Psychosocial Intervention

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A B S T R A C T

Lack of awareness of one's negative social reputation is linked to aggressive behavior among older school-age children. The present study extends this research to the first year of elementary school. The first goal was to compare generalized and dyadic perspectives in studying discrepancies between children's actual and perceived rejection. The second goal was to determine whether discrepancies between actual and perceived rejection are related to sociometric status. The third goal was to examine whether discrepancies between actual and perceived rejection are related to aggressive behaviors at school. Actual peer rejection was measured with peer negative nominations, perceived peer rejection with students' self-ratings and meta-perceptions, and aggressive behavior with teacher ratings. The discrepancies between actual and self-perceived rejection were substantial in the total sample. Furthermore, non-rejected children had higher scores than rejected children in dyadic overestimation (identifying peers who they believed disliked them but did not), while it was the reverse for dyadic underestimation (not identifying peers who in fact disliked them). High levels of dyadic underestimation were negatively associated with the concurrent aggressive behavior. Rejected children's underestimation of their peer rejection appeared to have protective effects on antisocial and aggressive problems. Findings are discussed in terms of theories of symbolic interactionism and social information processing.

La percepción del niño del rechazo de sus compañeros y el comportamiento agresivo según los docentes

R E S U M E N

No ser consciente de la mala reputación propia está relacionado con el comportamiento agresivo de niños y niñas. El presente trabajo amplia la investigación al inicio de la escuela primaria. El primer objetivo fue comparar la percepción generalizada y diádica en la discrepancia entre el rechazo real y el percibido. El segundo objetivo fue determinar si la discrepancia entre rechazo real y percibido está relacionada con el tipo sociométrico. El tercer objetivo fue examinar si la discrepancia entre rechazo real y percibido está relacionada con conductas agresivas. El rechazo real se midió con nominaciones negativas, el rechazo percibido con autoinformes y el comportamiento agresivo con calificaciones de los docentes. La discrepancia entre rechazo real y autopercibido fue sustancial en la muestra total. Además, los niños y niñas no rechazados obtuvieron puntajes más altos que los rechazados en la sobreestimación diádica (identificar como rechazadores a compañeros que de hecho no les rechazaron), mientras se dio la pauta inversa en la subestimación diádica (no identificar como rechazadores a compañeros que sí rechazaron al niño o a la niña). Los niveles elevados de subestimación diádica se asociaron negativamente con el comportamiento agresivo. La subestimación de los niños o niñas rechazados parece tener efectos protectores sobre los problemas antisociales/agresivos. Se comentan los hallazgos en relación con la teoría del interaccionismo simbólico y el procesamiento de la información social.

Previous research on peer rejection has brought into focus the importance of examining rejected children's perception of their rejection, because awareness of rejection may exacerbate their peer problems (e.g., Hymel & Franke, 1985). According to Guerra, Asher, and DeRosier (2004), self-perceived rejection may play an important role in the prediction of aggression by moderating the effects of actual rejection.

Most studies of children's social perceptions are based on *symbolic interactionism* (Cooley, 1902) or *social information processing* theories (Dodge et al., 2003). Symbolic interactionism

focuses on the effect of relationships on perceptions. It assumes that social perceptions emerge from the internalization of ongoing interpersonal experiences (Boivin & Hymel, 1997). Harter (1998) found that children with peer-relationship problems, such as aggressive or rejected children, lack the information needed to make realistic judgments about themselves because, by being excluded from peer interactions, they lack the opportunities to practice this important social skill (Bellmore & Cillessen, 2003) or because peers refrain from providing negative feedback (Zakriski & Coie, 1996). Simultaneously, social perceptions can affect peer relationships. Rejection and aggression are associated with maladaptive patterns of encoding, interpretation, and retrieval of interpersonally relevant information (Dodge et al., 2003). This cognitive distortion may then lead to an underdetection (Zakriski & Coie, 1996) or underutilization (Lochman & Dodge, 1998) of social cues in the formation of self-perceptions that would maintain a child's aggressive behavior and negative peer status.

Previous research showed that the discrepancy between actual and perceived rejection may be more consequential than perception per se (Brendgen, Vitaro, Turgeon, Poulin, & Wanner, 2004). Two types of discrepancies can be distinguished: overestimation of peer acceptance (or underestimation of peer rejection), which is generally associated with aggression and other externalizing problems, and underestimation of peer acceptance (or overestimation of peer rejection), which is generally associated with low self-esteem and depression (Baumeister, Smart, & Boden, 1996; Smith, Van Gessel, David-Ferdon, & Kistner, 2013). The aforementioned studies addressed an important conceptual and methodological issue, as they approached the point of view of rejected children by studying their self-perceptions of personal relationships, that is, how they perceive themselves accepted or rejected (e.g., "I have many friends" or "I do not get asked to play by others"). Self-perception generally relates to a general or group level, where discrepancy is measured by the difference between the self-rating score of a target and the mean score of others' actual ratings. However, children's perceptions of rejection also encompass meta-perceptions (Kenny & DePaulo, 1993), one's predictions of others' judgment of oneself (e.g., "I believe that my classmates do not like me"). Meta-perception relates to a dyadic level and compares target's expected nomination to peer nomination for each target-peer dyad. Accurate information about who likes or dislikes oneself helps people to interact appropriately.

A developmental issue is also to be considered. In the aforementioned studies, participants were eight-or-more-year olds because of the assumption that children's social perception skills develop in accordance with general cognitive abilities. The scarce studies that used meta-accuracy, however, do not support this assumption. In this line, MacDonald and Cohen (1995), studying disliking in children in grades one through six, found neither developmental nor sex effects in the accuracy of perceived disliking. Smith and Delfosse (1980) found that preschool-age children can identify accurately who their own friends are as well as who their classmates' friends are. Moreover, according to Vygotsky's sociocultural theory, early incorporation into school contexts allows children access to social information that is useful for them to make social assessments (Malloy, Albright, & Scarpati, 2007). Children in school have a greater exposure to peer interactions, which would rouse dyadic meta-perceptions, whereas generalized self-perception is more related to cognitive skills. Although generalized and dyadic approaches are conceptually and developmentally different, they can be used complementarily (Bellmore & Cillessen, 2003; Kenny & DePaulo, 1993; MacDonald & Cohen, 1995; Morrow et al., 2016).

