

THE ROLES OF EMOTION PROCESSES AND HYPOTHETICAL SCENARIOS IN
PREDICTING ANTISOCIAL BEHAVIOR

By

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The current study investigated the association of attributions and responses made to hypothetical vignettes, as well as trait levels of anger and anger regulation, with reported antisocial behavior in a sample of early adolescents. A sample of 413 6th graders completed two hypothetical social problem-solving tasks as well as a larger survey assessing anger, anger regulation, aggression, delinquency, and association with delinquent friends. Hierarchical regressions indicated that anger and anger regulation were much stronger predictors of antisocial behavior and delinquent friends than were hypothetical aggressive responses. Surprisingly, hypothetical hostile attributions were not related to hypothetical aggressive responses or to any antisocial outcome variable. Additional multivariate ANCOVAs conducted on attribution-response pattern groups within each vignette indicated that participants who made nonhostile attributions but still generated aggressive responses for one of the two vignettes evidenced higher levels of antisocial tendencies than those with nonhostile attributions and nonaggressive responses. The efficacy of using hypothetical vignettes to predict antisocial behavior in real life is discussed, as well as the need to consider characteristics of both the vignettes and of participants when conducting research in this area.

CHAPTER 1 INTRODUCTION

Social Information Processing

Adolescence is a time of numerous behavioral changes, during which temporary increases in aggression and antisocial activity are often observed (Moffitt, 1993). In addition to the fact that aggressive behavior merits serious attention and preventive efforts on its own, for a subset of individuals, aggression in early adolescence can foreshadow more serious antisocial behavior in adulthood (Coie & Dodge, 1998; Moffitt, Caspi, Rutter, & Silva, 2001). Therefore, the study of factors that influence aggressive and antisocial tendencies remains an important area of research in this age group. The present study investigates and compares the ability of attributions and responses made to hypothetical scenarios, as well as anger-related emotional processes, to predict rates of antisocial behavior in real life.

When an individual is trying to make sense of a social situation, it is the perception of others' intentions, regardless of those others' *actual* intentions, that guides the individual's response (Berkowitz, 1990; Dodge & Coie, 1987). Most research on attributions of intent is conducted using a social information-processing (SIP) framework (Crick & Dodge, 1994; Dodge, 1986; Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002), which attempts to explain how cognitive and emotional factors influence an individual's understanding and conception of the social world. These models describe a series of steps in which social information is encoded, interaction goals are recognized, and possible response alternatives are generated and evaluated, resulting in a reaction to a given social situation. Atypical processing during any step may lead to socially inappropriate behavior, such as aggression (Crick & Dodge, 1994; Lemerise & Arsenio, 2000).

Because of the potentially overwhelming amount of information to which an individual must attend in any given social scenario, (s)he will often try to simplify the amount of cognitive processing needed by applying heuristic shortcuts, such as the selective attention to particular cues, or a reliance on past experiences to inform interpretation of the current event (Crick & Dodge, 1994; VanOostrum & Horvath, 1997). Hostile attribution biases may arise through deficiencies in cue utilization, or the capacity to integrate attention information into cognition (Dodge, 1980). For instance, Dodge and Frame (1982) found that aggressive children falsely recalled hostile cues as taking place in past social situations more often than did their nonaggressive peers, partially supporting the conclusion that aggressive children were selectively attending to hostile cues at the expense of other social signals.

In a study on boys' reactions to ambiguous social situations, Dodge (1980) found that when aggressive participants made hostile attributions of intent to the peer provocateur, they responded aggressively 60% of the time. When this same group attributed benign intent to the provocateur, however, they still reported that they would respond aggressively 26% of the time. The results of Dodge's study suggest that other characteristics of individuals, besides a tendency to interpret hostile intent, play a role in the formation of aggressive responses (VanOostrum & Horvath, 1997).

Researchers often attempt to study the provocation and initiation of aggression as well as components of the SIP model through the use of hypothetical and role-play vignettes (e.g., Dodge, 1990; Vitaro & Pelletier, 1991). These tasks usually present a problematic social situation or a conflict-resolution scenario and ask the participants to react or to answer questions about how they would react in real life. Research of this type allows the benefit of assessing beliefs and emotions at the time of conflict. However, no matter how salient and similar to the

participant's life a particular hypothetical scenario may be, the participants are always aware of the task's "make-believe" quality. This remains the case in most role-play tasks as well, which, in research with children and adolescents, may use an adult confederate to interact with the target child (e.g., Borbely, Graber, Nichols, Brooks-Gunn, & Botvin, 2005). As a result, it is possible that important aspects of the real-life social scenario are not being captured through hypothetical and role-play investigative techniques.

Hypothetical social problem-solving tasks can often elicit differences in response strategies between aggressive and nonaggressive individuals, particularly in cases where the provocateur's intentions are ambiguous (Crick & Dodge, 1996; Orobio de Castro et al., 2002). For instance, Tremblay and Ewart (2005) found modest correlations between self-reported aggression and various aggressive responses to hypothetical vignettes of provoking situations in a sample of college students. VanOostrum & Horvath (1997) found that hostile attributions to ambiguous peer scenarios significantly predicted both aggressive hypothetical responses and actual aggressive behavior in a sample of high school-aged boys. However, results have been inconsistent across studies, with some suggesting that these relationships only hold for highly aggressive, all-male samples (Crain, Finch, & Foster, 2005; Orbio de Castro et al., 2002). Furthermore, there is evidence that children's utilization of response strategies in natural social settings is frequently different from the answers they give to hypothetical social tasks (see Vitaro & Pelletier, 1991, for a review). Vitaro and Pelletier found that maladjusted children behaved more aggressively than their well-adjusted peers to provocation by another child; however, no differences were observed in the two groups' responses to a hypothetical vignette depicting a similar social scenario. The authors hypothesized that even though the maladjusted children may have been aware of socially acceptable behavioral responses, they became unable to act

accordingly when confronted with real social problem situations because other factors, such as “prohibitive emotional arousal” (p. 514), prevented the proper utilization of these strategies. The influences of these other factors, specifically anger and anger regulation, are of interest in the present study.

The Influence of Emotion

Though authors of SIP models have continually mentioned the importance of emotional factors in social cognition (Crick & Dodge, 1994), the function and effects of emotion processes within the SIP framework have received relatively little attention. Lemerise and Arsenio (2000) are an exception, offering a reformulation of Crick and Dodge’s model that addresses the interaction between cognition and emotion processes in the interpretation of social cues and the generation of behavior. This new model views emotion processes, such as emotionality and temperamental factors, emotion regulation, and background moods, as influencing each step of the social cognitive process. For instance, a particularly anxious child may weigh response outcomes differently than a fearless one (Saltaris, 2002).

