# Young Children's Affective Responses to Acceptance and Rejection From Peers: A Computer-based Task Sensitive to Variation in Temperamental Shyness and Gender

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## Abstract

*This study presents a novel task examining young children's affective responses to evaluative feedback—specifically, social acceptance and rejection—from peers. We aimed to determine (1) whether young children report their affective responses to hypothetical peer evaluation predictably and consistently, and (2) whether young children's responses to peer evaluation vary as a function of temperamental shyness and gender. Four- to seven-year-old children (N = 48) sorted pictures of unknown, similar-aged children into those with whom they wished or did not wish to play. Computerized peer evaluation later noted whether the pictured children were interested in a future playdate with participants. Participants then rated their affective responses to each acceptance or rejection event. Children were happy when accepted by children with whom they wanted to play, and disappointed when these children rejected them. Highly shy boys showed a wider range of responses to acceptance and rejection based on initial social interest, and may be particularly sensitive to both positive and negative evaluation. Overall, the playdate task captures individual differences in affective responses to evaluative peer feedback and is potentially amenable to future applications in research with young children, including pairings with psychophysiological measures.*

*Keywords*: peer evaluation; temperamental shyness; gender differences

## Introduction

Early to middle childhood involves an expansion of children's social environments as peer interactions become more frequent and salient (Rimm-Kaufman & Pianta,

2000). Relative to earlier in development, when children enter school, peers assume a more central role in shaping immediate social experiences and overall socioemotional development (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). For some children, novel and unpredictable peer interactions may be distressing and challenging to navigate (Sanson, Hemphill, & Smart, 2004), particularly if they have difficulty interpreting and responding to evaluation from peers.

One important influence on how children respond to peer evaluation is temperament. In particular, temperamentally shy children tend to blame themselves for negative interactions with unfamiliar peers (Burgess, Wojslawowicz, Rubin, Rose-Krasnor, & Booth-LaForce, 2006) and may come to expect rejection. Further, a child's gender may moderate his or her responses to peer evaluation. For example, although females are often more sensitive to social cues than males (McClure, 2000), young girls also show greater suppression of their emotions, particularly when disappointed, in socially charged contexts (Cole, Zahn-Waxler, & Smith, 1994; Saarni, 1984). By contrast, although males face greater pressure to suppress their emotions in social contexts, young boys often have difficulty controlling negative affect, which may elicit negative evaluations from peers (Coplan, Prakash, O'Neil, & Armer, 2004). Both temperament and gender are, thus, important contributors to children's ability to interpret and respond to peer evaluation appropriately.

Traditional measures of children's responses to peer feedback often involve complex procedures that require large samples of children to provide sociometric ratings and self-reports, or involve intensive observation and coding of children's behavior in classroom or laboratory settings (Burgess et al., 2006; Dodge et al., 2003; Gazelle & Druhen, 2009). Although these methodologies have high ecological validity and yield high participation rates, their complexity and cost may limit their application to multimethod, multilevel examinations of children's responses to peer feedback. Translation into effective early interventions for children with socioemotional difficulties may also be difficult (Smith, Simon, & Bramlett, 2009).

For the current study, we developed a computer-based peer feedback task to add to the field's existing experimental repertoire. Much of the work to date using similar paradigms is limited to samples of adolescents or young adults (e.g., Guyer et al., 2008; Guyer, McClure-Tone, Shiffrin, Pine, & Nelson, 2009). Thus, we examined individual differences in young children's affective responses to peer evaluation using a novel, developmentally appropriate task, which is also amenable to pairing with additional sources and levels of measurement, such as psychophysiological responses and observations of prior social experiences.

*Importance of Peer Relationships and Peer Feedback*

Social information-processing models suggest that the ways in which children perceive, interpret, and respond to peer feedback have significant implications for social adjustment (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). Children's social behavior becomes reinforced over time as they learn the cues, responses, and attitudes that elicit approval from peers. As early as kindergarten, positive peer relationships relate to socioemotional adjustment and overall happiness with school (Ladd, Kochenderfer, & Coleman, 1996). Children who successfully interact with peers also tend to accurately understand their own and others' emotions (Denham et al., 2003). These children appropriately interpret and respond to peer feedback, demonstrate higher social competence, and ultimately experience more successful peer interactions.

