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When positive outcomes and reality collide: Children prefer optimists as social partners

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Abstract

Optimists, by definition, make inaccurate (overly positive) predictions regarding future event outcomes. Adults favor optimists as social partners. If children also prefer optimists, that preference could indicate early social benefits of being optimistic and might also shape how and what children learn regarding the likelihood of future outcomes. The present study thus sought to determine how children integrate the conflicting dimensions of optimism and accuracy in their social (friendship) preferences. Across two experiments ($N = 133$) 3- to 6-year-old children chose optimists over realists as social partners even if they were able to correctly identify the realist as being the most accurate of the two. However, when children made mistakes in identification, those mistakes primarily took the form of identifying the optimist as most accurate. These findings suggest that young children weigh optimism more heavily than accuracy in their affiliative relationships. Misidentifying the optimist as accurate also supports the notion that children have a bias to expect others to provide positive information. Further, a social preference for optimists might impact children's abilities to learn the true likelihood of event outcomes, as affiliating with optimists may result in setting oneself up to receive more positive (mis)information in the future. Such a preference suggests a mechanism by which optimism is perpetuated and points to potential social benefits that derive from being optimistic.

Keywords

Optimism; Positivity bias; Social partners; Event outcomes; Probabilistic reasoning

1. Introduction

From politics to the playground, people turn to others who offer a positive outlook on the future. Moreover, there is a pervasive sense that people, including children, do not necessarily value the truth if they like the message – or the messenger. Optimism, the tendency to overestimate positive future outcomes and underestimate negative ones (e.g., Sharot, 2011), likely plays a critical function in early childhood, serving as a

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Declaration of Competing Interest
None.

Appendix A. Supplementary data

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catalyst for how children learn, confront challenges, and navigate social relationships. Optimism, or a lack thereof (i.e., realism or pessimism), may also affect how children perceive and are perceived by others, impacting who children interact with and what they learn from those individuals. Adults reject pessimists (Segrin & Dillard, 1992), favor optimists over pessimists (Helweg-Larsen, Sadeghian, & Webb, 2002), and more strongly endorse both optimists and realists over pessimists as social partners (Milhabet & Verliac, 2011; Vollmann & Renner, 2010). Despite the importance of optimism in human social interactions and relationships, how and when these preferences develop is not yet known. Furthermore, as optimism is by definition a departure from reality, if children gravitate toward more optimistic social partners, this could have important consequences for children's ability to learn the true likelihood of future outcomes. There is a growing literature detailing the roles of benevolence and accuracy in children's epistemic trust decisions (e.g., Landrum, Mills, & Johnston, 2013; Johnston, Mills, & Landrum, 2015), however, whether these factors influence children's social preferences is not yet known. The present study investigates how children weigh optimism and accuracy when evaluating social partners in the context of affiliative relationships. These relationships might provide models for children's own expectations and have the potential to influence children's early learning regarding future outcomes.

A bias toward optimistic expectations contrasts with the prevailing view that accurate beliefs – those that best approximate reality – are most adaptive and that human cognition has evolved to form accurate beliefs about the world (McKay & Dennett, 2010). Indeed, there is substantial evidence that children are not indiscriminate learners but instead often seek out accurate information from others. Countless studies demonstrate that, although children have a general propensity to expect others to provide accurate information (e.g., Jaswal, Croft, Setia, & Cole, 2010), by age three children are adept at discerning accurate from inaccurate individuals and preferentially learn from those who are accurate (e.g., Koenig & Harris, 2005; Jaswal & Neely, 2006; Birch, Vauthier, & Bloom, 2008). Preschoolers use a range of cues that denote accuracy, including expertise (Keil, Stein, Webb, Billings, & Rozenblit, 2008), consensus with a majority (Corriveau, Fusaro, & Harris, 2009), and group membership (Kinzler, Corriveau, & Harris, 2010), in determining from whom to learn. However, there are limits to children's reliance on accuracy. For example, in the language domain there are contexts in which children rely more strongly on their expectations for regular morphology than an informant's prior reliability (Jaswal, McKercher, & VanderBorgh, 2008). Thus, children are adept at identifying accurate individuals and they often – but not always – rely on the information provided by accurate individuals in subsequent decisions. It is thus plausible that children could identify realists as providing more accurate information than optimists, yet still turn to optimists in contexts such as social partnership.

