



# The role of emotion dysregulation: A longitudinal investigation of the interpersonal theory of suicide

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## ABSTRACT

Emotion dysregulation is considered to be transdiagnostic in nature, given its association with a variety of problem behaviors. Of concern, emotion dysregulation also may be associated with key components of the Interpersonal Theory of Suicide (ITS), namely suicidal desire and acquired capability for suicide (ACS; heightened fearlessness toward death and pain tolerance). ITS suggests that experiencing suicidal desire in conjunction with ACS leads to greater risk for suicide attempts. The present 4-wave longitudinal study tested bidirectional associations among emotion dysregulation, NSSI, ACS, and suicidal desire. Emotion dysregulation was associated with both *desire* and *capability* for suicide over time. Specifically, emotion dysregulation was associated with (1) higher levels of suicidal desire, (2) higher levels of NSSI, which in turn predicted higher ACS, and (3) *lower* ACS, suggesting that individuals with emotion dysregulation may find thoughts of death and pain more aversive. Thus, there are two separate paths for how emotion regulation leads to ACS, one path in which emotion dysregulation indirectly leads to ACS through NSSI, and one path in which emotion dysregulation protects against the development of ACS (note that higher levels of ACS alone are not sufficient to lead to a suicide attempt – suicidal desire also is required).

## 1. Introduction

The ability to manage and regulate emotions has critical implications for psychosocial development. Emotion regulation has been conceptualized as a capacity for evaluating and modifying one's emotional reactions in order to achieve a desired goal (Thompson, 1994). Importantly, poor emotion regulation (i.e., emotion dysregulation) has been linked to models of psychopathology (see Aldao et al., 2010 for a review). Indeed, emotion dysregulation is associated with a variety of problem behaviors including nonsuicidal self-injury (NSSI; the deliberate destruction or alteration of bodily tissue without suicidal intent; American Psychiatric Association, 2013), depression (Silk et al., 2003), and of critical concern- suicide attempts (Pisani et al., 2013). Given the transdiagnostic nature of emotion dysregulation, theoretical models outlining its path to more severe problem behaviors (i.e., suicide attempts) are crucial for aiding in preventative efforts.

One important theoretical model is Joiner's (2005) Interpersonal Theory of Suicide. According to Joiner's theory, in order to end one's own life, an individual must not only desire to end their life (i.e., suicidal desire, thought to be composed of perceived burdensomeness and thwarted belongingness; Van Orden et al., 2010), but also be able to overcome the basic self-preservation instinct (i.e., they must have

acquired a *capability for suicide*; Van Orden et al., 2008). Acquired capability for suicide (ACS), defined as heightened fearlessness toward death and pain tolerance, is thought to develop over time through experiencing repeated painful and provocative events (PPE; e.g., abuse, being in the military, etc.; Van Orden et al., 2008). Although not the focus of the current study, recent research also has indicated that there may be a genetic component to acquired capability for suicide (Smith et al., 2012; see also Klonsky and May, 2015).

Emotion dysregulation may be an important component of the Interpersonal Theory of Suicide framework, given that it has been implicated as a risk factor for each of the main components of the theory, that is, both suicidal desire and ACS. Indeed, cross-sectional research has indicated that higher levels of emotion dysregulation are associated with higher levels of suicidal desire (Anestis et al., 2011a). According to Anestis et al., when individuals are easily overwhelmed by negative emotions they may become more at risk for suicidal desire. Thus, emotion dysregulation may be an important risk factor associated with the *desire to end life*. Researchers also have found a link between emotion dysregulation and ACS (Bender et al., 2012), although research in this area is more limited.

Recently, researchers have suggested two separate paths from which emotion regulation may be associated with ACS. The first is an *indirect*

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path from emotion regulation to ACS through NSSI (Anestis et al., 2013; Law et al., 2015). For example, emotion dysregulation has been found to be cross-sectionally associated with more frequent engagement in NSSI (e.g., as a way to regulate emotions; Andover and Morris, 2014; Anestis et al., 2011b). In turn, higher levels of NSSI has been found to be a PPE associated with higher levels of ACS (Joiner et al., 2012), as indicated by both self-report measures (Franklin et al., 2011) and lab-based tasks (Hamza et al., 2014; St. Germain and Hooley, 2013). In addition, a recent longitudinal study found a unidirectional association between NSSI and ACS, such that NSSI predicted higher levels of ACS over time (Willoughby et al., 2015).

