Dyadic accuracy and bias in preadolescents’ perceived peer relations: Associations with aggression, depression, and peer victimization

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Abstract
The dyadic accuracy and bias of preadolescents’ (M = 10.13 years) perceived peer relations were examined in relation to their aggression, depressive symptoms, and peer victimization. A racially diverse sample (235 boys and 281 girls) completed peer nominations of perceived and actual peer acceptance and rejection, peer nominations of friendship and peer victimization, and a self-report measure of depressive symptoms. Teachers completed measures of aggression. With higher depressive symptoms, children were more likely to underestimate their peer acceptance and friendship. With higher aggression, children were more likely to overestimate their peer acceptance and friendship but only when they experienced low levels of peer victimization. These findings highlight distinct patterns of dyadic bias associated with preadolescent's depressive symptoms and aggressive behavior.

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Throughout preadolescence, children develop stronger social cognitive capacities (Selman, 1980), and peers become more central in their daily lives (Rubin, Coplan, Chen, Buskirk, & Wojławowicz, 2005). Accordingly, preadolescents’ perceptions of their peer relations appear increasingly essential to their well-being (Sandstrom & Zakriski, 2004). Thus, it is important to investigate whether specific patterns in children’s perceived peer relations are linked to various aspects of their mental health.

Theoretical background

The extent to which people correctly judge how others perceive them is known as meta-accuracy (Kenny, 1994). While many youth can draw accurate conclusions about their relations with peers, others are much less accurate. For instance, one child may correctly perceive the majority of peers who like him and those who do not like him, whereas another child may be much less accurate and make many incorrect judgments about the peers who like her and those who do not. However, accuracy alone does not provide a full picture of peer perceptions.

Per Kenny and colleagues, social perception typically includes a mix of accuracy and bias, and both processes should be measured (Kenny & Acitelli, 2001; Kenny & Albright, 1987). Importantly, bias does not refer to a lack of accuracy (inaccuracy), rather it captures the specific patterns of inaccuracy or errors in social perception. When children are inaccurate about their peer relations, they could view their relations in an overly positive light (e.g., assuming they are more liked by peers than they actually are) or an overly negative light (e.g., judging they have fewer friends than they actually do). As reviewed later, a majority of previous research has focused on accuracy and inaccuracy while ignoring biases in children’s inaccurate perceptions.

Theorists have also proposed several dimensions of accuracy and bias in interpersonal perception. Generalized accuracy reflects people’s global impressions of how others perceive them, whereas dyadic accuracy reflects people’s specific predictions about how a particular person views them (Malloy & Cillessen, 2008). Generalized accuracy would capture the extent to which a child correctly perceives how well liked he is by peers overall, while dyadic accuracy would represent his precision in perceiving whether individual peers like him. Similarly, generalized bias would capture the degree to which a child overestimates versus underestimates that he is liked in his peer group, while dyadic bias would reflect his tendency to overestimate versus underestimate whether specific peers like him.

While both types of accuracy and bias are meaningful, dyadic approaches offer more precise estimates of consensus between individuals’ perceptions of their relations with one another (Bellmore & Cillessen, 2003). A child may accurately perceive the general extent to which peers dislike him but struggle to identify which specific peers dislike him, and he would evidence high generalized accuracy but low dyadic accuracy for peer rejection. A child could also display different patterns of bias in her generalized and
dyadic perceptions, and she could underestimate her rejection at the level of the peer group yet overestimate her rejection for individual peers. Given these potential discrepancies, generalized and dyadic approaches may reveal unique information about children’s perceived peer relations. In particular, dyadic methods are able to reveal more fine-grained patterns of accuracy and bias in children’s perceived relations with specific peers.

**Previous research**

Research on accuracy and bias in children’s perceived peer relations emerged six decades ago (Ausubel, Schiff, & Gasser, 1952), and multiple studies of this topic have been published since (e.g., Brendgen, Vitaro, Turgeon, Poulin, & Wanner, 2004; Hughes, Cavell, & Grossman, 1997; Orobio de Castro, Brendgen, van Boxtel, Vitaro, & Schaeipers, 2007; Rudolph & Clark, 2000). Collectively, these studies suggest that, by late elementary school, children’s global perceptions of their peer relations are moderately consistent with peers’ perceptions. Moreover, this research reveals that certain patterns of bias in children’s generalized peer perceptions are linked to adjustment difficulties (aggression, depressive symptoms, and sociometric rejection), while others are connected to adaptive functioning (social preference and friendship stability).

However, few studies have assessed children’s accuracy or bias at the dyadic level. There are two exceptions: Cillessen and Bellmore (1999, 2003) examined fourth graders’ dyadic accuracy for peer acceptance and rejection at three points in one school year. In their first analysis, they found that children’s dyadic accuracy was modestly stable across two 3-month periods and that children were more accurate in their perceptions of acceptance than rejection. Bellmore and Cillessen (2003) then reexamined these data and found that children were generally more accurate in their dyadic perceptions for same-sex than other-sex peers. Notably, these studies did not examine bias in children’s dyadic perceptions. To build upon this research, we assessed both the dyadic accuracy and dyadic bias of preadolescents’ perceived peer relations in three areas: peer acceptance, peer rejection, and friendship.

**Accuracy, bias, and adjustment.** Numerous theorists suggest that children’s realistic interpersonal perceptions are connected to positive mental health, while their biased social cognitions are linked to adjustment problems (e.g., Crick & Dodge, 1994; Quiggle, Garber, Panak, & Dodge, 1992). Thus, children who perceive their peer relations more accurately may be better adjusted than children who perceive their relations in less accurate or biased ways. In the present study, we evaluated the cross-sectional relations of three common indicators of children’s psychosocial adjustment (aggression, depressive symptoms, and peer victimization) with the dyadic accuracy and bias of their perceived peer relations.

**Aggression.** Aggression is associated with multiple aspects of children’s social information processing (Crick & Dodge, 1994) and generally linked to positive cognitive biases, and aggressive children tend to overestimate favorable characteristics of themselves and their peer relations (David & Kistner, 2000; Hughes et al., 1997). These biases appear
particularly pronounced in children who are aggressive and peer rejected (Rudolph & Clark, 2000; Zakriski & Coie, 1996). Additionally, extreme positive biases were found to predict increased aggression across a school year (Brendgen et al., 2004), and a combination of positive bias and peer rejection predicted increased proactive aggression over three years (Orobio de Castro et al., 2007). David and Kistner (2000) also detected concurrent positive relations between overestimating peer acceptance and two types of aggressive behavior (overt and relational aggression).