Generalized Self-perceptions and Dyadic Meta-perceptions of Peer Rejection

Generalized self-perceptions and dyadic meta-perceptions are linked to different social actors and types of social relationships, or utilize different cognitive processes or different data to assess relationships. Assessment of self-perception requires children to report their own perspective ("They often ask me to play"), whereas a dyadic meta-perception measure requires that children take the perspective of others ("I believe that Robert does not like me") (Kenny & DePaulo, 1993). According to Bronfenbrenner, Harding, and Gallwey (1958, cited in Bellmore & Cillessen, 2003), dyadic meta-perceptions and generalized self-perceptions are different abilities that serve in different social situations. They suggested that if a child wanted to be accepted by a specific peer, he/she needed to know what that person thought of him/her. However, if the child wanted to be accepted by the entire peer group, he/she needed to be aware of the more general perception by all group members or of peer group functioning. According to Morrow et al. (2016, p. 907) "dyadic meta-perception is more explicit and shaped by deliberate evaluation of past peer interactions", whereas "generalized self-perception is more implicit and guided by nonconscious peer-relational schemas" (Salmivalli, Ojanen, Haanpää, & Peets, 2005, cited in Morrow et al., 2016, p. 907). Thus, in this study, we propose that a dyadic meta-perception approach be used as a complement of the generalized self-perception approach.

Generalized self-discrepancy refers to the discrepancy between an individual's appraisal of how their relationship with others is in general and how their relationship with others actually is (e.g., Calhoun, 2011; Guerra et al., 2004; Zimmer-Gembeck et al. 2013). *Dyadic meta-discrepancy* refers to the discrepancy between an individual's knowledge of how he/she is seen by specific others and how each specific individual actually sees him/her (e.g., Bellmore & Cillessen, 2003; Cillessen & Bellmore, 1999; MacDonald & Cohen, 1995; Morrow et al., 2016). Each method not only assesses a different aspect of peer relationship functioning, but also provides different information (Bronfenbrenner et al., 1958, cited in Bellmore & Cillessen, 2003).

Most studies of children's self-perceptions have used the approach of generalized perceived peer acceptance, as in Harter and Pike's (1984) self-perception subscale. The generalized method presents two main problems for the interpretation of discrepancy. First, a specific reference group is not made clear to the participants. Children being rated and those rating them may not base their impressions on the same reference group (Cillessen & Bellmore, 1999). Second, it does not use an objective standard of children's social functioning (Berndt & Burgy, 1996, cited in Cillessen & Bellmore, 1999). One great difficulty in comparing children's self-ratings to ratings by others is to determine to what extent self- and other-ratings reflect children's actual social functioning and to what extent the responses of each one of the children is influenced by his/her own set of biases. In this sense, such discrepancy can only be named self-other (dis)agreement (Kenny & DePaulo, 1993). In the dyadic method, instead of eliciting a general likeability rating, a child is asked to nominate which specific classmates he/she thought liked him/her most and least. We can then match these child's expected nominations of acceptance or rejection with the nominations that he/she actually received at the dyadic level. As peer nominations are an objective standard, the terms of inaccuracy or error are appropriate (Cillessen & Bellmore, 1999).

The generalized discrepancy method yields a score on a continuum ranging from positive to negative scores that indicates the degree to which a child in general perceives more rejection (positive scores, overestimation) or less rejection (negative scores, underestimation) than is actually the case. Consequently, the direction of the discrepancy or bias is emphasized, (overestimation vs. underestimation or positive vs. negative scores), whereas the magnitude of the discrepancy is

usually not considered. In contrast, the dyadic method indicates how well a child perceives their rejecters and focuses on the magnitude of agreement (Morrow et al., 2016). Combinations of over- and underestimation of rejecters into one score (subtraction, aggregation, or kappa score; Bellmore & Cillessen, 2003) are the measures mainly used in the dyadic method. However, Kenny, and DePaulo (1993) argued that both the two dimensions of magnitude and direction are needed for a complete picture of social perceptions. In the present study, we propose that dyadic overestimation and dyadic underestimation be used as separate measures. Dyadic overestimation is the number of false positives over the total number of one's *own* expectations, whereas dyadic underestimation is the number of misses over the total number of dislikes received from *others* (MacDonald &Cohen, 1995; Morrow et al., 2016). Each measure reports a different type of error (bias) and, as it only has a positive direction, it is simultaneously a measure of magnitude. The rationale and calculations of these discrepancy scores are explained in detail in the Method section. These two measures would be useful to solve the question of whether bias or magnitude is accountable for the association of self-perceived rejection with aggressive behavior.

Self- and Meta-perceptions and Sociometric Status as Predictors of Aggressive Behavior

Generalized Self-perceptions

Findings from cross-sectional and longitudinal studies indicate that overestimation of generalized acceptance is associated with higher levels of aggressive behaviors (e.g., Brendgen et al., 2004). According to the *threatened egotism model* (Baumeister et al., 1996), individuals who hold unrealistically positive views of themselves feel threatened when they encounter disconfirming feedback from others, and they tend to react aggressively to the blow to their ego. The self-enhancement bias and insensitivity to social cues are particularly pronounced in children who are aggressive and peer disliked (Rudolph & Clark, 2001; Zakriski & Coie, 1996). On the contrary, overestimation of generalized rejection may be due to rejection sensitivity (Zimmer-Gembeck et al., 2013) and relates to biased patterns of social information processing (Dodge et al., 2003).

Using generalized methods, Cillessen and Bellmore (1999) found that rejected children rated their peer likeability higher than their teachers. Patterson, Kupersmidt, and Griesler (1990) found that rejected students tended to overestimate their general acceptance. Zakriski and Coie (1996) found that aggressive-rejected children underestimated their social rejection more than nonaggressive rejected children. As far as we know, Calhoun's (2011) work is the only one that explicitly studies the magnitude. He found that seventh and eighth graders who underestimated their general rejection had higher levels of overt and relational aggression than children who overestimated it, regardless of the size of the discrepancies.

Some authors have argued that the prediction of externalizing problems from the discrepancy between self- and other perceptions may not apply to all children but only to a subgroup, such as rejected children. Orobio de Castro, Brendgen, van Boxtel, Vitaro, and Schaepers (2007) found that overestimation of social acceptance was linked to proactive aggression for rejected children. White and Kistner (2011) also found that, among rejected children, reactive aggression was the highest in children who greatly underestimated their peer acceptance and in those who modestly overestimated their peer acceptance.