The influence of emotion on decision-making strategies depends on two main factors: the strength and valence of a particular experience of emotion, often referred to as arousal or emotionality; and the ability to consciously regulate or control the effect of a particular emotional experience. Efficient emotion regulation in challenging situations allows the individual to engage in more effortful evaluation of response alternatives, instead of jumping to a quick conclusion (Lemerise & Arsenio, 2000, Saarni, 1999). Being a “good regulator” may allow an individual to consider multiple perspectives of a situation instead of jumping to a quick conclusion (Saarni, 1999).

Individual differences in arousal levels and regulatory abilities are related to differences in both prosocial and problem behavior. Studies by Eisenberg and colleagues (Eisenberg et al.,

2001; Eisenberg et al., 1996) have shown that elementary school-aged children who are high in emotionality but low in regulatory abilities display the highest frequency of conduct problems and socially inappropriate behavior. One explanation of these findings is that these emotional factors may cause deficiencies in multiple steps of the social-information-processing cycle, so that in any given social situation, these children are prone to engage in more abnormal social cognitive processes (Lemerise & Arsenio, 2002). The intensity of emotional experiences and the ability to regulate those experiences will also influence the qualities an individual notices about a social encounter and the meaning ascribed to those qualities. In situations of ambiguous intent, the influence of emotion on decision-making may be heightened due to a lack of clearly interpretable cues on which to base the formation of cognitive reasons for a particular response (Lemerise & Arsenio, 2002).

Many types of emotional events can be experienced during the course of a social interaction, but one emotion thought to be particularly related to aggression is anger (Dearing et al., 2002). Research has demonstrated that high anger levels can contribute to aggressive behavior (Cornell, Peterson, & Richards, 1999; Nichols, Graber, Brooks-Gunn, & Botvin, 2006). The emotional experience of anger is characterized by “physiological arousal and cognitions of antagonism” (Novaco, 1994, p. 32); trait anger is defined as an enduring propensity to become angry (Spielberger, Jacobs, Russell, & Crane, 1983). Anger and the ability to effectively regulate anger are related, since an individual with a higher baseline anger level will have a much tougher job, relatively, of controlling his/her temper. Nichols et al. (2006) found aggression rates to be positively correlated with anger and negatively correlated with an overall scale of self-control. However, emotion arousal and emotion regulation are distinct factors that contribute uniquely to

antisocial behavior (Eisenberg et al., 2001; Lengua, 2003), suggesting that skill at effortful emotion regulation may vary widely within individuals with high anger levels.

Though the influence of emotion regulation factors on behavior has received much attention in recent years (Eisenberg, Morris, & Spinrad, 2005), research on anger regulation specifically has been scarce (Zeman, Shipman, & Suveg, 2002). Results have been mixed, with some studies finding no direct link between anger regulation and aggression in younger children (Dearing et al., 2002). In particular, there is little research about this relationship in adolescents. The present study included a scale that assesses control strategies relating explicitly to experiences of anger, and as such was more specific than scales assessing general regulation strategies.

Methodological Issues

Most of the research on the relationships between hostile attribution of intent and aggressive behavior has been conducted on preschool and elementary-school-aged children; less attention has been paid to the relationship of these processes in adolescents, especially non-clinical or non-incarcerated samples, even though this type of research on adolescents is necessary to examine the persistence and stability of these relationships over the life-span (VanOostrum & Horvath, 1997). The relationship of hypothetical aggressive responses to reported rates of aggression in real life is also unclear, especially in this age group (Crain et al., 2005); more research with mixed-sex, non-referred adolescent samples is needed. Thus, the present study seeks to determine how well aggressive responses in hypothetical scenarios relate to reports of aggressive behavior in real life in a non-clinical sample of early adolescents.

In addition, while research relating ambiguously hostile hypothetical vignettes to real-life behavior have typically focused only on aggression, it is possible that the tendency to overattribute hostile intentions to social interactions with peers may manifest itself in other

forms. Aggressive behavior is highly related to other forms of antisocial behavior, including delinquent acts such as vandalism and theft (Moffitt et al., 2001). While previous studies have investigated hostile attributions and the SIP framework in samples of “delinquent” individuals, this term has usually been used to differentiate between normal and referred or incarcerated samples, and thus the label represents aggressive behavior in addition to other antisocial acts (Guerra & Huesmann, & Zelli, 1990). Few, if any, studies to date have included measures of specific delinquent behaviors, or have attempted to separate these from specifically aggressive behaviors. Therefore, one aim of the present study is to investigate whether the predictive ability of hypothetical vignettes extends to delinquent behavior as well.

Attribution processing style may also be related to the antisocial behavior of one’s peers. For instance, a tendency to perceive hostility in social situations may lead individuals to select peers for whom this attribution style is considered acceptable. Alternatively, exposure to antisocial peers may lead to increased hostile attributions through modeling of others (Bosson & Johnson, 2006). Though investigation of these mechanisms is beyond the scope of the present study, individuals’ friendship with aggressive and/or delinquent peers is included as an outcome variable in order to assess its associative relationship with responses to the hypothetical vignettes.

The Present Study

The present investigation examines responses to hypothetical vignettes, emotions, and self-reported aggression, delinquency, and peer delinquency in a diverse sample of 6th graders. Based on previous research on the SIP model (Orobio de Castro et al., 2002), a significant relationship is expected between real-life rates of aggression and aggressive responses to the hypothetical social problem-solving vignettes, such that more frequent aggressive responding will lead to higher reported rates of aggressive behavior. Furthermore, it is expected that this

relationship will exist between rates of aggression and hostile attributions of intent in the hypothetical vignettes as well.

A second purpose of the present study is to investigate the influence of emotion-related variables on the relationship between responses to hypothetical vignettes and real-life aggression. The function of emotion in social cognition can be viewed as a marker that signals important features of the social interaction and offers direction for cognitive processes and behavior (Damasio, 1994). Anger and hostile attribution should be related in this sense, because if one feels high levels of anger (due to either high baseline levels or insufficient regulation), this would be an emotional signal that (s)he is in a threatening situation; therefore, (s)he should attribute hostile intent to the other person or people involved. A resultant prediction of this study is that mediated relationships between anger and hostile attributions and anger reduction and hostile attributions should both be observed, such that greater levels of trait anger and poorer ability to regulate anger should increase attributions of hostile intent, which in turn should lead to more aggressive responses in the hypothetical scenarios and more antisocial behavior in real life. A series of hierarchical regressions in accordance with the procedures of Baron and Kenney (1986) will be used to show the mediating impact of anger processes on the relationship between hostile attributions and hypothetical aggressive responses, as well as on the relationship between hostile attributions and reported antisocial outcome variables.

Anger and anger regulation skills may explain the association between hypothetical responses and real-life antisocial behavior, but they also may explain unique variance in antisocial behavior unrelated to the hypothetical scenarios (Zeman et al., 2002). Though anger levels and anger reduction ability should be moderately negatively correlated (Eisenberg et al., 2005), unique variance contributions to antisocial behavior are also expected from each. It is

hypothesized that this unique variance would represent differences in situational characteristics and emotional salience between hypothetical and real-life peer conflicts. Hierarchical regressions on each antisocial outcome variable, with anger processes, and hypothetical vignette responses entered in separate steps, will assess the relative variance explained by each variable.

