Aggression and the Risk for Suicidal Behaviors among Children

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Two subtypes of aggression—reactive and proactive—were examined to see how they relate to suicidal behaviors among young children admitted for acute psychiatric inpatient care. The children and their parents completed self-report questionnaires/interviews. Regression analyses revealed that depressed girls who scored higher on reactive aggression reported more suicidal behaviors; whereas proactive aggression did not relate to suicidal behaviors for either boys or girls.

Although less than 1 per 100,000 children between 5 to 14 years of age commit suicide (Centers for Disease Control, 1997), far more report suicidal ideation (Pfeffer, 1988). This poses a concern for future suicide risks because suicidal cognitions have been found to be predictive of suicidal behaviors later on in development (Pfeffer, 1997). It behooves us, therefore, to identify correlates and precursors of suicidal behaviors in childhood. Several psychosocial and psychiatric risk factors have been identified, with depression often cited as the most common risk factor (Greening & Stoppelbein, 2002; Ialongo et al., 2004; Pfeffer, 1997). Yet externalizing behaviors, specifically aggression, can also pose a potential risk for suicidal behaviors including ideation, gestures, and attempts (Greening et al., 2008; Ialongo et al., 2004; Reinherz et al., 1995). When investigating the role of aggression, however, it is important to examine the risk of suicidal behaviors within specific subtypes of aggressive children because aggression is a heterogeneous construct. The typologies for aggression are rather varied with classifications based on different parameters including the function (e.g., achieve a goal, reaction to provocations) and form (e.g., overt, covert) of the aggressive act. We attempted to expand on the current research linking childhood aggression to suicidal behaviors by evaluating the role of two types of aggression classified according to the function of the aggressive act—reactive and proactive aggression.

Reactive aggression derives from Berkowitz’s (1993) frustration aggression theory and is defined as impetuous responses to frustration or a perceived threat from others. Proactive aggression derives from Bandura’s (1983) social-cognitive learning theory and is defined as intentional and deliberate acts that are motivated by external reward. Despite the moderate statistical overlap between these two types of aggression (e.g., median $r$ across 36 studies = .68; Card & Little, 2006) and the skepticism reported in the literature about the utility of this typology (Bushman & Anderson, 2001), several studies and recent meta-analytic work suggest that proactive and reactive aggression relate differently to various behavioral outcomes (see Card &
Little, 2006). Proactive aggression, for example, appears to be uniquely related to psychopathic traits and antisocial behaviors (Fite, Stoppelbein, & Greening, 2009), whereas reactive aggression has been found to be uniquely related to emotional dysregulation, peer victimization, and peer rejection (e.g., Dodge & Coie, 1987). Furthermore, reactive, but not proactive aggression has been linked to depression in both community (Vitaro, Brendgen, & Tremblay, 2002) and clinical samples (Fite et al., 2009). Given the differential relation between reactive versus proactive aggression and depressive symptoms, it is possible that these constructs would also relate differentially to suicidal behaviors. Furthermore, of the two subtypes of aggression, reactive aggression is functionally more similar to impulsive aggression—a known risk factor for suicidal behaviors (Conner, Meldrum, Wieczorek, Duberstein, & Welte, 2004).

There have only been two studies to date that have examined proactive and reactive aggression in relation to suicidal behaviors. In a study of adult men, reactive aggression was found to be more common at age 19 among men who committed suicide by 36 years of age compared to a control group (Angst & Clayton, 1998). Fite et al. (2009) extended this association down to children; they found that reactive but not proactive aggression was related to increased suicidal behaviors in a young psychiatric population. However, they neglected to control for depression. This methodological limitation is relevant because depression has been found to mediate correlations between childhood aggression and suicidal behaviors (Greening et al., 2008). Furthermore, these correlations have not been examined in the context of subtypes of aggression, thereby precluding any conclusions about reactive and proactive aggression as discriminative risk factors for suicidal behaviors. To overcome these limitations, we examined reactive and proactive aggression in relation to children's suicidal behaviors while statistically controlling for the variance explained by depressive symptoms.

