Hostile Attributional Biases in Severely Aggressive Adolescents

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Adolescent boys (N = 128) from a maximum security prison for juvenile offenders were administered a task to assess hostile attributional biases. As hypothesized, these biases were positively correlated with undersocialized aggressive conduct disorder (as indicated by high scores on standardized scales and by psychiatric diagnoses), with reactive-aggressive behavior, and with the number of interpersonally violent crimes committed. Hostile attributional biases were found not to relate to nonviolent crimes or to socialized aggressive behavior disorder. These findings held even when race and estimates of intelligence and socioeconomic status were controlled. These findings suggest that within a population of juvenile offenders, attributional biases are implicated specifically in interpersonal reactive aggression that involves anger and not in socialized delinquency.

Numerous studies in the past decade have demonstrated that children with hostile attributional tendencies are likely to experience behavioral difficulties in interacting with peers. Aggressive children display a hostile attributional bias: They are up to 50% more likely than average children to attribute hostile intent to a hypothetical peer after an ambiguous provocation by the peer (Dodge, 1980; Waas, 1988), particularly when the provocation is directed toward the aggressive child (Dodge & Frame, 1982; Sancilio, Plumert, & Hartup, 1989). They demonstrate this bias both in response to photographs of peers (Nasby, Hayden, & dePaulo, 1979) and in response to actual ambiguous provocations (Steinberg & Dodge, 1983). Aggressive children are also deficient in attributional skills. When they are shown videorecorded stimuli of benign provocations, they demonstrate relative deficits in accurately interpreting others’ intentions (Dodge, Murphy, & Buchsbaum, 1984; Dodge, Pettit, McClaskey, & Brown, 1986). They misinterpret benign intentions as hostile, even when most of the presented cues favor a benign attribution (Dodge & Newman, 1981). Such findings have been interpreted as support for the role of attributional processes in mediating deviant retaliatory aggressive behaviors. In spite of the studies, alternate interpretations of the findings remain plausible, and the relevance of this work to psychopathology remains unclear. The goal of our study was to examine four questions about the nature of the relation between hostile attributional tendencies and aggressive behavior in adolescents.

First, it is not clear whether the previous findings hold among adolescents with extreme problems of undersocialized aggressive conduct disorder. Most of the studies reviewed earlier were conducted with young school children nominated as aggressive by peers. Such children may not be as severely disordered as adolescent boys who have been incarcerated in a maximum security prison for criminal offenses, as are the subjects in our study. Three studies have found evidence of hostile attributional biases in psychiatrically disordered aggressive children and adolescents (Milich & Dodge, 1984; Nasby et al., 1979; Slaby & Guerra, 1988), but none assessed attributional skill and biases with standardized videorecorded stimuli. Such stimuli are important because they reduce the likelihood of confounds with the subject's verbal ability (Dodge et al., 1984; Quay & Werry, 1986). Because the subjects in this study were older than subjects in previous studies, novel videorecorded stimuli of age-appropriate provocations were prepared for this investigation.

Because psychopathology in children is conceptualized both categorically and dimensionally (Edelbrock & Costello, 1988; Quay & Werry, 1986), both kinds of measures were collected. It was hypothesized that the level of hostile attributional biases among adolescents in this population would be positively correlated with undersocialized aggression scores on standardized ratings made by ward staff on the Conduct Disorder Scale of the Revised Behavior Problem Checklist (RBPC; Quay & Peterson, 1987) and on the Conners Teacher Rating Scale (CTRS;
The third question to guide this report concerns the distinction between reactive (or interpersonally hostile) and proactive (or instrumental) aggressive behavior. Similar distinctions have been made for many years by animal behavior researchers (e.g., affective vs. instrumental aggression; Scott, 1972), psychobiologists (e.g., affective vs. predatory aggression in cats; Moyer, 1976, p. 224), social psychologists (e.g., hostile vs. instrumental functions of aggression; Feinbach, 1970; Rule, 1978), and developmental psychologists (e.g., hostile vs. instrumental aggression; Hartup, 1974) but have not yet affected psychiatric nosological systems.

