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# Accuracy in Judgments of Aggressiveness

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*Perceivers are both accurate and biased in their understanding of others. Past research has distinguished between three types of accuracy: generalized accuracy, a perceiver's accuracy about how a target interacts with others in general; perceiver accuracy, a perceiver's view of others corresponding with how the perceiver is treated by others in general; and dyadic accuracy, a perceiver's accuracy about a target when interacting with that target. Researchers have proposed that there should be more dyadic than other forms of accuracy among well-acquainted individuals because of the pragmatic utility of forecasting the behavior of interaction partners. We examined behavioral aggression among well-acquainted peers. A total of 116 9-year-old boys rated how aggressive their classmates were toward other classmates. Subsequently, 11 groups of 6 boys each interacted in play groups, during which observations of aggression were made. Analyses indicated strong generalized accuracy yet little dyadic and perceiver accuracy.*

**Keywords:** *accuracy; bias; aggression; social relations model; hostile attribution bias*

Historically, person-perception researchers have focused on the finding that human perceivers make inaccurate judgments that are riddled with biases. In fact, rarely does one encounter a study that discusses

inaccuracy of perception without examining a possible bias as the culprit. Krueger and Funder (2004) reviewed the literature on biases and accuracy in social perception, and the resulting impression is that person perception is fundamentally flawed, "ludicrous" (Tversky & Kahneman, 1971, p. 109), and "self-defeating" (Tversky & Kahneman, 1971, p. 107). Following Krueger and Funder (2004) and Swann (1984), such a characterization of human judgment is undeserved for several reasons.

First, sometimes individuals make inaccurate judgments not because they are inept social perceivers but because under certain circumstances biases that lead to inaccuracy are "more beneficial than irrational" (Krueger & Funder, 2004, p. 7). For example, research in the field of close relationships has demonstrated that biased perceptions of one's relationship partner are often beneficial both to the perceiver and to the target when the bias is positive, specifically when the perceiver idealizes her or his partner (e.g., Murray, Holmes, & Griffin, 1996). It may be the case that

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having a negative bias, or perceiving another person as having more negative attributes or behaviors than he or she actually has, can also be beneficial in navigating one's social world, particularly when judgments are made of targets who may be particularly threatening.

The second general point is that biases do not always lead to inaccuracy; social judgments can be both biased and accurate (Dawes & Mulford, 1966; Hoch, 1987). For example, Kenny and Acitelli (2001) found that assumed similarity (i.e., assuming that oneself is similar to others) in the context of close relationships can lead to accurate judgments. Individuals who assume that close others are like them are often correct because close others are indeed like them. In addition, Lee, Jussim, and McCauley (1995) argued that stereotypes very often have a kernel of truth. When individuals make judgments based on stereotypes, such biased judgments can be correct. A judgment's being biased does not necessarily make it an inaccurate one.

The idea that biases may potentially lead to accuracy leads us to an important point: It is crucial to make a distinction between an error and a bias. The term *error* implies an incorrect judgment, whereas a bias may lead to an incorrect or a correct judgment. Psychologists sometimes use the terms *bias* and *error* interchangeably. In a critique of research on the fundamental attribution error, Harvey, Town, and Yarkin (1981) argued that the fundamental attribution error reflects a tendency to underestimate the importance of situational determinants and to overestimate the degree to which actions are determined by dispositional influences. However, the fundamental attribution error should not be characterized as an error but rather a bias in that it may be correct, and indeed it often is correct.

There are additional methodological reasons to believe that flawed social judgments are overrepresented in the literature. Historically, research paradigms used to examine social judgments were designed to facilitate biases in perceptions, which ultimately lead to inaccurate judgments (Krueger & Funder, 2004) rather than correct ones. There are several ways perception studies encourage the view that human perceivers are biased. First, perception studies very often provide perceivers with very impoverished information, and the most salient information given to perceivers is the bias factor. It then is hardly surprising that perceivers use this information (Schwarz, 1994) in making social judgments. Second, the stimuli being judged in many perception studies are artificial and, therefore, there is no correct judgment. Thus, from most bias studies one cannot even determine if perceivers are accurate. Third, perceptions are often considered either accurate or inaccurate, although it is more useful to place accuracy and inaccuracy on the ends of a continuum rather than

treating them as a dichotomy (Kenny & Albright, 1987). The issue then is not whether perceivers are either accurate or inaccurate but rather the extent to which perceivers are accurate.

Recent research in person perception has redefined how accuracy is measured and has allowed for the possibility of both accurate and inaccurate judgments. One illustration is research using the thin-slices (Ambady & Rosenthal, 1992, 1993) and the zero-acquaintance (Albright, Kenny, & Malloy, 1988) paradigms, which do not encourage or discourage the uses of biases in social judgment. Such research has found that human perceivers are often more accurate than chance, even when they are given very little information about a target. In thin-slices and zero-acquaintance studies, the degree to which a perceiver is accurate is determined by using a criterion for a target's standing on a trait, such as a behavioral measure, or self-reported individual difference variable (e.g., sexual orientation in Ambady, Hallahan, & Conner, 1999). Current methods of studying accuracy contrast the traditional approach of many bias studies in which "nothing true can possibly be said about the target" (Krueger & Funder, 2004, p. 11). To examine accuracy fairly, perceivers should be given the opportunity to be accurate or inaccurate, using a realistic context in which perceivers should be particularly motivated to be accurate rather than encouraged to be biased.

