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Aggressive Behaviors and Suicide Ideation in Inpatient Adolescents: The Moderating Roles of Internalizing Symptoms and Stress

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Abstract

The present study examined a conceptual model in which the association between aggressive behaviors and suicide ideation is moderated by internalizing symptoms and ongoing stress. Participants were 304 psychiatric inpatient adolescents (65.8% girls) ranging in age from 12 to 17 years (Mean age = 14.69). The association between aggressive behaviors and suicide ideation was significantly moderated by internalizing symptoms and ongoing stress; the association was positive in adolescents low in internalizing symptoms or high in ongoing stress, but negative in adolescents high in internalizing symptoms or low in ongoing stress. The three-way interaction between aggressive behaviors, internalizing symptoms, and ongoing stress was not statistically significant. The current findings indicate that in adolescents who display high levels of aggressive behaviors, the presence of high ongoing stress provides a more useful indicator of levels of suicide ideation than the presence of high internalizing symptoms. Implications for case identification and prevention are discussed.

Seventeen percent of high school students reported seriously considering a suicide attempt and 14% reported making a specific plan about how they would attempt suicide in the past 12 months (CDC, 2014). A much higher percentage of adolescents in psychiatric hospitals experience suicide ideation, with estimates ranging from 40% to 80% (e.g., Venta & Sharp, 2014). The high prevalence of suicide ideation in adolescence highlights the need for research on variables that are associated with and may contribute to its occurrence. Past research on suicide ideation has focused heavily on internalizing symptoms, including symptoms of depression and anxiety, and has documented significant associations between these symptoms and suicide ideation in adolescents (e.g., Hill, Castellanos, & Pettit, 2011; Lewinsohn, Rohde, & Seeley, 1996).

In light of these documented associations, case identification and prevention approaches for suicide-related behaviors often prioritize internalizing symptoms (e.g., Aseltine & DeMartino, 2004; King, Berona, Czyz, Horwitz, & Gipson, 2015). However, there also is evidence that suicidal crises may develop in a subset of individuals who experience low

levels of internalizing symptoms (e.g., Cukrowicz et al., 2011; Kerr et al., 2007). Identification of variables that are associated with suicide ideation in individuals who show low levels of internalizing symptoms is important to refine and improve case identification strategies and prevention programs.

Preliminary evidence suggests that this subset of individuals, especially in adolescence, is characterized by high levels of aggressive behaviors (Kerr et al., 2007; Simon et al., 2001). For example, Simon et al. (2001) found that a subset of suicide attempters who made attempts with minimal planning also had histories of aggressive behaviors (i.e., physical fighting). This finding is consistent with the possibility that adolescents who experience high levels of aggressive behaviors may be at risk for suicide ideation even in the context of low levels of ongoing internalizing symptoms. Stated differently, among adolescents who are high in aggressive behaviors, it is possible that ongoing internalizing symptoms are not good indicators of suicide risk (cf. Kerr et al., 2007). This possibility is consistent with the Three Step Theory (i.e., ideation to action framework) that emphasizes emotional and/or physical pain in the development of suicide ideation (Klonsky & May, 2015; May & Klonsky, 2016). Aggressive adolescents tend to experience high levels of emotionally painful yet transient states, including anger, frustration, and intense emotion dysregulation (e.g., Fives, Kong, Fuller, & Diguseppe, 2011; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011), that differ from ongoing high levels of internalizing symptoms.

If internalizing symptoms are not good indicators of suicide risk among adolescents who are high in aggression, it would have important implications for case identification and prevention approaches. Namely, the focus on internalizing symptoms to screen adolescents could miss a portion of adolescents who experience suicide ideation and are at risk for severe suicide-related behaviors. Screening programs may need to include aggressive behaviors to provide a more sensitive approach to identifying adolescents who experience suicide ideation. Further, for this subset of adolescents, targeting internalizing symptoms such as depression and anxiety may not be the optimal approach for preventing suicide ideation. Rather, for this subset, prevention and intervention efforts may be more impactful if they target aggressive behaviors (Newcomer et al., 2015). In the following sections, we briefly review what is known about the association between aggressive behaviors and suicide ideation and then discuss internalizing symptoms and ongoing stressful life contexts (i.e., daily hassles) as potential moderators of the association between aggressive behaviors and suicide ideation.