Multiple theories may explain why aggressive children display overly positive impressions of their peer relations. Aggressive children could have basic deficits in processing social information that lead them toward biased interpretations of peer interactions (Crick & Dodge, 1994). In contrast, aggressive youth may process social information adequately but deny or distort negative peer feedback to protect their self-concepts (Zakriski & Coie, 1996). Aggression could also be linked to positive biases insofar as individuals with highly favorable self-perceptions may be more likely to aggress to defend against threats to their positive self-views (Baumeister, Smart, & Boden, 1996). Finally, aggressive children may simply have less accurate information to construct beliefs about their peer relations because peers avoid offering them honest feedback (Brendgen et al., 2004).

**Depressive symptoms.** Children’s depressive symptoms have been linked to overly negative perceptions of their own competence and peer relations (Cole, Martin, Peeke, Seroczynski, & Fier, 1999; Cole, Martin, Peeke, Seroczynski, & Hoffman, 1998). Cillessen and Bellmore (1999) observed that children’s dyadic acceptance and rejection accuracy both related negatively to their reports of loneliness. Kistner, David-Ferdon, Repper, and Joiner (2006) found support for bidirectional negative relations between children’s depressive symptoms and their dyadic accuracy for peer acceptance across one school year. Short-term bidirectional relations have also been observed between children’s depressive symptoms and their tendency to underestimate peer acceptance (Brendgen et al., 2004; Kistner, David-Ferdon, Repper, & Joiner, 2006).

Multiple theories emphasize connections between depression and negatively skewed cognitions. According to Beck (1967), negative cognitions play a central role in contributing to and maintaining depression. Specifically, negative automatic thoughts arise from deeply internalized schema, particularly maladaptive representations of the self, world, and future. Such schema may shade children’s impressions of their peer interactions in a negative light and guide them toward overly negative perceptions of their relations with peers. For instance, a negative peer schema could lead a child to interpret an ambiguous (or even positive) peer interaction as a failure and sign that the peer involved dislikes her.

At the same time, negative peer perceptions might shape children’s behavior in ways that increase their vulnerability to depression. For example, Lewinsohn (1974) suggests that patterns of limited positive reinforcement and frequent punishment contribute to depression. Children who hold negative perceptions of their peer relations may be more likely to avoid peer interaction and miss potentially enjoyable social experiences, and they may also act in ways that draw out negative treatment by peers (Coyne, 1976). Together, patterns of avoidance and rejection-eliciting behavior could trigger or exacerbate depressive symptoms.
Peer victimization. Peer victimization refers to the experience of aggression enacted by other youth and is thought to provide children with salient data about their peer relations and to influence the development of cognitive patterns or styles (Brendgen et al., 2004; Gibb, Stone, & Crossett, 2012). Cillessen and Bellmore (1999) propose that recurrent peer victimization isolates children from the peer group. Victimized children may be blocked from interacting with peers, and peers may avoid them to minimize their own chances of being targeted. Consequently, chronic victims have less opportunity to gather the social data needed to form accurate impressions of their peer relations. Thus, they may be more likely than non-victimized children to form inaccurate and overly negative perceptions. However, peer victimization may operate in distinct ways depending on children’s own adjustment. That is, children’s current adjustment problems (e.g., elevated aggressive behavior or depressive symptoms) may be associated with different patterns of interpreting, responding to, and coping with peer victimization, which could be linked to variation in the accuracy and bias of these children’s peer perceptions.

To some degree, aggressive children’s positive biases may relate to a lack of honest negative peer feedback (Brendgen et al., 2004). However, some aggressive children experience frequent victimization by peers, and these aggressive victims appear to differ in multiple aspects of functioning compared to aggressive non-victims (for a review, see Schwartz, Proctor, & Chien, 2001). In contrast to aggressive non-victims, aggressive victims make more hostile attributions for ambiguous peer encounters (Camodeca, Goossens, Schuengel, & Terwogt, 2003) and exhibit less positive self-views (Graham, Bellmore, & Mize, 2006). While aggressive children may initially misinterpret, deny, or distort their victimization (Zakriski & Coie, 1996), with repeated victimization experiences, they may begin to perceive their peer relations in a less positive light. That is, aggressive children may be less likely to display positive biases in their perceived peer relations when they experience higher levels of peer victimization.

Peer victimization may function differently for depression. Multiple studies have documented concurrent and prospective relations between the experience of victimization by peers and depressive symptomology (Hawker & Boultion, 2000; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). Theorists have proposed that children’s repeated exposure to negative events, such as peer victimization, contributes to cognitive vulnerability to depression (Cole, Maxwell, Dukewich, & Yosick, 2010; Rose & Abramson, 1992), possibly in the form of maladaptive schema that give rise to negative cognitions (Cole et al., 2014), which are thought to be maintained by the experience of depression (Beck, 1967). Thus, any overly negative peer perceptions linked to victimization may appear even more pronounced when paired with depressive symptoms. That is, children with higher levels of peer victimization and depressive symptoms may be especially likely to display negative biases in their perceived peer relations.

The present study

In this study, we examined the accuracy and bias of children’s dyadic perceptions of their peer acceptance, peer rejection, and friendship. We also explored cross-sectional relations of psychosocial adjustment (aggression, depressive symptoms, and peer victimization) with dyadic perceptions. We hypothesized that aggression would relate to lower
accuracy, underestimating rejection, and overestimating acceptance and friendship; in contrast, we predicted that depressive symptoms would relate to lower accuracy, overestimating rejection, and underestimating acceptance and friendship. Finally, we predicted that peer victimization would relate to lower accuracy, overestimating rejection, and underestimating acceptance and friendship.

Peer victimization was also hypothesized to moderate the relations of aggression and depressive symptoms with dyadic biases. Specifically, we predicted that aggression would more strongly relate to the hypothesized biases (underestimating rejection and overestimating acceptance and friendship) at lower levels of victimization. In contrast, we predicted that depressive symptoms would more strongly relate to the hypothesized biases (overestimating rejection and underestimating acceptance and friendship) at higher levels of victimization.

**Method**

**Participants**

Parental consent forms were distributed to 901 children in 37 fourth- and fifth-grade classrooms across four schools within one public school district in the mid-Atlantic region of the U.S. Sixty-four percent (N = 581) of children returned their forms with parental permission, and their parents completed a brief demographic questionnaire (child birth date, gender, race, and ethnicity). Parents did not provide any additional data for this study. During data collection, 19 children declined to participate and 7 were absent. Consequently, data were collected for 555 children. However, 39 children chose to skip all peer nomination measures (by circling skip for each page rather than leaving the page blank) and were removed from the data set, which left a final sample of 516 children (54.5% girls and 45.5% boys).

The children’s parents reported the following racial/ethnic groups for the final sample: Caucasian (37.8%), African American (32.6%), Hispanic (14.5%), mixed race (6.8%), and Asian (1.9%); race/ethnicity was not reported for 6.4%. The average age was 10.13 years. A fourth- and fifth-grade sample was selected for this study because self-perceptions become more realistic and grounded in social comparison around this period of development (Harter, 1998).