### Types of Accuracy

In addition to the complication of studying accuracy in social perception, a further complication in the study of accuracy is its definition. Funder (1997) has distinguished between three major variants: constructivist (Kruglanski, 1989), realistic accuracy (Funder & West, 1993), and pragmatic accuracy (Swann, 1984). Kruglanski's (1989) constructivist approach defines accuracy in terms of consensus; the degree to which acquaintances agree with strangers is often assessed, and consensus then serves as the criterion for accuracy.

Once a researcher determines an appropriate definition for *accuracy*, moderator variables of accuracy are often examined. For example, Funder (1995) discussed four possible moderators of accuracy: The "good judge," some individuals are better perceivers than others are, the "good target," some individuals are easier to judge than others are, the "good trait," some traits are easier to judge and some behaviors easier to predict than others are, and "good information," certain types of information or more information leads to more accurate judgments. Such analyses of moderator effects examine accuracy ideographically.

In contrast to the ideographic approach to the study of accuracy, accuracy can also be examined nomothetically. Following Swann (1984), there are two different nomothetic ways in which a perceiver can be accurate: First, a perceiver can be accurate about how a target behaves with others, or global accuracy. Second, a perceiver can be accurate about how a target behaves with the perceiver in particular, or circumscribed accuracy. Swann and several others (McHenry, 1971; Zebrowitz & Collins, 1997) have argued that circumscribed accuracy should be much larger than global accuracy because of the pragmatic utility for perceivers to be accurate about how a target behaves specifically with them. For instance, it is usually more beneficial for a perceiver to know whether a target acts aggressively toward her or him specifically than it would be to know whether the target acts hostilely toward others. In sum, it is more pragmatic for perceivers to accurately predict the behavior of a target with them in particular than with others in general because such knowledge would aid them in navigating their social worlds.

One way to assess both global and circumscribed accuracy is to undertake a componential analysis. We next describe an analysis strategy that enables the examination of both bias and accuracy for individuals' perceptions of targets' aggressiveness at the dyadic and individual levels.

### The Social Relations Model

In these analyses, we examine a variation of Swann's (1984) two forms of accuracy using a componential approach. Kenny (1994) has noted a methodological difficulty with Swann's two types of accuracy. If a perceiver achieves global accuracy, then he or she is likely to achieve some circumscribed accuracy by presuming that the target would behave consistently with him or her as the target would with other people. Kenny has suggested two different but closely related types of accuracy that control for this difficulty. The first, called *generalized accuracy*, refers to the accuracy of judgments made by many perceivers of the target. The perceptions of many targets are averaged creating a consensual judgment, which is correlated with the average behavior of the target (i.e., the target with many partners). The second, called *dyadic accuracy*, refers to a perceiver's deviation from the average. For example, if Betty sees Sally as friendlier than others see Sally, does Sally behave more friendly toward Betty than she does to others? Generalized accuracy corresponds to Swann's global accuracy, and dyadic accuracy corresponds to his circumscribed accuracy. In this article, we adopt Kenny's approach to Swann's two types of accuracy.

To measure dyadic and generalized accuracy, the perceptions of a person must be broken up into components. Beginning with Cronbach (1955), the study of accuracy requires a decomposition of perceptions into components. As discussed by Kenny and Albright (1987), the Cronbach decomposition is an ideographic decomposition because it measures degrees of accuracy for perceivers compared to each other. To achieve a nomothetic decomposition, the Social Relations Model (SRM) can be used.

Kenny and La Voie's (1984) SRM decomposes a judgment made by a perceiver into three sources of variance: actor, partner, and relationship. For example, Abel's perception of Cain's aggressiveness consists of three major components:

- actor effect: the extent to which Abel sees all targets as aggressive or not aggressive,
- partner effect: the extent to which Cain is seen as aggressive or not aggressive by perceivers, and
- relationship effect: the unique relationship between how aggressive Abel sees Cain above and beyond how aggressive Abel sees others and how aggressive Cain is seen by others.

Note that the relationship effect can be viewed as the interaction between actor and partner effects; thus, the relationship is what is left over when actor and partner effects are removed.

In a parallel manner, we can decompose aggressive behavior. Consider for example, Cain's aggressiveness with Abel:

- actor effect: the extent to which Cain is generally aggressive with others,
- partner effect: the extent to which Abel is the recipient of aggression (i.e., Abel is a victim), and
- relationship effect: the extent to which Cain is particularly aggressive toward Abel.

Accuracy can be conceptualized as the correlation between SRM components. First, generalized accuracy, which closely corresponds to Swann's (1984) global accuracy, is the correlation of the target effect in perceptions with the actor effect in behavior. Second, dyadic accuracy, which corresponds to Swann's circumscribed accuracy, is the correlation of the relationship effect in perceptions with the relationship effect in behaviors. As discussed by Kenny and Albright (1987), there is a third type of accuracy: perceiver<sup>1</sup> accuracy. This form of accuracy is assessed by examining the correlation of the actor effect in perceptions with the partner effect in behavior: That is, if Abel thinks that others are aggressive, then do people tend to be aggressive when interacting with Abel? Perceiver accuracy is useful in the current context because it assesses the degree to

which a target accurately knows the extent to which he is victimized by others. Previously, accuracy researchers have not assessed perceiver accuracy.