The distinction has been made on various criteria, including stimuli (e.g., aversive vs. nonaversive stimuli to aggression; Berkowitz, 1983), targets (e.g., interpersonal vs. object targets; Hartup, 1974; and intraspecific vs. interspecific targets; Lorenz, 1966, p. 21), functions and outcomes (e.g., defense of young vs. selection of the strongest; Lorenz, 1966, p. 40; and anger expression vs. goal attainment; Feshbach, 1970; Rule, 1978), biological substrates (e.g., behavioral effects of stimulation of the septum vs. the centromedial amygdala; Karl, 1978), the role of emotion (e.g., emotional or hostile vs. nonemotional aggression; Berkowitz, 1989; and interpersonally violent aggression vs. nonviolent object acquisition; Hartup, 1974), and topography (e.g., hissing and growling vs. silent attacks in cats; Moyer, 1976). Reactive aggression involves facial displays of anger and rage and pronounced sympathetic arousal (Moyer, 1976, p. 224), whereas proactive aggression is more methodical and less affective. Even though debate continues about the most appropriate labels for these subtypes (reactive vs. proactive, hostile vs. instrumental, affective vs. predatory, angry vs. goal-directed) and the central defining criteria (topography, function, etc.), there is sufficient agreement in multiple disciplines that a distinction exists to warrant empirical study of possible mechanisms.

Social information-processing theory (Dodge, 1980; Dodge et al., 1986; McFall, 1982; McFall & Dodge, 1982) proposes that the tendency to make hostile-biased attributions will lead a person to display interpersonally angry, reactive-aggressive strikes (but not necessarily instrumentally aggressive behaviors). Dodge and Coie (1987) found that hostile attributional biases were significantly related to the display of reactive-aggressive behavior (anger) assessed by direct observation and by teachers but that these biases were not significantly related to the display of proactive aggressive behaviors (such as bullying and object acquisition). To examine this distinction in this study, we used data available from the RBPC to derive two new subscales on the basis of content analyses of items. The Reactive Aggression subscale includes items that depict anger (e.g., Item 38, “irritable, hot-tempered; easily angered”) and temper (e.g., Item 19, “has temper tantrums”), whereas the Proactive Aggression subscale includes instrumental and coercive behaviors (e.g., Item 49, “tries to dominate others; bullies, threatens,” and Item 65, “teases others”). We hypothesized that hostile attributional biases assessed in our study would relate significantly to the Reactive Aggression subscale and not to the Proactive Aggression subscale.

The fourth question posed in this study concerns an alternate explanation for the hypothesized correlation between attribu-
tional biases and conduct disorder. Even though the attributional biases and deficits seen in aggressive children in past studies are hypothesized to reflect a specific rather than a generalized problem in information processing, it is possible that attributional biases and deficits are correlated with intelligence, socioeconomic status (SES), or race, and these latter variables may account for the relation between attributional tendencies and aggressive behavior. Dodge and Somberg (1987) found cultural differences (urban–rural) in the accuracy of intention-cue detection, but these differences did not account for the relation between attributions and aggression. Waldman (1988) found that aggressive children displayed attributional errors even when skill at other cognitive tasks (such as matching familiar figures) was controlled statistically, but no studies have simultaneously controlled for verbal intelligence, SES, and race. In our study we tested the hypothesis that attributionally biased adolescents would display relatively high rates of undersocialized aggression and violent criminal offenses even when intelligence, SES, and race are controlled.