This methodological paradigm in which children are presented with two informants who differ on one or more characteristic (e.g., accuracy, expertise, group membership) and then asked to choose one informant for a specific purpose (e.g., to learn new information from, to befriend) has been widely used in developmental studies over the past 15 years. Of particular relevance to the present work are studies that examine stable traits of informants and studies that contrast traits with other dimensions such as expertise. For example, it

is well established that preschoolers, in the absence of any other information, use cues to benevolence to endorse individuals who are nice over those who are mean (Lane, Wellman, & Gelman, 2012; Mascaro & Sperber, 2009). Children are also motivated to attribute positive traits to others even when the attribution of a positive trait (e.g., niceness) is in direct conflict with testimony espousing a negative trait (e.g., meanness) that was provided by a previously reliable informant (Boseovski, 2012). Moreover, there are circumstances in which children appear to prioritize positive attributes over the potential for an individual to provide accurate information – although these findings are more complicated. For example, when given examples of prior nice or mean behaviors, 3- to 5-year-old children prefer to learn from nice individuals without expertise over mean experts (Landrum et al., 2013). However, when these characteristics are instead described as stable traits, children endorse mean but expert individuals over nice individuals without expertise (Johnston et al., 2015). Another study that contrasted benevolence with the valence of information provided by informants found that by 5 years of age children prefer to befriend nice informants who provided negative information over mean informants who provided positive information, but were more likely to view testimony from mean informants who provided positive information as being more accurate (Croce & Boseovski, 2020). Together this research indicates that by age three children can systematically use single cues denoting positive traits or accuracy to select social partners, and by age five children consider multiple dimensions *and* the objective of their choices (e.g., whether their social judgment is focused friendship versus information acquisition) in their selection of social partners.

The valence of the information an informant provides may also interact with children's evaluations of experts in other interesting ways. Specifically, in a study that crossed the expertise of an informant with the valence of the information provided by the informant (e.g., informants describing a novel animal in pleasant terms such as soft and cuddly, or unpleasant terms such as dirty and smelly), 3- to 5-year-old children reliably endorsed the expert – and even showed an increased preference for the expert who provided negative unpleasant information over the non-expert who provided positive information. However, by age 6 children relied more heavily on positive valence and endorsed the positive expert to a greater extent than the negative non-expert (Boseovski & Thurman, 2014). The findings for 3- to 5-year-olds fit with those of Landrum et al. (2013) and suggest that young children prioritize expertise over potentially transient positive characteristics. However, older children's preference for the positive informant is consistent with a positivity bias in children's social judgments that tends to peak in middle childhood (Boseovski, 2010). Optimistic expectations are more positive than realistic expectations, and also less accurate. If children's social preferences align with these prior findings that contrast information valence and expertise, then younger children might be expected to prefer realists over optimists, and older children might prefer optimists over realists. Critically, although optimists might have a lower likelihood of being accurate, they are not necessarily always wrong as optimistic predictions can be correct, and thus optimism and accuracy cannot be easily dissociated in the real world. However, in an experimental setting the levels of optimism and accuracy of one individual *relative* to that of another can be manipulated, allowing for a systematic investigation of the weight that each characteristic holds in social preferences among children.