**ROLE OF GENDER**

It is often reported that males are more likely to commit suicide (Hawton, 2000), whereas females are more likely to report suicide attempts and ideation (Swahn & Bossarte, 2007). The extent to which certain suicide risk factors might be gender specific, however, is unclear. One large-scale study of over 8,600 British youth ranging from 8 to 18 years of age showed that depression was a common risk factor for suicidal behaviors among both males and females, but that the relation was stronger for males (Wannan & Fombonne, 1998). Interestingly, antisocial behavior was only predictive of suicidal behaviors among girls and not among boys in this study, and only in combination with high levels of depression. Others have also found that aggression and antisocial behavior may be more strongly associated with suicidal behaviors among girls than boys (Reinherz et al., 1995). However, boys hospitalized for suicide attempts have been found to exhibit higher rates of conduct disorder than girls (Haavisto et al., 2003). Given that conduct disorder includes overt disruptive behaviors that are generally exhibited more often by boys than by girls (Moffitt, Caspi, Rutter, & Silva, 2001), it seems intuitive that conduct disorder might relate differently to suicidal behaviors for males than for females. Hence, we examined gender in relation to the unique variance that reactive and proactive aggression might account for in children's risk for suicidal behaviors.

In summary, the aim of the current study was to examine the differential variance that proactive and reactive aggression might contribute to suicidal behaviors while statistically controlling for depressive symptoms among a psychiatric inpatient sample of young children. Recent theoretical (Connor et al., 2004) and empirical work (e.g., Fite et al., 2009) suggests that reactive but not proactive aggression would be related to children's risk for suicidal behaviors. We also examined interaction effects involving gender. We expected that girls who score high on a mea-
sure of reactive aggression would endorse more suicidal behaviors than boys who score high on reactive aggression because of empirical evidence that aggression and antisocial behavior are linked to suicidal behaviors among girls (Reinherz et al., 1995; Wannan & Fombonne, 1998).

**METHOD**

**Participants**

Children (N = 223) admitted consecutively across 18 months for acute child psychiatric inpatient service were screened for participation. Exclusion criteria included (a) a history of traumatic brain injury, a diagnosis of either psychosis or pervasive developmental disorder, or an acute medical condition; (b) children in the custody of the Department of Human Services and who lacked a reliable informant to provide information about the child's history of suicidal behavior; and (c) children less than 6 years of age. Two parents declined to participate and 37 met one of the exclusion criteria. An additional five children were excluded from analyses because of incomplete data. The remaining children (N = 179, M age = 9.49 years, range = 6–12) were mostly male (n = 129). Over half of the children were African American (n = 115), 57 were Caucasian, and 7 were “Other.” Most of the children were enrolled in regular academic classrooms (n = 132), 43 were receiving special education services, 2 were in gifted programs, and 2 were home schooled. The children's mean achievement score (84.91) for reading on the Wechsler Individual Achievement Test, 2nd edition (WIAT-II) fell in the low average range. Most of the families (n = 158) were enrolled in Medicaid and 21 had private health insurance. The sample's demographic characteristics are representative of the population served by the hospital.

Thirty-nine children met the diagnostic criteria for major depressive disorder (MDD) and conduct disorder (CD) as outlined in the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (American Psychiatric Association [APA], 2000); 14 met criteria for MDD and attention deficit hyperactivity disorder (ADHD); another 16 met criteria for CD only; 52 met criteria for oppositional defiant disorder (ODD) and ADHD; 29 for ADHD only; 17 for MDD only; 7 for MDD and ODD; and 5 for ODD only. Most of the participants (n = 145) were or had received outpatient psychiatric services for emotional/behavioral problems. Over half of the children (n = 113) were on medication at the time of admission, with stimulants being the most common drug; 36 children had a documented history of abuse.

**Materials and Procedures**

**Children’s Depression Inventory (CDI).**

The CDI is a 27-item self-report measure in which children select one of three possible alternatives describing increasing levels of depressive symptoms. Participants selected the item that best described how they had been feeling for the previous 2 weeks. The CDI is a well-validated measure with acceptable levels of internal consistency (α = .70–.86). Alpha coefficient was high with the present sample (α = .83). Test-retest reliability over a 1-week to 6-month period is acceptable (r = .54–.87; Kovacs, 1992).

**Proactive and Reactive Aggression.** Proactive and reactive aggression were assessed using child reports of Dodge and Coie’s (1987) measure. The measure is comprised of six items designed to differentiate between reactive (e.g., “When I have been teased or threatened I get angry easily and strike back”) and proactive (e.g., “I threaten or bully others in order to get my way”) aggression. Children responded using a 5-point scale ranging from 1 (never) to 5 (always). Construct and criterion validity have been demonstrated for this scale (Waschbusch, Willoughby, & Pelham, 1998) and internal consistencies for the current sample were high (αs = .78).