Dyadic Meta-perceptions

Cillessen and Bellmore (1999), using the kappa score for rejection and acceptance, found that overestimation of peer rejection

predicted loneliness, but it did not predict either peer rejection or peer acceptance for play. Morrow et al.'s (2016) study approached the prediction of aggression from the dyadic perspective. In a sample of fourth and fifth graders, they did not find any association between aggression and self-perceived rejection, either as dyadic bias (difference between over- and underestimation, which is rather a measure of magnitude than a bias) or as dyadic discrepancy (kappa score). Thus, the inaccuracy found in aggressive children's peer perceptions may occur 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. No study has addressed the question of whether the prediction applies only to rejected children. While MacDonald and Cohen (1995) and Cillessen and Bellmore (1999) reported that of all sociometric categories, rejected children overestimated their rejection the least, no difference was found when using kappa scores. To the best of our knowledge, no study has used dyadic underestimation as a separate measure.

Additionally, no study has compared the association between dyadic measures of social perception and aggression as a function of the sociometric status group. Symbolic interactionism and social information processing theories can help to formulate hypotheses for such associations. Because of social desirability and norms, people do not usually give overt negative feedback to others (Bellmore & Cillessen, 2003). Therefore, rejected children might not perceive their peers as rejecters or have any ground to behave aggressively towards them, as symbolic interactionism would indicate. The remaining rejecters, those who do provide negative feedback, are perceived as rejecters, according to the social information processing, but as their number is small, they may thus not represent a great threat. Therefore, this "ignorance" would help the rejected child to engage in interactions with confidence and not react with aggression.

The Present Study: Awareness of Peer Rejection in the Early School Years

This study extends the study of perceptions of peer rejection to a younger age than participated in most previous studies, namely six-year-old children. We studied generalized self-perceptions together with dyadic meta-perceptions. We chose to focus on their links with aggressive behavior because aggressive behaviors by young children are easily observed by others and highly disruptive to peers and teachers, and previous research with older children has usually focused on antisocial behavior and aggression as well, since they are related to a wide range of peer problems such as bullying and cyberbullying (Garaigordobil, 2017). We used three sources of information: self and peers for liking and disliking and teacher ratings for aggressive behavior. We had three goals. The first goal was to compare generalized and dyadic approaches of the discrepancy between actual rejection and self-perceived and meta-perceived rejection in terms of both bias and magnitude of the discrepancy.

The second goal was to determine whether discrepancy indices vary according to sociometric status. With regard to magnitude, we expected no difference in generalized or dyadic measures (Calhoun, 2011; Cillessen & Bellmore, 1999; Morrow et al. 2016) because, as indicated, biases are specific patterns of perception, and combining them by subtraction or addition can make differences disappear. With regard to biases, we thought that rejected children might underestimate their *generalized* peer rejection more than average children because they lack the social information needed to make realistic judgments (Cillessen & Bellmore, 1999; Brendgen et al., 2004). They might also display biased interpretations of peer interactions to protect their self-concept (Dodge et al., 2003; Harter, 1998; Zakriski & Coie, 1996), as discussed earlier. Or, on the contrary, they might be more accurate in self-perceived rejection than average

children because of their greater exposure to experiences of peer rejection (Cillessen & Bellmore, 1999). For dyadic overestimation, we expected that rejected participants would overestimate their rejection less than average children (Cillessen & Bellmore, 1999; MacDonald & Cohen, 1995), in light of the social processing theory. In contrast, for dyadic underestimation, we expected that rejected children would underestimate their rejection more than average children, as suggested by the symbolic interactionist perspective.

The third goal was to evaluate how children's self-perceptions of social rejection are related to aggressive behavior, and whether this link varies by sociometric status group. We had three hypotheses. First, we hypothesized that discrepant social self-perceptions would be a correlate of aggressive behavior only through biases, but not through the magnitude of discrepancies (Calhoun, 2011; Cillessen & Bellmore, 1999; Morrow et al., 2016). Second, for generalized bias, we hypothesized that underestimation of peer rejection would be related to aggression only for rejected children (Calhoun, 2011; Zakriski & Coie, 1996; Zimmer-Gembeck et al., 2013), in light of the threatened egotism model and low rejection sensitivity. Third, for dyadic biases, we hypothesized that underestimation of rejection would be a negative correlate of aggression, consistent with the symbolic interactionism, because rejected children are likely not to receive overt negative information from their rejecters (Cillessen & Bellmore, 1999).

Method

Participants and Procedure

Participants were 809 children (M_{age} = 6.39 years, SD = 0.32) from 34 first-grade classrooms of 15 elementary schools in four Spanish cities. All participating schools were located in urban areas and enrolled primarily children from families of middle socio-economic status. The study was conducted in accordance with 1964 Helsinki Declaration and its later amendments, with the approval of schools. Review and approval from the ethics committee of our institution [blinded] was obtained. Participation was voluntary. Families gave the required written informed consent. Participation rate was 95.7%.

At the end of first school trimester, in a quiet room at school, by means of twenty-minute individual interviews, we administered a scale of perceived social acceptance and a sociometric questionnaire to children. Then, the classroom teacher-tutor—the teacher with whom the children spend most time and carry out most activities—filled out aggression ratings for each one of the children.

Sociometric status groups were determined using the procedure of García Bacete (2006; García Bacete & Cillessen, 2017), a revised version of the probability method developed by Newcomb and Bukowski (1983). García Bacete's probabilistic method uses Salvosa's tables to analyze positive and negative nominations received (PNR and NNR). Based on t-values and a probability level of .05, upper and lower limits can be set for positive nominations (UL_{PNR} and LL_{PNR}) and negative nominations (UL_{NNR} and LL_{NNR}) for groups of a certain size. A child is classified as preferred when PNR ≥ UL_{PNR} and NNR < M_{NNR}; rejected when NNR ≥ UL_{NNR} and PNR < M_{PNR}; neglected when PNR ≤ 1 (in case of 5 or unlimited nominations, the value should be the largest value of LL_{PNR} or 1) and NNR < M_{NNR}; controversial when either [PNR ≥ UL_{NPR} and NNR ≥ M_{NNR}] or [NNR ≥ UL_{NNR} and PNR ≥ M_{PNR}]; the remaining participants are classified as average. The percentage of students in each sociometric category was: 10.8% Preferred (n = 87), 13.7% Rejected (n = 111), 1.1% Controversial (n = 9), 4.8% Neglected (n = 39), and 69.6% Average (n = 563). There were missing data in the case of 10 of the rejected children due to absenteeism or no parental authorization Thus, for the current study, we selected a subsample consisting of all consenting rejected children who were present at data collection (n = 101, 65

boys), and a randomly selected subgroup of sociometrically average children matched by sex and classroom (n = 99, 63 boys). None of the children in this sample were diagnosed with special education needs or received special education services.