Methods

Subjects

The subjects for this investigation were 128 male adolescent volunteers randomly selected from a 500-bed maximum security prison for juvenile offenders. We judged the sample to be representative of the population, but it was limited to those adolescents who were not on medication and whose parent or guardian had given consent. Every attempt was made to obtain a representative sample. The project was very popular with subjects, and 75% of those adolescents who were solicited for participation actually participated. The subjects ranged in age from 14 years, 2 months to 19 years (M = 16 years, 6 months, SD = 1 year). Fifty-six percent of the subjects were minorities (47% Black, 4% Hispanic, 2% Native American, and 3% other), and the remaining 44% were White. Most of the subjects were reared in large urban communities and were recidivists with a history of chronic criminal behavior.

Measures

Measures of hostile attributional biases. To assess attributional patterns, we developed multi-item videorecorded stimuli. First, scripts were written to describe problematic social events in which one adolescent, while interacting with another adolescent, experiences a negative outcome (e.g., at school a peer damages the protagonist's metal shop project). A total of 16 different scripts were written. Different adolescent actors were recruited to act out each script. Four versions of each script were acted out, in which the intent of the peer varied as hostile, accidental, prosocial, or ambiguous. In all, 64 vignettes were videorecorded. These vignettes were then edited on to four videotapes, each with 16 vignettes (4 of each intent) in block randomized order. Each tape was then presented to 50 college undergraduates (25 men and 25 women) to ensure that the stories were understandable and that the intentions of the peers were clear to adults. One of the four tapes was dropped at this time because of lack of clarity in the scripts.

Each subject was randomly assigned to one of the three remaining tapes. During test administration, the subjects were asked to imagine that they were the protagonist in the story (i.e., the subject who eventually experiences some sort of negative outcome). After viewing each story, they were asked to attribute intent to the antagonist (i.e., the peer who caused the negative outcome) in a multiple choice format. The subjects were asked to choose one of the following attributional options to describe the antagonist's intent: (a) to be mean; (b) it was an accident; (c) to be helpful; and (d) it is unclear why he did it.

Almost all (i.e., >98%) responses to the hostile vignettes were accurate identifications, so these items were dropped from further analyses. For the hostile attributional bias measure, responses were scored as hostile ("to be mean") or nonhostile (any other response). The internal consistency of responses across the 12 test items (4 ambiguous, 4 prosocial, and 4 accidental) was calculated by coefficient alpha. Three items (one of each type of stimulus) were dropped at this point in order to maximize the internal consistency of this measure. The alpha for the hostile attributional bias measure was .64 (p < .001). The score used was the proportion of times in which a subject responded with a hostile attribution.1

Measures of aggressive behavior problems and disorders. The RBPC (Quay & Peterson, 1987) and the CTRS (Conners, 1969) were used to assess aggressive-behavior problems dimensionally. The RBPC includes two factor-analytically derived scales named Conduct Disorder and Socialized Aggression. According to the measure's authors, these scales capture the distinction between undersocialized and socialized conduct disorder. The CTRS yields a Conduct Problems total score that assesses undersocialized conduct disorder. Both instruments have well-established reliability and validity (see Lahey & Piacentini, 1985; Quay & Peterson, 1987; Quay & Werry, 1986, for reviews). These instruments were completed by the ward staff member who was most closely acquainted with the subject. Ward staff were adult men who were employed to manage and to be surrogate parents to their cottage residents. The ratings were completed not sooner than 6 weeks after the adolescent's admission to the prison, in order to ensure that the staff person could make a valid rating. The RBPC was completed for 109 subjects, and the CTRS was completed for all 128 subjects.

Because of theoretical interests, we created two new 8-item subscales of the Conduct Disorder scale of the RBPC (a Reactive Aggression subscale and a Proactive Aggression subscale), on the basis of a priori content analyses of items. See Table 1 for specific items. Internal consistency of each subscale was high (coefficient α = .90 and .89, respectively). As one might expect from the fact that these new subscales were derived from a single scale that had been factor-analytically derived, the subscales correlated highly with each other (r = .87, p < .001).

