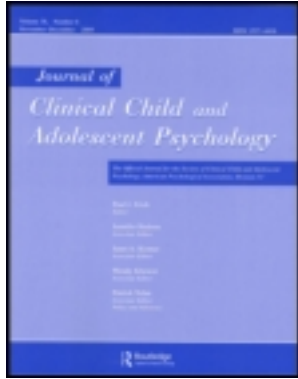


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Jeremy W. Pettit ^a, Kelly L. Green ^b, Kelly E. Grover ^b, Dawnelle J. Schatte ^c & Sharon T. Morgan ^d

^a Department of Psychology, Florida International University

^b Department of Psychology, University of Houston

^c Department of Psychiatry and Behavioral Stress, University of Texas Health Science Center at Houston

^d Department of Psychology, Prairie View A&M University

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Domains of Chronic Stress and Suicidal Behaviors Among Inpatient Adolescents

Jeremy W. Pettit

Department of Psychology, Florida International University

Kelly L. Green and Kelly E. Grover

Department of Psychology, University of Houston

Dawnelle J. Schatte

*Department of Psychiatry and Behavioral Stress,
University of Texas Health Science Center at Houston*

Sharon T. Morgan

Department of Psychology, Prairie View A&M University

Little is known about the role of chronic stress in youth suicidal behaviors. This study examined the relations between specific domains of chronic stress and suicidal behaviors among 131 inpatient youth (M age = 15.02 years) who completed measures of stress, suicidal ideation, suicide attempt, and suicide intent. After controlling for demographics, diagnostic status, past history of attempt, and life event stress, the predictors of suicidal ideation were chronic stress in family relationships, close friendship, and physical health. Chronic close friendship stress also predicted suicide intent among attempters after controlling for covariates. No domain robustly predicted the presence of an attempt or moderated the relation between life event stress and suicidal behaviors. These findings highlight the role of certain domains of chronic stress in suicidal ideation and suicide intent.

The rates of suicidal ideation and attempt increase dramatically during adolescence (Centers for Disease Control and Prevention, 2008), making it a critical period in which to investigate potential etiological factors. A sizable body of research has focused on the role of life event stress in adolescent suicidal behaviors (Overholser, 2003), but little research has considered the role of chronic stress, or ongoing conditions in the environment that create challenges to individuals (Hammen, 2004). Developing a clearer understanding of the relations between chronic stress and suicidal behaviors is important because it may identify targets for assessment and prevention strategies and may also inform etiological models of suicidal behaviors.

A small number of studies among adolescents reported that global chronic stress significantly, albeit weakly, predicted suicidal ideation (Grover et al., 2009; Kelly, Lynch, Donovan, & Clark, 2001), suicide attempt (Grover et al., 1990), and suicide (Beautrais, 2001; Marttunen, Aro, & Lonnqvist, 1993). The present study sought to add to this literature and to develop a more refined view of the relations between chronic stress and suicidal behaviors (operationalized as ideation, attempt, and the intent of attempts) by (a) examining the relations between specific domains of chronic stress and suicidal behaviors and (b) examining whether chronic stress interacted with major life event stress to predict suicidal behaviors.

The first aim was to examine the relations between domains of chronic stress and suicidal behaviors. Prior studies found that global chronic stress predicted suicidal ideation (Kelly et al., 2001) and attempt (Grover et al.,

Correspondence should be addressed to Jeremy W. Pettit, Department of Psychology, Florida International University, 11200 S.W. 8th Street, Miami, FL 33199. E-mail: jpettit@fiu.edu

2009), but global indices that reflect the sum of multiple domains may lead to inconsistent and misleading results by masking important context-specific features (Rudolph & Hammen, 1999). Although we are not aware of prior research that has examined domains of chronic stress in relation to suicidal behaviors, theory points toward ongoing interpersonal problems as a key precipitant of suicidal behaviors. The interpersonal-psychological theory emphasizes the roles of social disconnection from others and perceived burdensomeness toward others in suicide (Joiner, 2005). It may be that ongoing stress in relationships fosters social disconnection and perceived burdensomeness, which in turn enhance the risk of suicidal behaviors. Consistent with that theory, studies on life event stress in adolescence found that family disputes and romantic breakups frequently precipitated suicidal behaviors (e.g., Asarnow et al., 2008; Fordwood, Asarnow, Huizar, & Reise, 2007; Kelly et al., 2001).