There also may be a direct path from emotion regulation to ACS, whereby poor emotion regulation may serve as a protective factor against developing an ACS (Law et al., 2015). Specifically, Bender et al. (2012) found that higher levels of distress tolerance (i.e., good emotion regulation) were cross-sectionally associated with higher levels of ACS. Indeed, individuals who are better able to tolerate aversive emotions may find thoughts of death and engagement in painful behaviors more manageable and therefore, may be more likely to engage in lethal self-harm (Bender et al., 2012; Anestis et al., 2012). These cross-sectional studies, however, cannot assess temporal order; thus the direction of effects over time (e.g., whether emotion dysregulation predicts ACS (or NSSI) over time, and/or whether ACS (or NSSI) predicts emotion dysregulation over time) is not known. Further, longitudinal work that simultaneously tests both the *desire* and *capability* components of Joiner (2005) theory is necessary in order to ascertain the nature of these associations over time.

The present four-wave longitudinal study represents the first critical test of the link between emotion regulation, suicidal desire, NSSI and ACS over time. On the basis of previous cross-sectional research, we hypothesized that individuals with more emotion dysregulation would report greater suicidal desire over time than individuals with better emotion regulation. We also hypothesized that individuals with more emotion dysregulation would report more frequent engagement in NSSI over time than individuals with better emotion regulation and in turn, that more frequent NSSI engagement will be associated with greater ACS over time. With regard to the direct path from emotion regulation and ACS, in light of previous cross-sectional research, we hypothesized that individuals with better emotion regulation would report greater ACS over time. Whether these effects would still be found in a longitudinal study that measures the key components of the theory simultaneously, however, is not clear. Finally, we also controlled for other potential “third variables”, such as sex, parental education, age, and depression.

## 2. Method

### 2.1. Participants

The current sample ( $N = 782$ ; 75.4% female) was drawn from a larger longitudinal study consisting of 1132 first-year undergraduate students ( $M_{age} = 19.11$ ,  $SD = 1.05$ ) from a mid-sized Canadian university who completed a survey about aspects of their life annually for 7 years. In total, 87.5% of the participants were born in Canada, and the most common ethnic backgrounds reported other than Canadian were British (19%), Italian (16.8%), French (9.5%) and German (9%), which is consistent with the broader demographics for the region (Statistics Canada, 2006). Data on socioeconomic status indicated mean levels of education for mothers and fathers falling in between “some college, university or apprenticeship program” and “completed a college/ apprenticeship/ technical diploma.” Furthermore, 15% of respondents lived at home with one or both parents, 9% lived off-campus with roommates, and 76% lived in campus residences. Given that some of the critical measures in our study (e.g., Acquired Capability for Suicide) were not included in the first 3 waves of the study, and Suicidal Desire was only measured from the 5th to 7th waves, only data from the 4th to

7th waves (referred to in the present study as Time 1 - Time 4, respectively) were analysed in the present study.

### 2.2. Procedure

In the first year of the study, students in first-year university were invited to participate in the survey. The study was advertised by way of posters, emails, classroom announcements, website posting, and residence visits. Students could participate regardless of academic major, and were given monetary compensation or course credit for their participation. Only students who completed the first year of the survey were invited (by email and/or phone) to participate again. The University Ethics Board approved the study (09–118) and all participants provided consent. Although asking young adults about self-injury does not have iatrogenic effects (e.g., Muehlenkamp et al., 2010; Reynolds et al., 2006) or lead to increased distress (Gould et al., 2005), to ensure the safety of our participants a full debriefing was provided at the end of the survey and a list was given of available mental resources and researcher contact information. Participants also were given the opportunity during the survey to provide their contact information so that they could be contacted by a mental health professional if they were experiencing any distress.