Conversely, children who misinterpret and respond to peer feedback inappropriately may be at risk for social maladjustment and rejection by peers. For example, children who misinterpret peers' intentions as hostile or rejecting may respond aggressively or become withdrawn, reactions that increase children's risk for future rejection (e.g., Trentacosta & Fine, 2010). Additionally, misinterpretation of, or inappropriate responses to, social cues is often symptomatic of a range of social and developmental risk, including maltreatment (Lee & Hoaken, 2007), developmental disabilities (Meyer, Mundy, Van Hecke, & Durocher, 2006), mood disorders (Guyer et al., 2007), and social anxiety (McClure & Nowicki, 2001).

For young children, a bid for social interaction or an invitation to play may be a particularly meaningful sign of acceptance. Rejection by peers, on the other hand, is typically a stressful and negative experience for children. Children who are rejected and/or receive very few or no bids for social interaction are likely to experience negative affect and behave in maladaptive ways (Nesdale & Lambert, 2007). The impact of peer rejection is of particular interest because children who are rejected report more loneliness, and face risk for victimization and internalizing problems (Asher, Parkhurst, Hymel, & Williams, 1990; Boivin, Hymel, & Bukowski, 1995; Hodges & Perry, 1999).

Clearly, children's sensitivity to peer feedback is an important contributor to their social development. Children who are highly sensitive to rejection or who have attribution biases are likely to have extreme reactions to both actual and perceived experiences of rejection, and may come to expect peer rejection, act out, or experience loneliness, anxiety, and social withdrawal (London, Downey, Bonica, & Paltin, 2007; Prinstein, Cheah, & Guyer, 2005). Children differ in both the type of peer feedback they receive and in their sensitivity to different types of feedback. These individual differences may moderate the impact of negative peer feedback on adjustment.

### Temperamental Shyness and Peer Relationships

Temperament, a biologically based predisposition toward specific patterns of behavioral and emotional reactivity to environmental stimuli, plays an important role in modulating children's response to peer feedback. Temperament-linked differences appear early in life and are somewhat stable into adolescence, although subject to environmental and experiential influences (Kagan, 1998). Temperamental shyness, in particular, is often associated with behavioral inhibition, and is marked by heightened reactivity to novelty and social encounters (Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Kagan, 2008; Rubin, Coplan, & Bowker, 2009).

Children with extreme temperamental shyness often have difficulty with peers. Very shy children initiate fewer interactions with peers than less shy children, particularly when peers are unfamiliar (Asendorpf & Meier, 1993; Rubin et al., 2009). In Western cultures, children who are very shy and reticent in social situations are less likely to receive positive feedback from peers and more likely to experience peer rejection (Chen, DeSouza, Chen, & Wang, 2006; Rimm-Kaufman & Kagan, 2005). Peer rejection also occurs earlier for shy compared with outgoing children, perpetuating further peer rejection following school entry (Gazelle & Ladd, 2003).

Temperamental traits affect not only the formation and quality of peer relationships (Eisenberg, Vaughan, & Hofer, 2009), but may also influence the ways in which children respond to peers' social bids (Rubin, Burgess, & Coplan, 2004). Because

temperamental traits are early appearing, they likely shape social behavior and functioning as they first emerge. These patterns, in turn, may bias developmental trajectories into adolescence if they become inflexible to evolving environmental or social input. Such inflexibility to ever-changing social input may also heighten rejection sensitivity. Thus, for some children, high levels of temperamental shyness *early* in life may signal vulnerability to later social maladaptation.

### Gender and Peer Relationships

As noted above, one's gender importantly shapes peer relationships and social behavior from an early age (Fabes, Martin, & Hanish, 2003). Young children frequently choose same-gender playmates, and interaction styles differ notably between genders. The notion of homophily may partially drive this selection pattern, as children's peer preferences often reflect personal characteristics that are similar to their own, such as gender and age (Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006). Gender-based differences also emerge as young girls' peer interactions often center on emotional connectedness and prosocial exchanges (Rose & Rudolph, 2006). Young boys, on the other hand, tend to show less proficiency in regulating their social behavior (Kochanska, Coy, & Murray, 2001; Matthews, Ponitz, & Morrison, 2009), and often engage in competition and physical play with peers (Rose & Rudolph).

As such, young boys and girls respond differently to experiences of social acceptance and rejection. Boys who are rejected by peers are likely to feel anxious and expect future rejection whereas girls who experience similar rejection are less likely to report these negative emotions and expectations (London et al., 2007). In addition, the effect of shyness on social behavior may be worse in boys than girls. For example, shy or withdrawn boys are more likely to be excluded by peers than are shy or withdrawn girls (Coplan et al., 2004). It is, thus, important to consider how multiple relevant individual characteristics, including gender and temperament, operate together in shaping negative outcomes when children are rejected by peers.

