admitted to a private psychiatric facility, rather than a community or public inpatient hospital. To this end, findings may not generalize to adolescents recruited from a public acute inpatient facility, outpatient psychiatric settings, or the general population.

4.2. Treatment implications

Notwithstanding these limitations, the present study provided a valuable first investigation of the multidimensional approach to emotion dysregulation and its links with suicide ideation and attempt amongst adolescent inpatients, extending the only known community-based work among adolescents (Weinberg and Klonsky 2009). Although findings from this study are preliminary, and in need of further replication, results may have some tentative benefit to informing clinical assessment and treatment of suicidal thoughts and behaviors. Of note, current findings point to one specific dimension of emotion dysregulation [lack of emotion regulation strategies] as being particularly relevant to suicide ideation. Perceived limited access to emotion regulation strategies may be used as one critical variable in identifying risk for suicidal ideation. Based on ROC analyses in the current study, it appears that a cut point of 22.5 and up on the DERS Strategies subscale may serve as one useful factor in identifying adolescent inpatients at particular risk for experiencing suicide ideation; although highly preliminary, such a cut point may have clinical utility in addressing emotion-regulation specific deficits that may stand alongside psychiatric mood disorder diagnosis in marking risk for adolescent suicidal thoughts. Second, assessing emotion regulation difficulties (notably DERS strategies) may have incremental validity in clinical assessments for detecting suicide risk in the past year; in other words, findings of the current study indicate assessing perceived limited access to emotion regulation strategies, alongside other established suicide ideation risk factors, may help us better detect those at greater likelihood of experiencing past year suicidal ideation. Third, and pertinent to intervention, current findings may point to the importance of improving an adolescent's repertoire of emotion regulation strategies, and ability to appropriately utilize them in distressing situations, as a potentially valuable treatment target in acute care. Indeed, a focus on improving affect regulation skills is already incorporated in a number of clinical interventions (e.g., DBT-A; Rathus and Miller, 2002), but this may be especially important to prioritize in acute care settings, where duration stay is short and number of therapy sessions potentially limited. Following further research investigating and demonstrating the salience of perceived lack of access to emotion regulation strategies to suicidal ideation, increased focus on provision and application of appropriate regulatory strategies may also be easily and effectively incorporated in

suicide prevention and step-down outpatient-based programs for suicidal teens following inpatient discharge.

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