Children's social perceptions and metaperceptions during an initial interaction with an unfamiliar peer

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Background. Interacting with an unfamiliar social partner is a critical first step in forming a relationship (Hinde & Stevenson-Hinde, 1987). During these initial interactions, individuals tend to be more positive than negative in their impressions of others (i.e., social perception *positivity bias*) and tend to think others view them more positively than negatively (i.e., social metaperception *positivity bias*) (Sears, 1983). Interestingly, though, both children and adults show a "*liking gap*" where they tend to report liking their social partner more than they think their social partner likes them (Boothby et al., 2018; Wolf et al., 2021). However, research on the "*liking gap*" in children has mostly used structured tasks such as teamwork activities (e.g., tower-building tasks) to scaffold the interaction (Wolf et al., 2021) as opposed to unstructured tasks such as conversations that are more challenging but more ecologically valid. Further, adults can, in fact, accurately detect the impressions they make on unfamiliar others after a short interaction (i.e., *metaperception accuracy*) (Carlson & Furr, 2009; Tissera et al., 2023). The goal of the current study was to bring this literature together to examine *positivity bias*, the *liking gap*, and *metaperception accuracy* in children following a brief, unstructured (socially challenging) initial interaction with a previously unfamiliar peer.

Research Aims. Following a five-minute, online, unstructured interaction with a previously unfamiliar peer, I examined a) whether children rate themselves and others more positively than negatively (i.e., *positivity bias*), b) whether children rate their social partner more positively (and less negatively) than they believe their partner rates them (i.e., *liking gap*), and c) whether children are accurate in identifying what others think of them (i.e., *metaperception accuracy*).

Methods. Age- and gender-matched unfamiliar dyads ($N = 182$, 91 dyads, $M_{age} = 11.50$, 79 males) were observed during a five-minute unstructured conversation where children were

instructed to 'get to know each other' (Usher et al., 2015). Positive and negative social perceptions (e.g., "How happy is [name of partner]?") and metaperceptions (e.g., "How happy does [name of partner] think you are?") were assessed with the Perceptions and Metaperceptions Questionnaire (Usher et al., 2018). Means were summed for positive-trait and negative-trait social perceptions, as well as for positive-trait and negative-trait social metaperceptions.

Results. Children gave higher positive than negative trait scores when rating both their social partner and what they thought their social partner rated them (i.e., *positivity bias*). However, the positivity bias was enhanced when children rated their partner versus when they rated their expectations of how their partner viewed them. When analyzing the data dyadically, results also supported the presence of a *liking gap* where children believed their social partner was rating them more negatively (and less positively) (i.e., social metaperception) than they rated their social partner (i.e., social perception). Interestingly, children were not accurate in identifying how they were being perceived by their social partner for positive or negative traits and tended to underestimate how positively they were a*ctually* viewed by their interaction partner. Instead, children's metaperceptions (how they believed their partner viewed them) were associated with their *own* perceptions of their peer.

Conclusion and Implications. Together, these results partially replicate past findings with adults and extend past findings with children (from structured laboratory tasks) to less structured, more socially challenging contexts that better mirror real-world contexts in which friendships develop. These results suggest that children's initial perceptions, metaperceptions, and their accuracy are more a function of the individual than a function of the dyadic interaction. This research lays the groundwork for future studies examining within-child and interpersonal factors that impact the likelihood of relationship development in late childhood.

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Introduction

The ability to establish and maintain social connections is vital for healthy social-emotional development and is particularly important as children transition to adolescence (Berkman & Glass, 2000; Bagwell & Bukowski, 2018). During this transition, adolescents become more susceptible to peer influence (Steinberg & Monahan, 2007), and those who can consider others' perspectives are more socially adept in their day-to-day social interactions (Fett et al., 2014). Interacting with an unfamiliar social partner is a critical first step in establishing social connections and fostering friendships (Hinde & Stevenson-Hinde, 1987). The entire time individuals are interacting, they form impressions, both positive and negative, of their social partners (i.e., social perceptions), and they form ideas about what their social partners are thinking of them for both positive and negative traits (i.e., social metaperceptions; Hall & Andrzejewski, 2008). These initial impressions, and the accuracy with which one predicts how they are viewed by a partner, may be critical socio-cognitive mechanisms that support relationship development. Despite the importance of peer relationships in late childhood, little research has investigated children's social perceptions (i.e., what one thinks of their partner) and metaperceptions (i.e., what one thinks their partner thinks of them) in unstructured interactions with previously unfamiliar peers.

The majority of work on social perceptions, metaperceptions, and metaperception accuracy has been conducted with adults (Boothby et al., 2018; Elsaadawy & Carlson, 2022a; Elsaadawy & Carlson, 2022b; Carlson, 2016; Tissera et al., 2023). Of the limited developmental literature, the majority of it asks children to evaluate themselves and their *familiar* peers/classmates in terms of general abilities and dispositions (e.g., "Who do you like the most?", "Who is the best at reading?", "Who is the most popular?") (Bellmore & Cillessen,

2003; Malloy et al., 2007) as opposed to specific personality traits. Additionally, most of this work has been done in the form of peer nominations rather than in the context of dynamic, real-time interactions. Of interest in the current study are the actual impressions children make of each other as they are first getting to know someone.

Very little is known about how children think others perceive them, or how accurate they are in estimating the impression they are making on a new peer, specifically following a brief, live interaction. Examining the role of interpersonal perceptions and metaperceptions following live dyadic interactions is critical for understanding the interpersonal processes through which real-world friendships develop. Therefore, in the current study, immediately following a live interaction with a previously unfamiliar peer, I asked children what they thought of their peer (social perception) and what they thought their peer thought of them (social metaperception) for both positive and negative traits. This allowed me to a) see if children rate themselves and others more positively than negatively (i.e., *positivity bias*), b) see if children rate their social partner more positively (and less negatively) than they believe their partner rates them (i.e., *liking gap*), and c) determine if children are accurate in identifying what others are thinking of them (i.e., *metaperception accuracy*) (see Figure 1 for visual depictions of these three constructs).

Friendship Formation

Across the life course, interacting with unfamiliar people is a common day-to-day occurrence. While these interactions may elicit a degree of discomfort for some, they are a crucial step in forming lasting relationships (Hinde & Stevenson-Hinde, 1987) that provide individuals with many physical and mental health benefits (Saeri et al., 2018). As children transition into adolescence, they can clearly differentiate between friends and unfamiliar peers as they increasingly show more trusting and sharing behaviour towards their friends (Guroglu et al.,

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2014). Further, supportive friendships in adolescence protect against internalizing problems (Markovic & Bowker, 2017) and predict healthy psychosocial functioning later in life (Van Harmelen et al., 2017; Berndt & Murphy, 2002).

Given the importance of friendships, it is important to understand the interpersonal processes that may support (or hinder) the likelihood that initial interactions go well and set the stage for the formation of a true friendship. Various social and communication skills are known to play integral roles in all phases of friendship development (Burleson, 1995), including the ability to cooperate with others and engage in effective social communication. These component skills share a common need to take another's perspective (Frith & Frith, 2001) and to recognize the impact one is having on their social partner. Given the inherent 'back and forth' between conversation partners, I adopted a dyadic perspective to examine children's initial social interactions with an unfamiliar peer. Pairs of previously unfamiliar children were observed using a brief, unstructured task in which dyads were instructed to simply 'get to know each other' over a five-minute online interaction (Usher et al., 2015).