Is there empirical support for Swann's (1984) hypothesis that there is greater dyadic accuracy than generalized accuracy? Although Swann's hypothesis sparked much theoretical interest, few researchers have empirically tested it (Gill & Swann, 2004). In an extensive test of Swann's hypothesis,<sup>2</sup> Kenny, Kieffer, Smith, Ceglanski, and Kulo (1996) created four-person groups and had fraternity members rate each other on competitiveness and sociability. The participants then interacted one on one in a competitive task during which competitiveness and sociability were observed. A measure of accuracy was obtained by measuring the association between trait ratings and the subsequent behavior that occurred during the interactions. The authors found evidence of generalized accuracy (e.g., if a person is seen as talkative, he talks more in general); however, little evidence was found for dyadic accuracy. The finding of strong evidence for generalized accuracy and weak evidence for dyadic accuracy is consistent across other studies as well (e.g., Colvin & Funder, 1991; Levesque & Kenny, 1993). Colvin and Funder (1991) found little evidence of dyadic accuracy among friends by showing that friends were no more able than strangers were to predict a target's behavior. Moreover, Levesque and Kenny (1993) also did not find evidence of circumscribed accuracy, although this result was unsurprising given that judgments were made by perceivers who were not previously acquainted with the targets.

Kenny et al. (1996) were concerned that the variables of interest were not pragmatic enough for perceivers to be strongly motivated to be accurate at the dyadic level. In the current study, we tested Swann's (1984) hypothesis by examining the extent to which perceivers are accurate predictors of targets' behavior in a context where they should be particularly motivated to be accurate, specifically, at predicting their peers' aggressive behaviors toward them and toward others in general.

### Bias, Inaccuracy, and Accuracy of SRM Components

For perceptions of aggression, there are theoretical and empirical reasons to believe that each SRM component is potentially accurate and inaccurate. Moreover, biases can contribute to both inaccuracy and accuracy. We consider each component in the SRM and what factors contribute to bias, accuracy, and error.

The actor component in perception examines the extent to which a perceiver consistently sees targets as aggressive or not aggressive. Much of the variance in the actor effect might well reflect a bias in the perceptions of

others. The hostile attribution bias (Nasby, Hayden, & DePaulo, 1979) states that perceivers attribute hostile intent to targets, especially under ambiguous situations. Dodge, Pettit, McClaskey, and Brown (1986) demonstrated that aggressive children in particular have the hostile attribution bias. The bias leads to errors in the interpretation of targets' behaviors and in turn to more aggressive behavior on behalf of the perceiver. Thus, it may be that perceivers overestimate the degree to which targets are hostile, and the hostile attribution bias leads to an overestimation of targets' actual aggressive behaviors. Perceivers' judgments would then be inaccurate.

However, the hostile attribution bias might not lead to error but might reflect reality. If a person is consistently victimized by others, he or she might realize that he or she is a victim and so the bias is accurate. In this case, perceiver accuracy occurs because perception mirrors reality.

Alternatively, the hostile attribution bias made by the perceiver can lead to a self-fulfilling prophecy effect for the target. In this case, perception causes reality. Recall that perceivers who make the hostile attribution bias misattribute targets' behavior as aggressive. This then leads the perceiver to behave aggressively toward the target. The perceiver's aggressive behavior may in turn lead the target to respond with aggression against the perceiver. Thus, the hostile attribution bias can create a self-fulfilling prophecy for the target such that the target behaves aggressively in defense. If this is the case, the actor effect is biased, and this bias creates a reality.

In addition to the actor effect, the partner effect can also be influenced by biases that lead to accuracy or inaccuracy. Recall that the partner effect measures the degree to which judgments of a particular target's aggressiveness are consensual. These consensual judgments are accurate to the degree to which they predict aggressive behaviors: Are people who generally behave aggressively seen by others as aggressive? The partner effect can be biased if, for example, stereotypes are used as a basis for judgments of aggressiveness. For instance, stereotypes about race and gender might be used to infer whether someone is aggressive (Rich, Woods, Goodman, Emans, & DuRant, 1998), and facial appearance and body type might be used to infer aggressive behavior (e.g., Zebrowitz, Androletti, Collins, Lee, & Blumenthal, 1998). Inaccurate stereotypes would persist because perceivers tend to encode only stereotype-consistent information (Bodenhausen & Lichtenstein, 1987). To the extent that stereotypes are inaccurate and determine how a person is viewed, the accuracy of the partner effect would be weakened.

There are two ways in which stereotypes may be accurate. First as argued by Lee, et al. (1995), there may be a kernel of truth in stereotypes. For instance, the

belief that men are more aggressive than are women is likely grounded in the fact that men are indeed more aggressive than women are. Second, stereotypes can create their own reality as in the self-fulfilling prophecy. There is a long history in social psychology (Merton, 1957; Word, Zanna, & Cooper, 1974) of studies demonstrating that a target's behavior can be determined by the beliefs of a perceiver.

It is interesting that sometimes a self-fulfilling prophecy can backfire: Individuals who are stereotyped as being aggressive based on physical appearance may retaliate against the stereotype by behaving in a manner that is opposite to expectations. For example, research on the relationship between aggression and being baby faced has shown that baby-faced individuals are thought to be more submissive, weak, and naïve than are their mature counterparts (McArthur & Apatow, 1983). Zebrowitz et al. (1998) found that contrary to stereotypes, baby-faced adolescent boys were more assertive, hostile, and committed more crimes than their mature-faced peers did. Thus, if perceivers are biased by stereotypes, their judgments may be accurate if there is a kernel of truth to the stereotype or if the stereotype leads to a self-fulfilling prophecy, and they may be inaccurate if the stereotype is simply wrong or if knowledge of the stereotype leads to self-defeating effects for targets.

The final SRM component is the relationship: how especially aggressive a perceiver believes a target to be. According to Swann (1984), judgments of aggressiveness should be particularly accurate at the level of the relationship. It is more pragmatic for Abel to know how aggressive Cain is with him in particular than to know how aggressive Cain is with others in general.