Diagnoses of undersocialized conduct disorder by DSM-III criteria (American Psychiatric Association, 1980) were obtained from interviews conducted privately at the prison facility by one of two advanced doctoral students in clinical psychology, with the DISC (Costello et al., 1985). This interview is known to yield reliable and valid psychiatric diagnoses (Costello et al., 1985; Edelbrock & Costello, 1988; Edelbrock, Costello, Dulcan, Conover, & Kalas, 1986). The subjects were classified with a diagnosis of no disorder, possible or probable undersocialized conduct disorder, or possible or probable socialized conduct disorder.

1 An attributional accuracy measure was also created by scoring each response to the 4 accidental and 4 prosocial items as incorrect versus correct. The coefficient alpha for this measure was .54 (p < .01). This measure was negatively correlated with the hostile attributional bias measure, r(26) = -.35, p < .001. It was positively correlated with the intelligence estimate on the PPVT, r(26) = .25, p < .005. It did not correlate significantly with any behavioral measure once the variance attributable to the hostile attributional bias measure was taken into account. Thus, analyses of this measure are not described further.

2 It was not possible to obtain an independent assessment of the reliability of diagnoses in this particular study.
Table I
Reactive and Proactive Aggression Subscales of the Conduct Disorder Scale of the Revised Behavior Problem Checklist

<table>
<thead>
<tr>
<th>Item</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Reactive Aggression Subscale</td>
</tr>
<tr>
<td>28</td>
<td>Has temper tantrums</td>
</tr>
<tr>
<td>33</td>
<td>Uncooperative in group situations</td>
</tr>
<tr>
<td>34</td>
<td>Negative; tends to do the opposite of what is requested</td>
</tr>
<tr>
<td>38</td>
<td>Impertinent; talks back</td>
</tr>
<tr>
<td>38</td>
<td>Irritable, hot-tempered; easily angered</td>
</tr>
<tr>
<td>40</td>
<td>Argues; quarrels</td>
</tr>
<tr>
<td>41</td>
<td>Sulks and pouts</td>
</tr>
<tr>
<td>79</td>
<td>Blames others; denies own mistakes</td>
</tr>
<tr>
<td>5</td>
<td>Proactive Aggression Subscale</td>
</tr>
<tr>
<td>42</td>
<td>Disruptive; annoys and bothers others</td>
</tr>
<tr>
<td>49</td>
<td>Persists and nags; can’t take “no” for an answer</td>
</tr>
<tr>
<td>50</td>
<td>Tries to dominate others; bullies, threatens</td>
</tr>
<tr>
<td>55</td>
<td>Picks at other children as a way of getting their attention; seems to want how</td>
</tr>
<tr>
<td>65</td>
<td>Brags and boasts</td>
</tr>
<tr>
<td>71</td>
<td>Teases others</td>
</tr>
<tr>
<td>71</td>
<td>Selfish; won’t share; always takes the biggest pieces</td>
</tr>
<tr>
<td>83</td>
<td>Deliberately cruel to others</td>
</tr>
</tbody>
</table>

Measures of violent and nonviolent criminal charges. Official files from the maximum security prison for 127 subjects were reviewed by two advanced doctoral students in clinical psychology to determine the numbers of interpersonally violent and nonviolent criminal offenses charged to each subject, with the criteria derived by Kosson, Smith, and Newman (1990) from Hare and McPherson (1984). Both arrests and convictions were listed in the file (which are official records, not self-reports), but it was often difficult to determine which charges were dropped for lack of evidence and which were reduced as part of a plea bargain. Therefore, we decided to count all formal arrests rather than convictions, thus circumventing these problems (though admittedly others arise). Interpersonally violent crimes consisted of murder, assault, sexual assault, kidnapping, robbery, and weapons crimes. Nonviolent crimes were those crimes that were either noninterpersonal or did not involveaggression and consisted of escape, fraud, negligence, drug offenses, theft, obstructing justice, arson, and miscellaneous minor offenses. Violent crimes were fewer ($M = 2.05$ per subject, $SD = 1.82$) than nonviolent crimes ($M = 9.50$, $SD = 7.23$).