### Laboratory Studies of Peer Relationships

A range of empirical strategies have assessed variations in peer relationships and the impact that these variations may have on subsequent functioning. These include sociometric ratings, self-reports, and observed behavior in the laboratory and in naturalistic settings (Burgess et al., 2006; Dodge et al., 2003; Gazelle & Druhen, 2009). Recently, laboratory-based studies relying on simulated social evaluation have emerged as a new avenue of study.

In the adolescent literature, researchers have used a simulated 'chat room' task to examine behavioral and neural responses to peer feedback (e.g., Guyer et al., 2008, 2009). In one variant of this task, typically developing adolescents rated photos of unfamiliar teens based on their interest in later chatting online with each teen, and then reflected on what each teen would think of them (Guyer et al., 2009). Adolescents showed the expected preference for wanting to interact more with same- than opposite-gender peers. However, when appraising how peers would evaluate them, girls showed increased neural sensitivity relative to boys, which may indicate a stronger physiological regulatory response elicited when managing emotional responses to potential peer evaluation.

Other work using this task examined individual differences in social anxiety (Guyer et al., 2008), an outcome often predicted by temperamental shyness in early childhood (Chronis-Tuscano et al., 2009). Compared with non-anxious adolescents, socially anxious adolescents expected to receive more negative feedback from other teens (Guyer et al., 2008). With regard to neural responses, socially anxious vs. healthy adolescents showed hyperactivation in regions associated with social threat detection (amygdala; Guyer et al., 2008). Healthy adolescents with a history of behavioral inhibition (Guyer, Nelson, Pérez-Edgar, Pine, & Fox, 2011), a temperamental trait marked by extreme shyness, parallel the behavioral and neural findings noted in adolescents with clinical levels of social anxiety (Guyer et al., 2008).

Thus, 'chat room' tasks appear to reliably evoke salient responses to peer feedback, even in a laboratory setting. Together, results from these chat room studies indicate specific behavioral and neural responses to social evaluation among adolescents impacted by social anxiety, temperament, and gender. Given that these sensitivities appear relatively early in development, paradigms designed to evaluate these variations in young children are warranted.

*Present Study*

We employed a 'playdate' task to examine young children's emotional responses to experimentally controlled peer acceptance and rejection bids to address the following questions:

(1) Do young children report their affective responses to hypothetical acceptance and rejection in a predictable and consistent manner on the playdate task?
(2) Do young children's responses to acceptance and rejection vary as a function of temperamental shyness and gender?

Based on past literature, we expected that children rated higher on temperamental shyness would report more distress (sadness) than happiness when rejected by peers relative to children rated less shy. We hypothesized that girls would report less sadness after peer rejection due to their tendency to regulate disappointment in front of research assistants (Cole et al., 1994). We expected to replicate findings indicating that rejected boys report more negative affective responses than rejected girls (London et al., 2007). Last, we expected that both boys and girls would prefer same-gender to opposite-gender playmates, as noted in past work (Guyer et al., 2009).

**Method**

*Participants*

We recruited 57 children (32 male) from the ages of four to seven years ($M = 5.54$, $SD = .63$) from the area immediately surrounding George Mason University. The surrounding county has approximately 1.1 million residents, a median household income of \$105 416, and is 62.7 percent White, non-Hispanic (US Census Bureau, 2012). Participants were recruited via Experian Marketing Solutions (Schaumburg, IL), a company with access to large databases of children's names, addresses, and birthdates within the USA. We obtained contact information for households in zip codes surrounding the university with children in our targeted age range. Initial inclusion criteria were healthy gestational age (within two weeks of due date) and birth

**Table 1. Means and Standard Deviations (in Parentheses) of the Characteristics for the Complete Included and Excluded Samples, and Separately by Participant Sex and Shyness**

| | | Boys* | | Girls | |
|---|---|---|---|---|---|
| | | Shy | Non-shy | Shy | Non-shy |
| Included participants | | | | | |
| Age | 5.58 (0.61) | 5.70 (0.48) | 5.56 (0.81) | 5.50 (0.52) | 5.56 (0.53) |
| CCTI shyness | 2.29 (1.16) | 3.22 (0.90) | 1.48 (0.20) | 3.38 (0.96) | 1.24 (0.33) |
| N | 48 | 10 | 16 | 12 | 9 |
| Excluded participants | | | | | |
| Age | 5.33 (0.71) | 5.33 (0.58) | 5.50 (0.71) | 5.50 (0.71) | 5.00 (1.41) |
| CCTI shyness | 2.89 (1.54) | 4.33 (0.31) | 1.30 (0.42) | 3.90 (0.14) | 1.30 (0.42) |
| N | 9 | 3 | 2 | 2 | 2 |

*Note*. * Shyness data were missing for one included male participant. CCTI = Colorado Child Temperament Inventory.

weight (> 2500 g), and absence of serious illness or developmental delays. Parents identified the majority of children as White, non-Hispanic (73.7 percent), and the remaining children were identified as Asian/Pacific Islander (12.3 percent), African-American (3.5 percent), and Hispanic (10.5 percent).

