

## Biased Decision-Making Processes in Aggressive Boys

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Recent evidence has suggested that aggressive boys demonstrate a bias toward attributing hostility to peers in unwarranted circumstances. This study explored two aspects of cognitive processing that might be related to attributional bias: speed of decision making and selective recall of hostile cues. Groups of aggressive and nonaggressive boys at three age levels participated in a detective game in which the task was to accumulate evidence in order to decide whether or not a peer had acted with benevolence or hostility. Aggressive boys were found to respond more quickly and with less attention to available social cues than nonaggressive boys. Aggressive boys also overattributed hostility to peers in unwarranted circumstances, but only when they responded quickly. This restriction suggested that training aggressive boys to respond more slowly could lead to fewer biased attributions on their part. Selective recall was also related to biased attributions, for both groups of boys. This suggested that training boys to recall all cues nonselectively could reduce the frequency of their biased attributions. The results are discussed in terms of a cognitive model of aggressive behavior. Because of the correlational nature of this study, the conclusions are stated as tentative.

Recently, researchers have suggested that biases in children's social perceptions may act as mediators of deviant interpersonal aggressive behavior. Nasby, Hayden, and DePaulo (1980), for example, found that institutionalized aggressive boys display an attributional bias toward interpreting social cues from others as displays of hostility, even when the cues were meant to be benign. Similarly, Dodge (1980) found that in reaction to an ambiguously intended frustrating event, aggressive boys responded behaviorally as if the peer instigator had malevolently intended the act, whereas nonaggressive boys responded as if the peer had acted benignly. In a second study, Dodge also found that aggressive boys were more likely to attribute hostility to peers in ambiguous situations than nonaggressive boys were. The importance of this attributional bias in understanding interpersonal behavior is reflected in the work of Kelley and Stahelski (1970), who demonstrated in a different context that such attributional biases could lead to interpersonal conflicts that perpetuate the biased judgments.

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The present study is an attempt to explore two steps by which aggressive boys may come to misjudge the behavior of peers. First, it was hypothesized that a biased attribution is more likely to occur when an aggressive child makes a judgment prematurely or very quickly. This hypothesis is based on the information processing notion of "perceptual readiness" (Hochberg, 1970). According to this hypothesis, aggressive boys may be "primed" to attribute hostility to peers because of a preexisting expectancy. If so, they should make biased attributions quickly and without regard to available contradictory information. Second, on the basis of social psychological studies (Snyder, Tanke, & Bercheid, 1977), it was hypothesized that a biased attribution is related to a process of selective recall of hostile cues that are consistent with the attribution. Aggressive boys who selectively recall hostile information should make biased attributions.

To test these hypotheses, groups of aggressive and nonaggressive boys at three grade levels were asked to play a detective game in which they had to decide whether a fictitious peer did or did not commit a certain act. They could win a prize for a correct decision. They were allowed to gather as much information as necessary to be sure about their decision. The information came in packets, each of which consisted of a fixed ratio of supporting and nonsupporting audio-recorded statements by other peers about the character and behavior of the suspect. There were three dependent

measures: the number of packets of information that they requested prior to making a decision, their free recall of valenced pieces of information, and the decision they made.

#### Method

##### *Subject Selection*

Groups of aggressive and nonaggressive subjects were selected on the joint bases of classroom peer sociometric nominations and teacher assessments of students' behavior. Following receipt of parental permission, each of 551 students (one fifth were nonwhite) at two public elementary schools was asked in a private interview to name the three classmates whom he or she liked most and the three whom he or she liked least. Each student was then asked to name the two classmates who best fit a behavioral description of aggressive behavior ("This child starts fights and hits other kids") and the two classmates who best fit a prosocial description. Scores computed as the sum of the nominations received from all peers in each category have been shown to have 12-week test-retest reliabilities averaging .74 (Dodge, 1980). Teachers were asked to assess the behavior of each student by indicating on two 9-point scales the favorability of each student's social relationships and the frequency of each student's aggressive behavior. These scores have test-retest reliabilities of .82 and .84, respectively.