Social Perceptions and Metaperceptions

During social interactions, individuals continuously interpret the behaviour of others and use this information to generate stable impressions that allow them to predict their social partner's future behaviours. When meeting a new acquaintance, individuals tend to form relatively stable impressions of others, despite having little data to draw upon (Funder, 1995). These early impressions are critical in determining the likelihood that an acquaintance will become a friend (Hall & Andrzejewski, 2008). Beyond actively forming impressions of others, individuals also spend time thinking about the impressions they are making on others. Laing et al. (1996) coined the term *metaperception,* which refers to the process where individuals assess

what others are thinking about them. These metaperceptions require seeing oneself from another person's point of view (Oltmanns et al., 2005), play an important role in shaping initial interactions (Tissera et al., 2021), and have been shown to influence social behaviour (Byron & Landis, 2020; Tissera et al., 2020). For instance, beliefs about how others view us may make individuals act shyer (or more sociable) across many and varied contexts with different people. Together, metaperceptions can impact relationship quality in both the short term (e.g., determining how a brief interaction goes) and the long term (e.g., building relationships and friendships).

Normative Biases in Social Perceptions and Metaperceptions

Humans tend to hold, on average, more positive than negative impressions of others (i.e., social perception *positivity bias*) (Sears, 1983) and these positive impressions (e.g., thinking a social partner is friendly) predict higher ratings of liking among both new and old acquaintances (Human & Biesanz, 2011). This positivity bias also extends to how we think others view us (i.e., social metaperception *positivity bias*): people tend to think they are viewed positively by others (Campbell & Fehr, 1990). However, despite this general positivity bias, individuals consistently rate other people more positively than they believe other people rate them (Boothby et al. 2018; Savitsky et al., 2001; Mastroianni et al., 2021). Boothby et al. (2018) demonstrated a "*liking gap*" where adult strangers reported liking their unfamiliar social partner more than they thought their social partner liked them following a five-minute structured in-person conversation. Other work has similarly shown that adults generally fail to appreciate how positively they are seen by others following a five-minute unstructured conversation in dyads or groups of five to six people (Elsaadawy & Carlson, 2022a). A *liking gap* has also been identified in group (i.e., conversations amongst three or more unfamiliar people) and team (i.e., engineering teams working on a project

together) settings where people tend to like their social partners more than they think the other people like them (Mastroianni et al., 2021). These negative views of self (compared to views of others) may have negative consequences on how relationships form and how teams work together. While the liking gap is consistently noted in adult samples, there is limited research into whether a similar *liking gap* exists in late childhood.

Similar to adults, children quickly form impressions of others (Silver & Shaw, 2018) and describe and discriminate between others in terms of both positive and negative traits (LaFontana & Cillessen, 2002). Children also use these social impressions to guide their own interpersonal behaviours and to provide a context for interpreting others' social behaviours (Crick & Dodge, 1994). Consistent with findings with adults on the *liking gap*, children older than five years old (the age at which they become concerned with other people's evaluations of them) report liking their social partner more than they believe their social partner likes them (Wolf et al., 2021). Wolf et al. (2021) demonstrated this by pairing two unfamiliar children together and observing them as they worked on a cooperative tower-building task. After the task, in a series of six questions (rated on a Likert scale ranging from 1-7) children were asked to rate their global social perceptions and metaperceptions of "liking their peer" (e.g., "How much do you like the other boy/girl?" (i.e., social perception) and "How much do you think the other boy/girl likes you?" (i.e., social metaperception). To extend this past work, in the current study, positive and negative traits were compared (as opposed to global impressions of liking) following a five-minute unstructured conversation, a task considered more socially challenging (i.e., no support from the task for conversational scaffolding) and ecologically valid than a structured, cooperative task.

Metaperception Accuracy

While the *positivity bias* and *liking gap* literature describe mean level, within-person biases in social perceptions and metaperceptions, *metaperception accuracy* refers to the extent to which partners accurately perceive how they are viewed by others (Kenny & DePaulo, 1993). Specifically, the positivity bias and liking gap literature demonstrate that individuals overall show these biases, however, accuracy is about how accurate one is in their metaperceptions with a specific person. Accurate metaperceptions are important for both initial interactions (Carlson, 2016) and close relationship contexts (Tissera & Lydon, 2022). Holding accurate metaperceptions has been viewed as an important factor that supports the quality and stability of interpersonal relationships (Human et al., 2012). Accurate metaperceptions may also help individuals make in-the-moment behavioural changes in response to their social partners' cues (Carlson & Kenny, 2012) and may increase social reciprocity in day-to-day social interactions (Fett et al. 2014).

Researchers have demonstrated that, on average, adults can accurately infer the impressions they make on others (i.e., *metaperception accuracy*) (Carlson & Furr, 2009; Elsaadawy & Carlson, 2022b; Carlson, 2016; Tissera et al., 2023) and it has been shown that adults can achieve a high level of metaperception accuracy in initial interactions across a wide range of traits (Carlson & Kenny, 2012). This work on metaperception accuracy in adults has mostly assessed general traits and dispositions (e.g., "How likeable is person X?") (Carlson, 2016; Tissera et al., 2023; Elsaadawy & Carlson, 2022b) as opposed to specific personality traits (e.g., "How uncool is person X?"). Examining personality traits in the initial impressions that children form during social interactions allows for a more comprehensive understanding or representation of real-world social interactions.

Although much of the work on metaperception accuracy has been done in adults, there are a few studies examining this in children. Work by Malloy et al. (2007) demonstrated that by middle childhood, children can accurately perceive how their familiar peers perceive them. When rating their classmates and themselves on different dimensions (i.e., behavioural, social status, ability), children as young as grade 1 were able to accurately infer familiar peers' global judgements of them. Malloy et al. (2007) found that metaperception accuracy increased with age, with older children (grade 6) being more accurate than younger children (grade 1). Similar to the previous study design, using a peer nomination procedure within classrooms of familiar peers, Bellmore and Cillessen (2003) examined children's metaperception accuracy related to general domains of social acceptance and rejection. These researchers found that children more accurately perceived how they were seen by same-sex peers than by other-sex peers and were more accurate in their negative (rejection) social metaperceptions than their positive (acceptance) social metaperceptions. Interestingly, other work on metaperception accuracy in older adolescents (between 12 and 16 years of age) with and without autism spectrum disorder (ASD) using a similar "get to know you" task found that adolescents cannot accurately detect the impressions they leave on others (Usher et al., 2018). This finding could be due to the fact that adolescents were later in adolescence or because a typically developing adolescent was paired with an adolescent with ASD.

The Present Study

In summary, there is limited research on children's social perceptions, metaperceptions, and their metaperception accuracy following an initial and unstructured interaction with a previously unfamiliar peer. Of the limited developmental literature, the majority of it has asked children to evaluate themselves and each other through peer nominations on general traits and

dispositions as opposed to assessing personality traits following real-life interactions (Bellmore & Cillessen, 2003; Malloy et al., 2007). As well, most of this work has been done within a familiar peer context (Bellmore & Cillessen, 2003; Malloy et al., 2007). Of interest in the current study are the impressions that children make about each other when they initially interact, allowing for a real-world examination of the first step in relationship formation.

Specifically, children's mean level positive social perceptions of their peer (i.e., how positively I view my peer) were compared to their mean level negative social perceptions of their peer (i.e., how negatively I view my peer) (i.e., social perception *positivity bias*) and children's mean level positive social metaperceptions (i.e., how positively I think my peer views me) were compared to their mean level negative social metaperceptions (i.e., how negatively I think my peer views me) (i.e., social metaperception *positivity bias*) (see Figure 1; part A). Further, children's mean level positive social metaperceptions (i.e., how positively I think my peer views me) were compared to their mean level positive social perceptions (i.e., how positively I view my peer) to examine the positive trait *liking gap*. As well, children's mean level negative social metaperceptions (i.e., how negatively I think my peer views me) were compared to their mean level negative social perceptions (i.e., how negatively I view my peer) to examine the negative trait *liking gap* (see Figure 1; part B). To examine metaperception accuracy, children's mean level positive and negative social metaperceptions were compared to their social partner's mean level positive and negative social perceptions. Further, levels of agreement between dyad members' social perceptions (i.e., what I think of my peer) and their social partner's social metaperceptions (i.e., what I think my peer thinks of me) were examined, as an index of how accurate children are in estimating the impression they make on an unfamiliar peer (i.e., *metaperception accuracy*) (see Figure 1; part C).