Measures

The accuracy of the translation of English language instruments was verified with a back-translation procedure.

Teacher ratings. We used the Antisocial/Aggressive subscale of the School Social Behavior Scales (SSBS; Merrell, 2002) (10 items; e.g., "threatens others, is verbally aggressive", "takes things that are not his or hers"). All items were rated on a scale from 1 (*never*) to 5 (*frequently*). Cronbach's alpha was .92.

Acceptance self-rating. We assessed children's generalized self-perceptions with the Peer Acceptance subscale of the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984). This 6-item subscale includes positively as well as negatively worded items (e.g., "I do not get asked to play by others"), scored 1 to 4. It yields a measure of children's self-rated social standing in the peer group ranging from high competence to a complete lack of social competence (Brendgen et al., 2004). We created a measure of self-perceived rejection by reversing the scores—the higher the score, the more negative the social self-perception (e.g., Sandstrom & Herlan, 2007; Zimmer-Gembeck et al., 2013). Cronbach's alpha was .77.

Sociometric nominations. Peer nominations and meta-perceptions. To elicit sociometric nominations, we showed the participants photographs of each child in their classroom and asked them whom they liked most and whom they liked least. To assess children's perceptions, we also asked each child to nominate which peers liked him/her most and which liked him/her least. Nominations were unlimited. Using the Sociomet software (González & García Bacete, 2010), we calculated scores for negative nominations received (actual rejection) and negative nominations expected (expected rejection or dyadic meta-perceptions). We transformed the raw scores into percentages by dividing them by the number of nominating students in each classroom and multiplying by 100.

Calculation of Discrepancy Scores

Rationale. There has been considerable debate about the optimal methods of avoiding distortion in the calculation of discrepancy scores. Two methods are used to calculate discrepancy scores for generalized ratings (Calhoun, 2011), and both are based on the assumption that an individual can only underestimate, overestimate, or match the external assessment (Smith et al., 2013). The first method calculates the difference between self-ratings and ratings from other informants. The second consists of regressing self-ratings on other-ratings and saving the residual scores. Both methods yield continuous scores, with positive values indicating overestimation (positive bias), negative values indicating underestimation (negative bias), and scores near zero indicating accurate self-perception (agreement). Unlike the generalized method, the dyadic method allows a child to score simultaneously several overestimations together with several underestimations and several agreements, instead of an only score for the whole class. The paragon measure of dyadic accuracy is the kappa score, which corrects for chance agreement, but is very conservative and yields very low scores for rejection perceptions (Bellmore & Cillessen, 2003).

Cillessen and Bellmore (1999) computed the *accuracy proportion* of liked-most and liked-least nominations as a measure of dyadic bias. Similarly, the *inaccuracy* proportion for liked-least nominations is the proportion of negative nominations expected that were not received, which constitutes a measure of dyadic overestimation of

rejection. The counterbalancing measure of dyadic underestimation, the proportion of negative nominations received that were not expected, has not been used yet as a separate measure. Morrow et al. (2016), focusing on the magnitude in the dyadic method, proposed two scores they called inaccuracy and bias. Inaccuracy was the sum of the two proportions, dyadic overestimation and dyadic underestimation. Bias was the difference between underestimation and overestimation, in which the magnitude of the largest of the two proportions, the main discrepancy, had a great influence.

However, the two dyadic measures of overestimation and underestimation, used as separate measures of bias, would provide more nuanced information for understanding children's social self-perceptions than when they are combined into one score. Each one of the two measures indicates both direction and magnitude with a range from 0 (complete agreement) to 100 (complete disagreement).

To illustrate this, in Table 1 we present the scores in dyadic biases and dyadic discrepancies of 4 students from an imaginary class of 10. For these four students, the sum of negative nominations received and expected is 9, and there is always the same difference between the numbers of nominations expected and received, namely 1. However, as pointed out in Kenny and DePaulo (1993), both quantity and direction are necessary, that is, by using separately overestimation and underestimation, research would "reveal more fine-grained patterns of accuracy and bias in children's perceived relations with specific peers" (Morrow et al., 2016, p. 894). We can see in Table 1 that, when the two dyadic biases (overestimation and underestimation) are used separately, they show clear differences between mistakes done by the four students in their social self-perceptions. For example, Students 1 and 4 did not identify any of their actual rejecters and Student 2 only identified one out of his/her 5 rejecters, whereas Student 3 knows quite accurately who dislikes him/her. But the combination of the two indices gives pointless information because, on the one hand, in the subtraction of overestimation and underestimation (main dyadic discrepancy), as we can see, differences between students nearly disappear (only Student 4's score is different from the other three (1 vs. -1). On the other hand, the addition of the two biases (dyadic discrepancy), which apparently maintains differences

between the four students, does not take into account the type of mistake committed. For example, Students 1 and 4 score the same (9), but Student 1 perceived himself less rejected than he is actually, thus expecting a fewer number of negative nominations (4) than he received (5), while Student 4 , inversely, perceived himself more rejected than he is actually.

Indices used in our analyses. We calculated seven measures of discrepancy between children's social self- and meta-perceptions and peer nominations: two generalized indices, one for bias and one for magnitude, and five dyadic indices, two for bias and three for magnitude. Table 2 provides the definition and computation of these seven indices of discrepancy.

Generalized indices. *Generalized bias* of rejection was created by regressing children's standardized self-perceived peer rejection scores on their standardized actual rejection score. The standardized residuals were saved as children's generalized bias. These scores form a continuum where positive values represent overestimation of peer rejection and negative scores represent underestimation. This residual score has been used in prior studies of perceptual bias (e.g., White & Kistner, 2011). *Generalized discrepancy* is a measure of magnitude that was computed by taking the absolute value of the generalized bias scores (Calhoun, 2011).