The university's institutional review board approved this study. Families were monetarily compensated for their time and effort. Each family provided written informed consent, and children gave oral assent before starting study procedures.

Of the children who visited the laboratory, nine were excluded from analyses due to refusal to participate, fatigue from the study visit, or disinterest. All children were recruited for a larger study of socioemotional functioning with a fairly long experimental protocol (approximately two hours) involving multiple tasks presented in a semi-random order. Due to the testing session length, children could decline completing specific tasks.

The final sample consisted of 48 children (27 male; 70.8 percent White). Age, shyness scores, and gender are presented in Table 1 for included and excluded participants. There were no significant group differences, $ts < 1.34$, $ps > .19$.

*Playdate Task*

After children and their parents were greeted and consent for participation was obtained, the children were seated at a table in a developmentally appropriate testing room and were told that other children all over the country were taking part in a study examining how children choose friends. The children were then told that they would be shown pictures of other similar-aged children and could select children with whom they would like to one day have a playdate.

*Selections of Peers*. Participants were shown 52, 6 cm by 9 cm laminated cards of color photographs of similar-aged diverse children (75 percent White, 15.4 percent African-American, 9.6 percent Asian; 50 percent male) depicting happy, smiling
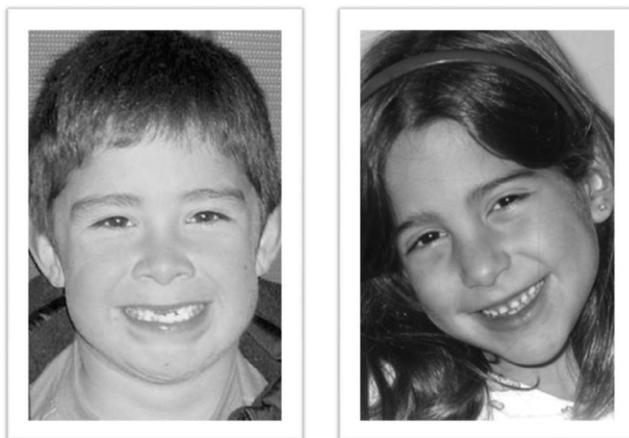
*Figure 1.* Examples of Photographs Presented to the Study Participants for Sorting in the Playdate Task.

expressions. Open-source pictures of young children available from the Internet were selected by the study's principal investigator and several graduate research assistants on the basis of being within the participants' age range and depicting a friendly, welcoming expression to reflect children that participants might encounter in their typical social environments (Figure 1).

Before sorting the pictures, the research assistant placed two 36 cm by 55 cm poster boards in front of the participant. Each board was divided into 26, 6 cm by 9 cm rectangles, with green rectangles on one and red rectangles on the other. Participants were asked to indicate which pictured children they wished to play with by placing those pictures in the green rectangles (interested), and which children they did not wish to play with by placing those pictures in the red rectangles (not interested). Participants were given five cards at a time and were allowed to move pictures across the posters. Due to our concern that free sorting could skew the number of trials per condition across participants, children were required to designate half of the pictures as interested and half as not interested. Sorting typically lasted 10 minutes.

*Delivery of Peer Feedback.* Following the sorting procedure, a research assistant took the participant's picture with a digital camera. The participant was told that his or her picture would be emailed to the other children, and that they would later 'find out if the children you saw want to play with you'.

Children then completed a series of tasks as part of the larger study. During this time, a research assistant noted which pictures were categorized as interested or not interested, and entered each picture's designation into the software program E-Prime (1.0, Psychological Software Tools Inc., Sharpsburg, PA). E-Prime was then used to assign interested and not interested pictures an equal number of acceptance and rejection feedback trials.

Approximately one hour after the initial sorting session, children were placed 40 cm in front of a 16-in. computer monitor. Participants were reminded of the earlier sorting procedure. They were then told that the pictured children had also made their playdate choices and that the computer would show whether each pictured child had selected the participant.