AGGRESSIVE BEHAVIOR AND SUICIDE IDEATION

Evidence indicates that aggressive behaviors are significantly associated with suicide ideation in adolescents (e.g., Hartley, Pettit, & Castellanos, 2016; O'Donnell, House, & Waterman, 2015). We are not aware of research that has examined the moderating roles of internalizing symptoms or ongoing stress in the association between aggressive behaviors and suicide ideation. Kerr et al. (2007) found support for the interaction between aggressive behaviors and internalizing symptoms predicting nonfatal suicide attempt in adolescent inpatients; adolescents who were high in both aggressive problems and internalizing symptoms were at highest risk of attempt. However, the variables posited to be implicated in

suicide ideation differ than the variables implicated in suicidal attempt (Klonsky & May, 2015; May & Klonsky, 2016; Van Orden et al., 2010), and empirical research supports the distinction between correlates and predictors of ideation versus attempt (e.g., King et al., 2001). Thus, it is important to evaluate ideation and attempt as separate outcome variables.

Among adolescents who are high in aggressive behaviors, the presence of ongoing stressful contexts and transient distress may provide the impetus that fosters suicide ideation, even if ongoing levels of internalizing symptoms are low. Aggressive adolescents tend to experience highly stressful contexts, including poor interpersonal relationships and peer rejection (Card, Stucky, Sawalani, & Little, 2008), academic difficulties (Barriga, Doran, Newell, Morrison, Barbetti, & Dean Robbins, 2002), and disciplinary/legal problems. These forms of stress, when they occur, induce intense state negative affect and may trigger thoughts of suicide in aggressive adolescents (Hartley et al., 2016). In such instances, negative states may be transient and may encompass noninternalizing aversive experiences such as anger and frustration; commonly used measures of internalizing symptoms, which emphasize enduring sad or anxious distress, may not be sensitive to such transient, reactive states. In contrast, higher levels of aggressive behaviors may be less closely connected to suicide ideation in adolescents who experience high ongoing levels of internalizing symptoms. This is because the presence of ongoing internalizing symptoms such as depression and anxiety represents emotional pain that can foster suicide ideation even when aggressive behaviors are low.

The Current Study

In this study, we sought to examine a conceptual model in which the association between aggressive behaviors and suicide ideation is moderated by internalizing symptoms and ongoing stress. Based on past research, we formulated three sets of hypotheses. First, we hypothesized that aggressive behaviors, internalizing symptoms, and ongoing stress would both be significantly and positively associated with suicide ideation. Second, we hypothesized that internalizing symptoms and ongoing stress would significantly moderate the association between aggressive behaviors and suicide ideation, such that adolescents' aggressive behaviors would be positively associated with suicide ideation at low, but not high, levels of internalizing symptoms, and at high, but not low, levels of ongoing stress. Third, we hypothesized a significant three-way interaction between aggressive behaviors, ongoing stress, and internalizing symptoms, such that the interaction between high aggressive behaviors and low internalizing symptoms would be positively associated with suicide ideation at high, but not low, levels of ongoing stress. That is, among adolescents who are high in aggressive behaviors and also high in ongoing stress, suicide ideation may be present even in the absence of ongoing internalizing problems such as depression and anxiety.

METHOD

Participants and Procedures

The present study received approval from the appropriate institutional review board. Participants were recruited from consecutively admitted inpatients at a university-affiliated acute-care psychiatric hospital in a large urban area. After the nature of the study was

explained, 377 parents provided informed consent for their adolescent child to participate. Of those 377 adolescents with parental consent, 304 (80.7%) provided assent to participate, 41 (10.8%) declined to participate, and 32 (8.5%) were ineligible to participate due to severe psychosis and/or intellectual disability.