Dyadic indices. Biases. *Dyadic overestimation* indicates the number of peers a child identified as rejecters who in fact did not reject him/her (Cillessen & Bellmore, 1999). These are "false positives" of negative nominations expected. The score is the percentage of rejection expected by a child that he/she actually did not receive. *Dyadic underestimation* indicates the number of actual rejecters that a child failed to identify. They are omissions of negative nominations expected. The score is the percentage of actual rejection that the child did not expect.

Dyadic indices. Magnitudes. *Dyadic discrepancy* is the sum of dyadic overestimation and dyadic underestimation, as calculated in Morrow et al. (2016). *Main dyadic discrepancy* is the subtraction of dyadic underestimation from dyadic overestimation (Morrow et al., 2016). Finally, *dyadic accuracy* is a child's kappa score derived from the 2 x 2 matrices of received and expected negative nominations for the child (Bellmore & Cillessen, 2003).

Table 1. Example of Dyadic Overestimation and Underestimation

Student	Student 1 NE	Student 1 NR	Student 2 NE	Student 2 NR	Student 3 NE	Student 3 NR	Student 4 NE	Student 4 NR
1				X	X	X	X	
2		X				X		X
3		X	X	X				X
4		X		X	X	X		
5		X		X	X	X		X
6		X		X				X
7	X				X	X	X	
8	X		X				X	
9	X		X				X	
10	X		X				X	
	4	5	4	5	4	5	5	4
Absolute difference between NE and NR	1		1		1		1	
% Absolute difference	11.1		11.1		11.1		11.1	
Dyadic overestimation (DO)	4		3		0		5	
% Dyadic overestimation (%DO)	100		75		0		100	
Dyadic underestimation (DU)	5		4		1		4	
% Dyadic underestimation (% DU)	100		80		20		100	
Main dyadic discrepancy (DO-DU)	-1		-1		-1		1	
% Main dyadic discrepancy (% DO - % DU)	0		-5		-20		0	
Dyadic discrepancy (DO+DU)	9		7		1		9	
% Dyadic discrepancy (% DO + % DU)	200		155		20		200	

Note. NE = negative nominations expected; NR = negative nominations received. DO = number of peer negative nominations expected and not received; DU = number of negative nominations received and not expected.

Table 2. Definition and Computation of the Discrepancy Indices

Variable	Definition	Computation
	Generalized measures, based on how much the child reports feeling disliked	
Generalized bias	Difference between how much a child is actually disliked by his/her peers and how much this child perceives him/herself rejected. It can be positive or negative (bias).	Standardized residual obtained by regressing self-perceived rejection score (based on reversed score of Harter and Pike's acceptance score) on real rejection score (based on negative nominations received).
Generalized discrepancy	Absolute value of the generalized bias. It is a magnitude	
	Dyadic measures, based on by whom the child reports being disliked	
Dyadic overestimation	Number of peers a child identified as rejecters who in fact did not reject him/her. These are "false positives" of negative nominations expected (bias).	Percentage of rejection expected by the child that he/she actually did not receive.
Dyadic underestimation	Number of actual rejecters that the child failed to identify. They are omissions (misses) of negative nominations expected (bias).	Percentage of actual rejection that the child did not expect
Dyadic discrepancy	Number of all the overestimation and underestimation mistakes put together (magnitude).	Sum of false positives plus misses, in percentages
Main dyadic discrepancy	Subtraction of dyadic underestimation from dyadic overestimation (magnitude).	Subtraction of misses minus false positives, in percentages
Dyadic accuracy	Agreement between the child's nominations for who dislikes him/her and their peers' actual negative nominations (magnitude).	Cohen's kappa score derived from the 2 x 2 matrices of expected and received negative nominations.

Table 3. Descriptive Statistics and Intercorrelations of the Study Variables

	Mean	*SD*	1	2	3	4	5	6	7	8	9	10
1. Negative nom. received	25.10	18.70										
2. Negative nom. expected	10.80	10.30	.25*									
3. Perceived rejection	0.67	0.61	.07	.01								
4. Generalized bias	0.00	1.00	.99*	.26*	.00							
5. Generalized discrepancy	0.85	0.52	.29*	.03	.07	.29*						
6. Dyadic overestimation	61.60	41.10	-.33*	.14*	-.08	-.31*	-.14					
7. Dyadic underestimation	77.70	32.60	.34*	-.22*	.05	.30*	-.26*	.18*				
8. Dyadic discrepancy	139.30	57.00	-.06	-.03	-.03	-.05	-.25*	.83*	.70*			
9. Main dyadic discrepancy	-16.10	47.60	-.49*	.27*	-.11	-.48*	.06	.74*	-.53*	.23*		
10. Dyadic accuracy	0.06	0.25	-.15*	-.06	-.08	-.14*	.08	-.59*	-.64*	-.79*	-.08	
11. Antisocial/aggressive	1.71	0.92	.57*	.26*	-.02	.58*	.20*	-.15*	.13	-.03	-.22*	-.12

*$p < .05$.

Results

Descriptive Statistics

The mean of self-perceived rejection was 0.67 and of expected rejection 10.8%. Intercorrelations and descriptive statistics are displayed in Table 3. Correlations between self-perceived rejection and all the other variables were low and nonsignificant, most particularly with generalized bias, which was zero.

Research Goal 1: Differences among Discrepancy Indices

Correlations between the three bias scores were significant but small. Generalized bias correlated positively with dyadic underestimation ($r = .30$) and negatively with dyadic overestimation ($r = -.31$). There was a small positive correlation ($r = .18$) between the two dyadic biases.

The three biases were differentially associated with nominations received and expected. Generalized bias was perfectly positively correlated with received nominations and with expected nominations. Dyadic overestimation was positively associated with nominations expected but negatively with nominations received. Dyadic underestimation correlated positively with nominations received but negatively with nominations expected.

Research Goal 1: Distribution of Dyadic Indices

To analyze differences between dyadic indices, we examined their distribution. The results are shown in Table 4.