**Procedure**

The first author or a graduate research assistant administered self-report and peer nomination measures to participating children in each classroom in a paper-and-pencil format. Two-to-five undergraduate research assistants circulated within the classrooms to answer children’s questions or read measures aloud to small groups of children identified by teachers as having reading difficulties. Teachers completed two measures of aggression for each participating child and were compensated $5 (U.S.) per child. We compensated children with a brief classroom party with healthy snacks and activities for all students in each classroom, including those who did not participate in the study. Parents were not compensated.
Measures

Peer nominations. Participating children completed eight unlimited peer nomination items. Each item (e.g., *Who do you really like?*) was displayed on a separate page with a class roster below it that included the names of all children enrolled in a classroom. Participating children were asked to nominate peers for an item by circling their classmates’ names. They were able to circle the names of students with and without parental consent; however, only data for children with parental consent were analyzed. A class participation rate of at least 40% is needed to collect accurate unlimited sociometric data (Terry, 1999). In our study, an average of 61% of children participated in the peer data collection across classrooms (range of 40% to 88%).

To assess actual acceptance, children nominated all classmates they like (*Who do you really like?*). Perceived acceptance was measured by asking children to nominate all classmates who like them (*Who really likes you*?). Actual rejection was assessed by asking children to nominate all classmates they dislike (*Who do you not like very much?*), whereas perceived rejection was measured by asking children to nominate all classmates who do not like them (*Who does not like you very much*?). Children’s friendships were assessed with a single item that asked them to nominate all classmates whom they consider friends (*Who are your friends?*). Both actual and perceived friendships were assessed with this item by separating the nominations that children received (actual friendship) from the nominations they made (perceived friendship).

Peer victimization was assessed using 3 items from a scale developed by Ladd and Kochenderfer-Ladd (2002) that has demonstrated moderate temporal stability as well as convergent and predictive validity. We used items that primarily reflect overt victimization (*Who gets hit, kicked or pushed*, *Who gets teased, called names, or made fun of*? and *Who gets picked on*?). Peer victimization scores were calculated as the average number of nominations received by each child across the 3 items, standardized within classroom (α = .83). Higher scores indicate greater levels of peer victimization.

Self-report. Children also completed Kovacs’s (2001) 10-item short version of the Children’s Depression Inventory (CDI-S). The CDI-S has evidenced acceptable test–retest reliability (Smucker, Craighead, Craighead, & Green, 1986) and is highly correlated with the well-validated full inventory (Kovacs, 1992). We removed 1 item that asks children to rate their popularity with peers because we expected this item to overlap with our measures of perceived acceptance and rejection. Accordingly, depressive symptoms scores were calculated for each child as the average of the 9 remaining items (α = .84), and higher scores reflect greater levels of depressive symptomology.

Teacher report. Teachers completed two measures of aggressive behavior for each child. The first scale was Dodge and Coie’s (1987) 6-item measure of aggression, which demonstrated high levels of internal consistency as well as convergence with behavioral observations of aggression. For this project, the internal consistency of this measure was .93. The second measure was Brown, Atkins, Osborne, and Milnamow’s (1996) 16-item measure of aggression, which evidenced high levels of internal consistency as well as predictive validity. Together, these measures include items that appear to assess physical
aggression (e.g., uses physical force), verbal aggression (e.g., says mean things about others), social manipulation (e.g., gets other children to gang up on a peer), property attacks (e.g., takes things from other students), and several ambiguous aggressive behaviors (e.g., picks on smaller kids). An overall aggression score was computed for each child by aggregating their average scores for both measures ($r = .97$), and higher scores represent higher levels of aggression.

**Dyadic accuracy and bias.** We examined the accuracy and bias of children’s peer nominations at the dyadic level for acceptance, rejection, and friendship. To accomplish this, we compared children’s nominations for perceived acceptance, rejection, and friendship with their classmates’ nominations for actual acceptance, rejection, and friendship. More specifically, we compared each nomination that a child received (or did not receive) from each peer with the nomination the child made (or did not make) for that peer. By evaluating peer nominations at this level, we derived four scores (hits, misses, correct rejections, and false positives), from which we computed the following variables: acceptance accuracy, acceptance bias, rejection accuracy, rejection bias, friendship accuracy, and friendship bias. Table 1 provides descriptions of the six scores and the formulas used to compute each variable.

The three dyadic accuracy variables indicate the extent to which children’s nominations for perceived acceptance, rejection, and friendship matched their classmates’ nominations for actual acceptance, rejection, and friendship. Each accuracy score reflects a proportion with a possible range of 0 to 1; a score of 0 indicates that a child did not make any correct nominations, whereas a score of 1 reveals that a child’s nominations were all correct. Notably, accuracy scores account for variation in classroom

<table>
<thead>
<tr>
<th>Term</th>
<th>Description/calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hits</td>
<td>Number of classmates who were nominated by a child for perceived acceptance/rejection/friendship and did nominate that child for actual acceptance/rejection/friendship</td>
</tr>
<tr>
<td>Misses</td>
<td>Number of classmates who were not nominated by a child for perceived acceptance/rejection/friendship but did nominate that child for actual acceptance/rejection/friendship</td>
</tr>
<tr>
<td>Correct rejections</td>
<td>Number of classmates who were not nominated by a child for perceived acceptance/rejection/friendship and did not nominate that child for actual acceptance/rejection/friendship</td>
</tr>
<tr>
<td>False positives</td>
<td>Number of classmates who were nominated by a child for perceived acceptance/rejection/friendship but did not nominate that child for actual acceptance/rejection/friendship</td>
</tr>
<tr>
<td>Accuracy</td>
<td>$\frac{\text{Hits} + \text{Correct rejections}}{\text{Total number of peer voters within classroom}}$</td>
</tr>
<tr>
<td>Bias</td>
<td>$\frac{\text{False positives}}{\text{Number of voters who did not nominate a child}} - \frac{\text{Misses}}{\text{Number of voters who did nominate a child}}$</td>
</tr>
</tbody>
</table>
participation in that they are calculated as proportions of possible peer voters (i.e., the number of students who completed peer nominations in a particular classroom). Specifically, the accuracy scores include the total number of peer voters as the denominator to avoid unfairly advantaging participants from classrooms with more peer voters. For instance, a child has greater potential for making more correct responses in a classroom with 20 peer voters as opposed to 10. By dividing children’s correct responses by the total number of peer voters, it is possible to “level the playing field” across classrooms.