Trials began with a fixation cross at the center of the screen. The research assistant advanced the trial by a keyboard press once the child was focused on the screen. Each fixation was followed by a 10 cm by 15 cm picture of a previously sorted child for 2000 ms. The participant's sorting decision was noted by the background color of the computer screen: if the participant was interested in the pictured child, the background was green, and if the participant was not interested, it was red. The research assistant also verbally reminded the participant of their choices, saying 'You wanted (or did not want) to play with this child'. The background color then reflected the pictured child's 'choice' for 200 ms. If the pictured child accepted the participant, the background was green. If the pictured child rejected the participant, the background was red. The research assistant also told the participant of the pictured child's decision with the statement 'This child did (or did not) want to play with you'.

The task was programmed to counterbalance the participant's sorting of the pictures with the simulated social feedback to ensure equal numbers of trials within each of four conditions: acceptance from children with whom they wished to play (interested/accepted; marked as green/green), rejection from children with whom they wished to play (interested/rejected; green/red), acceptance from children with whom they did not wish to play (not interested/accepted; red/green), and rejection from children with whom they did not wish to play (not interested/rejected; red/red).

*Affective Response to Peer Feedback.* After each trial, participants were asked to answer the question 'How do you feel?' in response to the feedback on a 5-point scale using a five-button response box. Above the leftmost button (1) was a schematic yellow smiling face, indicating 'very happy'. The rightmost button (5) had a schematic yellow frowning face, indicating 'very sad'. The middle button (3) had a schematic yellow face with a straight line for the mouth to represent 'neither happy nor sad'. The fixation cross reappeared once the participant made a rating or 2000 ms elapsed, whichever came first. However, the participants were given an indefinite amount of time to make their ratings.

The peer evaluation phase typically lasted 20 minutes. When this task was done, participants were debriefed and told that, in fact, there were no other children involved in the study. None of the children reported distress in response to this disclosure.

### Parental Reports of Shyness

Parents completed the Colorado Child Temperament Inventory (Buss & Plomin, 1984; Rowe & Plomin, 1977) when recruited. On this 30-item measure, mothers rated their children with a 5-point Likert scale on six factors pertaining to different dimensions of child temperament: emotionality, activity, attentional control, soothability, shyness, and sociability. Our focus is on shyness, as this measure has been related to children's social behavior (Hane, Cheah, Rubin, & Fox, 2008). The shyness subscale ($\alpha = .92$) is composed of five items, such as 'Child tends to be shy' and 'Child is very sociable' (reverse-scored), that cross contexts.

The participants displayed a wide range of shyness scores (range: 1.00–4.80). We created two groups based on a median split of shyness scores: low shyness and high shyness (see Table 1). There were no differences in shyness score or group designation based on gender ($ps > .30$).

Previous large-scale studies of temperament (Fox et al., 2005) have found that children in the top 20 percent of the Colorado Child Temperament Inventory shyness

distribution tend to have scores greater than 3.10. The lowest 20 percent have scores less than 1.70. We, therefore, supplemented the full-sample analysis noted below with an analysis involving only the children meeting the extreme groups cutoffs ($n_{low\ shy}$ = 17, $M$ = 1.31, $SD$ = .24; $n_{high\ shy}$ = 13, $M$ = 3.92, $SD$ = .47). The central interaction noted below was still significant, $F(1, 26)$ = 9.24, $p$ < .001, $d$ = 1.19. To maximize sample size, we present the data from the larger, median split groups.

## Results

### *Selections of Peers*

We examined the participant's sorting choices for selection biases. We focused on the participant's gender vs. the pictured child's gender, employing a $2 \times 2 \times 2$ mixed measures analysis of variance. The number of pictured children of each gender designated as interested served as the within-subjects variable. Participant gender and shyness group were between-subjects variables. Participant age was included as an initial covariate in an analysis of covariance, but was then removed as there were no significant effects involving age and the main findings did not change.

Male participants, on average, placed more boy pictures in the interested group ($M$ = 17.21) than girl pictures ($M$ = 8.73). Female participants showed the reverse pattern ($M$ = 9.32 vs. 16.72), leading to a significant interaction effect, $F(1, 47)$ = 25.77, $p$ < .001, $d$ = 1.48. There were no significant effects involving shyness ($ps$ > .17).

### *Response to Peer Feedback*

The main analyses focused on the participant's affective responses to feedback from the pictured children. We ran a split-plot analysis of variance with a $2 \times 2 \times 2$ within-subjects and a $2 \times 2$ between-subjects model. Within-subjects factors included participant's sorting decision (interested vs. not interested), peer feedback type (accepted vs. rejected), and the pictured child's gender (male vs. female). Between-subjects factors were the participant's gender (male vs. female) and the level of shyness (low vs. high). Again, age was included as an initial covariate, and then removed due to a lack of significant effects.