However, it may be that biases in judgments of aggression occur at the dyadic level (i.e., Abel's perception of Cain's aggressiveness toward him in particular) rather than at the general level (i.e., Abel's perception of Cain's aggressiveness toward others in general), and these biases lead to incorrect judgments. We consider three different biases: dyadic hostile attribution bias, hedonic relevance, and idiosyncratic stereotypes, all of which may occur at the dyadic level.

Hubbard, Dodge, Cillessen, Coie, & Schwartz (2001) examined the hostile attribution bias in groups of boys. Using the SRM, they found evidence for this bias across interaction partners. However, they found more variance in the bias at the level of relationship: A boy is more biased toward some targets than he is toward other boys. Hubbard et al. did not examine the correlation of this bias with the aggressive behavior of the partner, but they did find that dyadic hostile attribution biases correlated with the perceiver's actual aggressive behavior.

Jones and Davis (1965) theorized that when behaviors have hedonic relevance (i.e., cause pain or pleasure for the perceiver), the perceiver assumes that the target's behavior was dispositionally rather than situationally caused. This bias is particularly relevant for physical aggression, a behavior that potentially causes pain for the perceiver. If Cain behaves aggressively toward Abel once, and Abel interprets Cain's behavior using the hedonic relevance bias, Abel is going to assume that Cain is an aggressive person with him in particular. The bias would not apply to Abel's perceptions of Cain's aggressiveness with others. Cain can behave aggressively with Greg, but this act of aggression is not hedonically relevant for Abel.

Lastly, the relationship effect can be biased because individuals use idiosyncratic stereotypes when making judgments of targets. Stereotypes are generally viewed as consensually shared beliefs about members of social groups. However, stereotypes can be idiosyncratic, unshared beliefs that a particular perceiver holds (Ashmore & Del Boca, 1981). In fact, Kenny (1994) estimated that unshared stereotypes explained about twice as much variance as shared stereotypes did, and unshared stereotypes imply relationship variance. For example, if some perceivers believe that red-haired people are aggressive and other perceivers do not, there would not be a consensual or shared stereotype that red-haired individuals are aggressive but rather a dyadic relationship between the perceiver who holds the stereotype and the red-haired target. If a stereotype were idiosyncratic, there would be greater relationship variance than partner variance for that stereotype. If the idiosyncratic stereotype is incorrect, then judgments will be incorrect at the level of the dyad.

In sum, there is theoretical evidence to support the prediction that all three SRM components are biased as well as accurate or inaccurate. In some cases, the same bias that can potentially lead to error can also potentially lead to accuracy. For example, the hostile attribution bias can lead to self-fulfilling prophecy effects or it can lead to self-defeating effects. In addition, using stereotypes on which to base judgments can lead to inaccurate judgments if the stereotype is false, or it can lead to accurate judgments if there is a kernel of truth to the stereotype. These biases operate at the level of the actor, partner, and relationship.

### Measurement of Perceptions

Abel's perception of Cain's aggression is a more complicated question than might first be thought, especially if one wants to examine the accuracy of such perceptions. Swann (1984) was quite explicit in predicting at

which level perceptions are accurate: Dyadic perceptions (e.g., Abel's perception of Cain's aggression toward Abel) are more accurate than general perceptions are. We can denote such a perception as ACA, or A's perception of C's aggressiveness toward A. According to Swann (1984), the perceiver has pragmatic interests in knowing how aggressive the target is toward him or her. Alternatively, one could ask person A how aggressive C is toward others, or ACO. This measure—according to Swann, especially the relationship component—should not be as accurate as ACA.

Another possible measure is how others perceive how aggressive Cain is with Abel. We denote such a measure as OCA. If accuracy is due to the pragmatic interests of the perceiver, then the relationship effect in ACA should predict C's aggression toward A, whereas the relationship effect of OCA should not be as predictive.

### Overview

This study examines the accuracy of the actor, partner, and relationship components to determine at what level perceivers are accurate. Based on previous research and theory, we have discussed how each of the components is possibly inaccurate or accurate and how bias can lead to accuracy and inaccuracy.

Our general expectation is that perceptions of others' aggressiveness are both accurate and inaccurate. The difficult question is at what level there will be accuracy and inaccuracy. Prior theorizing by Swann (1984) and other researchers implies that the relationship should be the most accurate component. People have a strong interest in knowing who in the environment is going to be aggressive toward them in particular. However, prior research, though limited, has found little or no evidence that accuracy is greatest at the relationship level. What is found in past studies is that the partner effect, or how a person is consensually seen, is the most accurate component because it most strongly relates to behavior.

### This Study

In this study, we extensively test Swann's (1984) hypothesis that there should be more accuracy for perceptions made at the level of the relationship than for perceptions made at the general level. We examine how perceptions of boys' aggressiveness made by their peers predict actual aggressive behavior. We note that an SRM analysis of the behavioral data examined here was previously published by Coie et al. (1999) and Hubbard et al. (2001). Coie et al. (1999) examined aggressive behavior across contexts, and Hubbard et al. (2001) examined biases and behavioral aggression

as dyadic processes. In the SRM analyses of the behavioral data (Coie et al. 1999; Hubbard et al., 2001), sufficient variance for aggression was found at the actor, partner, and relationship levels. Some boys are more aggressive than others, some boys are more victimized than others, and there is more aggression in some dyadic relationships than in others. The sufficient variance at these three levels provides an ideal outcome measure for a test of Swann's hypothesis, given that behavioral aggression occurs both at the dyadic and generalized levels.