The second aim of the current study was to examine the interactive effects of chronic and life event stress on suicidal behaviors. Chronically stressful conditions may lead to a “straw that broke the camel’s back” phenomenon, in which even mild life event stress is sufficient to induce suicidal behaviors if it occurs in the context of high ongoing stress (Beautrais, 2001; Dupéré, Leventhal, & Lacourse, 2009). This has been noted particularly in the context of ongoing familial strife (Marttunen et al., 1993). According to this model, familial stress should moderate the relation between life event stress and suicidal behaviors, with life event stress being less predictive of suicidal behaviors among youth who experience high, as compared to low, chronic stress.

In summary, there are important, unaddressed questions about the role of chronic stress in youth suicidal behaviors. The present study addressed these gaps by examining domains of chronic stress and the interactive effects of chronic and life event stress. Based on the interpersonal-psychological theory and past research, we tested two hypotheses among inpatient adolescents: (a) domains of chronic interpersonal stress would predict suicidal behaviors but domains of noninterpersonal stress would not, and (b) chronic familial stress would moderate the associations between life event stress and suicidal behaviors, such that the associations between life event stress and suicidal behaviors would be smaller in magnitude among youth who experienced high, as opposed to low, chronic familial stress.

METHOD

Participants and Procedures

Participants were drawn from consecutively admitted psychiatric inpatients. During an admission interview,

142 patients who endorsed suicidal ideation or an attempt during the prior week were invited to participate in the study. Suicide attempt was defined as self-harm that involved at least some nonzero intent to kill oneself (O’Carroll, Berman, Maris, & Moscicki, 1996). Nine additional patients were identified as suicidal but were excluded due to developmental disabilities or severe psychosis that would have prevented completion of the study. After the study was explained, patients and their parents provided informed consent. One hundred thirty-one (92.3%) agreed to participate and were interviewed by clinical psychology graduate students. Participants were given a \$15 gift card as compensation. This study was conducted as approved by the Institutional Review Boards.

Participants (70.2% female) ranged in age from 13 to 17 years ($M = 15.02$, $SD = 1.23$) and identified themselves as Hispanic (42.7%), non-Hispanic White (26.6%), non-Hispanic Black (21.0%), multiracial (7.3%), or Asian (1.6%). Age, gender, and race/ethnicity were not significantly associated with suicidal behaviors.

Measures

The Modified Scale for Suicide Ideation (Miller, Norman, Bishop, & Dow, 1986) is an 18-item interview measure of suicidal ideation in the past year. Responses are scored from 0 to 3, and total scores range from 0 to 54 (higher scores represent greater ideation). Its reliability and validity have been supported among youth (Pettit et al., 2009). Internal reliability was acceptable ($\alpha = .76$).

The Suicide Intent Scale (Beck, Schuyler, & Herman, 1974) is a 15-item interview measure of the seriousness of intent to commit suicide in one’s most recent attempt. Each item is rated from 0 to 2 with the total score ranging from 0 to 30 (higher scores represent greater intent). Its reliability and validity have received support among youth (Goldston, 2000). The scale was administered to participants who endorsed an attempt in the week before admission. Internal reliability was acceptable ($\alpha = .77$).