We found a strong interaction effect between the participant's initial sorting of peers and type of peer feedback for affective responses to feedback, $F(1, 47)$ = 36.72, $p$ < .001, $d$ = 1.77 (Figure 2). Participants were relatively pleased when receiving positive feedback (accepted) from a child with whom they wished to play (interested/accepted; $M_{rating}$ = 1.36) and disappointed when the interest was not reciprocated (interested/rejected; $M_{rating}$ = 3.93). However, when participants did not wish to play with the pictured child (not interested), the affective response to acceptance and rejection was relatively muted (not interested/accepted vs. not interested/rejected; $M_{rating}$ = 2.29 vs. 3.14).

Two main findings of interest emerged from the analyses of between-subjects effects on affective response to feedback. Firstly, participants' responses to feedback varied with the gender of the participant, the gender of the pictured child, and the valence of the feedback, $F(1, 43)$ = 6.33, $p$ = .02, $d$ = .77. Follow-up analyses found that male participants were happier when accepted by boys than girls ($M_{rating}$ = 1.89 vs. 2.13), and unhappier when rejected by boys than girls ($M_{rating}$ = 3.52 vs. 3.18), $F(1, 24)$ = 6.75, $p$ = .02, $d$ = 1.06. The equivalent analysis in the female participants was not significant, $F(1, 19)$ = .82, $p$ = .38, $d$ = .42. The effects of initial sorting preferences were not significant.
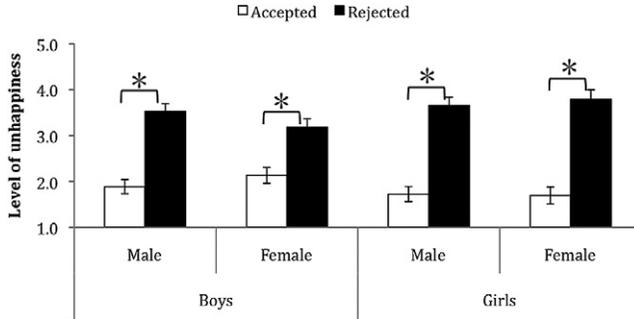
*Figure 2.* Ratings of Unhappiness in Response to Peer Acceptance or Rejection During the Playdate Task.
*Notes.* Data are presented separately for boy and girl participants as they responded to male and female potential (pictured) peers. Error bars represent standard errors of the mean. * $p < .05$.
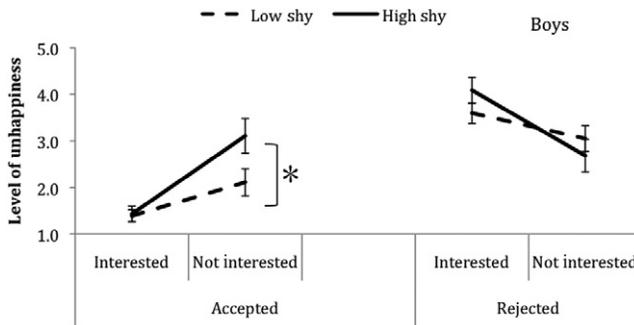


*Figure 3.* Ratings of Unhappiness Presented Separately for High-shy and Low-shy Boys as a Function of Their Peer Classifications (Interested/Not Interested) and Peer Feedback (Accept/Reject).
*Notes.* Error bars represent standard errors of the mean. The classification-by-feedback interaction ($p < .001$) and the three-way interaction with shyness ($p = .03$) were significant. High-shy boys were unhappier than low-shy boys when accepted by peers with whom they were not interested (* $p < .05$).