The 304 participants were interviewed by advanced clinical psychology graduate students. Participants were compensated for their time. Participants (65.8% girls) ranged in age from 12 to 17 years ($M = 14.69$, $SD = 1.45$) and identified themselves as Hispanic (39.5%), European American (26.9%), African American (26.6%), multiracial (6%), Asian (0.7%), and Other race/ethnicity identified (0.3%). A majority (84.4%) of participants reported a nonzero level of suicide ideation.

Measures

Internalizing Symptoms and Aggressive Behaviors.—The Youth Self Report (YSR) is a 112-item, self-report measure of behavior problems over the past 6 months for children and adolescents aged 11–18 years (Achenbach & Rescorla, 2001). The YSR problem behavior items are subdivided into internalizing and externalizing broadband scales. The externalizing broadband scale is further divided into subscales: aggressive behaviors, rule-breaking behaviors, and attention problems. Extensive research supports the internal consistency, retest reliability, and validity of these scales (Achenbach & Rescorla, 2001). The current study used the internalizing problems broadband scale and the aggressive behaviors subscale. Sample items of the aggressive behaviors subscale include: “I argue a lot,” “I destroy my own things,” “I get into many fights.” Research supports the convergent validity of the aggressive behaviors subscale via significant associations with other measures of aggression (Belter, Foster, & Imm, 1996). The internal consistencies in the current sample were .85 and .92 for aggressive behaviors and internalizing problems, respectively.

Ongoing Stress.—The UCLA Life Stress Interview—Adolescent Version (Hammen, 2004) is a semistructured interview about ongoing stress severity over the past 6 months. The interview covers multiple domains of stress during the prior 6 months: close friend, social life, romantic, family, academic, finance, personal health, and family health. During the interview, a narrative was written to summarize ongoing conditions and the context of each life event. A team of three to eight members, blind to participants’ subjective ratings of stress severity, gave consensual severity ratings of ongoing stress on a scale ranging from 1 (*exceptionally high-quality circumstances*; low stress) to 5 (*extreme adverse conditions*; high stress) with behaviorally specific anchors for each value. Interrater reliabilities based on independent ratings of ongoing stress domains events yielded correlations from .85 to .96.

Suicide Ideation.—The Modified Scale for Suicide Ideation (MSSI) is an 18-item clinician-rated measure of suicide ideation severity over the previous 12 months (Miller, Norman, Bishop, & Dow, 1986). Each item is rated from 0 to 3 and the total score ranges from 0 to 54, with higher scores representing greater suicide ideation. Research supports a bidimensional factor structure of the MSSI that includes suicide ideation/desire (e.g., frequency, duration, intensity) and suicide plans/preparation (e.g., specificity of plan, suicide note; Pettit et al., 2009). Research supports the internal consistency, interrater reliability,

factor structure, and validity of the MSSSI in adolescents (Pettit et al., 2009). Internal consistency in the present sample was $\alpha = .93$.

Data Analysis

Missing data occurred at a low frequency for the MSSSI (1.9%), YSR (10.5%), and ongoing stress (1.9%). Missing data were assessed using Little's MCAR test, which was not statistically significant, $\chi^2(25) = 28.07, p = .31$, thus supporting the missing at random assumption. Missing data were accommodated using an expectation maximization algorithm. Data were then evaluated for the presence of outliers with respect to leverage, influence, and discrepancy, resulting in the identification of five possible outliers. Analyses were conducted both with and without the possible outliers included and conclusions remained the same. The results presented here include the outliers to better represent the population of interest. Raw score data were used for the analyses while controlling for demographic variables. Data were examined using Pearson's correlations and ordinary least squares regression using centered variables for computing interaction terms. Analyses were conducted in IBM SPSS version 21 (IBM Corporation, Armonk, NY, USA). For probing the form of interactions and calculating the regions of significance, simple slopes analyses were conducted using an online macro (Preacher, Curran, & Bauer, 2015).

RESULTS

Means of, standard deviations of, and correlations between variables are presented in Table 1. Suicide ideation was significantly and positively correlated with aggressive behaviors, internalizing symptoms, and ongoing stress, as hypothesized. Further, means scores on measured variables were comparable to other samples of inpatient adolescents (e.g., Pettit et al., 2009), and substantially higher than nonclinical samples of adolescents (e.g., Butler, MacKay, & Dickens, 1995; Yang & Clum, 1994).