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To address the gaps in the literature, the following questions were investigated:

a) Are there significant differences between children's mean level positive and negative social perceptions of their peers (i.e., social perception *positivity bias*)? Similarly, are there significant differences between children's mean level positive and mean level negative social metaperceptions (i.e., social metaperception *positivity bias*)? It was hypothesized that children will report (a) more positive than negative impressions of their peer and, (b) that their peer thinks of them more positively than negatively (see Figure 1; part A).

b) Are there significant mean level differences between children's social metaperceptions (i.e., what I think my peer thinks of me) and their *own* mean level social perceptions (i.e., what I think of my peer) (i.e., *liking gap*)? Following Wolf et al. (2021), it was hypothesized that children will rate their unfamiliar partners more positively (and less negatively) than they believe their partner rates them (see Figure 1; part B).

c) Are there significant mean level differences between children's social metaperceptions and their social partner's *actual* perceptions? It was hypothesized that children's metaperceptions would be consistently less positive (and more negative) than their social partner's *actual* perceptions. Whereas research aims a) and b) examined within-person comparisons, this analysis moves into a within-dyad mean-level comparison. The following question looks at the within-dyad strength of the association (metaperception accuracy). Further, are children accurate in identifying what their unfamiliar social partner is thinking of them (i.e., *metaperception accuracy*) on positive and negative traits following a brief unstructured dyadic interaction? Following the adult literature (Elsaadawy & Carlson, 2022a; Carlson, 2016; Tissera et al., 2023), it was hypothesized

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that there would be at least moderate metaperception accuracy, with children's social

metaperceptions (i.e., what they think their peer thinks of them) being at least moderately

positively correlated with their unfamiliar peer's *actual* perceptions (i.e., what their peer

actually thinks of them) (see Figure 1; part C).

<center>**Methods**</center>

Participants

The sample consisted of 182 children (79 males) between the ages of 9 to 12 years (M_{age} = 11.50, *SD* = 0.83) who participated in a larger study examining behavioural, physiological, and social-cognitive correlates of temperament and interpersonal interactions. The study focused on late childhood/early adolescence as this developmental stage is when youth spend increasingly more time with peers and place increasing value on their peers' thoughts and opinions (Steinberg & Monahan, 2009). Children were recruited 1) by inviting families who had previously participated in research in the Social Development Lab at the University of Waterloo and consented to be contacted for future studies, 2) through online advertising (i.e., Facebook, Instagram, Twitter), and 3) through in-person community events in the Waterloo region. Eligibility criteria included children of a full-term birth with no complications, no formal diagnosis of attention deficit hyperactivity disorder (ADHD) or autism spectrum disorder (ASD), and access to the internet and a quiet room.

All parents completed an Information and Consent Form. Regarding the demographics of the sample from this form, the ethnic breakdown was as follows: 74.0% White, 6.8% South Asian (e.g., East Indian, Pakistani), 6.3% Mixed Ethnicity, 2.6% Chinese, 1.6% Black, 1.6% West Asian (e.g., Iranian), 1.0% Latin American, 0.5% Arab, and 2.1% Other. Most parents were highly educated: 60.4% of parents had a college degree (e.g., bachelor's degree), 29.2% of parents had graduate-level training (e.g., PhD, MD, law degree), 5.2% of parents had partial college training, and 2.1% of parents had their secondary school/high school diploma. Median household income was over $150 000 (CAD), with the following distribution: under $25 000

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(2.6%), \$25 000 - \$49 000 (5.7%), \$50 000 - \$74 999 (7.8%), \$75 000 - \$99 999 (14.1%), \$100 000 - \$124 999 (20.8%), \$125 000 - \$150 000 (10.9%), and over \$150 000 (33.9%).

Procedure

The study was approved by the Research Ethics Board at the University of Waterloo (ORE#: 41860). Parents and children completed written and verbal informed consent and assent online at the start of the session, and parents also completed a battery of questionnaires pertaining to family demographics, child temperament, and child socio-cognitive functioning. Prior to the dyadic interaction, children reported on their own temperament and completed several other measures that were not part of the current study.

The larger study was composed of three sessions spread over a duration of 6 weeks. Children were paired with the same, same-sex peer across all visits. The focus of the current study was on the initial dyadic interaction that took place during session 1 using Zoom Software, where children were randomly paired with an unfamiliar peer of the same sex and age (within six months) online. In a Zoom meeting room, dyads were told that they had five minutes to "get to know each other" (Usher et al., 2015). Throughout the duration of the interaction, the two research assistants involved turned off their video and audio to make it seem as though they were "busy" working on another task together. Both children had their video and audio on, and all dyadic sessions were video, and audio recorded.

Immediately following this five-minute unstructured interaction, children were put into breakout rooms with their respective research assistants to ensure privacy and were informed that there were no right or wrong answers and that their responses would be kept confidential. In the breakout room, each participant completed a questionnaire on Qualtrics rating their social partner in terms of several traits (social perceptions) and rating how she/he believed their social partner

answered the same questions about her/him (social metaperceptions). Following the questionnaires, children completed additional tasks not reported here. At the end of the session, children were debriefed and remunerated with a $20.00 gift card to Amazon.ca or the local mall (Conestoga Mall).

Measures

Immediately following the five-minute unstructured interaction, children completed the 25-item Perceptions and Metaperceptions Questionnaire (see Usher et al. 2018). This questionnaire assessed children's social perceptions (e.g., "How funny is [name of partner]?") and social metaperceptions (e.g., "How boring does [name of partner] think you are?") of their social partner; ratings were on a 5-point scale from 1 (not at all) to 5 (the most). This format ensured that all children answered the same questions. Overall impressions of the interaction (global impressions, e.g., "How well did your interaction with [name of partner] go overall?") were also answered by children but these were not included in the current study's analysis as they did not assess personality trait attributions, which was the primary focus of this study.

Means were summed for positive social perceptions (5 items), negative social perceptions (3 items), positive social metaperceptions (5 items), and negative social metaperceptions (3 items). Cronbach's alpha reliability coefficients were as follows: 0.79 for positive social perceptions, 0.69 for negative social perceptions, 0.81 for positive social metaperceptions, and 0.76 for negative social metaperceptions.

Data Analytic Plan

To investigate research objective a), I first conducted Principal Components Analyses (PCA; Abdi & Williams, 2010) to support the reduction of the data from the Perceptions and Metaperceptions Questionnaire into mean scores. Next, I compared mean level differences

between children's own positive and negative social perceptions (i.e., social perception *positivity bias*) and mean level differences between children's own positive and negative social metaperceptions (i.e., social metaperception *positivity bias*). This analysis was conducted using a 2 (*target*: my own social perceptions vs. my own social metaperceptions) x 2 (*valence*: positive vs. negative) ANOVA. This allowed me to directly test for main effects of target and valence and the potential interaction between target and valence. This analysis did not allow for a complete examination of the *liking gap*, as it does not control for the dyadic nature of the data. Therefore, to investigate research objective b), I then conducted two linear mixed models (LMMs) (controlling for the dyadic nature of the data) to compare children's mean level positive social metaperceptions to their mean level positive social perceptions (i.e., positive trait *liking gap*) and to compare children's mean level negative social metaperceptions to their negative social perceptions (i.e., negative trait *liking gap*) while controlling for the dyadic nature of the data. The LMMs allowed me to directly test whether children report rating their social partner more positively than they thought their partner rated them, and whether children tend to perceive themselves more negatively than they perceive their partner. To investigate research objective c), I conducted a paired-samples t-test to compare mean level differences between children's positive and negative social metaperceptions to the differences in their social partner's positive and negative social perceptions. This allowed me to determine whether children underestimate or overestimate how they are being perceived by their social partner. Finally, two actor-partner interdependence model (APIM) analyses (Cook & Kenny, 2005), were used to examine the magnitude of the association between a child's own metaperceptions (actor effect) and their unfamiliar social partner's perceptions (partner effect) of positive and negative traits. Using multilevel modelling, the APIM examined the associations between the two members in the

dyad, accounting for the interdependence of the two individuals. The model allows for the examination of both a person's effects on their own behaviour (actor effects) and their social partner's effects on their behaviour (partner effects).