To be selected as aggressive, a boy had to be above the median of his teacher's ratings on aggression and below the median on favorability of social relations. Also, he had to receive at least three more peer nominations as disliked than as liked and no more than two nominations as a prosocially behaving child. From this pool, the 15 boys in each of three grade groups (K-1, 2-3, and 4-5) whose peer nomination scores for aggression were highest were selected as the aggressive sample. Only boys were selected, since the total pool of aggressive children was predominantly male. The nonaggressive sample was selected according to opposite criteria on the same measures. The samples were matched in the proportions of boys from each race and classroom. Of the 90 boys selected, 81 agreed to participate in the study.

##### *Procedure*

Each subject was brought to a private interview room by a male experimenter who was blind to the subject's status and was asked to participate in a detective game. His tasks during the game were (a) to listen to a story about a boy who may have committed a certain act, (b) to gather information which would help him decide whether

the boy committed the act, and then (c) to state his decision on whether the boy committed the act. Each subject was told that he could win a small prize, displayed in front of him, if he made a correct decision.

Three stories described hostile acts that might have been committed by a particular boy. For example, one story concerned an incident in which an elderly woman called a school to complain that on the previous day, a student had deliberately spilled her groceries and then had run away. She suspected that the culprit might have been a particular boy, whom she named, but she was not certain of his identity. The subject was told to imagine that the suspected boy was absent from school and that he could gather information from peers to decide whether the named boy was indeed the culprit. Whereas the hypotheses of interest concerned boys' decisions about peers' hostile behavior, an appropriate control condition consists of boys' decisions about peers' benevolent behaviors. Therefore, each of the three hostile act stories was also written to describe a benevolent act. In all, six stories, varying in valence of the act (benevolent or hostile), served as stimuli.

After the subject heard a story, he was told that he could listen to up to five audiotaped testimonies by different peers of the suspect to help him decide whether the suspect had committed the act. After hearing the first testimony, each subject was asked whether he would like to hear another testimony or make his decision. The procedure was repeated until a decision was made, or until all five testimonies were heard, at which time a decision was solicited. Subjects were told that they should listen to as many testimonies as necessary in order to arrive at a confident decision.

Testimonies consisted of sentences that either implicated or counterindicated the suspect's involvement in the incident. An example of an implicating sentence for the story about the woman's groceries being spilled was, "I saw him running in the direction of that woman's house yesterday after school." Each testimony contained four such sentences, which were combined in one of three ways: supporting of involvement (three implicating and one counterindicating sentences), non-supporting of involvement (one counterindicating and three implicating sentences), ambiguous about involvement (two implicating and two counterindicating sentences). The five testimonies about a story each contained the same ratio of information; therefore, the balance of information (supporting, nonsupporting, or ambiguous) became an independent variable.

Initially, 200 implicating and counterindicating sentences were written to match the specific stories that they accompanied. Two judges indepen-

dently verified the valence and severity of each sentence and chose the 15 sentences of each type that would be used in each story. Sentences for the hostile stories were combined in random order for each testimony. The order of sentences for the benevolent stories was then matched (according to implication or counterindication) to the order for hostile stories. Once the 90 scripts of testimony were written, five children were recruited to record the testimonies. The resulting audio cassette tapes served as testimonies for subjects' use.

Each subject played the detective game six times, with a different story and balance of information combination each time. The order of story presentation was counterbalanced across subjects within a status group. Scoring sheets were used as a display for each subject to help clarify the nature of the task. Following the completion of the games, each subject was asked to freely recall the sentences that he had heard as testimony. After his recall, each subject was debriefed and given all of the prizes he had been trying to win.

### Results

The number of testimonies a child requested and his recall of testimonies for each game were subject to separate four-way repeated measures analyses of variance (ANOVA), with grade level (1, 3, or 5) and status (aggressive or nonaggressive) as between-subjects variables and valence of the act (benevolent or hostile) and balance of clues (supporting, ambiguous, or nonsupporting) as within-subjects variables. Following these analyses, the roles of these variables in determining subjects' decisions were explored through variance and correlational analyses.

#### *Number of Testimonies Requested*

The aggressive group of subjects ( $M = 1.44$ ) chose to hear 30% fewer testimonies prior to making a decision than did the nonaggressive group ( $M = 2.02$ ),  $F(1, 75) = 14.83$ ,  $p < .001$ . Also, the number of testimonies heard by subjects increased directly with grade level,  $F(2, 75) = 5.13$ ,  $p < .008$ . In fact, the fifth-grade aggressive group listened to as few testimonies as did the first-grade nonaggressive group ( $M = 1.71$ ). No other significant effects were found.