Twenty-nine files (22%) were rated independently by each of two coders in order to obtain estimates of the reliability of scores. Because the dependent variables for each subject were the numbers of each type of crime, the Pearson correlation between the two raters' scores is the appropriate measure of rater agreement. These correlations were .85 and .70 for the numbers of violent and nonviolent crimes, respectively (each $p < .01$).

Measures of intelligence and socioeconomic status. An estimate of intelligence was obtained with the Peabody Picture Vocabulary Test-Revised, Form L (PPVT; Dunn & Dunn, 1981). SES was estimated on the basis of parental occupation with Hollingshead's (1975) SES Classes I-V.

Procedure
The measures were administered to each subject by one of three female experimenters (who knew subjects were incarcerated but were unaware of each subject's individual history of behavior) in a private room in the institution. These procedures were administered as part of a larger study that investigated the effects of sucrose on cognitive performance (Bachorowski et al., 1990), and the subjects also completed other cognitive tasks not reported in this article. One half of subjects (randomly assigned) completed the attribution task on a day in which they had eaten a sucrose-sweetened breakfast, and the other half completed the task on a day in which they had eaten an aspartame-sweetened breakfast. Sucrose was unrelated to attributional performance and was therefore omitted from analyses.

Results
Relation Between Attributions and Undersocialized and Reactive Aggression

The first hypothesis was that the degree to which a subject displayed hostile attributional biases would be positively related to the two measures of undersocialized conduct disorder, to reactive aggression, to interpersonally violent crime, and to psychiatric diagnoses of undersocialized conduct disorder. This hypothesis was supported for all five measures. Hostile attributional bias scores were significantly positively correlated with the RBPC Conduct Disorder score, $r(107) = .24$, $p < .02$. Inspection of the scatterplot of these two scores and tests of polynomial trend relations revealed that the relation was uniformly linear. That is, the curvilinear function was nonsignificant, and the mean Conduct Disorder score increased linearly with each quartile group of boys classified on the basis of attributional bias scores (i.e., mean Conduct Disorder scores for the lowest, second lowest, second highest, and highest quartiles of attributional bias groups were 16.6, 16.6, 17.9, and 23.5, respectively). The scatterplot also revealed that the highest quartile group of boys classified by Conduct Disorder scores displayed 42% more hostile attributions than did the lowest quartile group of boys ($Ms = 1.85$ and $1.30$, respectively).

The hostile attributional bias score also correlated significantly with the Reactive Aggression subscale of the Conduct Disorder scale, $r(107) = .25$, $p < .01$. As with the full scale, the relation between this subscale and the hostile attributional bias score was uniformly linear, and the curvilinear function was nonsignificant. The highest quartile group of boys classified by Reactive Aggression scores displayed 66% more hostile attributions than did the lowest quartile group of boys ($Ms = 1.83$ and $1.10$, respectively).

Hostile attributional bias scores were also significantly positively correlated with the Conduct Problems score of the CTRS, $r(126) = .21$, $p < .02$. Again, inspection of scatterplots and tests of polynomial trends revealed that the relation was linear. The highest quartile group of boys classified by CTRS scores displayed 42% more hostile attributions than did the lowest quartile group ($Ms = 1.55$ and $1.09$, respectively).

Hostile attributional bias scores were also significantly positively correlated with the number of interpersonally violent crimes committed, $r(125) = .20$, $p < .03$, and the relation was again linear. The highest quartile group of boys classified by the number of violent crimes committed displayed 58% more hostile attributions than did the lowest quartile group ($Ms = 1.79$ and 1.13, respectively).
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Table 2
Hostile Attributional Bias Means and Standard Deviations for Undersocialized Conduct Disorder, Socialized Conduct Disorder, and No Conduct Disorder Groups

<table>
<thead>
<tr>
<th>Diagnostic group</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Undersocialized conduct disorder</td>
<td>1.88</td>
</tr>
<tr>
<td>Socialized conduct disorder</td>
<td>1.24</td>
</tr>
<tr>
<td>No conduct disorder</td>
<td>0.75</td>
</tr>
</tbody>
</table>

The group means, standard deviations, and sample sizes for subjects with various DSM-III diagnoses are found in Table 2. As hypothesized, the subjects who were diagnosed with undersocialized conduct disorder had scores that were 54% higher than were those of subjects who did not receive this diagnosis, a significant difference, F(1, 117) = 4.01, p < .05.