The three dyadic bias variables represent children’s tendency to make errors of overestimation (false positives) relative to errors of underestimation (misses). That is, when children err, are they more likely to nominate peers who did not nominate them or fail to nominate peers who did nominate them? Bias scores that are positive in magnitude reflect the tendency to overestimate, whereas bias scores that are negative in magnitude reflect the tendency to underestimate. Bias scores range from −1 to +1. A score of −1 indicates that a child made one or more misses but no false positives, while a score of +1 reveals that a child made one or more false positives but no misses. A score of 0 indicates that a child did not display any bias because he was completely accurate or made an equal proportion of misses and false positives. In both cases, a 0 bias score indicates an absence of bias or no predominant tendency to err by overestimating or underestimating.

In calculating bias scores, it was necessary to subtract children’s misses from their false positives (or vice versa) in order to gauge their tendencies to err in a certain way. However, rather than simply subtracting their misses from their false positives, we first calculated two proportions. The first reflects the number of false positives made over the number of potential false positives (the number of peers who did not nominate a child). The second represents the number of misses made over the number of potential misses (the number of children who did nominate a child). It was necessary to create these proportions before subtracting the two types of errors because some children had substantially more opportunity to make one type of error compared to the other based on the pattern of peers’ nominations for them. Accordingly, these proportion scores offer estimates of the tendencies to make errors of overestimation and underestimation standardized within the child, which are then subtracted to yield dyadic bias scores.

Finally, it is important to emphasize that bias is not synonymous with a lack of accuracy and, instead, reflects specific patterns of inaccuracy or errors. As such, children’s bias scores could be uncorrelated with their accuracy scores or could correlate with their accuracy positively or negatively, depending on the precise nature of covariation among correct perceptions and the specific errors children make when incorrect. For instance, if the children who are highly accurate in perceiving their friends also tend to make more false positives than misses for friendship, there could be a positive correlation for friendship accuracy and bias.

Results

Descriptive statistics and bivariate correlations

Table 2 provides descriptive statistics for all variables. Descriptive accuracy statistics indicate that children were fairly accurate (69% to 72%) in their perceived peer relations
and that there was little variability in their accuracy across acceptance, rejection, and friendship. Descriptive bias statistics reveal that children were more likely to err by underestimating, with underestimation greatest for rejection ($M = 0.44$), then acceptance ($M = 0.25$), and finally friendship ($M = 0.06$). Bivariate correlations for all variables are included in Table 3.

### Table 2. Descriptive statistics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Miss (%)</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggression</td>
<td>0.00</td>
<td>1.00</td>
<td>4.48</td>
<td>1.72</td>
<td>.81</td>
<td>1.26</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>0.00</td>
<td>1.00</td>
<td>2.90</td>
<td>1.28</td>
<td>.34</td>
<td>1.69</td>
</tr>
<tr>
<td>Peer victimization</td>
<td>0.00</td>
<td>-1.86</td>
<td>4.25</td>
<td>-0.06</td>
<td>.93</td>
<td>1.79</td>
</tr>
<tr>
<td>Acceptance accuracy</td>
<td>4.07</td>
<td>0.27</td>
<td>1.00</td>
<td>0.69</td>
<td>.14</td>
<td>-0.41</td>
</tr>
<tr>
<td>Acceptance bias</td>
<td>4.07</td>
<td>-1.00</td>
<td>1.00</td>
<td>-0.25</td>
<td>.47</td>
<td>0.41</td>
</tr>
<tr>
<td>Rejection accuracy</td>
<td>6.98</td>
<td>0.25</td>
<td>1.00</td>
<td>0.72</td>
<td>.15</td>
<td>-0.32</td>
</tr>
<tr>
<td>Rejection bias</td>
<td>6.98</td>
<td>-1.00</td>
<td>0.80</td>
<td>-0.44</td>
<td>.47</td>
<td>0.49</td>
</tr>
<tr>
<td>Friendship accuracy</td>
<td>0.00</td>
<td>0.18</td>
<td>1.00</td>
<td>0.71</td>
<td>.14</td>
<td>-0.54</td>
</tr>
<tr>
<td>Friendship bias</td>
<td>0.00</td>
<td>-1.00</td>
<td>0.94</td>
<td>-0.06</td>
<td>.44</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Note. $N = 516$. Miss (%) is the percentage of missing data. All variables are raw with the exception of peer victimization, which was standardized within classroom to account for different numbers of peer voters.

### Table 3. Bivariate correlations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Depressive symptoms</td>
<td>.14**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Peer victimization</td>
<td>.24**</td>
<td>.23**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Acceptance accuracy</td>
<td>.06</td>
<td>.11*</td>
<td>.20**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Acceptance bias</td>
<td>.18**</td>
<td>-.09</td>
<td>-.06</td>
<td>-.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Rejection accuracy</td>
<td>-.12**</td>
<td>-.25**</td>
<td>-.30**</td>
<td>-.09*</td>
<td>.14**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Rejection bias</td>
<td>-.05</td>
<td>.10*</td>
<td>-.00</td>
<td>.16**</td>
<td>-.03</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Friendship accuracy</td>
<td>.00</td>
<td>-.01</td>
<td>.05</td>
<td>.41**</td>
<td>-.09</td>
<td>.06</td>
<td>.15**</td>
<td></td>
</tr>
<tr>
<td>9. Friendship bias</td>
<td>.16**</td>
<td>-.15**</td>
<td>-.09*</td>
<td>-.12**</td>
<td>.55**</td>
<td>.19**</td>
<td>-.11*</td>
<td>-.17**</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01.

Demographic differences were explored in all variables. Significant sex effects emerged, and boys were rated by teachers as significantly higher in aggression (boys’ $M = 1.90$; girls’ $M = 1.58$), $t(514) = 4.48$, $p < .001$, and by peers as significantly higher in peer victimization (boys’ $M = .14$; girls’ $M = -.23$), $t(514) = 4.53$, $p < .001$. Girls also scored significantly higher than boys in friendship accuracy (girls’ $M = .73$; boys’ $M = .70$), $t(514) = -2.49$, $p < .05$, and in acceptance bias (girl’s $M = -.19$; boys’ $M = -.33$), $t(514) = -3.43$, $p < .001$. 

### Demographic differences

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Significant race/ethnicity differences were found for aggression, $F(4, 478) = 6.26, p < .001$, friendship bias, $F(4, 478) = 3.77, p < .01$, and acceptance bias, $F(4, 458) = 3.59, p < .01$. Per post hoc comparisons (Tukey’s honestly significant difference tests), teachers rated African American students higher in aggression ($M = 1.98$) than they rated Hispanic students ($M = 1.58; p < .001$) and Caucasian students ($M = 1.61; p < .001$). African American students scored higher in friendship bias ($M = .039$) than did Caucasian students ($M = -.11; p < .01$), and they scored higher in acceptance bias ($M = -.17$) than did Hispanic students ($M = -.36; p < .05$).