#### *Biased Recall of Testimonies*

The sentences recalled by subjects were recorded verbatim by the experimenter, so that the frequencies of supporting and nonsupporting

statements recalled could be computed by two independent coders. Agreement on coding exceeded 99%. Subjects demonstrated a clear bias toward recalling hostile pieces of information. This was reflected in the finding that subjects recalled more supporting statements when the suspect had possibly committed a hostile act than a benevolent act,  $F(1, 69) = 34.18$ ,  $p < .001$ , and in the finding that subjects recalled more nonsupporting statements when the suspect had possibly committed a benevolent act than a hostile act,  $F(1, 69) = 11.57$ ,  $p < .001$ . Whereas the aggressive group appeared to show a greater bias toward recall of hostile statements than the nonaggressive group did (70% of the statements recalled by aggressive subjects depicted hostile behavior compared to 59% for nonaggressive subjects), this difference was nonsignificant.

#### *Predictions of Subjects' Decisions*

Over all conditions, subjects responded in the affirmative 74% of the time, quite above a chance level (binomial test,  $p < .001$ ). To investigate the role of speed of responding in subjects' decisions, subjects were divided into groups of quick responders and slow responders based on within-cell median splits on the total number of testimonies heard. This classification was then included as an independent variable, along with grade, status, valence of the act, and balance of clues, in an ANOVA in which the decision made by the subject (scored as 1 for yes and 2 for no) was the dependent variable. As might be expected, there was a significant main effect of balance of clues,  $F(2, 138) = 71.31$ ,  $p < .001$ , in which subjects were more likely to decide that the suspect had committed the act when the balance of clues supported this decision (93% of cases) and when the clues were equally balanced (86%) than when the clues did not support this decision (43%). A main effect of valence of the act,  $F(1, 69) = 8.92$ ,  $p < .004$ , indicated that subjects more frequently decided that the suspect had committed a hostile act (78% of cases) than a benevolent act (70%). An interaction of valence of the act and balance of clues,  $F(2, 138) = 5.41$ ,  $p < .006$ , indicated that the effect of valence was strongest when the balance of clues did not support the possibility that the suspect had committed the act. This was the case because in the other experimental conditions, subjects almost always responded in the affirmative. A significant effect of grade level,  $F(2, 69) = 4.04$ ,  $p < .02$ , indicated that first graders were more likely to respond affirmatively to any decision (82% of cases) than were third (71%) or fifth (67%) graders.

Status of subject and speed of responding were found to have a significant effect on subjects' decisions only in the form of a complex interaction of all independent variables,  $F(4, 138) = 2.92$ ,  $p < .025$ . Since almost all subjects decided that the suspect had committed the act when the balance of clues favored that decision, only the non-supporting condition was investigated further. Two hypotheses were tested at each grade level, using Dunn's formula for comparison of cell means. First, it was hypothesized that *only* the aggressive subjects who were quick responders would consistently decide that the suspect had committed a hostile act when the clues suggested otherwise. Indeed, it was found that the aggressive, quick responding group in the third and fifth grades more frequently made this decision (at Grade 3, 75% of cases; at Grade 5, 71%) than did the pooled group of aggressive slow responders (50% and 37% at Grades 3 and 5, respectively), nonaggressive quick responders (33% and 22%), and nonaggressive slow responders (43% and 33%), by Dunn's test (each comparison,  $p < .05$ ). The second hypothesis was that the aggressive, quick responding group would more frequently decide that the suspect had committed a hostile act than they would decide that he had committed a benevolent act. This difference was significant at Grade 3 (75% of subjects decided that he committed a hostile act compared to only 37% for a benevolent act) and at Grade 5 (71% compared to 29%), by Dunn's test (each comparison,  $p < .05$ ). No differences in any comparisons were found among first graders. These data provide empirical support for the hypothesis that aggressive boys who respond quickly will attribute hostile behaviors to others in unwarranted circumstances, but this support was limited to boys in Grades 3 and 5. Aggressive boys who did not respond quickly made decisions that were not biased or different from those of nonaggressive boys.