Although examinations of individual hypothetical vignettes is rare in the literature to date (Orobio de Castro et al., 2002), one of the benefits of using these vignettes in SIP research is that they allow for the investigation of specific attribution-response relationships as they relate to a single scenario. Therefore, exploratory multivariate ANCOVAs will also be conducted for each hypothetical vignette to assess the relationship of individual attribution-response patterns with levels of real-life antisocial tendencies. It is possible that these additional analyses will uncover new relationships between hypothetical attributions and responses not seen in the more traditional regression analyses.

In addition to the age of the participants, several other demographic characteristics may play a role in the differential formation of hostile attributions and the expression of aggression. As stated previously, overall rates of aggression appear to be higher in adolescent males than in adolescent females, suggesting that males and females may utilize emotional factors differently in hostile or ambiguous peer situations (Crick, 1997). Family background and community characteristics may also play a role in displays of aggression. For instance, aggression in African-American urban communities may serve adaptive functions unique to that environment, and therefore not be considered as socially inappropriate as it would be in other contexts (Coie & Dodge, 1998). Because of the wealth of research addressing the relationships between these factors and the cognitive, emotional and behavioral variables in question (see Coie & Dodge,

1998, for review), differences in gender and demographic characteristics will not be a central focus of this study, but will be tested in preliminary analyses.

CHAPTER 2 METHODS

Design

The current investigation consists of a sub-study of a randomized clinical trial designed to evaluate a school-based drug abuse and violence prevention program. A total of 42 New York City middle schools took part in the full study, which was approved by the Institutional Review Board for the Protection of Human Subjects in Research (IRB) at Weill Medical College, Cornell University. Fourteen parochial and three public schools in the larger program agreed to participate in supplementary data collection activities. The high relative percentage of parochial schools in this sample is a result of the recruitment of only the smallest schools from within the larger study for the supplementary data collection due to its intensive nature. Data for this study is drawn from the pre-trial assessment at the beginning of the participants' 6th grade year in order to avoid confounding effects from the intervention program.

Participants

Only students who completed both the survey measures used in the full study and the supplementary videotaped activities were included in the current sample ($N = 413$). The mean age was 11.63 years ($SD = .49$ years; range = 9.64 to 13.86 years). Girls made up 50.4% of the sample ($n = 208$). Racial subgroups included African American (49.6%), Latino (25.4%), Caucasian (17.9%), and other (6.8%). Fifty-three percent of the sample lived in two-parent, non-blended families, while 23.5% lived with single mothers and 23.5% lived in other household configurations. Parochial school students made up 69.7% of the sample; all other students attended public school.

Procedures

Parental consent for the full clinical trial was obtained through a passive consent procedure, which provided a comprehensive description of the investigation and the self-report surveys and allowed parents the opportunity to object to their child's participation. The subsample of 17 schools received a secondary passive consent form that explained the supplementary data collection activities, including the hypothetical peer-interaction tasks. Parental objection to the primary consent form precluded student participation in the supplementary tasks.

An ethnically diverse team of three to five data collectors presented the self-report survey on two separate days during regularly scheduled class periods. A standardized protocol similar to ones used in previous research on drug use and delinquent behaviors was used (see Botvin et al., 1994). To maintain the quality of the self-report data, identification codes rather than names were used to emphasize the confidential nature of the questionnaire and students were assured about the confidentiality of their responses. To enhance the validity of the self-report data, carbon monoxide breath samples were collected using a variant of the bogus pipeline procedure developed by Evans and colleagues (Evans, Hansen, & Mittlemark, 1977). This measure is primarily used for questions pertaining to cigarette smoking, although research has shown that bogus pipeline procedures can also increase the validity of other self-reported problem behaviors (Tourangeau, Smith, and Rasinski, 1997).

Supplementary activities took place on a third day of data collection in the subset of 17 schools. Participating students completed a series of activities and answered questions about their reactions to hypothetical vignettes describing ambiguous peer interactions in an interview format. Data collectors were trained undergraduate and master degree students, and primarily

female, African-American and Hispanic, although at least one male data collector was sent to each school.

Students completed the hypothetical vignette tasks individually in a private classroom space provided by the school. A data collector read relevant instructions and confidentiality information to each student before beginning the tasks. Students were informed that they were to respond to these scenarios as they would in real life. Responses to open-ended questions were transcribed for later coding. Two hypothetical social problem solving tasks (Dodge, 1990) dealing with ambiguously aggressive peer interactions were selected from the larger set of tasks for analysis in the present study. In the first hypothetical scenario, the participant is instructed to imagine that he/she is denied access to a school lunch table for an unknown reason. In the second hypothetical scenario, a student walking toward the participant in a school hallway yells out an insult which may or may not have been directed at the participant. For both hypothetical tasks, the participant was asked what he/she thought was going on in the mind of the provocateur as well as what his/her desired and actual responses to the situation would be. Complete scripts for the social problem solving tasks are included in Appendix A.

Measures

Hypothetical Vignettes

Hostile attributions. Answers to both the attribution and response questions of the hypothetical social problem-solving vignettes used a coding scale developed for the larger study (Graber et al., 2001; Nichols et al., 2001). Participants' attributions of the provocateurs' intent were coded from open-ended responses at the end of the vignettes in which they indicated what they thought was going on in the mind of the hypothetical peers while the events were taking place. Attributions of intent were coded as hostile when they included intimidation (e.g., "she wanted to start trouble," "they want to embarrass me"); attention-seeking (e.g., "she was trying

to be popular,” “he was trying to show off in front of his friends”); or personal problems (e.g., “he was mad,” “he must be jealous of me,” “they’re racist”). For comparison purposes, other possible responses included self-blaming attributions (e.g., “he thinks I’m a loser”) and situational attributions (e.g., “somebody else really was sitting there”). Interrater agreement was 89% ($\kappa = .80$) for the lunch table vignette and 87% ($\kappa = .84$) for the hallway vignette. Hostile attribution responses for each question were summed to produce a hostile attribution score with a range of 0-2.

Hypothetical aggressive responses. Aggressive responses were coded from open-ended responses at the end of the vignettes in which participants indicated what they would do or say to the other kids if this event happened to them. Responses were coded as aggressive if they included physical force, such as pushing or shoving; verbal confrontation, such as the use of threats, insults, ridicule, or sarcasm; or non-verbal hostile gestures, such as giving nasty looks. Examples of nonaggressive responses included walking away or questioning why the seat was unavailable. Interrater agreement was 90% ($\kappa = .88$) for the lunch table vignette and 89% ($\kappa = .86$) for the hallway vignette. Aggressive responses for each question were summed to produce a hypothetical aggressive response score with a range of 0-2.