Results

All analyses were conducted in IBM SPSS Version 28. See Table 1 for descriptive statistics for all items (including summary scores) of the Perceptions and Metaperceptions Questionnaire included in the current analyses. All variables were normally distributed. See Table 4 for correlations between mean-level within-person social perception and metaperception variables and Table 5 for correlations between mean-level actor-partner positive and negative social perception and metaperception variables.

Data Reduction

To reduce the number of variables in analyses, inter-relations among ratings for both social perceptions and social metaperceptions were examined using two Principal Component Analyses with Varimax rotation (PCA; Abdi & Williams, 2010). Results of the PCA analyses supported the creation of two components, positive trait items and negative trait items, for both social perceptions and metaperceptions. The components for social perception items were labelled "positive trait items" (i.e., "How happy is [name of partner]?", "How entertaining is [name of partner]?", "How funny is [name of partner]?", "How exciting is [name of partner]?", and "How outgoing is [name of partner]?") and "negative trait items" (i.e., "How boring is [name of partner]?", "How annoying is [name of partner]?", and "How uncool is [name of partner]?"). Items loaded similarly for social perception and metaperception items (see Table 2 for eigenvalues and loadings for social perceptions and see Table 3 for eigenvalues and loadings for social metaperceptions). A significant third component "shyness" was identified but was dropped as it was not of interest in the current study.

Positivity Bias

To address research objective a), a 2 (*target*: my own perceptions vs. my own metaperceptions) x 2 (*valence*: positive vs. negative) ANOVA was conducted to test for the main effects of target and valence and the interaction between target and valence. This ANOVA revealed two significant main effects: *target* ($F(1,183) = 3.95$, $p = .048$, Cohen's d = 0.64) and *valence* ($F(1,183) = 381.09$, $p < .001$, Cohen's d = 0.79) demonstrating that children give higher positive than negative ratings, in general, when rating their partner (i.e., social perception) and when rating what their partner thinks of them (i.e., social metaperception). These main effects were qualified by a significant interaction ($F(1,183) = 171.78$, $p < .001$, Cohen's d = 0.83) suggesting that the strength of the positivity bias differs depending on whether children are rating their peer (social perceptions) or rating what they believe their peer thinks of them (social metaperceptions) (see Figure 2).

To follow up the significant interaction, four post hoc paired samples t-tests were conducted (see Figure 2). The first paired samples t-test was conducted to compare children's mean level positive social perceptions of their peer to their mean level negative social perceptions of their peer (i.e., perceptions *positivity bias*). Children perceived their peer significantly more positively ($M = 2.93$, $SD = 0.71$) than negatively (($M = 1.21$, $SD = 0.42$); $t(182) = 25.37$, $p < .001$, Cohen's d = 0.91). Second, a paired samples t-test was conducted to compare children's mean level positive social metaperceptions to their mean level negative social metaperceptions. Children believed their peer rated them significantly more positively ($M = 2.52$, $SD = 0.69$) than negatively (($M = 1.74$, $SD = 0.72$); $t(182) = 9.80$, $p < .001$, Cohen's d = 0.89) (i.e., metaperception *positivity bias*). Third, a paired samples t-test was conducted to compare children's mean level positive social perceptions to their mean level positive social metaperceptions. Children rated their peer more positively ($M = 2.93$, $SD = 0.71$) than they

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believed their peer rated them (M = 2.52, SD = 0.69); $t(182)$ = 9.53, $p < .001$, Cohen's d = 0.58 (i.e., positive trait *liking gap*). Fourth, a paired samples t-test was conducted to compare children's mean level negative social perceptions to their mean level negative social metaperceptions. Children rated their partner less negatively (M = 1.21, SD = 0.42) than they believed their peer rated them (M = 1.74, SD = 0.72); $t(182)$ = -9.89, $p < .001$, Cohen's d = 0.73 (i.e., negative trait *liking gap*).

The post hocs examining the *liking gap* suggest that children perceive others more positively (and less negatively) than they think others perceive them. However, this analysis does not control for the dyadic nature of the data and thus, I next conducted two linear mixed models (LMMs) to examine how children perceive themselves and how they think others perceive them. This analysis was done to account for the two continuous outcome variables (i.e., positive, and negative trait scores) and to account for the clustered/dyadic nature of the data (e.g., participants within dyads).

Liking Gap

Linear mixed model (LMM) analyses were conducted to appropriately analyze the *liking gap*. Specifically, two LMMs were conducted as the two types of targets (social perceptions and social metaperceptions) were nested within participants and participants were nested within dyads. Target type (social perception or social metaperception) was the independent variable, and positive and negative trait scores were the dependent variables for each model. Each model included the target type as a fixed effect and an intercept for each participant as well as an intercept for each dyad as random effects. Target type was entered as a fixed effect as it is assumed to have a constant effect on the outcome. Dyad was entered as a random effect as it is assumed to have a varying effect on the outcome. By including an intercept of dyad, I accounted

for the overall mean across all pairs in the model. The intercept represents the expected results when all other predictor variables are set to zero. In both LMMs, I controlled for the dyad because a) observations within the same dyad are likely to be correlated with each other, b) individuals within each dyad may have unique characteristics influencing the outcome (i.e., positive, and negative trait scores), and c) the nesting structure of the interaction (i.e., participants were nested within dyads).

Positive Traits

Results of a linear mixed model (LMM) for positive trait ratings revealed a significant effect of target type (social perception vs. social metaperception) on positive trait score after controlling for the dyad, $b = 2.30$, $SE = 0.69$, 95% CI $= [0.94, 3.66]$, $t(179) = 3.34$, $p = .001$, Cohen's d $= 0.60$, with children rating their social partner higher on positive traits (social perception: $M = 2.93$, $SD = 0.71$) than they perceived their social partner to rate them (social metaperception: $M = 2.52$, $SD = 0.69$) (see Figure 3).

Negative Traits

Results of a second LMM for negative traits revealed that children rated their social partner less negatively (social perception: M $= 1.21$, SD $= 0.42$) than they perceived their social partner to rate them after controlling for the dyad (social metaperception: M $= 1.74$, SD $= 0.72$), $b = 1.27$, $SE = 0.57$, 95% CI $= [0.51, 2.40]$, $t(179) = 2.24$, $p = .026$, Cohen's d $= 0.71$ (see Figure 4). Overall, and similar to past literature on children and adults, after controlling for the dyadic nature of the data, children still rated their peer more positively (and less negatively) than they believed their peer was rating them (i.e., *liking gap*).

Metaperception Accuracy

To move beyond within-person comparisons of mean ratings, I was interested in examining the relations between partners' social perceptions and metaperceptions as an index of *metaperception accuracy*. To do so, I first compared children's mean level social perceptions of their peer (for positive and negative traits) to their peer's mean level social metaperceptions. Next, using an Actor-Partner Interdependence Model (APIM) (Cook & Kenny, 2005), the associations between partners' social perceptions (i.e., what I think of my peer) and social metaperceptions (i.e., what I think my peer is thinking of me) were examined (see Figure 5; path A). Of particular interest was the association between children's own social perceptions and *their partner's* social metaperceptions, as an index of how accurate children are in estimating the impression they make on an unfamiliar peer (see Figure 5; path B). Two separate models were conducted for positive and negative traits.