**Risk of Suicide Questionnaire (RSQ).** The
RSQ is a 14-item self-report measure designed to assess the risk of suicide among children and adolescents in a hospital setting (Horowitz et al., 2001). The measure is designed to investigate the severity of the risk factors for suicide, including history of suicide attempts, self-harm behaviors, and suicidal ideation. The measure includes a yes/no response format, with higher scores indicating greater suicide risk. The measure has shown high sensitivity (.98), predictive validity (.97), and significant correlations with other measures of suicidal behaviors in children and adolescents (Horowitz et al., 2001).

Suicide Ratings. A psychiatrist or clinical psychologist assessed for suicidal behaviors during separate clinical interviews with the parent and child upon admission. Information from these interviews was documented in the child’s medical chart. Two clinical child psychologists blind to the child’s diagnostic status and history of suicidal behaviors conducted a chart review and rated the severity of previous suicide attempts where 1 = no evidence of suicide attempt and 2 = made a lethal suicide attempt (e.g., ingested poisonous substances). This scale is consistent with scales often used to assess for level of suicide risk (e.g., McKeown et al., 1998). Inter-rater agreement was high (94%). A third clinical child psychologist rated the chart in cases where the raters disagreed. Scores for which two raters agreed were recorded. Although this measure overlaps with the RSQ on information about suicide attempts, they only share 12% of the variance, suggesting that they measure different constructs.

Procedure

After obtaining approval from the Institutional Review Board, parents of the children admitted to the inpatient unit were informed about the study on the day of admission. The parents were asked if their child’s inpatient clinical data, which were collected as part of the hospital’s assessment protocol, could be used for the present study. They were also informed that their child’s clinical care would not be contingent upon nor would it be affected by their participation. After being informed, participants provided written consent to participate. In addition to parent interviews, the children completed self-report measures with the assistance of a master’s-level clinical psychologist approximately 24 hours after their admission to the unit. The children’s data were coded by random numbers to ensure the confidentiality of their records.

Data Analytic Strategy

Mean scores for each variable were calculated, followed by zero-order correlations to evaluate possible intercorrelations among suicide risk, suicidal behavior, and demographic and emotional/behavioral variables. To help control for type I error, only correlations significant at or below the .01 probability level were considered significant in correlational analyses. Separate simultaneous regression analyses were performed to predict the suicide ratings and the RSQ score. Only variables that were significantly related to suicide ratings or RSQ scores in zero-order correlations were included as predictor variables in regression analyses. A log transformation of the RSQ score was used because it was found to be positively skewed. A logistic regression analysis was performed to estimate the model predicting suicide ratings because of the dichotomous dependent variable.

RESULTS

The sample obtained a mean T score of 53.73 on the CDI (SD = 12.24), which falls in the nonclinical range. The mean reactive aggression score (M = 2.55, SD = 1.17) was observed to be higher than the mean proactive aggression score (M = 1.62, SD = .94), which is consistent with findings from community samples (Card & Little, 2006; Fite et al., 2009). The children reported a mean score of 2.27 on the RSQ (SD = 2.13). Ratings of suicidal behaviors based on chart re-
views revealed that 30 children had attempted suicide in the past.

Zero-Order Correlations

Correlational analyses (see Table 1) revealed that both gender and CDI scores ($r_s = -.20$ and $.53$, $p < .01$, respectively) were significantly related to the RSQ score, such that boys and children with higher CDI scores reported more suicidal behaviors on the RSQ. The CDI score was also significantly related to both reactive and proactive aggression ($r_s = .30$ and $.33$, $p < .01$, respectively). Interestingly, reactive aggression ($r = .26$, $p < .01$) but not proactive aggression was significantly related to the RSQ score, suggesting that children who reported more reactive aggression reported more suicidal behaviors. A similar pattern of results emerged when examining suicide ratings. That is, gender, CDI, and reactive aggression were significantly related to suicide ratings ($r_s = .20$–.22, $p < .01$), suggesting that boys and children who scored higher on either the CDI or the reactive aggression measure were more likely to have attempted suicide.

Regression Analyses

A simultaneous regression analysis was conducted with the RSQ score entered as the criterion variable. Variables that were significantly related to suicide rating ($p \leq .01$) in the correlational analyses, including gender, CDI, reactive aggression, and the interaction of these variables, were entered as predictor variables. The model was statistically significant, $F(7,171) = 15.22$, $p = .0001$. When entered simultaneously into the model, the main effect for gender ($\beta = -.23$, $p = .001$) and the CDI ($\beta = .61$, $p < .001$) were significant. An examination of the two- and three-way interactions revealed that the two-way interaction, Gender $\times$ CDI, was significant ($\beta = -.27$, $p < .001$), as was the three-way interaction, Gender $\times$ CDI $\times$ Reactive Aggression ($\beta = .16$, $p = .04$). Further regression analyses were performed to probe the highest order interaction (Gender $\times$ CDI $\times$ Reactive Aggression). These analyses revealed that reactive aggression did not predict RSQ scores among boys with either low, $F(1,64) = .98$, $p > .05$, or high, $F(1,62) = 1.19$, $p > .05$, CDI scores; whereas reactive aggression emerged as a significant predictor of the RSQ score among girls with high CDI scores, $F(1,25) = 3.71$, $p < .05$. Reactive aggression was not found to be a significant predictor among girls with low CDI scores, $F(1,23) = .09$, $p > .05$.