The Chronic Stress and Episodic Life Events Interview for Adolescents (Hammen, 2004) is a semistructured interview about chronic stress and specific events (i.e., life event stress) in eight domains (see Table 1). During the interview, a narrative was written to summarize ongoing conditions and the context of each life event. The narrative was later read aloud to a team of three to eight members including the first author and clinical psychology graduate students who were blind to participants’ suicide attempt status and subjective reactions to the events (i.e., how distressing the participants found the events). The team gave consensual ratings of chronic stress in the past 6 months in each domain on a scale from 1 (*exceptionally high-quality circumstances*) to 5

TABLE 1
Descriptions of Chronic Stress Domains

Domain	Description
Interpersonal	
Close Friend	Presence and quality of relationship with closest friend. Low scores reflect a high quality, close, confiding friendship. High scores reflect the absence of a close, confiding friendship.
Social Life	Number of friends, frequency of social activities, level of conflict with others. Low scores reflect the presence of many good friends, frequent social activities outside school, and low conflict with peers. High scores reflect social isolation and/or frequent fights with and rejection by peers.
Romantic	Quality of and satisfaction with romantic relationship. Low scores reflect stable, supportive, and satisfying relationships for those with a partner, or high satisfaction for those without a partner. High scores reflect high conflict, abusive relationships for those with a partner, or unhappiness and loneliness for those without a partner.
Family	Quality of relationships with parents. Low scores reflect high contact, closeness, trust, and good conflict resolution. High scores reflect neglectful, abusive relationships.
Noninterpersonal	
Academic	Quality of school performance. Low scores reflect superior grades in all subjects and possible receipt of awards for performance. High scores reflect failure in multiple subjects or full-time placement in special classes.
Finance	Financial standing. Low scores reflect comfortable lifestyle, no need to budget, enough money for leisure expenses. High scores reflect the absence of housing and/or food, dependence on social assistance.
Personal Health	Health status and healthy lifestyle. Low scores reflect excellent physical condition and a healthy lifestyle. High scores reflect serious, impairing health conditions that require ongoing care. Ongoing alcohol, drug, and tobacco are rated as an unhealthy lifestyle.
Family Health	Health status and healthy lifestyle in immediate family members. Scores are similar to those for personal health, with the exception that high scores may reflect adolescent caretaker responsibilities.

Note: Descriptions drawn from Hammen (2004)

(*extreme adverse conditions*). Reliabilities based on independent raters yielded intraclass correlations across the domains from .87 to .93. Based on Ostiguy et al. (2009), we computed interpersonal and noninterpersonal chronic stress indices by separately summing ratings for the four interpersonal domains ($\alpha = .57$) and ratings for the four noninterpersonal domains ($\alpha = .47$). Due to

the low internal reliability of the summed indices, we examined each domain separately and did not examine composite scores.

The team also gave consensual ratings for each life event on the objective stress of the event on a scale from 1 (*no negative stress*) to 5 (*severe negative stress*). A continuous objective event stress index in the past 3 months was computed by summing the rating for each event. Reliability based on independent raters yielded an intraclass correlation of .95 for total event stress. Additional details on the stress interview may be found in Hammen et al. (1987) and Rudolph and Hammen (1999).

Diagnostic status. Current Axis I diagnoses were obtained with the Diagnostic Interview Schedule for Children IV–Present State Voice Version (Voice DISC–IV; Wasserman, McReynolds, Fisher, & Lucas, 2005). For the present study, we created dichotomous variables representing the presence or absence of major depressive disorder or bipolar disorders (Mood Disorder), any anxiety disorder, any substance use disorder, and conduct disorder or oppositional defiant disorder.

RESULTS

Descriptive data on measured variables are presented in Table 2 for the total sample. In Table 3, descriptive data are provided for the 55 participants who made an attempt in the week before admission. Common methods of attempt were overdose (54.4%), cutting (22.8%), and asphyxiation (10.5%). Also in Table 2, the associations between predictors and suicidal behaviors are presented. Three domains of interpersonal stress (close friend, romantic, and family) and one domain of noninterpersonal stress (personal health) were significantly associated with ideation. To examine the incremental validity of these four domains in predicting ideation, analyses were repeated while controlling for demographic factors, past attempt, diagnostic status, and life event stress. Close friend stress, partial correlation (pr) = .18; family stress, pr = .21; and health stress, pr = .22, were still significantly associated with ideation after controlling for covariates (all $ps < .05$), but romantic stress was not, (pr) = .15, p = .10.