Positive Traits

To examine mean-level differences in children's positive trait metaperception accuracy, a paired samples t-test was conducted. I compared children's *own* mean level positive social perceptions of their peer to *their peer's* mean level positive social metaperceptions. Children underestimated how positively they were being perceived by rating themselves less positively ($M = 2.52$, $SD = 0.70$) than their partner rated them ($M = 2.93$, $SD = 0.71$); $t(182) = 5.55$, $p < .001$, Cohen's d $= 0.96$.

For positive traits, the APIM revealed a significant association between children's positive social perceptions of their partner and their *own* positive social metaperceptions (actor effect), $b = 0.67$, $t(176) = 12.11$, $p < .001$, indicating that overall, children who rated their peers positively predicted that their peers rated them positively as well (see Figure 5; path A). However, contrary to the hypothesis, there was no association between children's positive social

perceptions of their peer and their social *partner's* positive social metaperceptions (partner effect, indexing *positive trait metaperception accuracy;* see Figure 5; path B), $b = 0.12$, $t(175) = 0.13$, $p = .897$, indicating that overall, children's social metaperceptions of how positively their peer felt about them were not related to their partner's actual social perceptions.

Negative Traits

To examine mean-level differences in children's negative trait metaperception accuracy, a paired samples t-test was conducted. I compared children's mean level negative social perceptions of their peer to their peer's mean level negative social metaperceptions. Children overestimated how negatively they were being perceived by rating themselves more negatively ($M = 1.75$, $SD = 0.72$) than their peer rated them ($M = 1.21$, $SD = 0.40$); $t(182) = -9.15$, $p < .001$, Cohen's d $= 0.80$.

For negative traits, the APIM revealed a significant association between children's negative perceptions of their partner and their *own* negative metaperceptions (actor effect; see Figure 6; path A), $b = 0.42$, $t(172) = 3.15$, $p = .002$, suggesting that the more children rated their partner negatively, the more they thought their partner rated them negatively. Similar to positive traits, though, there was no significant association between children's negative social perceptions of their peer and their social *partner's* metaperceptions of being rated negatively (partner effect, indexing *negative metaperception accuracy*; see Figure 6; path B), $b = 0.17$, $t(172) = 1.28$, $p = .609$, indicating that overall, children were not accurate in their metaperception of being rated negatively.

Discussion

To our knowledge, this is the first study to examine children's social perceptions, metaperceptions, and their accuracy following a brief and socially challenging (i.e., unstructured) interaction with an unfamiliar peer. Broadly, the results demonstrate that children view themselves and others more positively than negatively (i.e., *positivity bias*) but view their peer more positively than they expect they are being viewed (i.e., the *liking gap*). Interestingly, though, children tend to underestimate how positively their peer *actually* perceives them and are not accurate in their metaperceptions for either positive or negative traits (i.e., *metaperception accuracy*). Instead, social metaperceptions, or how one thinks they are being perceived by another, are better predicted by one's own impressions of their partner than by their social partner's *actual* impressions of them. Therefore, following a brief interaction, social metaperceptions seem to be a reflection of within-person ways of thinking rather than features of the actual interpersonal exchange. The findings of the current study will be discussed along with the limitations, implications, and future directions.

Normative Biases in Social Perceptions and Metaperceptions

My first hypothesis was supported: Children tend to see themselves and their peers more positively than negatively (i.e., *positivity bias*). Interestingly, though, the positivity bias was stronger when children reported on their partner relative to when they reported on how they thought their partner felt about them. Further, to our knowledge, this is the first study to investigate the *liking gap* phenomenon in relation to specific personality trait attributions (as opposed to global impressions) following a socially challenging (i.e., unstructured), live, interaction between unfamiliar peers. When analyzing the data dyadically, the *liking gap*

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hypothesis was supported demonstrating that children tend to rate their social partner more positively (and less negatively) than they think their partner rates them.

It is possible that children are either a) less generous with the views of themselves than others, or b) they exaggerate their positive views when they think about other (and/or new) people. It may be that children rate themselves less positively (and more negatively) than they rate their peer because they worry that the people they interact with see them more negatively (Sears, 1983) and therefore feel self-doubt when estimating their own abilities in social situations. Future work could test this hypothesis by collecting a general self-esteem measure (prior to a dyadic interaction) to examine whether differences in general self-esteem predict positive and negative social perceptions and metaperceptions. If so, this would suggest that pre-existing differences in children's representations of themselves and others guide the initial impressions they form more so than anything that *actually* happens during the social interaction. Further, in future work instead of forcing responses (asking about specific traits), it would be interesting to see whether these results on normative biases hold if a different response format such as open-ended questions is used.

The finding that children tend to rate their social partner more positively (and less negatively) than they think their partner rates them is in accordance with other research showing that children as young as five years old (Wolf et al., 2021) and adults (Boothby et al., 2018; Mastroianni et al., 2021) tend to rate their social partner more positively (and less negatively) than they believe their partner rates them. Wolf et al. (2021) argued that holding an unstructured conversation was too socially challenging for pairs of young children (5 to 12 years old) and thus used a cooperative tower-building task to scaffold the interaction. However, given the central role of unstructured conversations for relationship development in early adolescence, I placed

children in a socially challenging "get to know you task" with no distractions or conversation aids. Interestingly, despite our more challenging task, our pattern of results is consistent with Wolf et al.'s (2021), demonstrating that children believe their social partner views them less positively than they view their partner regardless of whether they complete a structured or unstructured interaction task.

I believe this *liking gap* may exist because individuals are biased to spend more time focusing on their social deficits (vs. strengths), so they assume that the people they are interacting with are doing the same (Gilovich et al., 2000). During late childhood and early adolescence, children place more value on peers' opinions and perspectives and become increasingly concerned with how they are viewed (Wolf et al., 2021). Children in this developmental period also express concern for the reputation and status they have within their friend groups (LaFontana & Cillessen, 2010) which may be a reason why this age group is particularly prone to be concerned that others will perceive them less positively. However, this work by LaFontana and Cillessen (2010) was based on hypothetical vignette scenarios (a non-socially challenging task) versus a socially challenging task such as our study which may be a reason as to why the authors may be seeing this expression of concern for others. Future work could examine the magnitude of the *liking gap* at different developmental stages to see how individuals' concern for how others perceive them changes across development. For instance, in early adolescence, the *liking gap* may be at a peak. I expect this peak to fall (but not completely disappear) as adolescents move into adulthood where they learn to better manage their concerns around how others view them.

Further, we may believe our social partners view us less positively than we view them as a strategy for avoiding disappointment (e.g., hope for the best but expect the worst). If we

believe our social partner is rating us more negatively (or less positively), we may set ourselves up to be happy if the outcome is better than expected. It may be an unconscious strategy for avoiding disappointment if social partners fail to reciprocate the desire to continue the relationship. On the other hand, the 'gap' could also be driven by overly generous and gracious reports of the social partners – extending them the benefit of the doubt following such a brief interaction. An interesting future direction would be to explore what traits predispose some children to be more positive in their perceptions of others/less positive in their perceptions of themselves and to have a larger liking "gap". Specifically, future research should examine within-child characteristics (e.g., temperament) and/or dyad characteristics (e.g., similarity in temperament, shared affect; e.g., Sosa-Hernandez et al., *in press*) that might relate to how children think about others and the impression they leave on others.