Whereas much of the extant literature focuses on children's endorsement of information provided by specific individuals, it is also important to consider children's interest in forming social connections more broadly. Understanding with whom children chose to affiliate is important for understanding early peer relations and socio-emotional development. It also has potential epistemic implications as these early relationships may serve as a continuing source of information across contexts. There is some evidence that social affiliation follows a similar pattern to information endorsement when it comes to positive traits, however, when and why children turn to specific individuals across differing social contexts remains an unanswered and complex question. For example, one study found that 3-year-olds prefer to befriend nice over mean individuals, and by 5 years of age children were more likely to seek information from those with positive traits (Lane et al., 2012). Another study found that, in addition to endorsing collaborators more than non-collaborators, 5-year-olds (but not 3-year-olds) also liked collaborators better (Plötner, Over, Carpenter, & Tomasello, 2015). These findings provide evidence that preschoolers prefer to befriend benevolent individuals and by 5 years of age also prefer to learn from them. An assumption that underpins the present work is that both being optimistic and providing accurate information are desirable traits that children might seek out when deciding whom to befriend. If children view optimism in a similar manner to niceness, and/or if children themselves are optimistic and thus want to befriend others who are like them in this regard, then children should value optimism in a friendship. However, children's drive to acquire accurate information about the world, including their early abilities to seek out and learn from reliable sources, also suggests they value accuracy in their social affiliations. Thus, whether young children consider optimism and/or accuracy in their friendship evaluations remains an empirical question that will be addressed in the present study.

As a first step in understanding how optimism impacts children's social preferences, the present study focused on children's social evaluations and ability to accurately identify individuals who differed with regard to the relative levels of optimism and accuracy in the information they provided about the likelihood of a future event outcome. Although children might prefer different social partners for different purposes, the question of with whom children affiliate may inform our understanding of how children form new beliefs (and misbeliefs) about the world – as affiliating with optimists potentially means setting oneself up to receive more positive (mis) information in the future. A preference to form social relationships with optimistic individuals also provides a mechanism by which optimism is perpetuated and has important implications regarding the potential social benefits that derive from being optimistic.

2. Present research

The present research aims to determine how 3- to 6-year-old children integrate optimism and accuracy in their social preferences. When considered independently, we might expect children to choose social partners who expect desirable event outcomes *and* social partners who provide accurate information about the world. How children make social evaluations when these dimensions conflict – as optimistic predictions inherently do – is currently unknown. If a preference for optimists as social partners is present in early childhood, as it is in adults (e.g., Helweg-Larsen et al., 2002), then we would expect children to broadly

prefer social partners who are optimistic over those who are more accurate. In contrast, if children show a preference for accurate informants over optimists in a similar manner to their endorsements of experts over non-experts in the absence of cues to benevolence (e.g., Landrum et al., 2013, Study 1) that would suggest that children prioritize accuracy in early childhood and raise interesting questions about how and when a preference for optimists might develop. Although our predictions are based on the former account, either pattern of results would provide important information about how children weight the conflicting dimensions of optimism and accuracy in their decisions regarding whom to befriend.

The main study (Social Preference) tested children's preferences between informants who offered desirable, ambiguous, or undesirable predictions about a specific instance of an event outcome relative to the true likelihood of that outcome. Of key import were trials in which children were taught that a desirable outcome was unlikely (e.g., there are *almost never* pinwheel cookies) and then made a choice between an informant who provided a more optimistic yet inaccurate prediction (yes, there will be pinwheel cookies) or an informant who was more accurate (no, there will not be pinwheel cookies). For these trials, we predicted children would choose optimistic but inaccurate informants. In contrast, for trials in which optimism and accuracy do not conflict (e.g., there are *almost always* pinwheel cookies), we predicted children would choose informants who are more optimistic and accurate over those who are neither optimistic nor accurate.

If the findings from the main study support these predictions, we could conclude that children prefer social partners who are optimistic over those who are accurate (i.e., realistic). However, that pattern of findings would raise the question of whether children's preferences were due to children correctly remembering the true likelihood of the outcome but discounting that information in their choice, or whether they did not correctly remember the true likelihood of the undesirable event outcome. Therefore, a stronger test of the prediction that children prefer social partners who are optimistic yet inaccurate over those who are more accurate is to establish that children chose the optimist while understanding that the realist was most accurate. A follow-up study (Accuracy Identification) was thus conducted to directly test children's ability to correctly identify the more accurate informant on the same trials for which they had previously provided a social preference.