In order to investigate the relation between a subject's recall of valenced clues and his decision about the clues, correlational analyses were performed. A ratio score of supporting clues recalled over nonsupporting clues was computed and correlated with the decision made by the subject. As with the previous analyses, these correlations were calculated only for the condition in which the balance of clues was nonsupporting. This correlation was significant both when a benevolent act was considered,  $r(79) = .28$ ,  $p < .02$ , and when a hostile act was considered,  $r(79) = .27$ ,  $p < .02$ . That is, subjects tended to make decisions that were consistent with the kinds of clues that they recalled. Though these are correlational data, they are nonetheless consistent with the hypothesis that

selective recall of information mediates one's decision about the information. These correlations were also calculated for aggressive and nonaggressive subjects separately. For a hostile act, the correlation was larger for aggressive subjects ( $r = .35$ ,  $p < .03$ ) than for nonaggressive subjects ( $r = .17$ , *ns*), whereas for a benevolent act, the reverse was true. Neither of these differences was significant, however, by *z* test. To investigate a further possibility that the number of testimonies heard somehow interacted with these correlations, the analyses were repeated with the number of testimonies heard partialled out. The partial correlations were significant and of the same magnitude as the original correlations, indicating that this variable had no effect on the reported pattern.

#### Discussion

The results of this study demonstrate two important correlates of attributional bias in aggressive boys. The first correlate is a quick response made without attention to available relevant social cues. Only when an aggressive boy chose to ignore these cues and elected to respond quickly did he overattribute hostile behavior to a peer. Attributional bias was not observed among nonaggressive boys, nor was it observed among aggressive boys when they considered a benevolent act. The second correlate of attributional bias is selective recall of presented cues. Aggressive boys who selectively recalled hostile cues over nonhostile cues demonstrated a bias toward attributing hostile behavior to a peer. This relation between selective recall and biased attribution was found, to some extent, in both aggressive and nonaggressive boys and when both hostile and benevolent decisions were considered. These data suggest that the relation between recall and decisions is not specific to aggressive boys, but is nonetheless an important factor in attributional bias.

From these data, it is suggested that quick responding and selective recall are cognitive paths that lead to attributional bias in aggressive boys. The data are consistent with reciprocally deterministic cognitive models of aggressive behavior offered by Dodge (1980) and Novaco (1978). According to these models, aggressive boys have acquired a cognitive expectancy that others will behave toward them in hostile ways. Through quick responding and selective attention to hostile cues, they come to biased attributions about peers' behavior. The biased attributions lead them to behave aggressively toward peers. Finally, this aggressive behavior leads to retaliatory aggression by peers, which is viewed by aggressive boys as

confirmation of their expectancy. The cycle thus starts over. The present data suggest that quick responding and selective recall may be mediating links in this model.

The importance of determining these links in the model is that they lead directly to potential interventions to alter the biased attributions of aggressive boys. It is possible that by training aggressive boys to respond to interpersonal cues more slowly and with greater attention to available nonhostile cues, they may become less likely to attribute hostility to peers in unwarranted circumstances. However, this proposed intervention is based on a causal interpretation of correlational data. Of course, only experimental manipulation of speed of responding and patterns of cue recall could convincingly demonstrate a causal model. By manipulating the speed with which aggressive boys are forced to respond with an attribution, and by forcing aggressive boys to attend to *all* presented cues, is it possible to alter their errors in attributions? This experimental manipulation is proposed as a next step of inquiry in this area.

#### References

- Dodge, K. A. Social cognition and children's aggressive behavior. *Child Development*, 1980, *51*, 162-170.
- Hochberg, J. Attention, organization, and consciousness. In D. I. Mustofsky (Ed.), *Attention: Contemporary theory and analysis*. New York: Appleton-Century-Crofts, 1970.
- Kelley, H. H., & Stahelski, A. J. Errors in perception of intention in a mixed motive game. *Journal of Experimental Social Psychology*, 1970, *6*, 379-400.
- Nasby, W., Hayden, B., & DePaulo, B. M. Attributional bias among aggressive boys to interpret unambiguous social stimuli as displays of hostility. *Journal of Abnormal Psychology*, 1980, *89*, 459-468.
- Novaco, R. W. Anger and coping with stress: Cognitive behavioral intervention. In J. P. Foreyt & D. P. Rathjen (Eds.), *Cognitive behavioral therapy: Research and application*. New York: Plenum Press, 1978.
- Snyder, M., Tanke, E. D., & Berscheid, E. Social perception and interpersonal behavior: On the self-fulfilling nature of social stereotypes. *Journal of Personality and Social Psychology*, 1977, *35*, 656-666.

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