Metaperception Accuracy

Overall, and contrary to my hypothesis, children were not accurate in their metaperceptions of either positive or negative traits, as they underestimated the positive impression they *actually* had on their social partner. Further, children's metaperceptions regarding how they were being viewed by their partner were statistically unrelated to their partner's actual perceptions of them (partner effect). Rather, children's metaperceptions were associated with their *own* perceptions of their peer (actor effect). The finding that children were not accurate in their metaperceptions suggests that social perceptions and metaperceptions in the context of a brief, initial interaction may be more a function of the individual than the actual dyadic interaction. I based the hypothesis that children would be accurate in their metaperceptions on the adult literature that suggests that adults can, in fact, accurately detect the

impressions they leave on their social partners after a brief interaction (Elsaadawy & Carlson, 2022b; Tissera et al., 2023; Carlson, 2016).

Unlike previous literature suggesting that adults can accurately detect the impressions they leave on others (Carlson, 2016; Tissera et al., 2023), our finding is in line with work by Usher et al. (2018) that examined metaperception accuracy in 12- to 16-year-old adolescents with and without autism spectrum disorder (ASD). Researchers placed children in a similar "get to know you" task with an unfamiliar peer over a five-minute period. The main difference between Usher et al.'s (2018) study and the current study is that adolescents in Usher et al.'s (2018) study were paired with a partner with ASD and were older (12- to 16- years of age) as opposed to 9- to 12- years of age. They found a significant association between adolescents' perceptions (ratings of liking (and disliking) of a peer) with their own metaperceptions of being liked (and disliked) by their peer (actor effect) and found no overall association of the peer's liking (and disliking) with adolescents' metaperceptions of being liked (or disliked) (partner effect). Our study replicates Usher et al.'s (2018) findings and demonstrates that children may be relying on their own views to determine how others view them (vs. thinking about what their peer thinks of them) as both studies found a significant actor effect, but not a significant partner effect. Our findings and Usher et al.'s (2018) findings support Kenny and DePaulo's (1993) theory that adults' social metaperceptions may be independent of their social partner's *actual* evaluations. Based on a review of eight studies, Kenny and DePaulo (1993) argue that individuals determine how others view them from their own views more so than based on specific feedback they receive from their partner during an interaction.

Kenny and DePaulo (1993) also propose that individuals are more accurate in understanding how people *in general* view them but less accurate when predicting how specific

interaction partners view them. This may be why found no partner effect was found in the current study. Kenny and DePaulo (1993) also suggest that accuracy may be better when individuals have the opportunity to interact with multiple unfamiliar social partners. When put in a group with multiple people (as opposed to one person), individuals receive more than one source of information from multiple partners that they can average into a relatively accurate "general" metaperception. Thus, future work with children should employ a one-with-many design where one person interacts with many social partners to examine if and how the number of interaction partners influences accuracy. This would be interesting to examine as children in this developmental stage receive multiple points of feedback while in school and extra-curricular settings.

Further, the current set of analyses was cross-sectional, meaning that children were examined at one point in time which allowed me to focus on how children form first impressions when first getting to know a new peer. However, to understand relationship development we need to examine children over time and/or following a longer interaction (e.g., 15 minutes). Thus, future research should examine children from the same dyads over time (or following a longer interaction) to see whether time affects a) the extent to which children rate themselves and their peers more positively than negatively (i.e., *positivity bias*), b) whether the magnitude of the *liking gap* decreases as children become more familiar with each other, and c) whether *metaperception accuracy* increases (or decreases) over time. I expect that as children interact with each other, they may be better able to estimate the impression they are leaving on their social partner as they have more and varied social cues to incorporate into their representation.

Similar to the discussion of potential developmental changes in the magnitude of the *liking gap* as individuals get older, are individuals better able to discern with age how unfamiliar

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people view them, improving their metaperception accuracy? It would be interesting to see whether metaperception accuracy changes across developmental periods. For instance, adolescents may be better able to discern what others are thinking of them since adolescence is a time when children place more value on their peers' opinions and are concerned with how they are viewed (Wolf et al., 2021). As children progress into adolescence and adulthood, they may be better able to manage their opinions and perspectives of themselves and others, which may increase this accuracy. A future study should examine how this accuracy changes across different stages of development (e.g., young children, middle adolescence, early adulthood), after a live initial interaction with an unfamiliar peer.

Limitations

Our study is not without limitations. First, the sample is relatively homogenous in terms of ethnicity and socioeconomic status, which affects the generalizability of our findings. The majority of our sample were White (74.0%) and from families earning an annual income over $100 000 (CAD; 65.6%). It will be important to replicate the present findings using a more diverse sample given the importance and amount of cultural variation in social interactions (Edwards et al., 2006). For instance, individuals from collectivist cultures may be more concerned about others' perceptions than individualistic cultures. Next, our study was cross-sectional as it examined children in late childhood at one point in time, allowing me to focus on first impressions but not relationship development. As noted above, it will be important to consider how *positivity bias*, the *liking gap*, and *metaperception accuracy* unfold as relationships emerge and stabilize over time. Our assumption is that social perceptions and metaperceptions set the stage for relationship development, however, a longitudinal design will be required to fully assess how relationships unfold over time.

Conclusion

Overall, it was found that children rate themselves and others more positively than negatively, but this positivity bias is accentuated when thinking about others (i.e., *positivity bias*). Additionally, children tend to believe their social partner views them more negatively (and less positively) than they view their unfamiliar social partner (i.e., *liking gap*). Further, children generally underestimate how positively their social partner views them and were not accurate in identifying what their partner thought of them following a brief, socially challenging interaction with an unfamiliar social partner (i.e., *metaperception accuracy*). The results suggest that social perceptions and metaperceptions in the context of a brief, initial interaction are more a function of the individual (vs. of the actual dyadic interaction). Overall, the current results suggest the presence of a *liking gap* in late childhood and highlight the presence of children's concern about the impression they are making on their social partner during live interactions with unfamiliar peers. These results partially replicate past findings with adults and extend past findings with children (from structured laboratory tasks) to less structured, more socially challenging contexts that better mirror real-world contexts in which friendships develop. Collectively, this research lays the groundwork for future studies examining within-child and interpersonal dynamic factors in late childhood and provides valuable information about children's abilities to discern what an unfamiliar social partner thinks of them.

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Figure 1

Visual depictions of research aims a) social perceptions positivity bias, b) the liking gap, and c)