Secondly, there was a three-way interaction among shyness group, the gender of the participant, and the valence of the feedback, $F(1, 43) = 6.61, p = .01, d = .78$ (Figure 3). Follow-up analyses showed that among male participants, the two-way interaction between shyness and social feedback was significant, $F(1, 24) = 5.05, p = .03, d = .92$. In particular, high-shy boys were more upset, relative to low-shy boys, when accepted by children with whom they were not interested in playing (not interested/accepted; $M_{rating} = 3.11$ vs. 2.11). The high- and low-shy boys had similar responses when accepted by children with whom they were interested (interested/accepted; $M_{rating} = 1.43$ vs. 1.39). When rejected by the pictured children, high-shy boys were more unhappy than low-shy boys if interested (interested/rejected; $M_{rating} = 4.09$ vs. 3.60) and happier if not interested (not interested/rejected; $M_{rating} = 2.68$ vs. 3.05). The equivalent
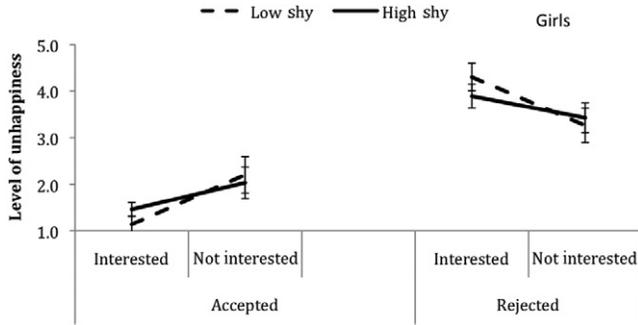
*Figure 4*. Ratings of Unhappiness Presented Separately for High-shy and Low-shy Girls as a Function of Their Peer Classifications (Interested/Not Interested) and Peer Feedback (Accept/Reject).
*Notes*. Error bars represent standard errors of the mean. The classification-by-feedback interaction was significant ($p < .001$); all other effects were non-significant.

interaction was not significant in female participants, $F(1, 19) = .72$, $p = .41$, $d = .39$ (Figure 4).

## Discussion

The first purpose of the present study was to assess a developmentally appropriate computer-based peer evaluation task in which young children report affective responses to peer acceptance and rejection. Our results are encouraging. The children in our sample (as young as four) appeared to understand the task and rules for reporting how they felt about acceptance and rejection from peers. Within the selection phase of the task, the children sorted the cards as we expected: boys were more likely to select boys for a future playdate whereas girls were more likely to select girls. This is consistent with the well-established finding that young children consistently prefer same-gender playmates (Maccoby, 1998) and the concept of homophily (Rubin et al., 2006).

When reporting on their feelings about being accepted and rejected, the children understood the subtleties of our 5-point rating system of extreme happiness to extreme sadness. The children did not simply respond with the buttons corresponding to the affective extremes, but provided nuanced responses across all five options that varied according to their level of shyness, their gender, the gender of the pictured child, and whether the pictured child accepted or rejected them. Overall, the children took their own sorting preferences into account when responding to the feedback they received from peers. Children were happier when accepted by children with whom they wanted to play, and unhappier when rejected by children with whom they wanted to play. When the participants were accepted *or* rejected by children with whom they did not want to play, their affective responses tended to fall in the neutral range. Thus, this is an appropriate and sensitive task for use with young children.

The second purpose of the present study was to determine whether children's emotional sensitivity to peer acceptance and rejection varied as a function of temperamental shyness and gender. Here, our findings centered on responses among boys. Compared with non-shy boys, shy boys reported higher levels of sadness when a child with whom they wanted to play rejected them. This heightened emotional response in the context of a social situation is consistent with prior work showing that boys high vs.

low in negative reactivity (a temperamental factor often associated with shyness) in infancy were more likely to exhibit social wariness at the age of four (Henderson, Fox, & Rubin, 2001). Shy boys also tend to experience more peer rejection than shy girls (Coplan et al., 2004). Boys who are shy may be particularly sensitive to feedback from peers and appear to experience negative affective responses to rejection.

Shy boys also reported lower levels of sadness than non-shy boys when a child with whom they did not want to play rejected them. Thus, shy boys appeared to take their initial preferences into account when responding to peer rejection, allowing these preferences to moderate their emotional responses. Indeed, shy boys also reported *higher* levels of sadness than non-shy boys when children with whom they were not interested in playing accepted them. This pattern may reflect the difficulty these boys have with socially awkward situations marked by a mismatch in social desirability. This response is also consistent with the idea that shy children may wish to avoid social interactions, particularly with unfamiliar peers (Rubin et al., 2004). In this situation, the boys may have felt distress at the prospect of having a playdate with unfamiliar peers with whom they did not wish to play.

The pattern of results across the genders may, in part, be due to the socialization children receive. Parents of girls are more likely to focus on emotions that promote social connectedness (Brody, 2001). Previous work in lab settings suggests that, compared with boys, girls are more skilled at regulating negative emotions in the presence of unfamiliar researchers (Cole et al., 1994; Saarni, 1984). Girls may be particularly mindful of and skilled at moderating emotions that threaten social harmony. When confronted with disappointment in a research setting, girls are more likely to display self-monitoring behaviors that indicate an effortful regulation of disappointment whereas boys are more likely to openly display their disappointment (Davis, 1995). However, it is also possible that our small sample size prevented us from finding significant results for heightened emotional responses in girls.