### 2.3. Missing data analysis

Missing data occurred within each assessment time point because some students did not finish the entire questionnaire (average missing data = 1.54%, 4.08%, 6.52% and 5.7% at Times 1–4, respectively), and because some students did not complete all four waves of the survey. In our sample, 72.0% completed all four assessments, 15.3% completed three of the four assessments, 7.0% completed two of the four assessments, and 5.6% completed only one of the four assessments. Missing data analysis revealed that the missing data were not dependent on the values of the study measures ( $p > 0.05$ ). Thus, missing data were estimated using the full information maximum likelihood (FIML) estimation method. FIML retains cases that are missing survey waves, thus avoiding the biased parameter estimates that can occur with pairwise or listwise deletion (Schafer and Graham, 2002).

### 2.4. Measures

#### 2.4.1. Demographics

Age, sex, and parental education (one item per parent using a scale of 1 (*did not finish high school*) to 6 (*professional degree*), averaged for participants reporting on both parents;  $r = 0.40$ ) were assessed at Time 1.

#### 2.4.2. Depressive symptoms

Depressive symptoms were measured at Time 1 using the Center for Epidemiological Studies Depressive Symptoms Scale (CES-D, Radloff, 1977). Participants indicated how often they experienced 20 depressive symptoms (e.g., felt sad) on a 5-point scale from 1 (*none of the time*) to 5 (*most of the time*). The CES-D has been shown to have good internal consistency and validity in previous research (Radloff, 1977). Cronbach's alpha for this sample was 0.931.

#### 2.4.3. Emotion dysregulation

Participants completed 6 items from the Difficulties with Emotion Regulation Scale at all four time periods (DERS, Gratz and Roemer, 2004), reporting the extent to which they agreed with the items (e.g., “When I'm upset, I have difficulty concentrating”) on a scale from 1 (*not at all like me*) to 5 (*completely like me*). Higher scores indicate higher levels of emotion dysregulation. The DERS has been shown to have good internal consistency and discriminant validity (Gratz and Roemer, 2004; Weinberg and Klonsky, 2009). The Cronbach's alphas in the present study were 0.780, 0.781, 0.771, 0.790 at Times 1–4,

respectively.

#### 2.4.4. Acquired capability for suicide

A 5-item shortened version of The Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008) was used to assess an individual's fear of death and pain tolerance. At all four time periods, participants rated each item (e.g., “Things that scare most people don't scare me” and “I can tolerate more pain than most people”) on a 5-point scale ranging from 1 (*not at all like me*) to 5 (*very much like me*). Higher scores indicate higher levels of ACS. The ACS questionnaire has shown good reliability and validity in previous studies (Bender et al., 2011). Cronbach's alpha in the present study were 0.743, 0.771, 0.771, 0.765 at Times 1–4, respectively.

#### 2.4.5. Nonsuicidal self-injury (NSSI)

Participants completed the Inventory of Statements about Self-Injury (ISAS; Klonsky and Glenn, 2009) at all four time points to specify whether they had engaged in self-injury. A list of seven self-injurious behaviors that specifically involved tissue damage (e.g., cutting, burning, head banging) was provided. Participants were asked to indicate how many times they had intentionally engaged in the behaviors, without lethal intent, in the past year using the following seven categories: (1) I have engaged in NSSI at some point in lifetime but not in the past year, (2) 1 incident, (3) 2–4 incidents, (4) 5–10 incidents, (5) 11–50 incidents, (6) 51–100 incidents, (7) more than 100 incidents (see Hamza and Willoughby, 2014; Heath et al., 2008). The ISAS has been shown to have good reliability and validity in previous research (Klonsky and Glenn, 2009).

#### 2.4.6. Suicidal desire

Suicidal desire (i.e., perceived burdensomeness and thwarted belongingness; Van Orden et al., 2010) was assessed at Times 2–4 using 11 items from the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012 – note that items related to perceived burdensomeness versus thwarted belongingness were correlated at 0.70). Participants rated each item (e.g., “These days, the people in my life would be better off if I were gone” and “These days, I rarely interact with people who care about me”) on a 7-point scale ranging from 1 (*not at all true for me*) to 7 (*very true for me*). Higher scores indicate higher levels of suicidal desire. Cronbach's alpha in the present study were 0.911, 0.907, 0.918 at Times 2–4, respectively.