metaperception accuracy

a) Perceptions Positivity Bias

b) The Liking Gap

C) Metaperception Accuracy

Figure 2

Social Perceptions and Metaperceptions Positivity Bias: Mean level differences and interaction between children's positive and negative (i.e., valence) perceptions and metaperceptions (i.e., target)
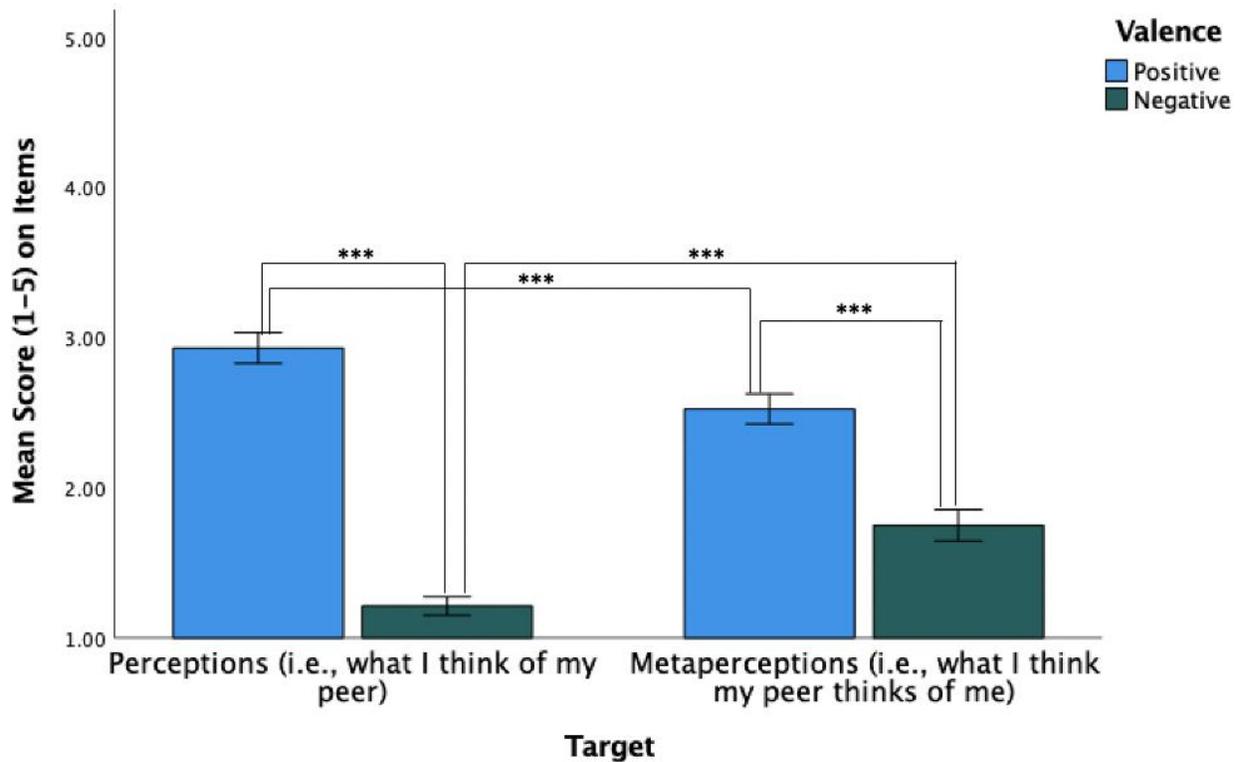
Note. Error bars represent 95% CI.

*** *p* < .001

Figure 3

Positive Trait Liking Gap: Mean level ratings of children's positive social perceptions of their unfamiliar peer, and children's positive social metaperceptions after controlling for effects of the dyad
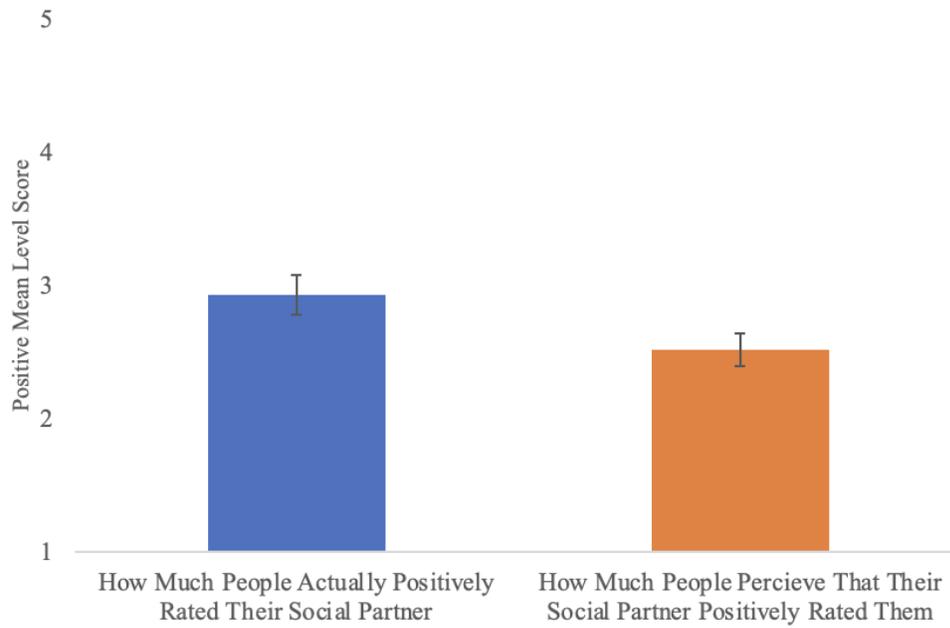
Note. Error bars show 95% confidence intervals.

Figure 4

Negative Trait Liking Gap: Mean level ratings of children's negative social perceptions of their unfamiliar peer, and children's negative social metaperceptions after controlling for effects of the dyad
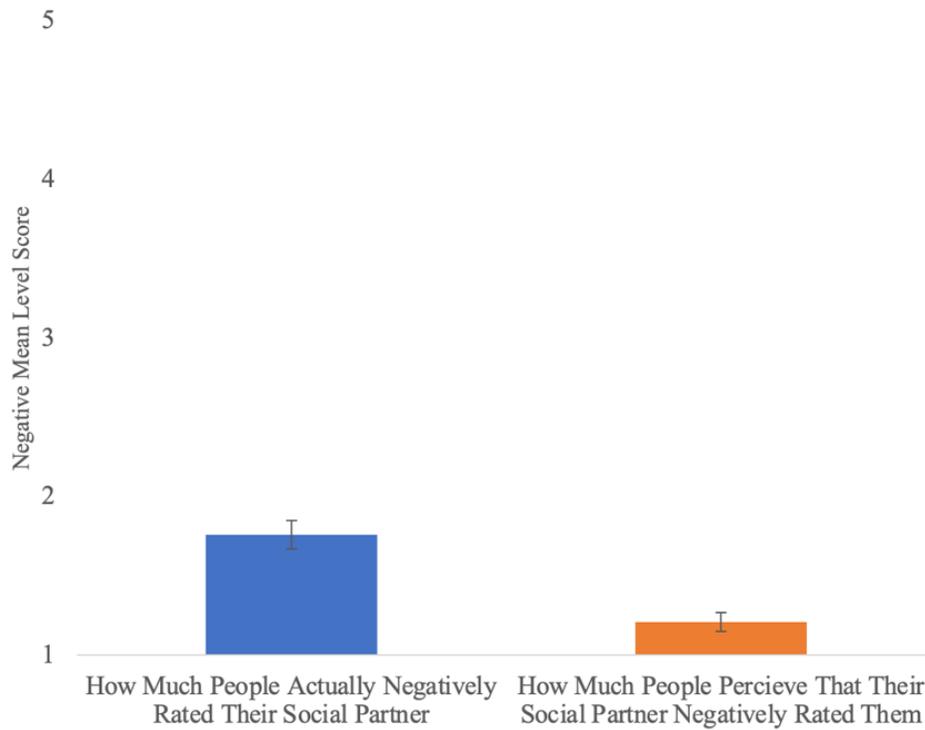
Note. Error bars show 95% confidence intervals.