As indicated by the low average kappa score (.06), dyadic inaccuracy was high. Furthermore, only 5% of children did not display any dyadic error. Almost 70% of children committed both over- and underestimation. The percentage of children displaying overestimation was 76%, whereas 88% displayed underestimation. Not only were the percentages of errors high, the error rates were also high: 62% for overestimation and 78% for underestimation. Almost 50% of participants presented 100% rate both in over- and underestimation.

Research Goal 2: Discrepancy Indices by Sociometric Status

To determine whether discrepancy indices vary according to sociometric status, we computed a 1-way (peer-status: average vs. rejected) ANOVA on each social perception index. We applied a Bonferroni correction; the *p*-value required for significance ranged from .05 to .007.

Rejected children (R) expected more dislikes than average children (A), $M_A = 8.67\%$, $M_R = 13.03\%$; $F(1, 198) = 9.29$, $p < .01$, p needed = .025. Peer rejection was strongly associated with the direction of discrepancy, but not with magnitude. The average group scored higher than the rejected group in dyadic overestimation, $M_A = 73.7\%$ vs.

Table 4. Prevalence of Dyadic Overestimation and Underestimation in the Total Sample and for Rejected and Average Children

	Total Sample		Average Group		Rejected Group	
	Over-estimation	Under-estimation	Over-estimation	Under-estimation	Over-estimation	Under-estimation
Mean (%)	62	78	74	70	50	85
Median (%)	75	91	100	100	50	89
% showing this bias	76	88	79	76	73	100
% showing a bias of 50%	69	86	74	73	44	89
% showing a bias of 100%	44	48	63	59	26	38
% showing one bias	8	20	15	12	0	27
% showing both biases	68		64		73	
% showing no bias	5		9		0	

M_R = 49.8%, $F(1, 198)$ = 18.25, $p < .001$, p needed = .007. The rejected group scored higher on generalized bias, M_A = -.81 vs. M_R = .81, $F(1, 198)$ = 378.29, $p < .001$, p needed = .007, and on dyadic underestimation, M_A = 70.2% vs. M_R = 85.1%, $F(1, 198)$ = 11.00, $p = .001$, p needed = .007.

The distribution of dyadic indices also varied by rejected status: 100% of rejected children displayed some discrepancies, whereas this was true for 91% of average children (z = 2.42, p = .016), 100% of rejected children underestimated compared to 76% of average children (z = 4.84, $p < .001$), 26% of rejected children had a 100% overestimation rate, compared to 63% of average children (z = 5.39, $p < .001$). None of the rejected children made only errors of over-estimation, whereas 15% of average children committed only such bias (z = 4.07, $p < .001$).

Research Goal 3: Generalized and Dyadic Indices and Aggression

To evaluate how children's self- and meta-perception discrepancies of social rejection are related to aggression, and whether this link varies by sociometric status group, we performed hierarchical regressions predicting aggressive behavior from generalized and dyadic discrepancy scores, while also examining the moderating effects of rejected status. We conducted two separate sets of regressions, one with generalized measures as predictors (Table 5) and one with dyadic measures as predictors (Table 6).

Regression strategy. In both sets of regressions, shared method variance was avoided because predictors and criteria came from different sources. The dependent variable (aggression) came from teachers whereas the independent variables (discrepancy measures) came from self- and peer reports.

It should be noted that because generalized and dyadic discrepancy scores were computed from a self-reported score and a peer-reported score, an association between the dependent variable and the discrepancy score could ensue from a strong association between the dependent variable and one of the components of the discrepancy score. In that case, the predictive value of the discrepancy score is lower than indicated by its regression coefficient. To examine this possibility, we used the procedure proposed by Calhoun (2011), which involves repeated regressions with the discrepancy score as predictor, preceded by one of its components, the other, or both.

As the inclusion of many variables and the method discrepancy calculation may pose a risk of multicollinearity and independence, all continuous variables were standardized to z-scores before entering them in regression analyses, and we examined tolerance, variance inflation factor, and the Durbin-Watson test, which indicated no problems. Only regression analyses yielding significant main effects of discrepancy indices or their interactions with sociometric status are presented.

Generalized predictors. In regressions with the generalized predictors, the order of variables was as follows. To control for sex differences, sex was included as Step 1. In Step 2, rejected status was entered as a dichotomous variable (0 = rejected, 1 = average). In Step 3, discrepancy indices were entered. We ran the model three times, with three versions of Step 3: once with generalized bias, once with generalized discrepancy (magnitude), and once with both generalized bias and generalized discrepancy together. In Step 4 of each of these three regressions, the moderating effect of rejection was tested by entering the interaction of rejection with predictor(s) from Step 3.

The significant results of these regressions are presented in Table 5. Only prediction models with each of the generalized predictors separately made significant contributions to antisocial behavior (total R^2 = .38). Generalized bias had a significant positive effect (β = .48). Generalized discrepancy was significant only for rejected children, and with lower β and F values. Following Calhoun (2011), we repeated all analyses adding negative nominations received as an additional predictor, which led to the result that both generalized indices depended completely on actual rejection, which was accountable for significance.

Table 5. Results from Hierarchical Regression Analyses Predicting Aggressive Behavior from Generalized Bias and Discrepancy

	Aggressive Behavior	
	Bias	Discrepancy
	β	β
Step 1: Sex	-.16**	-.16**
Step 2: Status	-.12	-.06
Step 3: Bias	.48***	---
Step 3: Discrepancy	---	.30***
Step 4: Status x Bias	ns	---
Step 4: Status x Discrepancy	---	-.52***
Total R^2	.38	.38
F	37.13***	28.40***
df	(3, 187)	(4, 186)

Note. R^2 and F are for the last model where F change was significant; ns indicates that the variable was not significant when introducing it in the model; "---" indicates that the variable was not introduced in the model.
Sex: boys = -1, girls = 1; status: rejected = 0, average = 1.
$^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Dyadic predictors. For dyadic measures, we followed the same strategy as for generalized predictors. That is, sex in Step 1, rejected status in Step 2, dyadic predictor(s) in Step 3, and interaction(s) of rejected status with dyadic predictor(s) in Step 4. We ran six versions of Step 3: one with overestimation alone, one with underestimation alone, one with both overestimation and underestimation together, one with dyadic discrepancy, one with main dyadic discrepancy, and one with dyadic accuracy. None of the three indices of magnitude was a significant predictor. Only the models with underestimation alone and with under- and overestimation together made significant contributions to aggressive behavior.