Controlling for the Effects of Race, Socioeconomic Status, and Intelligence

The next hypothesis tested was that hostile attributional bias scores would be positively related to the five scores described earlier even when intelligence, socioeconomic status, and race are controlled. For the four continuously distributed measures, this hypothesis was tested in stepwise regression analyses (equivalent in this case to partial correlations), in which the attributional bias score was predicted at the first step from the PPVT score, the SES score, and race (dichotomously coded as minority vs. majority status), and then at the next step from the Conduct Disorder or Reactive Aggression score. These analyses revealed that the attributional bias score could be predicted significantly (or marginally) from each of the four behavior scores, even after intelligence, SES, and race were controlled: for the Conduct Disorder score of the RBPC, F(1, 102) = 6.30, p < .02; for the Reactive Aggression subscale of the RBPC Conduct Disorder score, F(1, 102) = 7.38, p < .01; for the CTRS score, F(1, 119) = 6.46, p < .02; and for the number of violent crimes committed, F(1, 118) = 3.80, p < .06.

For the DSM-III diagnoses from the DISC, an analysis of covariance was conducted in which the diagnosis was the independent variable, the attributional bias score was the dependent variable, and PPVT score, SES, and race were covariates. A marginally significant effect of diagnosis (undersocialized conduct disorder vs. all other subjects) was found, F(1, 113) = 3.60, p < .07, wherein the undersocialized conduct disorder group displayed more biased hostile attributions than the other subjects.

Contrasting Undersocialized and Socialized Aggression

The hypothesis that attributional biases would be related to forms of aggression that involve interpersonal deficits (undersocialized aggression) but not to deviant behaviors classified as socialized aggression or socialized delinquency was tested next. The relation between attributional biases and the measures of undersocialized aggression has been evaluated above, and each has been found to be significant. Next, correlations were computed between the hostile attributional bias score and the two measures of socialized deviance (the Socialized Aggression score of the RBPC and the number of nonviolent crimes committed). As hypothesized, the two correlations were non-significant (r = .13 and .13, both ns).

Next, stepwise regression analyses were performed to examine whether undersocialized aggressive behavior incremented the prediction of hostile attributional biases even when the level of socialized aggression was controlled. In the first analysis, as hypothesized, the hostile attribution score was significantly predicted from the RBPC undersocialized Conduct Disorder score, even when race, SES, PPVT score, and the Socialized Aggression score of the RBPC were taken into account, F(1, 101) = 5.35, p < .03. On the other hand, when race, SES, PPVT score, and the Conduct Disorder score were entered first, the Socialized Aggression score did not contribute significantly to the prediction of hostile attributional biases.

In the second analysis, as hypothesized, the hostile attribution score was significantly predicted from the number of violent crimes committed, even when race, SES, PPVT score, and the number of nonviolent crimes committed were taken into account, F(1, 117) = 5.46, p < .03. Again, when race, SES, PPVT score, and the number of violent crimes were entered first, the number of nonviolent crimes did not significantly predict hostile attributional biases.

Finally, in a direct contrast, the DISC-diagnosed undersocialized conduct disorder group was found to have marginally significantly higher hostile attribution scores than the socialized conduct disorder group (see Table 2 for means), F(1, 116) = 3.71, p < .06.