Romantic stress was the only domain that was significantly associated with attempt, but the association was not significant after controlling for covariates (odds ratio = 1.45, 95% confidence interval = .86–2.44, p = .16). Among attempters, close friend and general social life were significantly associated with intent. The former association remained significant after controlling for covariates, pr = .30, $p < .05$, but the latter did not, pr = .27, p = .06.

TABLE 2
Associations Between Predictor Variables and Suicidal Behaviors

	<i>n</i> (%) or <i>M</i> (<i>SD</i>)	<i>Ideation</i>		<i>Attempt</i>		<i>Intent^a</i>		
		<i>t</i>	<i>r</i>	χ^2	<i>t</i>	<i>t</i>	<i>r</i>	
Diagnosis								
Mood Disorder	30 (23.1%)	3.56**	—	0.14	—	0.36	—	
Anxiety Disorder	50 (38.0%)	2.41*	—	0.59	—	0.22	—	
Substance Disorder	26 (19.8%)	1.39	—	8.79**	—	0.14	—	
Conduct/ODD	36 (27.3%)	2.08*	—	2.02	—	1.15	—	
Suicidal Behaviors								
Ideation	20.16 (11.16)	—	—	—	—	—	—	
Intent ^a	13.71 (4.61)	—	.24	—	—	—	—	
Attempt	55 (41.9%)	3.38**	—	—	—	—	—	
Past Attempt	26 (19.8%)	2.08*	—	4.48*	—	1.50	—	
Interpersonal Stress								
Close Friend	2.65 (1.02)	—	.18* [†]	—	1.46	—	.42** [†]	
Social Life	3.06 (.87)	—	.13	—	-0.50	—	.34*	
Romantic	2.75 (.80)	—	.17*	—	2.23*	—	.12	
Family	3.40 (.70)	—	.24** [†]	—	1.66	—	.06	
Noninterpersonal Stress								
Financial	3.23 (.65)	—	.12	—	0.74	—	-.02	
Academic	3.42 (1.11)	—	-.02	—	0.20	—	-.17	
Personal Health	2.27 (.55)	—	.31** [†]	—	1.45	—	.12	
Family Health	2.79 (.71)	—	.03	—	1.14	—	.01	

Note: Data in second column are presented as mean (*SD*) for continuous variables, *n* (%) for categorical variables. *T* statistics are presented for categorical-continuous associations, Pearson *r* for continuous-continuous associations, and chi-square values for categorical-categorical associations. For Attemptal and Diagnosis, 0 = Absent and 1 = Present. *N* = 131.

^a*n* = 55.

p* < .05. *p* < .01.

[†]Association remained significant after controlling for covariates.

TABLE 3
Descriptive Statistics on Study Variables Among Current Attempters

	<i>n</i> (%) or <i>M</i> (<i>SD</i>)
Demographics	
Age	14.93 (1.14)
Female Gender	38 (69.1%)
Hispanic/Latino	21 (38.1%)
Non-Hispanic Black	12 (21.8%)
Non-Hispanic White	16 (29.1%)
Diagnosis	
Mood Disorder	15 (27.3%)
Anxiety Disorder	20 (36.3%)
Substance Disorder	16 (29.1%)
Conduct/ODD	17 (30.9%)
Suicidal Behaviors	
Ideation	23.27 (11.06)
Past Attempt	17 (30.9%)
Interpersonal Stress	
Close Friend	2.77 (1.05)
Social Life	3.09 (.80)
Romantic	2.94 (.83)
Family	3.50 (.70)
Noninterpersonal Stress	
Financial	3.35 (.60)
Academic	3.47 (1.18)
Personal Health	2.25 (.50)
Family Health	2.92 (.65)

Note: Data are presented as mean (*SD*) for continuous variables, *n* (%) for categorical variables. *n* = 55.

We examined whether each domain of chronic stress moderated the associations between life event stress and suicidal behaviors. Life event stress and chronic stress were centered before computing interaction terms. Because 24 interaction models were examined, Holm's modified Bonferroni correction was used to retain .05 as the familywise error rate. None of the eight interaction terms significantly predicted ideation, attempt, or intent after controlling for covariates.