Hierarchical linear regression was used to test moderation hypotheses (Table 2). Suicide ideation was placed as the dependent variable. In step 1, we entered age, sex, and ethnicity. Sex significantly predicted suicide ideation; female participants had higher ideation. In step 2, we entered aggressive behaviors, internalizing symptoms, and ongoing stress. Sex and internalizing symptoms significantly predicted suicide ideation. In step 3, we entered two-way interaction terms between aggressive behaviors and internalizing symptoms, and between aggressive behaviors and ongoing stress. Sex, internalizing symptoms, and both interaction terms significantly predicted suicide ideation. In step 4, we entered the three-way interaction term between aggressive behaviors, internalizing symptoms, and ongoing stress. The three-way interaction was not significant, $B = 0.00, p > .05$. For ease of presentation, we omitted step 4 from Table 2.

We used the step 3 model with the significant two-way interactions to probe the simple slopes of these interaction terms. As shown in Figure 1a, the association between aggressive behaviors and suicide ideation was significant and positive at low levels of internalizing symptoms ($-1.5 SD$), and significant and negative at high levels of internalizing symptoms ($+1.5 SD$). The simple slope at the mean of internalizing symptoms was not significant. As shown in Figure 1b, the association between aggressive behaviors and suicide ideation was

significant and positive at high levels of ongoing stress (+1.5 *SD*), and significant and negative at low levels of ongoing stress (−1.5 *SD*). The simple slope at the mean of ongoing stress was not significant.

DISCUSSION

The present findings provide additional evidence of significant associations between aggressive behaviors, internalizing symptoms, ongoing stress, and suicide ideation in adolescent inpatients. Further, they support a conceptual model wherein the association between aggressive behaviors and suicide ideation was moderated by internalizing symptoms and ongoing stress; the association between aggressive behaviors and suicide ideation was positive in adolescents who endorsed low internalizing symptoms or had high ongoing stress, whereas the association was negative in adolescents who endorsed high internalizing symptoms or low ongoing stress.

This pattern of findings is consistent with studies that have found high levels of suicide-related behaviors among individuals experiencing low levels of internalizing distress (e.g., Cukrowicz et al., 2011; Kerr et al., 2007), and offers initial insight into one characteristic of these individuals: high levels of aggressive behavior. Further, aggressive adolescents who also experience high levels of ongoing stress experienced higher levels of suicide ideation. This finding is consistent with theoretical frameworks that emphasize recurrent aversive experiences (i.e., Klonsky & May, 2015; May & Klonsky, 2016), such that suicide ideation arises in aggressive adolescents when they are embedded within ongoing aversive contexts (e.g., academic problems, disciplinary problems). It will be important for future research to further examine predictors of suicide ideation in adolescents who display high levels of aggressive behaviors.

Another possible explanation of the significant association between aggressive behaviors and suicide ideation at low levels of internalizing symptoms is that peer rejection and attributions of others' actions as hostile (Crick & Dodge, 1994) may lead to social disconnection in aggressive adolescents, which in turn motivates thoughts of suicide (cf. Van Orden et al., 2010). Although we are not aware of research that has directly tested this possibility, indirect support comes from research demonstrating that reductions in disruptive and aggressive behaviors in children lead to long-term reductions in suicidal behaviors via higher levels of peer acceptance (Newcomer et al., 2015). Further, adolescents who are hospitalized following aggressive behavior outbursts might perceive their hospitalization, and related ongoing difficulties (e.g., academic difficulties), as a burden on their families in terms of emotional, financial, and time resources, which in turn may foster suicide ideation (cf. Van Orden et al., 2010).