Contrasting Reactive and Proactive Aggression

The final hypothesis tested was that attributional biases would relate to reactive, but not proactive, aggression. The significant positive correlation between the Reactive Aggression subscale score and the hostile attributional bias score has been reported above as .25. Contrary to hypotheses, the Proactive Aggression subscale score was also significantly positively correlated with the hostile attributional bias score, r(109) = .19, p < .05. Given the high correlation between the Reactive and Proactive Aggression subscale scores (r = .87), these variables must share a good deal of variance, and the findings are understandable. To test the predictability of hostile attributions from the unique variance in each subscale score, we conducted two stepwise regression analyses. In the first, the hostile attributional bias score was found to be significantly predicted from the Reactive Aggression score even after race, SES, PPVT score, and the Proactive Aggression score had been entered as predictors, F(1, 101) = 3.95, p < .05. On the other hand, when race, SES, PPVT score, and the Reactive Aggression score were entered first, the Proactive Aggression score did not contribute significantly to the prediction of hostile attributional biases, and the F result was less than 1.
Discussion

This study is among the first to demonstrate in a sample of adolescent boys with a history of criminal behavior that the biased tendency to attribute hostile intent to peer antagonists is positively correlated with the level of severity of undersocialized aggressive conduct disorder. This finding held when undersocialized aggression was measured dimensionally (through the RBPC Conduct Disorder score and the CTRS Conduct Problems score), when it was assessed categorically (through DISC diagnoses), and when it was assessed through numbers of interpersonally violent criminal charges. These findings are important because they bring the phenomenon of hostile attributional biases to bear on adolescent psychopathy, whereas most previous studies (e.g., Dodge & Frame, 1982) pertained to less disturbed younger children selected from school populations (with exceptions by Milich & Dodge, 1984; Nasby et al., 1979; and Slaby & Guerra, 1988).

These findings are consistent with (but by no means prove) the hypothesis that hostile attributional biases in response to provocation stimuli partially cause severe interpersonal aggression in children and adolescents. This study supports that hypothesis by providing evidence to rule out several competing hypotheses about the nature of the empirical relation between attributional tendencies and aggression.

One competing hypothesis is that hostile attributional biases are characteristic of general aggressive deviance and are not specific to undersocialized forms of conduct disorder. This hypothesis was not supported, because hostile attributional biases were not significantly related to a form of deviance that is socialized (measured by the RBPC Socialized Aggression score and the number of nonviolent crimes committed). Likewise, even when socialized aggression was controlled, the significant relation between hostile attributional biases and undersocialized aggressive conduct disorders still held. Also, when the number of nonviolent crimes committed was controlled, hostile attributional biases were still significantly related to the number of violent crimes committed. Thus, the evidence is consistent with the hypothesis that attributional biases are related specifically to undersocialized aggressive behaviors that are interpersonal in character.

A separate hypothesis was that hostile attributional biases would be related specifically to reactive aggression and not to proactive aggression. To test this hypothesis, we created new subscales of the RBPC Conduct Disorder scale. As expected, the Reactive Aggression subscale correlated significantly with the hostile attributional bias score, but, contrary to hypotheses, the Proactive Aggression subscale also correlated significantly with hostile attributional biases. Because these subscales were derived from the same scale (one that had been created by factor analyses), these subscales were highly correlated and did not have the degree of divergent validity that one may ordinarily desire in scales of distinct constructs. Ideally, one creates scales a priori that have high discriminant validity. Still, stepwise regression analyses were used to apportion the variance in these scores that was related to attributional biases. These analyses revealed that the Reactive Aggression subscale continued to relate significantly to hostile attributional biases even when the Proactive Aggression subscale was partialled out. On the other hand, when the Reactive Aggression score was partialled out, the Proactive Aggression score did not even come close to correlating significantly with hostile attributional biases. These findings are consistent with those of Dodge and Coie (1987) in demonstrating that hostile attributional biases appear to play a more significant role in mediating angry, reactive aggressive behaviors than in nonangry, proactive aggressive behaviors. This study extends previous findings by demonstrating that they hold in a sample of incarcerated adolescents. We are tentative in this conclusion, however, because the scores used for reactive and proactive aggression in the current study did not evidence the level of divergent validity that one desires. Because the items in the Proactive Aggression score in the current study were derived from the Conduct Disorder scale, they are not the same as those that one may use to create a measure of this construct. Further research on these constructs will more profitably use the psychometrically sound measures constructed by Dodge and Coie (1987).