We extended Hubbard et al.'s (2001) findings by specifically examining how perceptions of aggression are related to behavioral aggression, and thus our interest is in the accuracy of perceptions. We conducted an SRM analysis of the data that uses three different perception measures: A's perception of C toward A or ACA, A's perception of C toward others or ACO, and others' perception of C toward A or OCA. We examined how the actor, partner, and relationship effects in each of these measures are correlated with the corresponding SRM component in a behavioral measure.

## METHOD

The study involved two phases. In Phase 1, during the spring of the school year, boys in classrooms made judgments of classmates' aggression. In Phase 2, the aggressive behavior of selected boys was observed on 5 consecutive days during the following summer. Accuracy is measured by the correspondence between classroom judgments and play-group observations.

### Phase 1

We studied 11 classrooms containing 142 9-year-old boys. Of these 142, 116 participated as raters; the number of raters per classroom ranged from 8 to 14. Children were presented with a list of dyads in their class. The rating scale consisted of a 5-point scale that asked, "How much does \_\_\_ start fights with \_\_\_?" (1 = *not at all*, 5 = *very much*). In some cases, the rater was a member of the dyad. When the number of possible dyads in a class was too large, children rated a random subset of all possible dyads. Across classes, 116 boys rated 876 dyads.

### Phase 2

Based on the aggression ratings, six boys from each class were selected (66 in total). Two boys were members of a highly mutually aggressive dyad; the remaining four were randomly selected from the classroom. The

groups of boys met for five daily sessions in one week of the summer following the school year. The play groups met in a large room that contained a variety of toys and active games and had videotaping capability. Each session began with an adult leader directing a brief structured playtime, after which the adult left the room for most of the remaining 45-minute period. Videotapes of the sessions were coded by two trained observers for the occurrence of aggression. Aggression was assessed with a focal-dyad coding system. Observers coded the interactions of one dyad of boys at a time. Each 45-minute playgroup session was segmented into 270 ten-second intervals. At the end of each interval, observers recorded the occurrence or nonoccurrence of an initiation from one of the boys in the dyad toward the other. The two following classes of initiation were coded: Proactive aggression included nonangry, goal-oriented aggressive behaviors. This category was coded when a boy teased, made fun of, or physically abused his dyadic partner or used aversive means to reach an external material goal (e.g., acquisition of an object). Reactive aggression included angry aggressive behaviors. This category was coded when a boy responded to a peer overture with hostility and retaliatory counterattacking behaviors. Signs of overt hostility or anger were often readily observable. For later analysis, the number of intervals in which each boy initiated dominance or one of the aggression subtypes toward his play-group peers was calculated. These scores were corrected for instances in which boys were off camera. Total aggression, summed across the two types, is analyzed here. Moreover, because the measures were highly skewed, we used a square root transformation. Further detail concerning the measure of aggression can be found in Coie et al. (1999).

### Variables

In addition to the transformed measure of behavioral aggression, we computed three measures from the peer ratings of aggression. The first measure, ACA, consisted of A's rating of how aggressive C was toward A and is of particular interest for dyadic or circumscribed accuracy. The second measure, ACO, consisted of the average of person A's perception of how aggressive C was toward others in the class. Note that some class members were not in the observational groups. This measure is most appropriate for examining generalized accuracy. The third measure, OCA, measures other classmates' perceptions of how aggressive C was toward A. This third measure serves as a control for the ACA measure. ACO cannot be used to measure circumscribed accuracy because it assesses how aggressive A thinks C is with others.

### Analysis Strategy

The data were analyzed using SRM (Kenny & La Voie, 1984). SRM is a statistical model of a dyadic measurement that results in a partitioning into components. As discussed in the introduction of this article, the behavioral measure of aggression can be partitioned into actor, partner, and relationship components.

Each of the three judgment measures, ACA, ACO, and OCA, can also be partitioned into actor, partner, and relationship, although the meaning of the components is somewhat different for each variable. The components for ACA are interpreted as follows:

- *actor effect* is the extent to which boy A views others in the group as aggressive toward him in particular,
- *partner effect* is the extent to which the group generally sees boy C as being aggressive toward fellow group members, and
- *relationship effect* is the extent to which A sees C as especially aggressive toward him in particular.

The components for ACO are interpreted as follows:

- *actor effect* is the extent to which boy A views others in the group as aggressive toward others in the classroom,
- *partner effect* is the extent to which the group generally sees boy C as aggressive toward others in the classroom, and
- *relationship effect* is the extent to which A sees C as particularly aggressive toward others in the classroom.

Finally, the components for OCA are interpreted as follows:

- *actor effect* is the extent others in the class view boy A as the recipient of aggression from the group,
- *partner effect* is the extent to which the classroom generally sees boy C as being aggressive toward group members, and
- *relationship effect* is the extent to which classmates see C as particularly aggressive toward A.

Thus, the actor effect reflects the extent to which A either is seen as a victim by the self and others or sees victimization of others; the partner effect reflects how aggressive C is seen by people in general; and the relationship effect reflects how especially aggressive C is either with A in particular or by A in particular.

To measure generalized accuracy, we correlated the actor effect in behavioral aggression with the partner effects (ACA, ACO, and OCA) in perception of aggression (i.e., how aggressive a boy is consensually seen by others). Dyadic accuracy was obtained by correlating the relationship effect of behavioral data with the relationship effects of the perceptual data: If A is especially aggressive toward C, does C judge A as especially

**TABLE 1:** Social Relations Model Variance Partitioning of Perceptions and Behavior

Measure	Actor	Partner	Relationship/Error <sup>d</sup>
ACA	.292*	.063	.645
ACO	.528*	.132*	.340
OCA	.140*	.266*	.593
Behavior	.341*	.304*	.355

NOTE: *Actor* refers to A and *partner* to C.