Figure 5

Actor-Partner Interdependence Model for Positive Traits
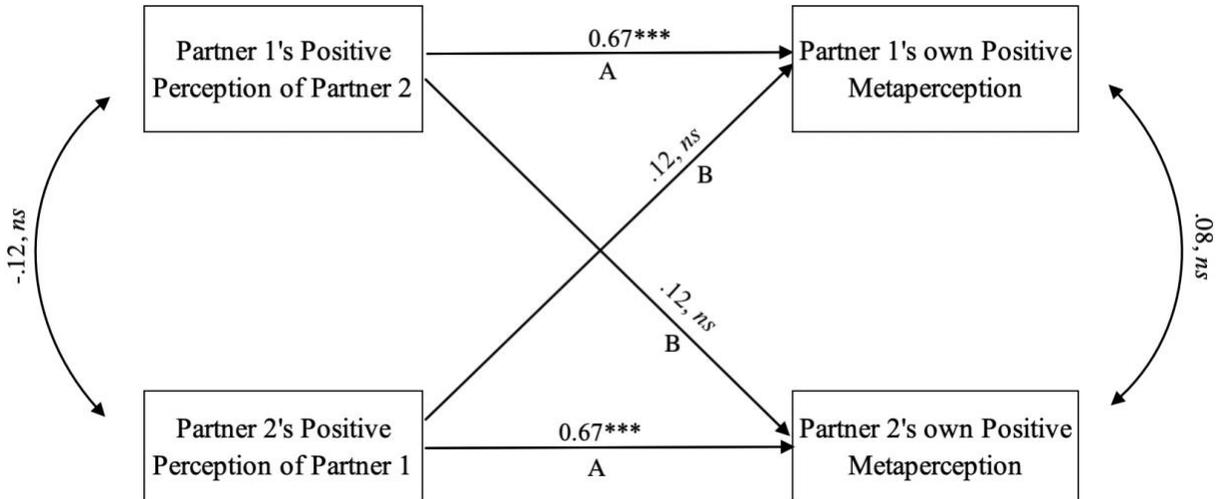
Note. Actor-Partner Interdependence Models (APIM) depicting dyadic associations between children's positive social perceptions of their partner with their own positive social metaperceptions (where "A" illustrates the actor effect) and their positive social perceptions with their unfamiliar partner's positive social metaperceptions (partner effect, where "B" illustrates *metaperception accuracy*) immediately following the Get to Know You Task. ***p < .001, *ns* non-significant.

Figure 6

Actor-Partner Interdependence Model for Negative Traits
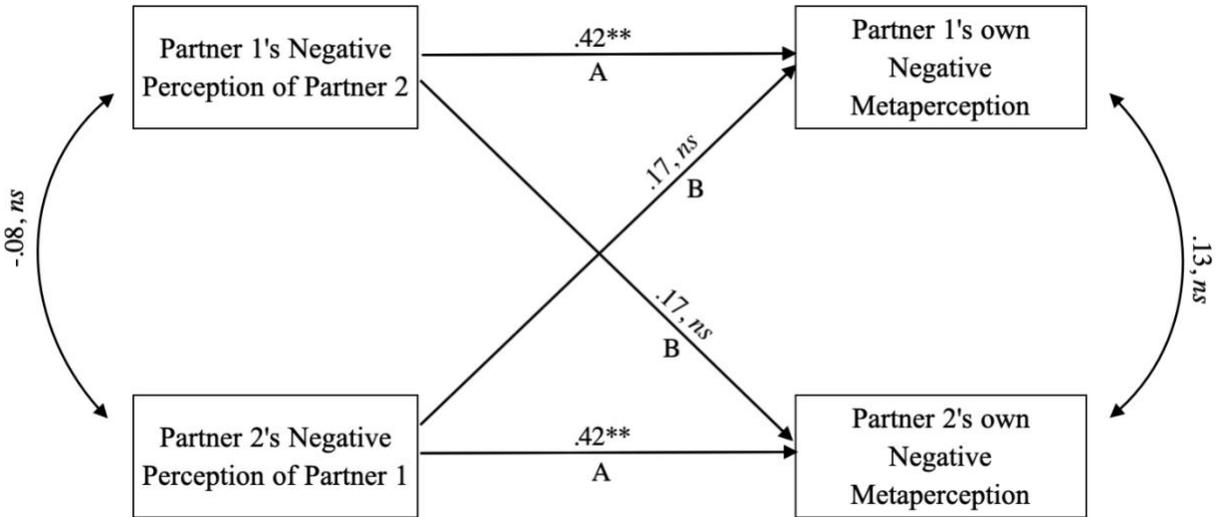
Note. Actor-Partner Interdependence Models (APIM) depicting dyadic associations between children's negative social perceptions of their partner with their own negative social metaperceptions (where "A" illustrates the actor effect) and their negative social perceptions with their unfamiliar partner's negative social metaperceptions (partner effect, where "B" illustrates *metaperception accuracy*) immediately following the "Get to Know You Task". $**p <$ .005, *ns* non-significant.

Appendix B – Tables Used

Table 1

Descriptive statistics for items on the Perceptions and Metaperceptions Questionnaire included in the current analyses

Item	*n*	*M*	*SD*	Range	*Skew*	*Kurtosis*
Perceptions						
Positive Trait Items						
How entertaining is __?	183	3.01	.905	1-5		
How happy is __?	183	3.32	.936	1-5		
How exciting is __?	183	3.01	.943	1-5		
How outgoing is __?	183	2.79	1.002	1-5		
How funny is __?	183	2.53	.993	1-5		
Positive Perception (Composite Score)	183	2.93	.708	1.40-5	0.34	-0.07
Negitive Trait Items						
How uncool is __?	183	1.24	.609	1-4		
How annoying is __?	183	1.09	.359	1-3		
How boring is __?	183	1.31	.608	1-4		
Negative Perception (Composite Score)	183	1.21	.422	1-3	0.97	2.94
Metaperceptions						
Positive Trait Items						
How entertaining does __ think you are?	183	2.42	.916	1-5		
How happy does __ think you are?	183	3.10	.884	1-5		
How exciting does __ think you are?	183	2.54	.906	1-5		
How outgoing does __ think you are?	182	2.49	.996	1-5		
How funny does __ think you are?	183	2.06	.915	1-5		
Positive Metaperception (Composite Score)	183	2.52	.695	1.20-4.80	0.55	0.35
Negitive Trait Items						
How uncool does __ think you are?	183	1.77	.874	1-5		
How annoying does __ think you are?	183	1.52	.850	1-5		
How boring does __ think you are?	183	1.98	.914	1-5		
Negative Metaperception (Composite Score)	183	1.76	.724	1-4.33	0.92	0.28

Table 2

Eigenvalues and loadings for Perceptions and Metaperceptions Questionnaire social perception

composite variables PCA

	Eigenvalues	
	Positive	Negative
	.400	.400
Variables	Loadings	
How exciting is __?	**.846**	-.143
How entertaining is __?	**.779**	
How outgoing is __?	**.682**	
How happy is __?	**.679**	-.123
How funny is __?	**.665**	-.126
How uncool is __?		**.794**
How annoying is __?		**.781**
How boring is __?	-.228	**.771**

Note. Bold values indicate variables that were included in each factor.

Table 3

Eigenvalues and loadings for Perceptions and Metaperceptions Questionnaire social

metaperception composite variables PCA

	Eigenvalues	
	Positive	Negative
	.400	.400
Variables	Loadings	
How entertaining does __ think you are?	**.810**	-.128
How happy does __ think you are?	**.757**	-.112
How exciting does __ think you are?	**.733**	
How outgoing does __ think you are?	**.733**	.260
How funny does __ think you are?	**.710**	
How uncool does __ think you are?		**.856**
How annoying does __ think you are?		**.798**
How boring does __ think you are?	-.228	**.688**

Note. Bold values indicate variables that were included in each factor.

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Table 4

Correlations between mean-level within-person perceptions and metaperceptions variables

	1	2	3	4
1. Positive Perceptions	-			
2. Negative Perceptions	-0.262**	-		
3. Positive Metaperceptions	0.656**	-0.098	-	
4. Negative Metaperceptions	-0.176*	0.254**	-0.158*	-

**$p < .001$

*$p < .05$

Table 5

Correlations between mean-level between-person perceptions and metaperceptions variables

	1	2	3	4
1. Positive Perceptions (Partner 1)	-			
2. Negative Perceptions (Partner 1)	-0.262**	-		
3. Positive Metaperceptions (Partner 2)	0.044	0.003	-	
4. Negative Metaperceptions (Partner 2)	-0.110	0.074	-0.158*	-

**p* < .001

**p* < .05