Boys with extreme shyness may be at a social disadvantage and less equipped to deal with negative social feedback that may elicit anxiety. Boys who do not conform to socialization pressures to display powerful and assertive emotions may have particular difficulty when their emotions and behavior are outside the realm of social acceptability (Brody, 2001). In the short time from preschool to school entry, the frequency of boys' expressions of sadness and anxiety decreases by half, likely due to intensified pressure to fit into traditional gender roles (Chaplin, Cole, & Zahn-Waxler, 2005). For example, seven-year-old boys who are socially reticent and withdrawn are less accepted by, and perceive themselves to be less physically and cognitively competent than, their peers (Nelson, Rubin, & Fox, 2005). Further, shy boys who have experienced exclusion by peers tend to become more upset by experimentally manipulated peer rejection (Gazelle & Druhen, 2009).

## Limitations and Future Directions

Several issues should be considered when interpreting the findings from the present study. Firstly, our sample size was fairly small and primarily White, non-Hispanic, which may limit generalizability of our findings across populations. Nonetheless, findings were consistent with our empirically derived hypotheses and parallel behavioral findings from the adolescent chat room task using similar sample sizes (Guyer et al., 2008, 2009, 2011), giving us confidence in the integrity of our results and conclusions. Secondly, we did not collect data on participants' school experiences.

Experience interacting with and responding to feedback from a variety of peers in a school setting likely influences how children affectively respond to feedback. This may be an important consideration in future work with this task.

We recognize that a drawback of the greater experimental control provided by our task is reduced ecological validity, particularly in comparison to more traditional measures of peers' bids for interaction. In this study, children chose playmates based on pictures of unfamiliar peers. This is a contrived situation, and children are not likely to choose friends in this way in their everyday lives. Future work with the playdate task could manipulate familiarity by using pictures of familiar rather than unknown peers. As seen in our results, however, rejection from a desired playmate can elicit distress even when the rejecting child is an unknown peer.

Finally, we focused solely on the self-reported emotional reactions of young children. Future incorporation of an observational index of children's emotional responses and associated regulation of such responses to corroborate self-reports would strengthen the findings, as would self-reports and parent reports of children's rejection sensitivity.

Despite these limitations, the playdate task may expand laboratory avenues for examining social processes in young children. Past sociometric protocols for studying children's responses to peer social bids and feedback are not as amenable for assessing neural or psychophysiological correlates of peer feedback, although recent work is encouraging (Gazelle & Druhen, 2009). This is particularly important as work with adolescents has paired magnetic resonance imaging and eye tracking with ecologically relevant computer-based tasks that simulate experiences of peer evaluation. Findings from this neuroscience-based research indicate that youths' behavioral responses to peer feedback and social exclusion correlate with meaningful differences in neural responses to anticipated and experienced social evaluation (e.g., Guyer et al., 2008, 2009). As young children often have difficulty with aspects of the magnetic resonance imaging environment (Byars et al., 2002), experimentally based tasks that can be administered while also collecting psychophysiological measurements (e.g., event-related potentials, heart rate, eye movements, and pupil dilation) can advance our ability to examine affective, behavioral, and physiological response patterns to equivalent social experiences earlier in development and at salient transitions in social development.

The ease with which the playdate task may be administered and the minimal motoric response requirements make it ideal for pairing with electroencephalogram and event-related potentials in future work. Recent work has found strong evidence for linkages between specific event-related potential components (e.g., N2 and late positive potential) and socioemotional processing in young children (Dennis, 2010). Event-related potential measures, in turn, have been linked to specific neural regions of interest amenable to study with magnetic resonance imaging (McPartland et al., 2011). Thus, the playdate task may allow researchers to bridge the gap between neuroimaging data on peer evaluation in adolescence (Guyer et al., 2008, 2009, 2011) and behavioral data focused on young children.

The flexibility and relative simplicity of the playdate task also lends its use to a wide range of populations of interest. For example, recent work has focused on the difficulties with social interactions evident in maltreated (Kim & Cicchetti, 2010) and aggressive children (Crick, Ostrov, & Werner, 2006). This task may provide additional behavioral and psychophysiological insight into each group's response to positive and negative peer feedback. In addition, the task's clear structure may make it particularly amenable for use with children with developmental delays or autism (Guralnick, 2010; Magyar, 2011). Finally, this task has potential translational applications. For example,

the task could be used in social skills training efforts designed to assist children in appropriately interpreting interactions with peers. Ultimately, we believe this first study with the playdate task has shown it to be a valuable and easy-to-implement new tool to measure young children's responses to social feedback in a reliable and sensitive manner utilizing a relatively straightforward procedure.

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