<sup>a</sup>Because these are single-indicator variables, this variance must be nonnegative and is therefore not tested for statistical significance.

\* $p < .05$ .

aggressive with him? To measure perceiver accuracy, we correlated the partner effect in behavioral aggression with the actor effects (ACA, ACO, and OCA) in perception of aggression (i.e., how much a boy is seen as a victim of aggression).

For 23.6% of the cases, there were missing data for the ACA measure. We adopted an estimation strategy developed by Snijders and Kenny (1999) to provide estimates of SRM variances and correlations. We used SAS's (2006) Mixed Procedure to obtain maximum likelihood estimates and tests. These estimates equal those from more conventional SRM analyses<sup>3</sup> (see Appendix B in Kenny, 1994).

Finally, the reader should note that correlations involving actor and partner effects are disattenuated; that is, the correlations are forecasts of what they would be if there were many actors and partners. However, correlations involving the relationship are not disattenuated and refer to the specific relationship. Because of this, correlations for actor and partner effects are much larger than are those for relationship effects.

## RESULTS

### Perception of Aggressiveness

Using the SRM, we examined the variance in the three perceptual judgments. As seen in Table 1, the variance partitioning is quite different for the three measures ACA, ACO, and OCA. We discuss these results for each SRM component, actor, partner, and relationship.

The actor effect has very different meanings for the three types of perceptions. The actor effect in OCA reflects the extent to which perceivers think a target is a victim, that is, the tendency to think Abel is victimized. The actor effect in ACA reflects self-perceptions of victimization, that is, the tendency for Abel to think that others are aggressive toward him in particular. The actor effect in ACO reflects the extent to which a perceiver sees others as aggressive toward others, that is, the tendency for Abel to think that others are aggressive. The hostile attribution bias would be reflected in

the actor effect in ACA and ACO. All three perceptual measures exhibit statistically significant actor variance.

We next examine the correlations between the actor effects for the three measures. The correlation between how aggressive the perceiver generally thinks others are toward him (the actor effect in ACA) with how aggressive he thinks others are toward others (the actor effect in ACO) is .467 ( $p = .025$ ). The correlation of the actor effect in ACA with the actor effect in OCA reflects how aggressive Abel thinks others are toward him in particular with the degree to which perceivers think that Abel is a victim. This correlation is not statistically significant ( $r = .360$ ,  $p > .05$ ). Moreover, the correlation of the actor effect in ACO with the actor in OCA reflects the extent to which Abel sees others in the group as aggressive toward others with the degree to which perceivers think that Abel is a victim. This correlation is negative and not statistically significant ( $r = -.283$ ,  $p > .05$ ). The nonsignificant correlations of OCA with both ACA and ACO suggest that self-perceptions of victimization do not agree with the perceptions of victimization by other perceivers. Moreover, the correlation between ACA and ACO reflects a general tendency to see aggression in the environment or a heightened awareness of aggressive behaviors that are targeted toward the self and toward others, that is, a hostile attribution bias.

The partner variance for all three variables measures consensus in perceptions of who is aggressive and who is not: Do perceivers agree that Cain is aggressive? With the exception of ACA (Abel's judgment of how aggressive Cain is toward him), we find evidence for partner variance. Conceptually, the partner effect in ACO is the same as in OCA, and we do find that they correlate perfectly ( $p < .001$ ). Given sufficient partner variance, we can assess generalized accuracy for the ACO and OCA measures but not for the ACA measure because it has no reliable partner variance.

We now turn to the final SRM component: the relationship. We first note that the ACA measure has the largest proportion of relationship variance. Perceivers have idiosyncratic perceptions of how aggressive a particular person is toward them. First, there is a correlation between ACA and OCA, that is, the extent to which Abel sees Cain as especially aggressive toward him with the extent to which classmates see Cain as particularly aggressive toward Abel. The correlation is positive and statistically significant ( $r = .207$ ,  $p = .014$ ). Thus, there is agreement on who is particularly aggressive toward whom.

Second, there is a correlation between the relationship effects of ACA and ACO, or the extent to which Abel sees Cain as especially aggressive toward him with the extent to which Abel sees Cain as particularly aggressive toward others in the classroom. The correlation is

positive and statistically significant ( $r = .195, p = .022$ ). There is little or no correlation between the relationship effects of ACO and OCA ( $r = -.027, p > .05$ ). If only Abel thinks Cain is aggressive toward others, then classmates do not see Cain as aggressive toward Abel. In the next set of analyses, we examine the degree to which perceptions of aggression are predictive of aggressive behaviors.

### Behavioral Aggression

Examining the variance partitioning of the behavioral measure of aggression, we see, not surprisingly, that our results parallel those of Coie et al. (1999). Of particular importance for generalized accuracy is that we find evidence of actor variance. Some boys were generally seen as aggressive in these interactions and others were not. We also find statistically significant partner variance, which indicates that there are individual differences in victimization (i.e., some boys were seen as victims of aggression and others were not). The correlation between actor and partner effects is positive ( $r = .313$ ) and marginally significant ( $p = .09$ ). If Cain is aggressive towards others, he is also the victim of aggression.

Because the variables in our analyses are all univariate, error and relationship variances are confounded (Kenny, 1994). However, analyses by Coie et al. (1999) of the behavior measure revealed that about 37% of the systematic variance resided at the level of relationship.