Survey Measures

Anger. The seven-item anger subscale ($\alpha = .74$) from the Buss and Perry (1992) Aggression Questionnaire was used to assess trait levels of anger. Students were asked to rate how well a series of statements fit them. Items included “I sometimes feel like a powder keg ready to explode” and “Some of my friends think I’m a hothead.” Response categories ranged from 1 (Really Not True for Me) to 5 (Really True for Me). Items were averaged such that higher scores indicate greater anger.

Anger reduction. Anger reduction skills were assessed with a six-item subscale ($\alpha = .81$) created for the larger clinical trial (Epstein, Botvin, Diaz, Baker, & Botvin, 1997). Participants were asked how often they engaged in a series of activities when they felt really angry. Items included “Count to ten,” “Take a few deep breaths,” and “Tell myself this isn’t worth fighting over (it’s no big deal.)” Response categories ranged from 1 (Never) to 5 (Always). Items were averaged such that higher scores indicated greater skill at conscious anger reduction.

Aggression. Self-reported rates of aggression were assessed using 10 items from the aggression scale ($\alpha = .92$) of the Youth Self Report (Achenbach & Edelbrock, 1986). Students were asked how many times in the past month they had engaged in incidents of aggressive behavior. Items included “Yelled at someone (you were mad at),” “Told someone off,” “Pushed or shoved someone on purpose,” and “Hit someone.” Response categories were on a 5-point scale. Response options included 1 (Never), 2 (Once), 3 (2-3 times), 4 (4-5 times), and 5 (More than 5 times). Responses were rescored to a zero-baseline and then summed to produce an overall aggression score with a range of 0-40.

Delinquency. Delinquent acts were measured using a 10-item scale (Elliot, Huizinga, & Menard, 1989, $\alpha = .86$) that asked how often students had engaged in delinquent behaviors in the past year. Examples included “purposely damaged or destroyed property or things that did not belong to you” and “taken something from a store when a clerk wasn’t looking.” Response options included 1 (Never), 2 (Once), 3 (2-3 times), 4 (4-5 times), and 5 (More than 5 times). Responses were rescored to a zero-baseline and then summed to produce an overall delinquency score with a possible range of 0-40.

Friends’ delinquency. Friends’ participation in delinquent acts was measured using a seven-item scale (Elliot et al., 1989, $\alpha = .88$) that assessed how many of the participants’ friends

had engaged in delinquent behaviors in the past year. Examples included “ruined or damaged something on purpose that wasn’t theirs” and “broken into some place to steal something.” Response options referred to the portion of the participant’s friends and included 1 (None), 2 (Less than half), 3 (About half), 4 (More than half), and 5 (All or almost all). Responses were rescored to a zero-baseline and then summed to produce an overall friends’ delinquency score with a possible range of 0-40.

Demographic Characteristics

For facilitation of regression analyses, single mother households were collapsed into the “other” group of family structure and used as a comparison group for the two-parent variable (Nichols et al., 2006).

CHAPTER 3 RESULTS

Table 3-1 presents full sample means and standard deviations for each of the seven continuous variables employed in this study. Tests of normality were run on the distribution of each variable. Because hypothetical aggressive responses, self-reported aggression, delinquency, and friends' delinquency were positively skewed ($z_{\text{skewness}} = 6.86$ to 17.88), these variables were transformed using the square root function in all subsequent analyses. Distributions of other variables did not require transformation.

Demographic Associations

Table 3-2 presents bivariate correlations between study variables. Among demographic variables, family structure was significantly associated with all three antisocial variables; living in a two-parent, non-blended family served as a protective factor against exhibiting high rates of antisocial behavior and against associating with antisocial peers. Being African-American was positively correlated with higher rates of aggressive behavior, and being male was positively correlated with higher rates of delinquent behavior, but both correlations were small in size, indicating no meaningful association. It is interesting to note that no gender differences existed for aggressive behavior in this sample. In addition, attending public school (as opposed to parochial school) was associated with an increased rate of hostile attributions.

Because of the categorical nature of each demographic variable, chi-square analyses were conducted as a further test of demographic associations. Family structure and school type were associated such that participants who lived in two-parent families were less likely to attend public school ($\chi^2 = 18.80, p < .001$). Family structure and school type were also both confounded with race: African-American participants were less likely to live in two-parent, non-blended families, and public schools contained greater proportions of African-American students and

smaller proportions of Caucasian participants than would be expected by chance ($\chi^2 = 64.27, p < .001$). Gender was mildly associated with being African-American or Latino (there were more African-American girls than boys and more Latino boys than girls). The gender differences were considered an anomaly of the sample and not relevant to any other findings.

Associations Among Core Constructs

As expected, the three outcome variables (aggression, delinquency, and friends' delinquency) were highly colinear, and aggression and delinquency especially exhibited similar relationships with hypothetical and emotion-related variables. Also as predicted, hypothetical aggressive responses were related to reported aggression, though this association was weak, $r = .16, p < .01$. Hypothetical aggressive responses were also weakly associated with increased rates of delinquent behavior and, to a lesser extent, association with delinquent friends.

Surprisingly, hostile attribution of intent was not significantly associated with hypothetical aggressive responses or with reported rates of aggression, delinquency or having delinquent friends. In addition, hostile attributions were not correlated with either anger variable. One of the hypotheses of this study was that emotional processes would mediate the relationship between hostile attribution and aggression. However, because no significant correlations existed between hostile attribution and any of the emotion and aggression variables, this model was not examined, and hostile attribution was dropped from subsequent analyses.

Anger levels and anger reduction were not meaningfully associated, $r = -.09, p = .07$. The small magnitude of this relationship supports the conceptual distinction between emotion arousal and emotion regulation (Eisenberg et al., 2005). As expected, both anger variables were moderately correlated with all antisocial variables. High anger levels were associated with greater rates of aggression, delinquency, and delinquent friends, while good anger reduction skills predicted lower rates of each.

A hierarchical multiple regression analysis was conducted to test the overall variance explained by both hypothetical aggressive responses and anger-related variables in rates of reported aggression, delinquency, and delinquent friends. Because of their associations with one or more of the outcome variables, gender, family structure (two-parent family vs. other), and race (African-American vs. other) were entered into all models in step 1 as covariates. School type was dropped as a covariate due to its lack of association with any outcome variable (Stevens, 1996). Due to the fact that correlational analyses showed anger processes to be more strongly associated with antisocial behavior and delinquent friends than were hypothetical aggressive responses, the model was structured to first account for the combined association of anger and anger regulation and then test further contributions to the relationship explained by hypothetical aggressive responses. Accordingly, in each regression, anger and anger regulation were entered in step 2; and hypothetical aggressive responses were entered in step 3.

Tables 3-3, 3-4, and 3-5 present the results of these analyses. After controlling for gender, family structure, and race, anger and anger regulation both remained significant predictors of all three outcome variables, explaining 23% of the total variance in reported aggression, 20% of the total variance in reported delinquency, and 14% of the total variance in delinquent friends. Hypothetical aggressive responses also remained a significant predictor of each outcome variable upon addition to the model; however, it only explained an additional 1% of variance in aggression, 3% of variance in delinquency, and 1% of variance in delinquent friends. Reversing the order of steps 2 and 3, so that hypothetical responses were entered into the regression before anger variables, did not substantially change the variance explained by any of the predictors.