A logistic regression analysis was conducted with suicide rating as the criterion variable. Variables that were significantly related to suicide rating ($p \leq .01$) in the correlational analyses and their interactions were simultaneously entered as predictor variables in the analyses. The predictor variables in-

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<td></td>
<td>—</td>
<td>-.05</td>
<td>—</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>2. CDI score</td>
<td>—</td>
<td>-.11</td>
<td>.30$^b$</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3. Reactive Aggression</td>
<td>—</td>
<td>-.15</td>
<td>.33$^b$</td>
<td>.54$^b$</td>
<td>—</td>
</tr>
<tr>
<td>4. Proactive Aggression</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5. RSQ</td>
<td>—</td>
<td>-.20$^a$</td>
<td>.53$^b$</td>
<td>.26$^a$</td>
<td>.16</td>
</tr>
<tr>
<td>6. Suicide Rating</td>
<td>—</td>
<td>-.22$^a$</td>
<td>.22$^a$</td>
<td>.21$^a$</td>
<td>.13</td>
</tr>
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Note. The Children’s Depression Inventory (CDI) is from Kovacs (1992). The Risk of Suicide Questionnaire (RSQ) is from Horowitz et al. (2001). Gender, 1 = male, 2 = female. $^a p \leq .01$, $^b p \leq .001$. 

The Risk of Suicide Questionnaire (RSQ) is from Horowitz et al. (2001).
TABLE 2
Regression Analysis Predicting Score on Risk of Suicide Questionnaire

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<tr>
<th>Variable</th>
<th>β</th>
<th>t</th>
<th>p</th>
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<tbody>
<tr>
<td>Gender</td>
<td>−.23</td>
<td>−3.52</td>
<td>.001</td>
</tr>
<tr>
<td>CDI</td>
<td>.61</td>
<td>8.56</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Reactive Aggression</td>
<td>.06</td>
<td>.75</td>
<td>.45</td>
</tr>
<tr>
<td>Gender × CDI</td>
<td>−.27</td>
<td>−3.56</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Gender × Reactive Aggression</td>
<td>.09</td>
<td>1.17</td>
<td>.24</td>
</tr>
<tr>
<td>CDI × Reactive Aggression</td>
<td>−.04</td>
<td>−.60</td>
<td>.55</td>
</tr>
<tr>
<td>Gender × CDI × Reactive Aggres-</td>
<td>.16</td>
<td>2.10</td>
<td>.04</td>
</tr>
</tbody>
</table>

Note. The Children’s Depression Inventory (CDI) is from Kovacs (1992). The Risk of Suicide Questionnaire (RSQ) is from Horowitz et al. (2001). Gender, 1 = male, 2 = female.

Similar to the findings for the RSQ, the model was statistically significant, $\chi^2(7) = 22.01, p < .01$. However, contrary to the findings for the RSQ, only the main effects for gender (OR = .11) and the CDI (OR = 1.06) were statistically significant, suggesting that boys and children who endorsed more depressive symptoms tended to have a history of previous suicide attempts.

DISCUSSION

As predicted, reactive but not proactive aggression was observed to be significantly related to children’s risk for suicidal behaviors. However, this association was not maintained after controlling for the variance explained by depressive symptoms; thus supporting the often-reported link between depression and suicidal behaviors. Although reactive aggression did not emerge as a main effect, it was found to act as a moderator variable. That is, young depressed girls were found to be less likely to endorse suicidal behaviors if they scored lower on reactive aggression than if they scored higher. This finding is consistent with observations from a large-scale study of over 8,600 British youth (Wannan & Fombonne, 1998) and suggests that while depression increases children’s risk for suicidal behaviors, young girls who present with depressive symptoms may be at a heightened risk if they also present with reactive aggression.