Even with the tentative nature of the conclusions about reactive and proactive aggression, it appears that further study of these constructs as components of nosological systems is warranted. It is not clear whether the constructs of reactive and proactive aggression are distinct enough from the constructs of undersocialized and socialized aggression to merit retaining both distinctions. If not, the well-developed constructs of undersocialized and socialized conduct disorder may still benefit from the theoretical distinction between reactive (hostile) and proactive (instrumental) aggression that has been made in other disciplines such as developmental and social psychology.

Another competing hypothesis was that the relation between attributional biases and aggressive behavior is due to covariation with intelligence or SES, which are possibly the actual causes of both aggressive behaviors and attributional biases. This hypothesis was not supported, in that hostile attributional biases were found to be related to interpersonal aggression even when intelligence, SES, and race were statistically controlled. This finding is consistent with and extends the findings by Waldman (1988) and Dodge and Somberg (1987) that attributional biases are positively correlated with aggression scores even when skill in nonsocial information-processing tasks or cultural backgrounds were controlled.

By elimination of competing hypotheses and by specifying the type of aggressive conduct that is assessed, as has been done in this study, the evidence mounts in favor of the hypothesis that hostile attributions are an important factor to mediate the expression of interpersonally aggressive responses in both normal and psychopathological populations. Of course, this evidence is indirect and inconclusive. It is possible that a third variable (perhaps some other cognitive function or some other general form of behavioral deviance) will be found that accounts for the relation between hostile attributional biases and interpersonal aggression.

Also, our findings ought not to be construed as evidence that attributional tendencies cause an undersocialized aggressive behavior disorder, because it is possible that this correlation is accounted for by the reverse causal path (i.e., interpersonal aggressive behavior disorder may cause hostile attributional...
biases). Other methods (such as experimental manipulation) are required to tease out the causal direction of this relation. The contribution of these findings is not evidence of causation; rather, it is evidence of the striking specificity of the relation between hostile attributional biases and undersocialized aggressive conduct disorder.

Social information-processing theories of interpersonal behavior (e.g., Dodge et al., 1986; McFall, 1982) posit numerous possible mechanisms for behavioral responses (including attentional biases, response accessing, and response decision tendencies in addition to attribution and interpretation tendencies). Thus, it is unlikely that attributional tendencies will be found to be the only mechanism by which the likelihood of aggressive responses is increased. In fact, several investigators (Dodge et al., 1986; Slaby & Guerra, 1988) have found evidence that aggression is multidetermined, with some (but only some) of the explained variance uniquely accounted for by attributional biases.

Finally, our findings suggest that hostile attributional biases do not contribute to behavior disorder that is socialized or nonviolent (such as those problems assessed by the Socialized Aggression scale of the RBPC, the Proactive Aggression subscale, and the number of nonviolent criminal offenses). It is posited that these behavior problems occur as a function of other kinds of social information-processing biases, such as the expectation that antisocial behavior leads to positive outcomes.

In conclusion, the limits of the current data set must be underscored. The findings are merely correlational. They support a specific relation between attributions and aggression but not necessarily a causal one. The evidence of specificity is a function of the measures used here (namely, the PPVT, the report of parents' occupation, the RBPC, the CTRS, and chart files of criminal offenses), and specificity not have been found had other measures been used. The findings apply only to the population of adolescent boys incarcerated for criminal behavior. Further evidence is needed to evaluate the extent to which these findings generalize to girls and other populations.

References


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