**Regression analyses**

Prior to performing regression, we explored whether it was necessary to account for between-class variation in the accuracy and bias variables. We computed the intraclass correlation (ICC) and design effect statistic (DES) for every accuracy and bias variable. As a rule of thumb, ICCs greater than .05 (Raudenbush & Bryk, 2002) and DESs greater than 2 (Muthén & Satorra, 1995) suggest it may be necessary to account for clustering effects (e.g., via multilevel regression). The ICCs for each accuracy and bias variable were extremely low (all <.01), as were the DESs (all <.01). Accordingly, there appears to be very minimal variation in children’s accuracy and bias scores between classrooms; thus, it was not necessary to account for classroom-level nesting within our regression model.

For our primary analysis, we performed multivariate regression using Mplus 5.1 (Muthén & Muthén, 2007). We tested one model with all six dyadic accuracy and bias variables regressed simultaneously onto aggression, depressive symptoms, and peer victimization, along with two interaction terms (Aggression × Peer Victimization and Depressive Symptoms × Peer Victimization). Demographic variables (sex or race/ethnicity) were specified to predict the dependent variables, for which significant demographic differences were previously found. As seen in Table 4, the reference group for sex was girls (girls coded 1 and boys coded 0), and the reference group for race/ethnicity was African Americans (African Americans coded 1 and all other racial/ethnic groups coded 0). We chose African American children as the reference for race/ethnicity because this group was involved in all three significant racial/ethnic differences found in our demographic analyses. Finally, each dependent variable was specified to covary with every other, which allowed us to account for the covariation among the accuracy and bias variables when estimating the relations of each predictor with accuracy and bias.

We specified our adjustment variables (aggression, depressive symptoms, and peer victimization) as simultaneous predictors, rather than dependent variables, for several reasons. Our main objective was to examine cross-sectional relations of children’s adjustment with the accuracy and bias of their peer perceptions. Accordingly, the adjustment variable could be considered either predictors or dependent variables in our regression model, as could the accuracy and bias variables. However, to test our hypothesis that peer victimization moderates the relations of aggression and depressive symptoms with dyadic bias, it was necessary to include the adjustment variables as predictors. By including all predictors simultaneously, we were also able to examine the relations of each construct with accuracy and bias, while controlling for the others’ relations, all in a single model.
### Table 4. Multivariate regression of dyadic accuracy and bias on aggression, depressive symptoms, and peer victimization.

<table>
<thead>
<tr>
<th></th>
<th>Acceptance accuracy</th>
<th>Acceptance bias</th>
<th>Rejection accuracy</th>
<th>Rejection bias</th>
<th>Friendship accuracy</th>
<th>Friendship bias</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( R^2 = .05 )</td>
<td>( R^2 = .08 )</td>
<td>( R^2 = .12 )</td>
<td>( R^2 = .05 )</td>
<td>( R^2 = .02 )</td>
<td>( R^2 = .09 )</td>
</tr>
<tr>
<td>Intercept</td>
<td>4.76** .25</td>
<td>-0.78** .20</td>
<td>5.60** .23</td>
<td>-1.11** .21</td>
<td>5.18** .26</td>
<td>-0.07 .18</td>
</tr>
<tr>
<td>Sex (girls)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Race/ethnicity (African American)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Aggression</td>
<td>-.00 .05</td>
<td>.25** .05</td>
<td>-.04 .04</td>
<td>-.07 .04</td>
<td>-.05 .01</td>
<td>.22** .04</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>.07 .04</td>
<td>-.12** .04</td>
<td>-.19** .05</td>
<td>.09 .05</td>
<td>-.05 .05</td>
<td>-.15** .04</td>
</tr>
<tr>
<td>Peer victimization</td>
<td>.19** .04</td>
<td>-.08 .05</td>
<td>-.26** .05</td>
<td>-.05 .06</td>
<td>.05 .05</td>
<td>-.07 .05</td>
</tr>
<tr>
<td>Aggression \times Peer victimization</td>
<td>.01 .04</td>
<td>-.01 .05</td>
<td>.01 .05</td>
<td>.17** .06</td>
<td>.07 .05</td>
<td>-.17** .05</td>
</tr>
<tr>
<td>Depressive symptoms \times Peer victimization</td>
<td>-.01 .05</td>
<td>.02 .05</td>
<td>.05 .05</td>
<td>-.01 .06</td>
<td>.03 .05</td>
<td>.04 .05</td>
</tr>
</tbody>
</table>

Note. \( N = 516 \). Dependent variables were allowed to covary. Sex and race/ethnicity were only included as covariates for dependent variables with significant demographic differences. Estimates are standardized.

\*p < .05; \**p < .01.
Variables were centered before computing interaction terms. We evaluated significant interactions with an online application designed to probe two-way interactions (Preacher, Curran, & Bauer, 2003). Four dependent variables (acceptance accuracy, acceptance bias, rejection accuracy, and rejection bias) were missing data. Thus, we estimated our model using full information maximum likelihood estimation, which allowed us to obtain maximum likelihood parameter estimates and standard errors in the presence of missing data (Allison, 2002). Due to the skewness of the friendship accuracy variable, we used maximum likelihood estimation with robust standard errors (Table 4), which allows for the estimation of parameters and standard errors that are robust to nonnormality (Huber, 1981).

**Aggression.** We hypothesized that aggression would relate to lower accuracy (negative relations with each of the three accuracy variables), underestimating rejection (negative relation with rejection bias) and overestimating acceptance and friendship (positive relations with acceptance bias and friendship bias). In support of this hypothesis, aggression related positively to acceptance bias and friendship bias. However, aggression did not relate to any of the three accuracy variables or to rejection bias.

**Depressive symptoms.** We predicted that depressive symptoms would relate to lower accuracy (negative relations with all three accuracy variables), overestimating rejection (positive relation with rejection bias), and underestimating acceptance and friendship (negative relations with acceptance bias and friendship bias). In support of this hypothesis, depressive symptoms negatively related to acceptance accuracy, rejection bias, and friendship bias. Depressive symptoms did not relate to acceptance accuracy, rejection bias, or friendship accuracy.

**Peer victimization.** We hypothesized that peer victimization would relate to lower accuracy (negative relations with each of the three accuracy variables), overestimating rejection (positive relation with rejection bias), and underestimating acceptance and friendship (negative relations with acceptance bias and friendship bias). In support of this hypothesis, peer victimization related negatively to rejection accuracy. However, peer victimization was unrelated to friendship accuracy and all three bias variables. Furthermore, contrary to hypotheses, peer victimization was positively related to acceptance accuracy.