There is, then, evidence for variance at the levels of the actor, partner, and relationship for the behavioral measure of aggression and so we can measure the three types of accuracy. For the ACA measure, we do not find partner variance and so for that measure we cannot examine generalized accuracy. However, for the other two measures, ACO and OCA, there is variance at all three levels and all three types of accuracy can be studied.

### Accuracy Correlations

In the next analytic step, we took each of the SRM components in the observational measure and correlated that component with each of the corresponding three SRM components in the perceptions. There are three such correlations:

- perceiver accuracy, the correlation of actor effect in perceptions with the partner effect in behavior;
- generalized accuracy, the correlation of target effect in perceptions with the actor effect in behavior; and
- dyadic accuracy, the correlation of relationship effect in perceptions with the relationship effects in behaviors.

We first consider perceiver accuracy. For ACA, perceiver accuracy implies that if Abel thinks others are

**TABLE 2:** Accuracy Correlations Between Judgments and Observations of Behavior

	ACA	ACO	OCA
Perceiver <sup>a</sup>	.283	-.143	.480*
Generalized <sup>b</sup>	##	.645*	.420*
Dyadic <sup>c</sup>	-.141	-.002	-.048

<sup>a</sup>If someone generally sees others as aggressive, do others generally behave aggressively toward this person?

<sup>b</sup>If someone is consensually seen as aggressive, does this person generally behave in an aggressive manner?

<sup>c</sup>If someone is uniquely judged to be especially aggressive with one person, is that person especially aggressive with that one person?

##Insufficient variance to compute the correlation.

\* $p < .05$ .

aggressive toward him (actor effect in ACA), then others are in fact aggressive toward him (partner effect in behavior). Perceiver accuracy assesses the extent to which a target accurately knows that he is victimized. For ACO, perceiver accuracy implies that if Abel thinks others are generally victimized by others (actor effect in ACO), then others behave aggressively toward him (partner effect in behavior). The question for ACO is, then, Do victims of aggression see aggression? We see in Table 2 that for ACA and ACO there is no perceiver accuracy. Recall that the actor effects of ACA and ACO were fairly strongly correlated, and we suggested that the two actor effects reflect hostile attribution bias. It would appear that the bias is not accurate: Abel may think that targets are generally aggressive, both to Abel and to others, but in fact Abel is no more victimized than anyone else is. Note that for OCA there is a fairly strong and statistically significant correlation ( $r = .480, p = .033$ ) between the actor effect, how much perceivers (not including the self) think that Abel is victimized and how victimized Abel actually is (partner effect in behavior). People (but not the self) know who the victims of aggression are.

In the next analytic step, we took the actor effect in the behavioral measure (the measure of how consistently aggressive a boy is with the other five boys in the group) and correlated it with the partner effect in the perceptions (how aggressive a boy is consensually seen by others). This correlation reflects generalized accuracy. As we have stated earlier, because we did not find any consensus in the ACA measure (i.e., no statistically significant partner variance), we did not compute the correlation for that measure. For ACO, the correlation of partner effect in perceptions (the extent to which the group generally sees Cain as aggressive toward others in the classroom) was correlated with how aggressive Cain is in general with others. For OCA, the correlation of the partner effect in perceptions (the extent to which the classroom sees Cain as aggressive toward group members) was correlated with how aggressive Cain is

toward others. As seen in Table 2, we find statistically significant generalized accuracy for both the ACO and the OCA measures, the average of the two correlations being .53. Boys who are seen as aggressive by their peers do indeed behave aggressively in their interactions.

For dyadic accuracy, the question is as follows: If Abel thinks that Cain is particularly aggressive toward him, does Cain act aggressive toward Abel in particular? We answer this question by examining the correlation of the relationship effect in ACA (the extent to which Abel sees Cain as particularly aggressive toward him) with the relationship effect in the behavioral measure (how aggressive Cain is in particular toward Abel). We see in Table 2 that the correlation equals  $-.141$  and is not statistically significant. We find the same lack of correlation for both ACO and OCA. Therefore, the results indicate no dyadic accuracy for aggression.

## DISCUSSION

Our results provide very strong support for the position that perceivers can accurately predict the behaviors of others. The extensive bias literature implies that perceivers are clueless about the social world they inhabit (Krueger & Funder, 2004; Swann, 1984). Our research uses a paradigm quite different from the traditional bias paradigm. First, perceivers' judgments concerned real behaviors of real targets in social interactions. Second, perceivers had the opportunity and motivation to be both accurate and inaccurate. Third, we conceptualized accuracy at multiple levels of analysis.

We first consider our findings for the ACA measure, or how aggressive Abel thinks Cain is toward Abel. This is the simplest and most direct measure, and it is most relevant to prior theorizing by Swann (1984) and others. The preponderance of evidence from this study suggests the ACA measure is largely biased and inaccurate. Evidence for this conclusion is as follows: First, there is no consensus or agreement in this measure about who is aggressive and who is not, indicated by the lack of partner variance for this measure. Second, there is actor variance in the measure but it appears to largely reflect the hostile attribution bias, given that it does not correlate with victimization (i.e., the partner effect in behavior). Third, the relationship effect does not appear to be accurate because it fails to correlate with behavioral observations.

We next consider the ACO measure, or how aggressive Abel thinks Cain is with others. There is evidence of accuracy and inaccuracy of this measure. The accurate part of the measure is the partner effect: If perceivers agree that Cain is aggressive, Cain does indeed behave aggressively with others. However, both the actor and relationship do not show any evidence of accuracy.