Based on these analyses, it appears that simply examining levels of hostile attributions or aggressive responses in these hypothetical vignettes provided little information about antisocial

behavior occurring in real life, and that emotional characteristics like anger levels and regulation may be better indicators of antisocial behavior in normative samples. However, hypothetical scenarios such as the ones used in this study continue to be widely used in research on child and adolescent samples. Hence, additional analyses were conducted to further explore potential associations of hypothetical vignette responses with antisocial behaviors in real life.

Attribution-Response Patterns

One approach that goes beyond simply investigating overall levels of attributions and responses is to instead look at differences in the patterns of responses that participants give to individual scenarios. For instance, in any given sample, only a portion of participants will respond aggressively to a particular scenario, and of those that do, not everyone will have attributed hostility to the provocateur. It is possible that separating participants into groups based on response patterns will uncover information about differences in social information-processing and real-life behavior even when hostile attributions show no association with hypothetical responses in the sample as a whole. This approach allowed for the examination of situational characteristics of the vignettes that may have resulted in different attribution or response outcomes from vignette to vignette.

For each vignette, four attribution-response pattern groups were created: nonhostile-nonaggressive, nonhostile-aggressive, hostile-nonaggressive, and hostile-aggressive. Group distributions are displayed in Table 6. A chi-square analysis comparing group membership in the lunch table vignette to the hallway vignette was not significant ($\chi^2 = 14.22, p < .115$), indicating that membership in a particular group did not stay stable across the vignettes.

A multivariate analysis of covariance was conducted for each vignette using group membership as the independent variable and a multivariate construct of “antisocial tendencies,” consisting of aggression, delinquency, and friends’ delinquency, as the dependent variable.

Gender, family structure, and race were included as covariates in each analysis, and for exploratory purposes, interactions between pattern group membership and each covariate were included in the analyses as well. Games-Howell error corrections were employed for post-hoc tests due to the large disparities in group sizes.

Lunch Table

The multivariate ANCOVA for the lunch table vignette groups was significant, Wilks' $\lambda = .95$, $F(9, 961.48) = 2.09$, $p < .05$, partial $\eta^2 = .02$, as were univariate tests for each individual outcome variable (Table 7). Post-hoc means comparisons revealed that the nonhostile-aggressive group had significantly higher rates of aggression, delinquency, and association with delinquent friends than did the nonhostile-nonaggressive group (mean differences = .34 to .47 *SD*; Figure 3-1).

In addition to expected multivariate main effects of family structure (Wilks' $\lambda = .96$, $F(3,395) = 5.22$, $p < .01$, partial $\eta^2 = .04$) and race (Wilks' $\lambda = .97$, $F(3,395) = 4.66$, $p < .01$, partial $\eta^2 = .03$), a multivariate effect also existed for the interaction between lunch table group membership and race, Wilks' $\lambda = .93$, $F(9, 961.48) = 3.50$, $p < .001$, partial $\eta^2 = .03$. Univariate tests revealed that the multivariate effect was driven by a significant interaction effect for delinquency only ($F[3, 397] = 4.70$, $p < .01$, partial $\eta^2 = .03$), such that within non-African Americans, nonhostile-aggressive participants were significantly higher in delinquency than all other groups; however, this pattern did not hold for African Americans (Figure 3-2). One issue is that large standard errors existed for the hostile-aggressive groups in particular, possibly due to their small size ($N = 10$ for African Americans; $N = 11$ for non-African Americans), which may have prevented further significant differences from becoming evident.

Hallway

The multivariate ANCOVA for the hallway vignette groups was not significant (Wilks' $\lambda = .97$, $F(9, 961.48) = 1.51$, $p = .140$, partial $\eta^2 = .01$), and its pattern of results did not replicate those of the lunch table scenario (Figure 1). Follow-up univariate ANCOVAs were not significant for any of the three outcome variables. In addition, no group membership x demographic variable interactions existed for the hallway vignette.

Table 3-1 Summary statistics on continuous variables

Measure	<i>M</i>	<i>SD</i>
Hostile attributions	.84	.64
Hypothetical aggressive responses	.49	.55
Anger level	2.50	.90
Anger reduction	2.79	1.03
Self-reported aggression	12.97	10.18
Delinquency	3.73	4.70
Friends' delinquency	4.17	4.81

Table 3-2 Correlations among study variables

	1	2	3	4	5	6
1 Gender						
2 Public school	.00					
3 African American ^a	-.10*	.34**				
4 Caucasian ^a	.04	-.29**	n/a			
5 Latino ^a	.10*	-.03	n/a	n/a		
6 Two-parent, non-blended family	.07	-.14**	-.26**	.19**	.09	
7 Hostile attributions	.01	.14**	-.02	.01	.04	-.03
8 Hypothetical aggressive responses	-.01	-.01	.05	.01	-.10*	.01
9 Anger	-.05	-.01	-.03	.05	.01	-.01
10 Anger regulation	-.06	-.05	-.03	.05	.01	.03
11 Reported rates of aggression	.04	.04	.11*	-.03	-.09	-.15**
12 Delinquency	.10*	.05	.08	-.08	-.04	-.15**
13 Friends' delinquency	.01	.06	.07	-.09	.03	-.19**

Note. For student sex, 1 = boys. * $p < .05$. ** $p < .01$. ^a Correlations were not applicable due to covariance caused by variable coding.

Table 3-2 Continued

	7	8	9	10	11	12
1 Gender						
2 Public school						
3 African American ^a						
4 Caucasian ^a						
5 Latino ^a						
6 Two-parent, non-blended family						
7 Hostile attributions						
8 Hypothetical aggressive responses	.04					
9 Anger	-.02	.06				
10 Anger regulation	-.03	-.08	-.09			
11 Reported rates of aggression	-.02	.16**	.40**	-.31**		
12 Delinquency	-.02	.20**	.38**	-.29**	.75**	
13 Friends' delinquency	-.07	.13*	.33**	-.22**	.58**	.61**

Table 3-3 Summary of hierarchical regression analysis for variables predicting reported rates of aggression

Variable	ΔR	ΔR^2	<i>B</i>	<i>SE B</i>	β
Step 1	.03**				
Gender			.17	.15	.06
Family structure			-.40	.15	-.13**
Race			.23	.15	.08
Step 2	.26**	.23**			
Gender			.17	.13	.06
Family structure			-.35	.13	-.12**
Race			.26	.13	.09
Anger			.62	.07	.38**
Anger reduction			-.38	.06	-.27**
Step 3	.27**	.01**			
Gender			.17	.13	.06
Family structure			-.36	.13	-.12**
Race			.24	.13	.08
Anger			.61	.07	.37**
Anger reduction			-.37	.06	-.26**
Hypothetical aggressive responses			.32	.12	.12**

Note. ** $p < .01$.