We also hypothesized that peer victimization would moderate the relations of aggression and depressive symptoms with dyadic biases. Specifically, we predicted that aggression would more strongly relate to its hypothesized biases (underestimating rejection and overestimating acceptance and friendship) at lower levels of victimization. In contrast, we predicted that depressive symptoms would more strongly relate to its hypothesized biases (overestimating rejection and underestimating acceptance and friendship) at higher levels of victimization. In support of these hypotheses, peer victimization interacted with aggression to predict rejection bias and friendship bias; however, this interaction did not predict acceptance bias as hypothesized. Furthermore, peer victimization did not interact with depressive symptoms to predict any of the three bias variables.
To probe the two significant interactions, simple slopes were tested at three levels of peer victimization (at the mean and at one standard deviation above and below the mean). For rejection bias, only the simple slope for the lowest level of peer victimization was significantly different than 0 (Figure 1). This slope was negative, and in support of the hypothesis, aggression was only associated with the tendency to underestimate peer rejection for children with the lowest levels of victimization. For friendship bias, simple slopes were significantly different than 0 at the average and lowest levels of peer victimization (Figure 2). These slopes were positive, and in support of the hypothesis, aggression was only linked to the tendency to overestimate friendship for children with average to below average levels of victimization.

**Discussion**

In the current study, the dyadic accuracy and bias of preadolescents’ perceptions of their own peer acceptance, peer rejection, and friendship were examined. To our knowledge, accuracy and bias in all three constructs using dyadic-level analyses have not been explored in any previous investigation. This study also expands upon existing work by assessing the relations of children’s dyadic accuracy and bias with three adjustment indices: aggression, depressive symptoms, and peer victimization. Moreover, we explored whether peer victimization moderates the relations of aggression and depressive symptoms with children’s dyadic accuracy and bias.

To evaluate the proposed relations, we used three assessment strategies (peer-, self-, and teacher-report measures) to minimize shared method variance. We also assessed these relations in a multivariate model that included all adjustment variables as simultaneous predictors and all accuracy and bias variables as simultaneous outcomes allowed

**Figure 1.** Interaction of aggression and peer victimization on rejection bias. *Note.* PV is peer victimization; *M* is mean; and *SD* is standard deviation.
to covary. Altogether the children were relatively accurate in predicting their relations with peers and displayed a general tendency to underestimate whether peers like them, dislike them, and consider them friends. However, their dyadic accuracy and bias varied substantially across different levels of aggression, depressive symptoms, and peer victimization. Furthermore, peer victimization was found to moderate aggression’s relations with two specific types of dyadic bias.

**Aggression**

As hypothesized, children rated as more aggressive by teachers were more likely to overestimate that peers like them and consider them friends. These findings are consistent with previous work documenting overly positive peer perceptions in aggressive youth (e.g., David & Kistner, 2000; Hughes et al., 1997; Rudolph & Clark, 2000). On one hand, these results may suggest that aggressive children do not experience or internalize negative feedback from peers (Brendgen et al., 2004; Zakriski & Coie, 1996). If aggressive children lack, overlook, deny, or misinterpret negative feedback, they likely feel little incentive to curb their aggression. For instance, if peers are fearful of retaliation from an aggressive child, they may ignore, encourage, or even join in the child’s aggressive actions. Even if they do not like or consider the child a friend, their responses may suggest that they are indifferent to or in support of this child’s behavior. As a result, the aggressive child may inaccurately presume that these peers like him or are his friends. On the other hand, peers may provide an aggressive child with direct negative feedback; however, she may not attend to these cues or may even distort them in ways to maintain positive views of her peer relations. In either case, aggressive children’s tendency to overestimate their peer acceptance and friendship could maintain their aggression over time.

**Figure 2.** Interaction of aggression and peer victimization on friendship bias.

*Note.* PV is peer victimization; M is mean; and SD is standard deviation.
Contrary to our hypothesis, aggression was not related to children’s tendency to underestimate their rejection by peers. Accordingly, aggressive children’s biases may be unique to their dyadic perceptions of peers who like them and consider them friends yet not extend to their dyadic perceptions of peers who dislike them. Perhaps peers who dislike aggressive children are more willing to provide them with clearer negative feedback than peers who simply do not like aggressive children or consider them friends. Peers’ negative feedback regarding acceptance and friendship may be more subtle or even absent for aggressive children. Consequently, aggressive children may experience more salient cues of their rejection by peers than their acceptance or friendship, which may guide them away from underestimating rejection but preserve their tendencies to overestimate acceptance and friendship.

Also contrary to our prediction, aggressive behavior was unrelated to dyadic accuracy for all three constructs assessed (acceptance, rejection, and friendship). We were surprised that our results were not consistent with previous research linking aggression to inaccurate social perceptions (e.g., Hughes et al., 1997; Rudolph & Clark, 2000; Zakriski & Coie, 1996). However, we examined the accuracy of children’s perceived peer relations at the dyadic level, whereas a majority of previous work analyzed their generalized accuracy. It is possible that children utilize different cognitive processes or different data to evaluate their relations with a single peer versus their global relation with peers. Specifically, generalized peer perception may be more implicit and guided by nonconscious peer-relational schema (Salmivalli, Ojanen, Haanpää, & Peets, 2005), while dyadic peer perception may be more explicit and shaped by deliberate evaluation of past peer interactions. Thus, the inaccuracy found in aggressive children’s peer perceptions may arise in their global judgments about their relations in the peer group at large but not in their dyadic perceptions for their relations with individual peers.

It is also important to emphasize that our measure of child aggression yields a general composite of aggressive behavior and does not offer subscales for specific forms of aggression. Different forms of aggressive behavior may relate to different patterns in children’s dyadic accuracy and bias. For instance, a certain level of interpersonal skill is often needed to carry out relational aggression (e.g., convincing peers to turn on another child); thus, children high in relational aggression could be quite accurate in their perceived relations. Conversely, those high in aggressive behaviors requiring less social tact (e.g., physical aggression) could display lower levels of accuracy. In addition, dyadic accuracy and bias could vary across different functions of aggression (e.g., reactive and proactive aggression). At least one study suggests that children’s social biases vary with their levels of reactive versus proactive aggression (Orobio de Castro et al., 2007). Accordingly, future research on dyadic accuracy and bias should consider not only different forms but also different functions of aggression.

**Depressive symptoms**

As predicted, children with higher depressive symptoms perceived rejection by peers less accurately and also displayed biases toward underestimating the extent to which peers accept them and consider them friends. These results converge with theory and
research emphasizing connections between depressive symptoms and inaccurate or negatively skewed cognitions (Beck, 1967; Cole et al., 1998, 1999; Rudolph & Clark, 2000). Children’s tendencies to underestimate their peer acceptance and friendship may be guided by the negative cognitions and schema that characterize depression. That is, depressive cognitive tendencies may lead children to focus their attention on negative aspects of peer interactions and misconstrue ambiguous (or even positive) social cues in negative ways. By underestimating their acceptance and friendship, children high in depressive symptomology may have particular difficulty identifying peers who are interested in spending time with them. Moreover, when they interact with these peers, their depressive cognitions likely lead them to socially withdraw, which may limit their opportunity to establish and maintain close and lasting relationships with peers.