### 3. Results

#### 3.1. Preliminary analyses

Descriptive statistics for all study variables are listed in Table 1. A MANOVA testing sex differences among the four main study variables indicated that males, in comparison to females, had higher ACS across all four time points ( $p < 0.001$ ), greater suicidal desire across Times 2, 3 and 4 ( $p < 0.01$ ; see Davidson et al., 2011 and Freedenthal et al., 2011 for similar findings using the INQ), and greater engagement in

NSSI at Time 4 ( $p = 0.037$ ). Females had greater emotion dysregulation at Time 1 ( $p < 0.001$ ), Time 2 ( $p = 0.013$ ), and Time 3 ( $p = 0.014$ ) than males.

At Times 1–4, 20.9%, 26.0, 26.9%, and 27.2% of the participants indicated that they had engaged in NSSI at some point during their lifetime but not in the past year, and 12.6%, 8.3%, 8.7%, and 8.4% indicated that they had engaged in NSSI in the past year respectively. On average, 15% of the sample reported at least one instance of suicide ideation over the four years of the study, while 6.3% reported at least one suicide attempt in their lifetime.

#### 3.2. Primary analyses

Statistical analyses were carried out using auto-regressive cross-lag path analyses in MPlus 7. Model fit was determined using the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) indicators. The cut-off criteria recommended by Hu and Bentler (1999) for a well-specified model are a CFI > 0.95 and a RMSEA < 0.06, simultaneously. The model was comprised of four variables measured across four years: NSSI, ACS, emotion dysregulation and suicidal desire with one exception—suicidal desire was not included in the first wave given that it was not assessed in the study until wave 2 (see Fig. 1). Across the four time periods the following paths were included: lag-1, lag-2, and lag-3 autoregressive paths (i.e., within each variable), lag-1 cross-lag paths, and concurrent associations among all variables within each wave. We also included sex, parental education, age, and depression as covariates. Correlations were specified among the covariates and each of the study variables at Time 1, while paths were estimated from each of the covariates to the study variables at Time 2, Time 3 and Time 4. Any significant paths, therefore, accounted for the correlations among the variables within a wave and controlled for previous scores on the outcome variables, covariates, and any other predictors in the model (i.e., allowing for the estimation of the unique relation between study variables).

In order to assess whether results were invariant across the time periods, we first compared a model where the cross-lag paths were constrained to be equal across the four waves, to one where paths were unconstrained (i.e., free to vary) over time. A chi-square difference test of relative fit indicated that the unconstrained model did not provide a significantly better fit to the data than the constrained model,  $\chi^2_{diff}(18) = 15.533, p = 0.625$ . Thus, all subsequent analyses were based on the constrained, more parsimonious, model. Model fit was well-specified,  $\chi^2(48) = 57.008, p = 0.175, CFI = 0.999$  and RMSEA = 0.015, 90% CI [0.00, 0.028],  $p = 1.00$ . See Table 2 for a summary of the beta weights. Significant paths among the key variables are depicted in Fig. 1.

The results indicated that emotion dysregulation was a significant predictor of all key study variables, controlling for previous scores. Specifically, higher emotion dysregulation was associated with higher suicidal desire over time. There also was a significant unidirectional association found between emotion dysregulation and NSSI, as well as between NSSI and ACS, such that higher emotion dysregulation was

**Table 1**  
Means and Standard Deviations.

Variables	Time 1 <i>M(SD)</i>		Time 2 <i>M(SD)</i>		Time 3 <i>M(SD)</i>		Time 4 <i>M(SD)</i>	
Emotion Dysregulation	2.801	(0.774)	2.676	(0.787)	2.657	(0.764)	2.595	(0.775)
Nonsuicidal self-injury	0.623	(1.171)	0.539	(1.039)	0.567	(1.074)	0.584	(1.144)
ACS	2.355	(0.827)	2.290	(0.834)	2.296	(0.863)	2.289	(0.838)
Suicidal Desire			2.505	(1.213)	2.520	(1.302)	2.454	(1.222)
Depressive Symptoms	2.026	(0.680)						
Sex (%)	75.4% Females							
Age	22.986	(0.870)						
Parental Education	3.687	(1.291)						

Note. ACS = acquired capability for suicide.