The current findings, although from a cross-sectional study design, are consistent with the possibility of different profiles of adolescents with suicide ideation, one involving high aggressive behaviors and low internalizing symptoms, and another involving high aggressive behaviors and high ongoing stress. Although not hypothesized, the current findings also suggest that among inpatient adolescents with high internalizing symptoms or low ongoing stress, aggressive behaviors are negatively associated with suicide ideation. One possible

explanation of this unexpected finding could be that extremely high levels of internalizing symptoms in this subset of adolescents results in behavioral inactivation (i.e., limited social interactions and/or vegetative symptoms diminish opportunities for aggressive behaviors and interpersonal conflicts).

The findings should be interpreted in light of the study's limitations. First, adolescents were the sole informant source. Additional data collected from the parents, particularly regarding aggressive behaviors, could have corroborated the degree to which these behaviors occurred. Second, the clinical severity of this inpatient sample may limit the generalizability of these findings to adolescents in other settings. Third, data on psychiatric diagnoses were not available, as well as other potential variables that could serve to elaborate on the current conceptual model (e.g., beliefs of social disconnection, emotion dysregulation). Fourth, conclusions about the temporal order of aggressive behaviors, internalizing symptoms, and ongoing stress in relation to suicide ideation could not be established due to the cross-sectional study design.

In spite of these limitations, the present study has identified internalizing symptoms and ongoing stress as moderators of the association between aggressive behaviors and suicide ideation in a racially and ethnically diverse sample of inpatient adolescents. Case identification and risk assessment strategies should consider whether inclusion of aggressive behaviors and contextual variables (i.e., ongoing stress) in screening approaches may provide a more sensitive approach to identifying adolescents who experience suicide ideation. Further, it is possible that aggressive youth, with low internalizing symptoms or high ongoing stress, could benefit from emphasizing problem-solving and distress tolerance strategies related to ongoing stressors. We encourage future research to address this possibility and replicate the present findings in samples drawn from other settings (e.g., outpatient, community-based, and so on).

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Figure 1.
 (a) Simple slopes: aggressive behaviors $\times$ internalizing. (b) Simple slopes: aggressive behaviors $\times$ stress.

TABLE 1

Means of, Standard Deviations of, and Correlations Between Study Variables

	1	2	3	4
1. Suicide ideation	–			
2. Aggressive behaviors	.31	–		
3. Internalizing symptoms	.60	.57	–	
4. Ongoing stress	.16	.27	.28	–
Mean	19.27	12.33	23.44	23.96
<i>SD</i>	13.31	6.71	11.76	4.38
Range	0–49	0–32	0–58	13.5–39

Note. All correlations significant, $p < .01$.

TABLE 2.

Regression Model of Suicide Ideation

Model	B	SE	t	p
Step 1 ($R^2 = .093, p < .001$)				
Age	0.63	0.51	1.24	.22
Sex	-6.62	1.57	-4.23*	<.001
Hispanic	1.11	2.88	0.39	.70
African American	-3.82	2.99	-1.29	.20
European American	3.01	2.99	1.01	.32
Step 2 ($R^2 = .386, p < .001$)				
Age	0.08	0.44	0.18	.86
Sex	-3.55	1.32	-2.68*	.01
Hispanic	2.63	2.40	1.10	.27
African American	0.17	2.50	0.07	.95
European American	4.47	2.48	1.80	.07
Aggressive behaviors	-0.05	0.11	-0.41	.68
Internalizing symptoms	0.65	0.07	9.92*	<.001
Stress	-0.01	0.15	-0.07	.95
Step 3 ($R^2 = .412, p < .001$)				
Age	0.18	0.43	0.43	.67
Sex	-3.25	1.30	-2.50*	.01
Hispanic	2.23	2.36	0.95	.35
African American	0.39	2.46	0.16	.87
European American	4.02	2.45	1.64	.10
Aggressive behaviors	0.01	0.11	0.08	.94
Internalizing symptoms	0.66	0.07	10.16*	<.001
Stress	-0.02	0.15	-0.16	.88
Aggressive behaviors $\times$ Internalizing symptoms	-0.02	0.01	-3.24*	.001
Aggressive behaviors $\times$ stress	0.04	0.02	2.23*	.02

Note. All equations included a constant.
* Statistically significant t value.

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