DISCUSSION

This study examined the relations between domains of chronic stress and suicidal behaviors among inpatient adolescents. Consistent with the interpersonal-psychological theory and past research (e.g., Asarnow et al., 2008), results largely supported the hypothesis that domains of chronic interpersonal stress would predict suicidal behaviors. This was the case for suicidal ideation as well as for suicide intent among those who made an attempt. Examination of chronic stress domains revealed significant associations between ideation and higher stress in each interpersonal domain except general social life. The present findings add to

the existing literature linking interpersonal disputes to suicidal ideation in adolescence (King & Merchant, 2008; Wagner, Silverman, & Martin, 2003) and emphasize the importance of ongoing family and close friend functioning in addition to isolated episodes of conflict. The absence of a significant relation between chronic social life stress and ideation may indicate that stress in close relationships (e.g., best friend, immediate family) is more closely connected to suicidal thoughts than stress in broader peer networks. Moreover, the findings for chronic family stress are consistent with the well-documented relations between interpersonal trauma, particularly sexual abuse, and suicidal behaviors (e.g., Bebbington et al., 2009; King & Merchant, 2008), although this investigation did not examine abuse.

The significant association between chronic health stress and suicidal ideation was unexpected, although it is consistent with a recent study linking health problems to suicidal behaviors in high school students (Epstein & Spirito, 2009). Our measure of health included regular substance use, which has been associated with suicidal behaviors. However, the finding that the association between chronic health stress and suicidal ideation remained significant after controlling for psychiatric diagnoses (including substance use disorders) suggests that other aspects of health stress may have driven this relation.

The only domain related to suicide attempt was chronic romantic stress. This finding corresponds to past findings that romantic life event stress (i.e., breakups and pregnancy) predicted the presence of an attempt among youth (Asarnow et al., 2008). It also suggests that ongoing romantic problems, not just major romantic events, may enhance the risk of attempt. However, it is important to note that the relation between romantic stress and attempt did not remain significant after controlling for covariates. It therefore seems likely that romantic stress was related to attempt at least in part via its overlap with other measured variables.

Among attempters, those who experienced high chronic stress in the close friendship and general social life domains displayed greater suicide intent, and the association between close friendship and intent remained significant after controlling for covariates. High scores on close friendship indicate the absence of a close, confiding friendship, and high scores on general social life can reflect either social isolation or conflictive relations with peers. Consistent with the interpersonal-psychological theory, these findings may suggest that ongoing social disconnection portends a greater intent to die when adolescents make a suicide attempt.

Finally, the present findings did not support a “straw that broke the camel’s back” model in which domains of chronic stress moderate the relation between life event stress and suicidal behaviors. Rather, the findings

suggest that some domains of chronic stress had incremental validity in predicting suicidal ideation and intent and that these effects did not vary across levels of life event stress.

Findings should be interpreted in light of study limitations. First, data were not collected from parents to confirm diagnostic status and suicidal behaviors. Second, the low prevalence of current psychiatric disorders may indicate that youth did not attend to items on the Voice DISC-IV. The Voice DISC-IV was administered at the end of data collection, and it is possible that participant fatigue and the less interactive nature of the computerized task—as compared to direct interviews—led to inaccurate responding. Third, histories of non-suicidal self-injury and Axis II disorders, including borderline personality disorder, were not assessed. Fourth, the severity of this inpatient sample and the absence of a nonsuicidal control group limit the generalizability of the findings. Finally, the cross-sectional design prevents conclusions regarding the direction of associations.

Implications for Research, Policy, and Practice

Specific domains of chronic stress were significantly associated with suicidal behaviors in an inpatient sample. These findings highlight the importance of chronic stress in assessment of suicide risk. Risk assessment typically targets psychopathological symptoms and recent life events. Brief measures of ongoing stress may be incorporated in risk assessment, and suicide prevention and intervention strategies may incorporate skills for coping with ongoing strife. Particular attention may be given to ongoing stress in close friendships, familial relations, and physical health, as these domains each displayed incremental validity in the prediction of suicidal behaviors. Future research is encouraged to cross-validate these findings using prospective designs and to examine mechanisms by which chronic stress may increase the risk of suicidal behaviors.

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