Table 3-4 Summary of hierarchical regression analysis for variables predicting reported rates of delinquency

Variable	ΔR	ΔR^2	B	$SE B$	β
Step 1	.04**				
Gender			.28	.12	.11*
Family structure			-.35	.12	-.14**
Race			.14	.12	.06
Step 2	.24**	.20**			
Gender			.28	.11	.12**
Family structure			-.31	.11	-.13**
Race			.16	.11	.07
Anger			.49	.06	.36**
Anger reduction			-.28	.05	-.24**
Step 3	.27**	.03**			
Gender			.28	.10	.12**
Family structure			-.32	.11	-.13**
Race			.14	.11	.06
Anger			.48	.06	.35**
Anger reduction			-.27	.05	-.23**
Hypothetical aggressive responses			.35	.10	.16**

Note. ** $p < .01$.

Table 3-5 Summary of hierarchical regression analysis for variables predicting reported rates of delinquent friends

Variable	ΔR	ΔR^2	B	$SE B$	β
Step 1	.04**				
Gender			.05	.12	.02
Family structure			-.44	.12	-.18**
Race			.05	.12	.02
Step 2	.18**	.14**			
Gender			.05	.11	.02
Family structure			-.41	.11	-.17**
Race			.07	.11	.03
Anger			.42	.06	.31**
Anger reduction			-.21	.05	-.18**
Step 3	.19**	.01*			
Gender			.05	.10	.02
Family structure			-.41	.11	-.17**
Race			.06	.11	.02
Anger			.41	.06	.31**
Anger reduction			-.20	.05	-.18**
Hypothetical aggressive responses			.21	.10	.09*

Note. * $p < .05$. ** $p < .01$.

Table 3-6 Attribution-response pattern group membership

Group	Lunch table scenario		Hallway scenario	
	<i>N</i>	%	<i>N</i>	%
Nonhostile-nonaggressive	256	62.0	105	25.4
Nonhostile-aggressive	79	19.1	41	9.9
Hostile-nonaggressive	57	13.8	201	48.7
Hostile-aggressive	21	5.1	66	16.0

Table 3-7 Univariate ANOVAs for lunch table groups

Source	Aggression			Delinquency			Delinquent Friends		
	<i>df</i>	<i>F</i>	partial η^2	<i>df</i>	<i>F</i>	partial η^2	<i>df</i>	<i>F</i>	partial η^2
Group Membership (GM)	3	2.82*	.02	3	5.29**	.04	3	2.75*	.02
Covariates									
Gender	1	.01	.00	1	2.64	.01	1	.47	.00
Family Structure	1	7.20**	.02	1	7.54**	.02	1	15.43**	.04
Race	1	3.78	.01	1	5.10*	.01	1	.71	.00
Covariate Interactions									
GM x Gender	3	.38	.00	3	.10	.00	3	1.32	.01
GM x Family Structure	3	.90	.00	3	.71	.01	3	1.57	.01
GM x Race	3	1.98	.02	3	4.70**	.03	3	1.26	.01
Error	397	(2.13)		397	(1.35)		397	(1.38)	

Note. Values in parentheses represent mean square errors. * $p < .05$. ** $p < .01$.

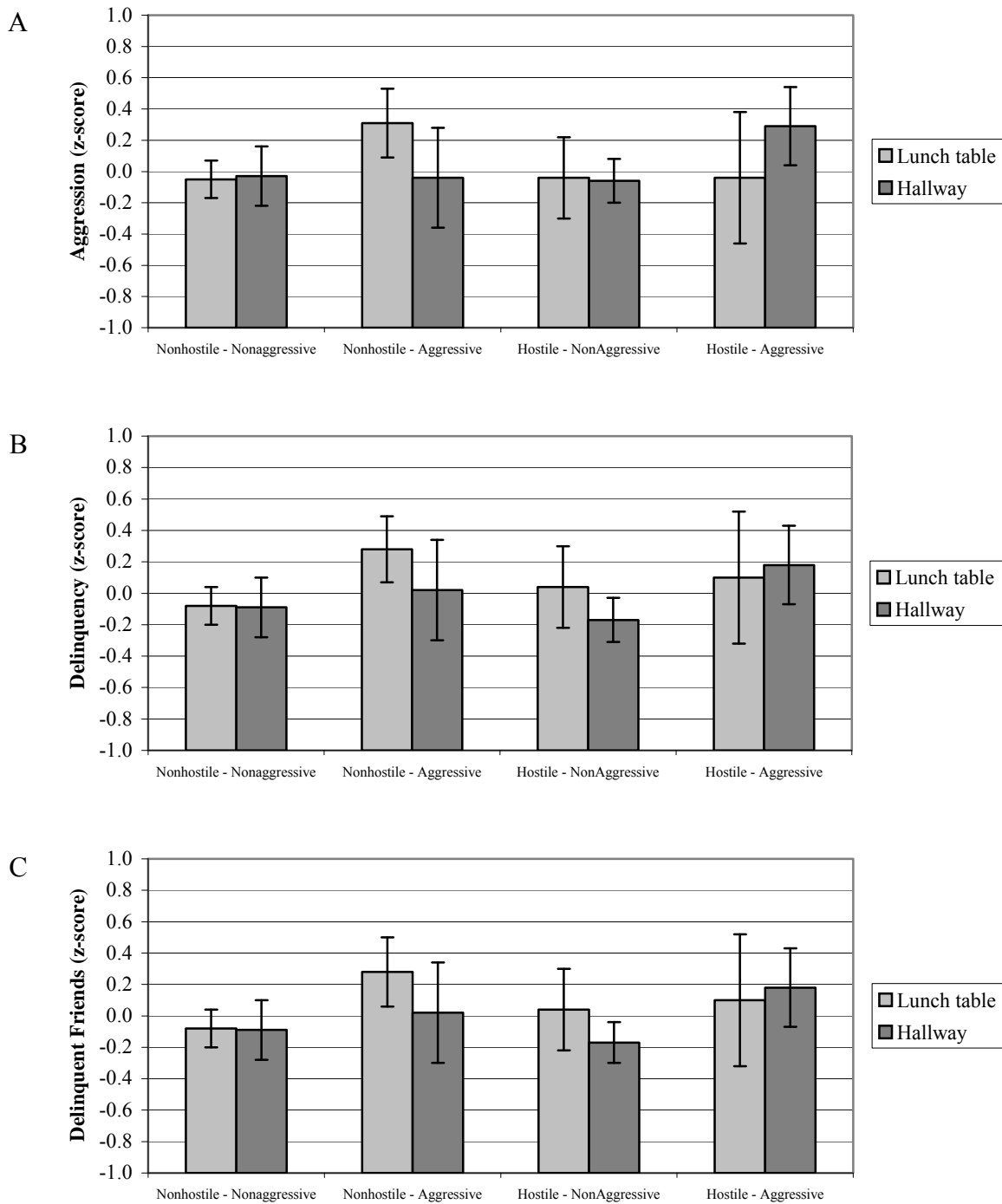


Figure 3-1 Attribution-response pattern differences in antisocial outcome variables for lunch table and hallway vignettes. Error bars represent 95% confidence intervals. A) Attribution-response patterns for aggression. B) Attribution-response patterns for delinquency. C) Attribution-response patterns for delinquent friends.