Table 6 summarizes regression analyses for dyadic biases. In the two significant models (R^2 = .32), the predictors were sociometric

Table 6. Results from Hierarchical Regression Analyses Predicting Aggressive Behavior from Dyadic Overestimation and Underestimation

	Aggressive Behavior		
	Overestimation	Underestimation	Over and Under
	β	β	β
Step 1: Sex	-.19**	-.20***	-.20***
Step 2: Status	-.51***	-.54***	-.55***
Step 3: Overestimation	ns	---	.07
Step 3: Underestimation	---	-.36*	-.40*
Step 4: Status x Overestimation	ns	---	-.10
Step 4: Status x Underestimation	---	.39*	.43**
Total R^2	.30	.32	.32
F	40.59***	22.15***	14.91***
df	(2, 193)	(4, 191)	(6, 189)

*Note.* β, R^2, and F are for the last model where F change was significant; *ns* indicates that the variable was not significant when introducing it in the model; "---" indicates that the variable was not introduced in the model.
Sex: boys = -1, girls = 1; status: rejected = 0, average = 1.
*p < .05, **p < .01, ***p < .001.

status and underestimation, which was negatively associated with aggressive behavior and its interaction with sociometric status.

To interpret the nature of the interaction, we followed Holmbeck's (2002) strategy for dichotomous moderators. We performed post-hoc tests with the ModGraph program by Jose (2008) to determine whether there were differences between the slopes of the two groups. As shown in Figure 1, more underestimation significantly predicted less aggressive behavior for rejected children, $t(192) = -2.21$, $p = .028$, but not for average children, $t(192) = 1.00$, $p = .317$.
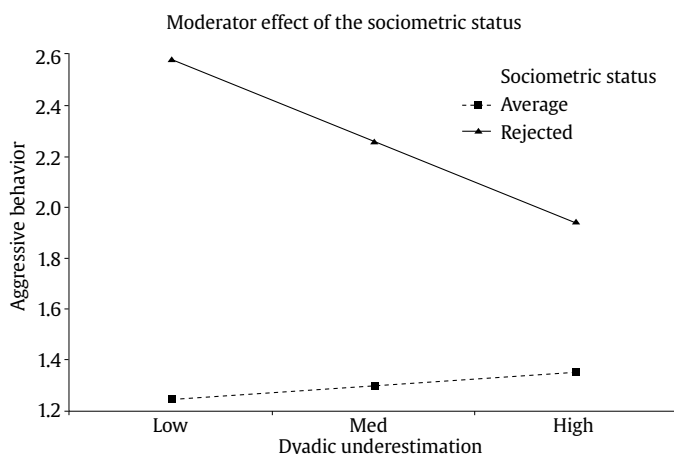
Figure 1. Interaction between Rejected Status and Dyadic Underestimation for the Prediction of Aggressive Behavior.

Discussion

Our first goal was to compare the discrepancy indices of generalized self-perceptions and dyadic meta-perceptions. The generalized approach has repeatedly proved to be valid in studies conducted with older children (e.g., Calhoun, 2011; White & Kistner, 2011). However, it was not so with our 6-year old sample: generalized bias was completely independent of self-perceived rejection and overlapped with actual received rejection. Self-perceived rejection seems to be independent of social reality measured by dislike-nominations received, as there was no difference between rejected and average children. This result may be due to the tendency in early childhood to make positive self-evaluations (Harter, 1998). Yet, this is not a sufficient explanation for our results because self-perceived peer acceptance, although high, was comparable to that of older children (e.g., McQuade et al., 2012; Orobio et

al., 2007). In fact, it is possible that self-perception of generalized acceptance/rejection is not a reflection of reality, because children at this young age lack self-awareness and coordination of perspectives (Selman, 1980). These results would confirm that the use of generalized self-perceptions at this age is not appropriate. On the contrary, dyadic meta-perceptions do provide differential information on how rejected and average children perceive their social reality, as explained below.

Dyadic Indices: Discrepancy or Bias

In line with the tendency of younger children to make positive evaluations, the percentage of expected rejection was 11%, lower than 15% and 23% reported by MacDonald and Cohen (1995) and Bellmore and Cillessen (2003) for older primary school children. This 11% is also far from the percentage of actual received rejection (25%), which indicates a high discrepancy between meta- and peer reports (Cillessen & Bellmore, 1999). The large amount of errors in the identification of rejecters is similar to that found in children from first to sixth grades (MacDonald & Cohen, 1995).

Our results suggest that bias (type of error) plays a significant role, but not magnitude (quantity of error). The dyadic indices of magnitude did not predict aggressive behaviors or differentiate between rejected and average status. The lack of effect of magnitude may be due to the heterogeneity of rejected children, with differences in children's behavior and in the intensity and chronicity of rejection, and therefore, differences in their exposure to negative feedback (Morrow et al., 2016). The results may also ensue from the fact that the three dyadic discrepancy indices are a combination of the two biases of different nature, and the mean and variance of kappa score for rejection is very low (Cillessen & Bellmore, 1999). As dyadic discrepancy indices did not explain aggressive behaviors, we then focused on the contributions of the two dyadic biases only.

Dyadic Indices and Sociometric Status

Both rejected and average groups made many mistakes in identifying their rejecters, but differed in the type of errors: rejected children underestimated more than average children, whereas average children overestimated more than rejected children. Furthermore, rejected children underestimated more than they overestimated, whereas average children overestimated and underestimated to the same degree. Thus, the many dyadic overestimations, simultaneous to underestimations, weaken the self-protective function of underestimation (Zakriski & Coie, 1996).

Rejected children are skilled perceivers of negative feedback because they are more accustomed to receiving such signals than average children (Cillessen & Bellmore, 1999; MacDonald & Cohen, 1995). However, they interact less with peers because peers dislike them and, consequently, they may have more difficulty to know their peers' perspectives (Cillessen & Bellmore, 1999). The higher overestimation by average children may occur because they are poorer perceivers of disliking than rejected children (Cillessen & Bellmore, 1999). Having less experience with rejection, average children may be more sensitive to rejection and interpret insignificant gestures of disliking as rejection (Zimmer-Gembeck et al., 2013).