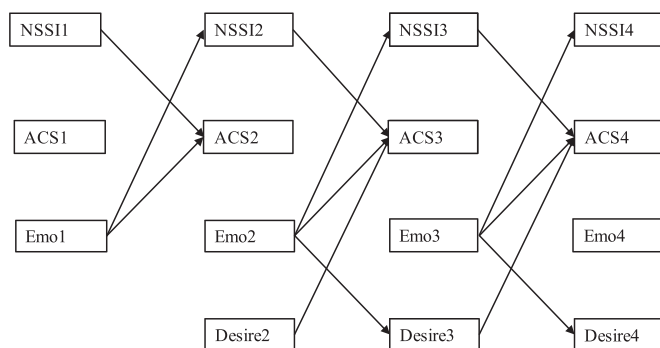


Fig. 1. Significant cross-lagged paths among all key study variables. Numbers 1, 2, 3 and 4 indicate Time 1 to Time 4, respectively. NSSI = nonsuicidal self-injury, ACS = acquired capability for suicide, Emo = emotion dysregulation, Desire = suicidal desire.

associated with more engagement in NSSI over time and greater engagement in NSSI was associated with higher ACS over time. Greater suicidal desire was also associated with higher ACS a year later. There also was a unidirectional association between emotion dysregulation and ACS, whereby higher emotion dysregulation was associated with lower levels of ACS over time (note that the bivariate correlation between emotion dysregulation and acquired capability for suicide was negative as well  $r = -0.108, p < 0.01$ ).

#### 4. Discussion

The present study extended previous cross-sectional research by longitudinally testing the role of emotion dysregulation in predicting the desire and capability components of Joiner's (2005) Interpersonal Theory of Suicide. Specifically, we tested the bidirectional associations among emotion dysregulation, NSSI, ACS and suicidal desire. Results revealed that emotion dysregulation may be an important predictor of both desire and capability for suicide. In terms of desire, emotion dysregulation was associated with higher levels of suicidal desire. Thus, emotion dysregulation may be an important construct to consider when trying to identify why individuals may develop and maintain a desire for suicide.

In regard to the development of a capability for suicide, two distinct paths in which emotion dysregulation was associated with ACS were found. First, emotion dysregulation was associated with greater engagement in NSSI over time, and, in turn, greater engagement in NSSI

predicted higher levels of ACS over time. Thus, emotion dysregulation may be an important predictor for a key painful and provocative event (NSSI) associated with higher ACS.

The second path represents a more direct association between emotion dysregulation and ACS. Specifically, emotion dysregulation significantly predicted lower levels of ACS over time. This suggests that emotion dysregulation may act as a protective factor against developing a capability for suicide (i.e., less fear of death/ pain tolerance). Indeed, individuals with emotion dysregulation may have a hard time enduring inherently frightening or painful experiences (i.e., suicidal behaviors), whereas individuals with good emotion regulation may be better able to handle aversive situations (Bender et al., 2012), and thus be less afraid of death and more tolerant to pain. Future research, however, should further investigate why emotion dysregulation may be a protective factor against developing a higher level of ACS. Overall, the results of this study highlight the importance of identifying how individuals regulate emotions in order to aid in preventative measures, given that emotion dysregulation plays a key role in predicting ACS. Critically, our results should not be interpreted as implying that good emotion regulation will be associated with more suicide attempts. Indeed, while having good emotion regulation is linked to higher levels of acquired capability for suicide over time, it is simultaneously associated with lower levels of suicidal desire. Joiner's (2005) theory suggests that both desire and capability are necessary in order to engage in lethal self-harm; thus, we would not expect good emotion regulation to be associated with suicide attempts in the absence of suicidal desire.