The last measure is OCA, or how aggressive others think Cain is toward Abel. It is this measure that appears to be least biased and it is, except for the relationship effect, which is fairly accurate. The actor effect, or how much others in general think that Abel is victimized, is accurate. Note that this measure of victimization does not contain hostile attribution bias because it is averaged across perceivers. Additionally, the partner effect is accurate. The only component that is not accurate is the relationship.

In summary, when the self is the victim of aggression (i.e., ACA), the perception of aggression appears to be very biased and inaccurate. Additionally, the hostile attribution bias exhibits no accuracy. Finally, when perceivers agree with each other (i.e., show consensus) there is accuracy.

Although we understand why the relationship effect in ACA and ACO may not show accuracy, perhaps because of hedonic relevance, this bias and other biases that operate at the dyadic level should not be present in the relationship effect for OCA. Also, because the actor and partner effects of this measure are accurate, why would the relationship effect not be accurate? We can think of three factors that might weaken the correlation of the relationship effect in OCA with the relationship in behavior. First, in analyses of the triadic ratings of the perceptions of aggression, Cillessen (2006) reported that relationship explains only 3% of the total variance. Second, there are fewer judgments aggregated across the relationship than there are for actor and partner. Thus, it is likely that the reliability of the estimated relationship effect of OCA is quite low. Third, the observations and judgments were separated by a few months. Perhaps there were changes in relationships between the boys in this time. There is evidence that relationships change at a faster rate than do individual differences (Neyer & Asendorpf, 2001). Perhaps the combination of small variance, low reliability, and instability contributed to the lack of effects of the estimated relationship effect.

Although we did not directly measure hostile attribution bias, our results provide evidence that the bias exists. Recall that individual perceivers who see themselves as victims of aggression in general also have a tendency to see others as the victims of aggression. Moreover, consistent with Hubbard et al. (2001), the hostile attribution bias operates at the dyadic level. If Abel thinks Cain is aggressive toward him, Abel thinks that Cain is aggressive toward others. These findings suggest that the hostile attribution bias applies at two levels: the dyadic level (i.e., the perceiver interprets acts toward him as aggressive) and the general level (i.e., the perceiver attributes acts toward others as aggressive).

Additionally, we have found that bias in perceiver's judgments is inaccurate. As indicated by the lack of

perceiver accuracy in ACA and ACO, the perceiver's perception of the amount of general aggression around him or her does not correlate with behavioral measures of aggression. It is most relevant to dyadic inaccuracy that the individual perceiver's perception of the degree to which he or she is victimized in general also does not correlate with behavioral measures of his or her own victimization. It then follows that the individual perceiver is not only inaccurate at knowing how much he or she is victimized in general but also inaccurate in knowing how much he or she is victimized by a particular person.

However, when judgments made by individual perceivers are aggregated, we find accuracy. It is interesting and totally consistent with the results of Kenny et al. (1996) and Levesque and Kenny (1993) that consensual judgments of perceivers are quite accurate. The generalized accuracy found in those two studies averages to about .50, a value close to the value found in this study of .53. In addition, we find some evidence of perceiver accuracy when perceptions are averaged across perceivers: Perceiver reports of Abel's victimization correlate with Abel's actual victimization (as indicated by the OCA perceiver accuracy correlation).

In sum, we see that perceptions of others are both valid and biased. This mix is represented in a formal model of person perception called PERSON (Kenny, 2004). That model consists of six terms, two of which are particularly relevant to this article. The P or Personality component represents the theoretical consistency in the perceptions that others in general have about the target in general. The O or Opinion component represents the different ways that perceivers view the targets. Consistent with the speculation in Kenny (2004), perhaps the P component is relatively accurate and the O component reflects the internal psychological biases and needs of the perceiver. If true, this would explain why we found generalized but not dyadic accuracy.

Self-interest does magnify the pragmatic interest of the perceiver. However, self-interest also generates biases in perception. At least in the study we have conducted, the biases overwhelm the pragmatic interests of the perceiver.

## CONCLUSION

Beginning with the path-breaking article of Swann (1984), there has been considerable interest in whether a perceiver is especially able to predict the behavior of a target when that target interacts with the perceiver. This hypothesis of dyadic accuracy has been posited by numerous theorists. However, previous research has found surprisingly little support for it.

In this study, we conducted an elaborate and extensive test of Swann's (1984) hypothesis. We have individuals

who are well acquainted, a variable of strong pragmatic interest, and five days of behavioral observations in a highly controlled setting. Such conditions are ideal for finding dyadic accuracy. However, consistent with previous research (e.g., Kenny et al., 1996), our results reveal no indication of dyadic accuracy but a strong indication of generalized accuracy. That is, we found that boys who were seen as aggressive by their peers in the classroom were indeed aggressive. However, if a boy thought a target was particularly aggressive toward him, then that target was not particularly aggressive toward the boy.

Certainly the door is not totally closed for the search for dyadic or circumscribed accuracy. However, it seems very clear that consensual judgments are much more accurate than one might have thought and that relational judgments are much less accurate.

## NOTES

1. This was called *response set accuracy* by Kenny and Albright (1987).

2. Gill and Swann (2004) have also studied circumscribed accuracy. However, we see their Study 1 more as a study of consensus or agreement than accuracy and their Study 2 more as a study of self-other agreement than accuracy.

3. This method also provided estimates of group variances that are not conventionally reported in Social Relations Model studies. We only found group variance in one measure, ACA, and it explained a relatively small amount of variance.

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