Reactive aggression largely involves overt aggression such as fighting and attacking others (APA, 2000); further, whether it is a function of physiological factors or cultural norms, overt aggression tends to be observed more often among males (Moffitt et al., 2001). Girls tend to express interpersonal hostility through more covert behaviors such as gossiping (Crick & Grotpeter, 1995). These observations do not rule out the fact that girls can engage in overt disruptive behavior and that they are just as vulnerable to the negative consequences of such behavior, including poor school adjustment and antisocial behavior later in development (Bierman et al., 2004). It also appears from the present study that reactively aggressive girls might also be at risk for suicidal behaviors if they exhibit depressive symptoms. This interaction effect is consistent with research revealing a stronger link between antisocial and suicidal behaviors among girls than among boys (Reinherz et al., 1995; Wannan & Fombonne, 1998).

Observations of gender-specific moderating effects for reactive aggression on children’s risk for suicidal behaviors offer potential theoretical and clinical implications. Perhaps it may not be appropriate, for example, to assume that aggression is a universal risk factor for suicidal behaviors among children. While some subtypes of aggression such as reactive...
aggression may pose a risk for suicidal behaviors, others such as proactive aggression may not. Furthermore, reactive aggression might not pose a direct risk but rather might heighten children’s risk for suicidal behaviors if they are also suffering from another known risk factor—such as depression. This interaction effect might also be more relevant for girls than for boys, perhaps because depressed girls who exhibit reactive aggression might represent a more pathological and hence at-risk group compared to depressed boys who exhibit reactive aggression. Given that girls are, on average, less likely than boys to manifest the behaviors that are characteristic of reactive aggression, overt aggression might indicate more serious emotional and behavior problems that increase girls’ risk for self-destructive behavior. These findings might prove useful for prevention and triage since females are twice as likely to report suicidal ideation and suicide attempts (Swahn & Bossarte, 2007).

Although reactive aggression correlated with previous suicide attempts in the present study, this relation was not maintained after statistically controlling for the variance explained by depressive symptoms. In addition, reactive aggression did not emerge as a significant moderator variable for the relation between depressive symptoms and previous suicide attempts. These findings suggest that reactive aggression might not add to depressed children’s risk for suicide attempts. However, recent path analytic research suggests that aggression may be indirectly related to suicide attempts through suicidal ideation (Greening et al., 2008). Maybe reactive aggression and the impulsivity associated with this subtype of aggression potentiates depressed youth’s risk for specific suicidal behaviors such as suicidal ideation, which in turn increases their risk for attempts. Brent et al. (2004) found support for the role of impulsive types of aggression in depression and suicide risk in their study of offspring with a parental history of suicide attempts. Reactive aggression has also been linked to suicidal ideation among prepubertal and adolescent youth after controlling for disruptive behaviors such as impulsive aggression (Conner et al., 2004). Although suicide ratings in the present study refer to past suicide attempts, a history of previous attempts is a common risk factor for future attempts and thus is worthy of investigation (Hawton, Harriss, & Zahl, 2006).

Contrary to reports in the literature, we found that boys attempted suicide and reported suicidal behaviors more often than girls. This finding is consistent with a study of Inuit youth (Kirmayer, Malus, & Boothroyd, 1996). It is likely that the largely male composition of the sample accounts for the present finding as the magnitudes of the correlations for both attempts and suicidal behaviors were not large.

Limitations

Although the present psychiatric population limits generalizations to outpatient and community samples, it allowed for an investigation of risk factors for a serious mental health problem that occurs in relatively low frequency in the general population. Nevertheless, replications are strongly recommended with other samples to maximize generalizations. Large community samples would further increase future studies’ statistical power to detect effects for a relatively low base-rate problem.

Using self-report measures allowed us to assess for such internalizing symptoms as depression and suicidal ideation. We also supplemented these data with parent interviews about the children’s self-destructive behavior. However, using only self- and parent-report measures can be limiting. Hence, future research should include other informants (such as teachers) to add further validity. Finally, the correlational design of the present study precludes assuming any causal inferences from the data.

Clinical Implications

The present study adds to a growing body of literature linking childhood aggression to suicidal behavior and offers potential theoretical and clinical implications. Chil-
dren exhibiting reactive aggression, for example, might be monitored for depressive symptoms so as to minimize their risk for possible suicidal behaviors. Similarly, children exhibiting depressive symptoms might be screened for reactive aggression to assess their suicide risk. If they score high on a measure of reactive aggression, for example, cognitive-behavioral treatment might be applied to not only address their depressive symptoms but also to help them to learn how to manage their impulsive reactions, which in turn might minimize their risk for future self-destructive behavior. Furthermore, teaching at-risk children adaptive coping skills early in development might potentially prevent negative outcomes before they develop an intractable pattern of self-destructive behaviors.

REFERENCES


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