Also consistent with the theory and research cited earlier, children with higher levels of depressive symptoms had more difficulty than other children in accurately perceiving whether peers dislike them. However, in contrast to this previous work, these children’s perceptions of rejection were not negatively skewed; that is, they did not overestimate their own rejection by peers. Importantly, this pattern could create an especially challenging peer experience for many children high in depressive symptoms. They may approach peers who dislike them (under the assumption these peers do not) and likely experience unpleasant social interactions, and they may also avoid peers who do not dislike like them (under the assumption these peers do) and miss out on potentially pleasant exchanges. Without being able to distinguish peers who do and do not dislike them, children high in depressive symptoms may face considerable barriers in establishing adaptive relationships with peers and avoiding maladaptive ones.

The remaining hypotheses regarding depressive symptoms were not supported. That is, children’s depressive symptoms did not predict lower acceptance accuracy, lower friendship accuracy, or the tendency to overestimate peer rejection. Notably, it is plausible that we did not capture enough variability in children’s depressive symptoms to detect the expected inaccuracy and bias in their dyadic perceptions. In our sample, children reported generally low levels of depressive symptoms and evidenced limited between-child variation. If we captured greater variability in depressive symptomology, we might have observed the hypothesized (but unsupported) connections. Perhaps dyadic inaccuracy for acceptance and friendship and dyadic bias for peer rejection is only apparent at clinically significant levels of depression.

At the same time, children’s dyadic peer perceptions may also be less susceptible (than their generalized peer perceptions) to the inaccuracies and biases related to depression. As previously suggested, generalized peer perception may be more implicit in nature and driven by nonconscious schema (Salmivalli et al., 2005), while dyadic peer perception may be more explicit and arise from a more careful analysis of past social experiences. Consequently, children’s generalized peer perceptions could be more vulnerable to depressive cognitions or deeper depressive schema; that is, depression may be more likely to cloud children’s global perceptions of their peer relations than their specific perceptions of relations with individual peers. However, additional research is needed to evaluate whether children’s depressive symptomology is more strongly tied to
inaccuracy and negatively skewed biases in their generalized peer perceptions than in
their dyadic peer perceptions.

**Peer victimization**

In support of our hypothesis, the more children were victimized, the less accurate they
were in perceiving their peer rejection. This finding is consistent with Cillessen and
Bellmore’s (1999, 2003) model, in which peer victimization promotes withdrawal and
isolation from peers, leaving victimized children with less data to build realistic per-
ceptions of their peer relations. Given that peers rarely intervene during bullying inci-
dents (Hawkins, Pepler, & Craig, 2001), chronically victimized children may have
particular difficulty judging whether peer bystanders dislike them or not. In contrast,
victimized children may be especially sensitive to social cues signaling peer acceptance,
which may explain their greater accuracy in identifying which peers like them, a finding
that emerged contrary to hypotheses. No support emerged for predictions about relations
between peer victimization and the remaining dyadic accuracy and bias variables.

However, as predicted, peer victimization moderated the relation between aggres-
sion and the tendencies to overestimate friendship and underestimate rejection, with
these relations holding only for children at lower levels of peer victimization.
Aggressive children who experienced low or moderate levels of victimization over-
estimated whether peers consider them friends and underestimated whether peers
dislike them. Conversely, these biases were not evident for aggressive children who
were more frequently victimized by peers. These findings are consistent with studies
showing that aggressive victims endorse less positive self-views than aggressive non-
victims (Graham et al., 2006). They also support our position that peer victimization
provides aggressive children with salient data that could deflate their overly positive
peer perceptions and bring their perceptions more in line with their actual peer rela-
tions. Specifically, repeated victimization may overpower aggressive children’s ten-
dencies to overlook, deny, or distort negative peer feedback (Crick & Dodge, 1994;
Zakriski & Coie, 1996), and without this feedback, aggressive children may be more
likely to maintain their biases.

We also predicted that peer victimization would moderate relations between
depressive symptoms and biases in perceived peer relations, with more victimized
children showing stronger tendencies to underestimate their acceptance and friendship
and overestimate their rejection. However, no support emerged for these effects. As
noted earlier, our sample reported low levels of depressive symptomology and exhibited
limited variation, and it is possible that peer victimization only functions as a moderator
for children with significant levels of depressive symptomology and not for those with
subclinical levels. Clinically depressed children’s peer perceptions may be more sus-
ceptible to peer victimization as a result of depressive cognitive patterns or schema not
yet crystallized in less depressed youth. If the current sample included wider variation
in depression, we might have detected the predicted moderating effects.

It is also plausible that certain types of peer victimization may play this moderating
role, while others do not. Research suggests that indirect forms of victimization may be
more strongly tied to depression than direct victimization experiences (Epkins &
Indirect victimization has also been found to have a stronger impact on short-term changes in children’s inferential styles (Gibb et al., 2012). In the present study, the peer nomination items used to assess peer victimization were generally more consistent with direct victimization. If our assessment included other forms of victimization, we may have found support for the hypothesized interaction between peer victimization and depressive symptoms in predicting dyadic bias in children’s perceived peer relations. For instance, indirect victimization might play this moderating role, while more direct forms of victimization might not.

Demographic variation

Two racial/ethnic differences were detected, suggesting that African American children overestimate their acceptance and friendships more than Hispanic and Caucasian children, respectively. These findings are consistent with at least two previous studies (David & Kistner, 2000; Zakriski & Coie, 1996) revealing stronger positive biases in African American children’s perceived peer relations. Zakriski and Coie (1996) proposed that African American children may discount negative social feedback and attribute it to prejudice or they may demonstrate a presentation bias in which they skew the impressions they share with others to “save face.” David and Kistner (2000) also keenly noted that these differences may be a function of an extreme response style found to be more common in African American youth.

Two sex differences also emerged. Girls were more accurate in judging whether peers considered them friends. While boys and girls appear equally accurate in their generalized peer perceptions (Bellmore & Cillessen, 2003), girls may understand better than boys whether specific peers view them as friends, which is consistent with the position that girls are more attentive, emotionally expressive, and willing to disclose personal information in close relationships (Malloy & Cillessen, 2008). Girls were also more likely to overestimate peer acceptance, which supports Bellmore and Cillessen’s (2003) stance that girls expect more acceptance (than rejection) from other girls. It contrasts work by Kistner and colleagues (2006), who found that girls were more likely to underestimate peer acceptance, and David and Kistner (2000), who observed no sex differences in perceptual biases for acceptance. While theories suggest that girls are socialized to be more adept at or perhaps more motivated to make accurate social perceptions (Graham & Ickes, 1997), additional work is needed.