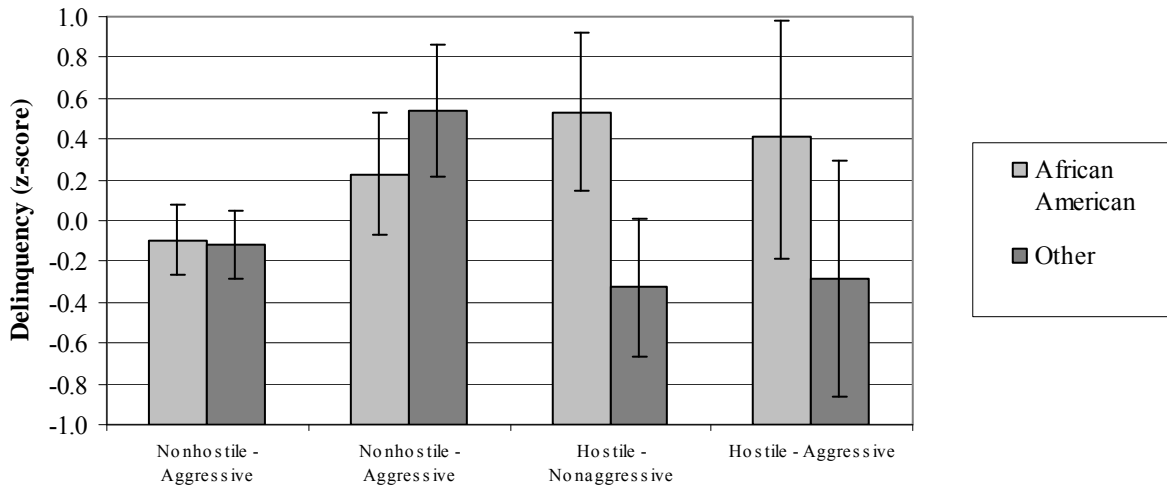


Figure 3-2 Lunch table attribution-response pattern differences in delinquency by race. Error bars represent 95% confidence intervals.

CHAPTER 4 DISCUSSION

This study investigated the relationship of anger and anger regulation to the associations between aggressive responses to hypothetical social scenarios and reported rates of aggression in real life. Because previous research has tended to focus on the application of SIP-based hypothetical research techniques to real-life aggression only, delinquent behavior and association with delinquent friends were also included as outcome variables of interest in order to give a fuller picture of real-life antisocial behavior. A moderate, yet significant, link was demonstrated between hypothetical aggression and the three kinds of reported antisocial tendencies. This finding is similar to previous research using hypothetical and role-play scenarios to assess aggression (e.g., Tremblay & Ewart, 2005). However, both anger and anger regulation had stronger associations with all three antisocial variables than did hypothetical aggressive responses, and these two emotion processes jointly accounted for nearly all of the explained variance in reported aggression, delinquency, and delinquent friends.

Combined with the finding that neither emotional process was significantly associated with hypothetical aggressive responses, the results of this study lend support to Lemerise & Arsenio's (2000) reformulation of the social-information-processing model and suggest that hypothetical social problem-solving tasks may not capture something crucial about the emotion processes that contribute to aggression in real life. This supports previous work proposing that children can "know" appropriate responses to hypothetical situations, but that characteristics about real-life encounters which differ from hypothetical scenario may generate an impulsive response which prohibits this knowledge from being implemented (Vitaro & Pelletier, 1991). Therefore, future researchers using these types of tasks to investigate or evaluate aggressive behavior need to take their potential limitations into consideration.

In addition, this study assessed the prevalence of hostile intent attributed to the provocateur in these problem-solving tasks and its association with anger processes and aggression in both the hypothetical scenarios and in real life. Unexpectedly, hostile attributions were not related to any antisocial outcome variable. More surprisingly, they were also not related to hypothetical aggressive responses, which were assessed using the same vignettes. This result was a departure from prior research on hostile attributions, which has demonstrated a pronounced association with aggressive behavior (Orobio de Castro et al., 2002). However, much of this work has compared highly aggressive, clinically referred or incarcerated samples to less aggressive control groups. It is possible that within normal spectrums of aggressive behavior in non-referred samples, the SIP model of hostile attributions → aggressive behavior is not an accurate representation of cognitive processes taking place during these scenarios.

Hostile attributions were also not associated with either of the two anger variables. The questions contained in the Buss and Perry (1992) anger scale conceptually assess trait anger, or enduring tendencies to become angry across contexts (Spielberger et al., 1983), rather than state anger, which is transiently aroused and assessed during specific situations. The specific association between trait anger and hostile attribution biases in adolescents has not been conclusively studied, although research in adults has demonstrated a link between the two (Epps & Kendall, 1995). Orobio de Castro, Merk, Koops, Veerman and Bosch (2005) found a mild correlation between emotion regulation skills and interpretation of intent in hypothetical vignettes, but their sample included a subset of highly aggressive boys referred for behavior problems. It is possible that the results of the current study reflect the existence of a weaker association between these constructs in non-clinical, mixed-gender adolescent samples.

An alternative explanation for our findings is that the failure to replicate previous research on the association between hostile attribution and aggression, as well as the weakness of the relationship observed between hypothetical aggression and real-life antisocial behavior, may be due to the small number of hypothetical scenarios assessed in this study (two), resulting in a restricted range of possible response scores. Prior work on hostile attribution and aggression typically has presented 7 to 12 scenario vignettes to each participant (e.g., Crain et al., 2005; Orobio de Castro et al., 2005). Adding more scenarios to the continuous measures used in this study might have resulted in stronger statistical associations between hostile attribution and other constructs. However, other research using small sets of scenarios suggests that the nonsignificant relationship observed between hostile attribution and reported antisocial tendencies may not just be a result of low variance in the measures. Vitaro and Pelletier (1991) presented children with four hypothetical vignettes of ambiguous provocation and three actual ambiguous provocations by a trained peer-confederate. Results indicated that children classified as maladjusted (i.e., aggressive and rejected by peers) responded to the peer-confederate provocations with more verbal attacks than did well-adjusted participants; however, no difference was seen between the two groups for the hypothetical vignettes. Additional research by these authors (Vitaro, Pelletier, & Contu, 1989) found that maladjusted children also attributed more negative intentions to provocateurs in peer-confederate interactions than in hypothetical vignettes. This research suggests that, small measure set or not, the lack of association in the current study between hostile attributions and reported rates of aggression may be a reflection of the larger issue of emotional processing differences between hypothetical scenarios and real-life situations.