Dyadic Indices and Aggressive Behavior

Once actual peer rejection was controlled, dyadic overestimation of peer rejection was no longer related to aggressive behaviors for rejected or average children. This confirms findings of previous studies on generalized overestimation of peer acceptance with older children, although such studies focused on slightly different variables (Calhoun, 2011; Guerra et al., 2004; Orobio et al., 2007; White & Kistner, 2011; Zimmer-Gembeck et al., 2013).

Average children overestimated their rejection more than rejected children. But average children are not aggressive and do not have a reputation of being aggressive among teachers. Their expected rejection (9%) represented nominations by one to three peers. Thus, their overestimation was small in absolute terms. It is possible that the origin of false negative expectations in average children is linked to circumstantial events of low intensity (i.e., conflict between friends), or to self-centered beliefs that they will also be rejected by peers whom they reject (Selman, 1980). Neither the quantity nor the source of the false expectations of average children can be interpreted as threatened egotism (Baumeister et al., 1996). Rejected children are more accurate perceivers of rejection than average children (Cillessen & Bellmore, 1999), and their overestimations of rejection did not increase the predictive power of actual rejection. Furthermore, lack of prediction of aggression for rejected children may have occurred because the rate of overestimation was not high enough, or the rate of underestimation influences the occurrence of aggressive behaviors, as seen above.

Dyadic underestimation predicted fewer aggressive behaviors, but only in the rejected group. This contrasts sharply with previous studies, in which generalized underestimation of rejection was linked positively with aggression (Zakriski & Coie, 1996; Zimmer-Gembeck et al., 2013). Our results highlight rejected children's tendency to underestimate their rejection, which is consistent with symbolic interactionism. Because they are somewhat excluded from interactions with peers, or peer attitudes of disliking may not always be overtly conveyed to rejected children (Zakriski & Coie, 1996), or because peers avoid giving them frank feedback (Brendgen et al., 2004), they have little access to negative feedback in peer context. In the absence of sufficient interaction with peers, rather than interpreting social information negatively, rejected children probably do not have the information needed to make realistic judgments about themselves and others. Therefore, they may react in one of two ways, depending on whether they are interested in interacting with peers who reject them. If they are not interested, they will continue not interacting with them and will ignore the fact that they are being rejected. If they are interested, as they are not aware of rejection, they will approach these peers with positive intentions, without being aggressive or defensive, and will not lose opportunities to interact positively with peers who initially did not like them. Such positive interactions then may change peers' point of view. Kenny and DePaulo (1993) stated that individuals' own expectations of how others see them can change the way others actually see them. This may explain the protective role of underestimation of rejecters in our results. Regarding the lack of prediction for average children, the same explanation as before about overestimation in average children may apply.

Conclusion

People do not usually express negative feedback overtly to others (Bellmore & Cillessen, 2003), which makes it more difficult to acknowledge peer rejection. Nevertheless, it appears that children at this age use this information to some extent as a basis for their dyadic judgments but not for assessment of their generalized social acceptance/rejection. Dyadic methods yield unique information for understanding the discrepancy between social reality and self-perception in 6-year olds.

At this age, when social skills are still emerging, to have a frame of reference is important. Dyadic measures provide the same reference group for students and peers, and evaluations about specific children may be easier than evaluations about the peer group in general. Generalized and dyadic agreement may require different skills that develop in a different way (Morrow et al., 2016). Generalized agreement requires that children develop their own self-appraisal based on the multiple implicit and nonconscious acceptance/rejection evaluations that take place in the peer group. Dyadic accuracy consists of identifying correctly peers that like and dislike you, based on the more explicit and deliberate feedback that each peer provides (Morrow et al., 2016). In the generalized method, what is stated for overestimation is the opposite of what is stated for underestimation because they are the two end points of a continuum. In the dyadic method, errors of overestimation and underestimation are independent of each other because each one uses a different frame of reference, one's *own* expectations of rejection (cognitive models) and rejection expressed by *others* (reality, interpersonal model), respectively.

The two separate dyadic indices allow us to better understand the social perceptions of rejected children because they echo two possible explanations of social inaccuracy (Bellmore & Cillessen, 2003). As explained by social information processing, which emphasizes the influence of cognition on reality, rejected children are accurate perceivers of rejection signals because they are more used to these signals. Then, why do they underestimate so much? Perhaps because children try to protect themselves by denying that they are disliked by some peers (Zakriski & Coie, 1996), but the dyadic overestimation found in our data show that neither rejected nor average children were reticent in their meta-perceptions of rejection. Additionally, our research confirms that rejected children nominate more peers who dislike them than average children (Bellmore & Cillessen, 2003). According to symbolic interactionism, which emphasizes the influence of social reality on self-perceptions, it is more plausible that actual rejecters do not provide rejected child with negative feedback. In turn, this ignorance makes rejected children participate more optimistically in peer interactions and prevents them from being aggressive with peers (Kenny & De Paulo, 1993). These exchanges between reality and cognition are bidirectional and simultaneous (Rudolph & Clark, 2001).

Our study is relevant for the debate about the utility of rejected children being aware of their rejecters (Calhoun, 2011; McQuade et al., 2012). The results show that if negative information is not available, rejected children will make errors. Although such underestimation should protect them, being more accurate in identifying rejecters was not associated with aggression. Consequently, our findings support interventions that promote peer interaction, since higher levels of peer interactions and participation in school context have been associated with lower levels of school violence (Crespo-Ramos, Romero-Abrio, Martínez-Ferrer & Musitu, 2017). Such interventions would give opportunities for rejected children to interact cooperatively with peers. These contexts, however,

should also facilitate the expression of positive and negative judgments in an authentic and assertive way, so that rejected children could be more aware of their rejection. Simultaneously, the school should teach social skills that would allow all students, and more especially those who are rejected, to increase their likeability.

To feel globally rejected by a group may require abilities that are different from the ability needed to be aware of being rejected by a particular peer (Bellmore & Cillessen, 2003; Morrow et al., 2016). Thus, research should refrain from extrapolating findings obtained with generalized methods to those obtained with dyadic methods, and vice versa, and from adding or subtracting biases of a different nature. The two independent positive measures of bias maintain the separate dimensions of magnitude and bias.

This study used a standard cross-sectional methodology. Even though it is an established methodology in behavioral sciences, it has limitations. Future research using longitudinal designs across elementary-school years could help to describe the development of awareness in judging one's reputation among same-sex and other-sex peers.

Conflict of Interest

Acknowledgements

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