In terms of sex, it is important to note that children appear more accurate in their dyadic perceptions for same-sex than other-sex peers (Bellmore & Cillessen, 2003; Malloy & Cillessen, 2008). Accordingly, we might have observed different trends if we analyzed our data separately for same- and other-sex dyads. In addition to being more accurate for their relations with same-sex peers, children may also display different patterns of bias across same- and other-sex dyads. For instance, when children err in their judgments for same-sex peers, they may be more likely to overestimate acceptance and friendship and underestimate rejection; however, when they err for other-sex peers, they may be more likely to underestimate acceptance and friendship and overestimate rejection. Moreover, patterns of inaccuracy and bias for same-sex or other-sex peers may
relate to boys’ and girls’ psychosocial functioning in distinct ways. That is, certain patterns of bias could be associated with poorer adjustment for boys than for girls (and vice versa).

**Summary across constructs**

In looking across constructs, the present study reveals distinct patterns of perceptual inaccuracy and bias linked to children’s own aggressive behavior, depressive symptoms, and peer victimization. It is particularly striking that children’s aggression and depressive symptoms were positively correlated with each other but related to opposite patterns of dyadic bias, with aggression linked to overestimating peer acceptance and friendship and depressive symptoms linked to underestimating peer acceptance and friendship. This finding adds to the existing literature on distinct social cognitive patterns associated with internalizing and externalizing symptoms (Crick & Dodge, 1994) and documents this distinction at the dyadic level of children’s interpersonal perception. While aggression and depressive symptoms share certain perceptual tendencies (e.g., hostile attribution bias; Quiggle et al., 1992), our findings support the general trend that externalizing symptoms are characterized by inflated social perceptions, while internalizing symptoms are associated with deflated social perceptions.

It is also noteworthy that peer victimization correlated positively with both aggression and depressive symptoms and at roughly the same magnitude; thus, children high in aggression or depressive symptoms both appear more likely to experience victimization by peers. However, peer victimization only interacted with children’s aggression (and not their depressive symptoms) to moderate their dyadic bias. It is likely that the different social cognitive patterns linked to aggression and depression may lead children to experience and interpret their victimization by peers in distinct ways. It is also plausible that aggressive and depressed children encounter distinct patterns of peer victimization, which could influence their peer perceptions in unique ways. For instance, social and relational victimization appear uniquely linked to youth’s depressive symptoms (Epkins & Heckler, 2011), and recent research suggests that such experiences are likely to be perceived as more salient and painful than other experiences such as physical victimization (Vaillancourt, Hymel, & McDougall, 2010). Nonetheless, further research is needed to explore the cognitive and affective processes that influence children’s peer perceptions and whether these processes vary across different adjustment indices and different types of peer victimization.

Collectively, the current findings also reinforce the importance of Kenny and colleagues’ recommendation that both accuracy and bias be carefully assessed in studies of interpersonal perception (Kenny & Acitelli, 2001; Kenny & Albright, 1987). If we had only assessed dyadic accuracy, we would have overlooked the dyadic biases linked to aggression and falsely concluded that the preadolescents’ aggressive behavior was unrelated to dyadic patterns in their perceived peer relations. By assessing dyadic bias, we were also able to detect patterns of error linked to depressive symptoms. Interestingly, these findings revealed that depressive symptoms were linked to inaccurate perceptions of peer rejection but not to a stronger tendency to overestimate or underestimate, which emphasizes that inaccurate social perceptions are not always biased.
Accordingly, researchers are encouraged to examine whether children’s adjustment difficulties are related in distinct ways to inaccurate social perceptions that are and are not characterized by bias, and it is possible that inaccurate (but not biased) peer perceptions could be just as or even more strongly tied to children’s psychosocial adjustment.

Notably, it is important to address a major methodological difference between the current study and previous research. At least two studies observed relations between children’s adjustment and inaccurate perceptions of peer acceptance (Brendgen et al., 2004; Kistner et al., 2006); however, these relations emerged for bias estimates computed by regressing generalized self-report data (global ratings of peer acceptance) on aggregated dyadic peer data (peer acceptance ratings for individual children). While this method is widely used and has many strengths (Cole et al., 1998, 1999), it is questionable whether these estimates truly reflect dyadic bias. Thus, we encourage researchers studying dyadic accuracy and bias to assess self-report and peer-report data both at the dyadic level and directly compare nominations for actual and perceived peer relations within each dyad when computing estimates of accuracy and bias.

**Limitations**

It is important to acknowledge several limitations of this study. First, the sample was limited to fourth- and fifth-grade children, and the findings should not be generalized outside of the preadolescent developmental period. Second, all data were cross-sectional, and it is not possible to draw conclusions about sequential relations among the constructs. While perceptual accuracy and bias may contribute to later adjustment, it is just as plausible that adjustment contributes to later perceptual accuracy and bias. If longitudinal data were available for this study, we would expect to find bidirectional associations between children’s adjustment (aggression, depressive symptoms, and peer victimization) and their dyadic accuracy and bias. Third, the predictors in our regression model accounted for small proportions of variance in the accuracy and bias variables; thus, additional constructs should be explored as predictors of children’s dyadic accuracy and bias. For instance, actual peer rejection has been linked to overly positive generalized biases in aggressive youth’s social perceptions (Rudolph & Clark, 2000; Zakriski & Coie, 1996); thus, it could also be linked to similar biases at the dyadic level. We omitted peer rejection from this study and focused on peer victimization because our hypotheses were grounded in the notion that children’s experiences of victimization by peers provides more salient data to shape peer perceptions than does their experience of being disliked by peers. Nevertheless, researchers are encouraged to consider the role of both peer rejection and victimization in examining the dyadic accuracy and bias of children’s perceived peer relations.

**Implications**

Despite these limitations, the findings may have several implications for intervention with youth who display either aggressive or depressive symptoms or are peer victimized. In particular, social cognitive-oriented interventions could be useful in targeting the perceptual inaccuracies and biases linked to children’s aggression and depressive
symptoms or peer victimization. These children may benefit from training in detecting and interpreting peers’ behavior with greater accuracy. Stronger recognition of positive peer feedback could help override the inaccuracies and negatively skewed biases in depressed and victimized children’s peer perceptions. Additionally, by enhancing aggressive children’s awareness of subtle forms of negative peer feedback, they may develop more accurate views of their peer relations. Overall, greater awareness and understanding of peer feedback could shift these children’s peer perceptions in ways that promote prosocial behavior and, in turn, support better psychosocial adjustment. Several interventions could prove helpful in these areas, such as elements of Hudley and Graham’s (1993) BrainPower program, along with multiple components of cognitive–behavioral therapies (for a review, see David-Ferdon & Kaslow, 2008).

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**References**