Though a surprisingly small relationship was found between hypothetical and real-life tendencies when responses were summed across vignettes, one of the benefits of hypothetical

vignette research methods remains the ability to investigate attributions and responses as they relate to a specific hypothetical incident. Because of the importance of the outcomes which these studies are trying to accomplish – the identification and prevention of youth aggression (e.g., Hudley & Graham, 1993) – it may be worthwhile to reexamine the predictive relevance of these types of hypothetical measures through additional methodological techniques. It was therefore of interest to determine whether any useful predictive information about real-life antisocial behavior could be obtained from investigating attribution-response patterns within individual vignettes. This attribution-response pattern approach has been underutilized in research to date: SIP research using group comparisons has usually based group membership on levels of real-life aggression or participant characteristics such as peer rejection (Lansford et al., 2006; Lösel, Bliesener, & Bender, 2007; Orobio de Castro et al., 2002).

Separating participants into groups based on their attribution-response patterns (hostile or nonhostile; aggressive or nonaggressive) yielded significant differences between the nonhostile-nonaggressive and nonhostile-aggressive groups in the lunch table vignette, such that nonhostile-aggressive participants (approximately 19% of the sample) were higher in aggressive and delinquent behavior and reported that they had more delinquent friends. An interaction effect between group membership and race further suggested that this pattern of results was mainly due to higher rates of antisocial tendencies among the non-African American members of this group. Nonhostile-aggressive response patterns may represent a particularly problematic group of adolescents, who seem to be arriving at aggressive solutions to social interactions without having a “reason” to do so (i.e., feeling threatened by the perceived hostility of a peer).

However, no such relationship was found for the hallway scenario, in which attribution-response group membership did not yield any significant predictive information about antisocial

tendencies in real life. The wide difference in pattern distribution between the two vignettes, especially in attributions of hostility, is likely explained by the fact that while both vignettes could be classified as ambiguous, they differed in their levels of ambiguity: In the hallway scenario, while it remains unclear whether the provocateur was addressing his/her remarks to the participant or to another student, the actual statement the participant makes (“Hey, geek. Yeah, I mean you, nerd”) contains more obvious hostility than the statement made in the lunch table scenario (“You can’t sit there, that seat’s taken”). As such, the majority of participants thought that the hallway provocateur was hostile, while the lunch table provocateur was not. The ambiguity level of the vignettes may be an important predictor of SIP processing in normative, nonreferred individuals, and as such may be a useful inclusion in future research using these populations.

Further investigation of antisocial behavior differences among attribution-response pattern groups should include possible personality measures which might account for participants’ differing reactions to the hypothetical vignettes. For instance, empathy- and fear-related characteristics might explain why more antisocial adolescents in this sample tended to act aggressively in the absence of perceived threat in the lunch table scenario (Andershed, Kerr, Stattin, & Levander, 2002). Social measures such as peer rejection or the desire to increase one’s social status may also play a role in adolescents’ decisions to act aggressively in the absence of hostility (Guerra, Asher, & DeRosier, 2004; Rose, Swenson, & Waller, 2004).¹ These variables could potentially be incorporated at various steps of the SIP model to explain why attributions of hostile intent do not usually result in aggressive responses in this sample.

Hypothetical tasks like the ones described in this study are often used in prevention and intervention efforts for youth with behavior problems (Sukhodolsky, Golub, Stone, & Orban,

2005). A greater understanding of the relationship between hypothetical and real-life responses to stressful social situations, as well as the factors that may differ between the two, may help to improve the efficacy of these programs. However, it is important to note that effect sizes of the attribution-response pattern analyses were still quite small, mimicking the amount of variance explained when continuous versions of the hypothetical variables were analyzed. The utility of hypothetical scenarios at telling us about actual antisocial behavior is expected to be moderate at best, suggesting the need to consider other characteristics of adolescents in addition to their performance in these tasks.

An additional limitation of the study may be that the distinction between reactive aggression (aggression in response to provocation) and proactive aggression (aggressive behavior for instrumental gain) was not assessed. Though the two are correlated, reactive aggression has been shown to have a much stronger relationship with hostile attribution of intent (Crick & Dodge, 1996). Assessing rates of real-life aggression in this manner may have contributed to a more detailed understanding of the effects of hostile attribution in this study, and any future research on this topic should take the distinction between subtypes of aggression into consideration.

While it was not the initial purpose of this study to investigate demographic differences in aggression, hostile attributions or emotion processes, the lack of gender effects in these constructs is of interest. Traditionally, boys have been viewed as more aggressive than girls; however, a growing amount of research suggests that this difference is narrowing (Odgers & Moretti, 2002). Although the inclusion of gender in this study was to serve as a possible control variable, more research is needed to specifically investigate the presence or absence of gender differences in social-emotional-cognitive pathways of this type.

The sample used in this study was drawn exclusively from schools within an urban setting. Aggression levels are higher in urban settings relative to rural settings (Farrel, Sullivan, Esposito, Meyer, & Valois, 2005), which may reflect differences in cultural views about the appropriateness of aggression in certain contexts (Tolan, Gorman-Smith, & Henry, 2003). However, the fact that anger variables showed a stronger association with antisocial tendencies than did hypothetical variables implies that emotion processes are contributing to variability in rates of antisocial behavior over and above the implementation of what may be considered a culturally-appropriate retaliatory response. Still, the results of this study may not be generalizable to other samples of early adolescents due to particular characteristics of the urban setting.

The current research is thought to contribute to the collective understanding of hostile attributions and anger processes and their role in aggression in early adolescence. In addition, the results of this study have implications for the future use of hypothetical vignettes to assess aggression in individuals of this age. Analysis of pattern groups, in particular, is a methodological technique that can easily be applied to existing data to evaluate and compare the predictive efficacy of individual vignettes. Besides the inclusion of samples with different demographic characteristics, research in this area should assess the relationships of these core constructs over time.

APPENDIX
HYPOTHETICAL VIGNETTE SCRIPTS

Task: Lunch Table

Instruction: “Imaging that you get your lunch at school and then walk over to a table. You want to sit at this table. Several other kids are already seated there and there is one empty seat. As you begin to sit down, one of the other kids says, ‘You can’t sit there. It’s taken.’ A couple of other kids laugh.”

Question 1: “So you were not able to sit at the table. What do you think was going on in the minds of the kids at the table when this happened?”

Question 2: “What would you do or say to the other kids if this happened to you?”

Task: Hallway

Instruction: “Imagine that you are walking down the hallway at your school with two other kids on the way to lunch when you see another boy/girl coming toward the three of you from the other end of the hallway. There are lots of kids in the hallway. This other kid yells out, ‘Hey, geek. Yeah, I mean you, nerd.’ Some of the other kids start laughing.”

Question 1: “So some kids are laughing. What do you think was going on in the mind of the boy/girl when he/she said this?”

Question 2: “What would you do or say to the boy/girl if this happened to you?”

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BIOGRAPHICAL SKETCH

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