There are important strengths of our study including a large sample, the inclusion of multiple covariates, as well as the use of a longitudinal design. Our study, however, is not without limitations. First, participants consisted of a university sample with the majority of the participants born in Canada and of Caucasian ethnicity; therefore, the generalizability of this study to other geographical regions may be limited. Further, it would be valuable for future research to assess self-injurious behaviors in real time through techniques such as ecological moment sampling (i.e., daily diaries). Third, the present study utilized a non-clinical population. Future research should investigate whether the results of this study are generalizable to, or are

consistent in clinical populations. Fourth, some of the standardized coefficients were small, yet this is common among cross-lagged models given that the model controls for previous scores (within variables), covariates, and correlations among variables within each wave (Adachi and Willoughby, 2014). Another limitation in our study is that some of our measures did not include all the items from the original scales (e.g.,

Table 2  
Autoregressive Cross-Lagged Model Results.

	Time1→Time2		Time2→Time3		Time3→Time4	
	β	95% CI	β	95% CI	β	95% CI
Emo→Emo	0.555***	[0.494, 0.617]	0.433***	[0.360, 0.506]	0.423***	[0.347, 0.500]
Emo→NSSI	0.032*	[0.007, 0.057]	0.033*	[0.007, 0.058]	0.031*	[0.007, 0.056]
Emo→ACS	-0.044*	[-0.079, -0.009]	-0.043*	[-0.077, -0.009]	-0.042*	[-0.076, -0.009]
Emo→Desire			0.128***	[0.070, 0.186]	0.132***	[0.072, 0.193]
NSSI→Emo	0.010	[-0.024, 0.044]	0.010	[-0.023, 0.043]	0.010	[-0.023, 0.042]
NSSI→NSSI	0.795***	[0.766, 0.824]	0.430***	[0.374, 0.486]	0.364***	[0.286, 0.442]
NSSI→ACS	0.036*	[0.004, 0.068]	0.032*	[0.004, 0.061]	0.033*	[0.004, 0.062]
NSSI→Desire			0.033	[-0.016, 0.082]	0.035	[-0.017, 0.087]
ACS→Emo	-0.032	[-0.066, 0.001]	-0.034	[-0.069, 0.001]	-0.034	[-0.070, 0.001]
ACS→NSSI	0.017	[-0.005, 0.039]	0.018	[-0.005, 0.040]	0.018	[-0.005, 0.042]
ACS→ACS	0.638***	[0.592, 0.684]	0.494***	[0.425, 0.564]	0.398***	[0.324, 0.472]
ACS→Desire			0.024	[-0.028, 0.075]	0.026	[-0.031, 0.084]
Desire→Emo			0.026	[-0.002, 0.075]	0.028	[-0.023, 0.079]
Desire→NSSI			0.015	[-0.014, 0.044]	0.016	[-0.015, 0.047]
Desire→ACS			0.048*	[0.007, 0.089]	0.053*	[0.008, 0.098]
Desire→Desire			0.321***	[0.233, 0.408]	0.287***	[0.201, 0.372]

Note. β = standardized beta weights; CI = standardized confidence intervals. NSSI = nonsuicidal self-injury, ACS = acquired capability for suicide, Emo = emotion dysregulation, Desire = suicidal desire. \* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

ACSS, INQ, and DERS). As the data were part of a larger longitudinal study assessing a wide range of constructs relating to adjustment, it was not feasible to include all items from every scale. The reliability of these reduced scales, however, was good for all three measures. Finally, because ACS was measured through self-report questions, it is unclear whether this measure of pain tolerance represents actual pain tolerance. Future research would benefit from using a lab-based test such as a cold pressor test to help address this question.

## 5. Conclusion

The present study helps to clarify the relationship between emotion dysregulation, NSSI, suicidal desire, and ACS. Importantly, this study offers three separate ways in which emotion dysregulation may be associated with an increased risk for suicide. First, emotion dysregulation was found to be associated with higher levels of suicidal desire. Second, emotion dysregulation predicted greater engagement in NSSI, which, over time, predicted higher levels of ACS. Finally, having good emotion regulation (an ability to tolerate aversive stimuli) was found to be directly associated with higher levels of ACS. While the results may seem conflicting because they suggest that both good and bad emotion regulation can lead to higher levels of ACS, it is important to note that higher levels of ACS alone are not sufficient to lead to a suicide attempt – suicidal desire also is required. Overall, interventions targeted at decreasing risk for suicide attempts may benefit from implementing emotion regulation strategies that encourage healthier and more balanced ways of managing emotions.

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