3. Method: main study (Social preference)

3.1. Participants

Participants were a community-based sample of 133 3- to 6-year-old children enrolled in a larger study that broadly investigated early optimism (37 3-year-olds, 45 4-year-olds, 51 5- & 6-year-olds; $M = 4;9$). Of those children, 51 % identified as White, 30 % Black, 7 % Hispanic, 9 % as bi- or multi-racial, and 4 % as other (see Supplement 1A for additional demographic information). The racial and socioeconomic demographics of this sample broadly mirror the St Louis, Missouri region where this study took place. Twelve additional children participated but were excluded from analyses for failure to pass the warm-up trials ($n = 3$), failure to complete all trials ($n = 2$), or a side response bias that suggested lack of meaningful engagement with the task ($n = 7$). That is, children chose the informant on the same side of the screen on 8+ trials (out of 9) suggesting they neither incorporated outcome

likelihood nor informant optimism into their response. This exclusion criterion was set *a priori* using binomial probabilities to determine the cut off at which the likelihood of chance responding was $<.05$.

Children were recruited concurrently from low, mixed, and mid/high income schools with the goal of enrolling 24 children from low and mid/high socioeconomic backgrounds at each of three age groups (3-years, 4-years, and 5- & 6-years; see Supplement 1B for details). This study uses new measures to test optimism in a new population; thus there was no clear research on which to base a power analysis. To respect standard sample sizes in developmental psychology, the decision to include 24 children per age and SES group was made prior to data collection. This sample is nearly twice as large as is commonly used in these types of binary-choice paradigms with young children (e.g., Jaswal et al., 2008; Johnston et al., 2015; Croce & Boseovski, 2020) to account for potential variability in our sample as a function of SES. All testing sessions were video recorded to allow for blind coding of children's responses. All study procedures were approved by the Washington University institutional review board and informed consent from caregivers and verbal assent from children were obtained.

3.2. Design and procedure

Two warm-up trials were administered to familiarize children with the task format and ensure that they could match a neutral activity presented on one slide with a target informant accurately describing that activity on a later slide (see Supplement 2A for details). If children failed to identify the target informant the trial was repeated up to two times. Three children were excluded for failing to identify the target informants; 86 % correctly identified both on the first try.

Experimental Trials: Nine scenarios were created consisting of four slides each and presented on a tablet computer in a pseudorandomized order. An experimenter walked children through each slide by reading the text and pointing to accompanying images in a systematic manner (Fig. 1). On the first slide children were introduced to an event that consisted of a subject, an outcome for that subject, and the likelihood of that event outcome. Semi-novel subjects (e.g., bowtie kites) were used to ensure that children did not have pre-existing knowledge of the likelihood of the event outcome. Events were selected such that for roughly half the stories the event happening was desirable or the event not happening was undesirable (positive valence) and for half the event happening was undesirable or the event not happening was desirable (negative valence). A total of 12 task orders were created with each order administered to roughly the same number of children at each age and SES group. Event order was pseudorandomized across task orders.

The likelihood of the event outcome was taught using one of three base-rates: *almost never*, *sometimes*, or *almost always*. The second slide reinforced the base-rate by depicting six instances of the outcome. For the *almost always* and *almost never* base-rates the six outcomes uniformly depicted the relevant outcome. *Sometimes* trials depicted three instances of the outcome happening and three of the outcome not happening. The decision to depict the outcome uniformly instead of probabilistically for the *almost always* and *almost never* trials was made to ensure that children would focus on and learn the most

likely outcome and not be distracted by the rare or unexpected outcome (e.g., the one non-broken crayon versus the five broken crayons). Across the nine events three were paired with each of the three base-rates, and which base-rate was paired with which event was counterbalanced between children.

Children begin using quantifiers such as “all” and “none” around their second birthdays, and by 3 years of age can distinguish between the terms “all” and “some” in contexts utilizing concrete examples with perceptible referents (Hollander, Gelman, & Star, 2002). Whereas, to our knowledge, there is no parallel work examining the terms *almost always* and *almost never*, by providing children with both linguistic and pictorial information about the base-rates, it seemed likely that even the youngest children in our sample would be able to learn the likelihood of each event outcome. Importantly, if children do not understand the base-rates then their responses should not differ as a function of base-rate – the key independent variable in this study. Moreover, although the situations were presented probabilistically as optimistic predictions are inherently probabilistic, if children did not understand the qualifier *almost* and/or relied solely on the outcome depiction (e.g., that all the crayons were broken), that interpretation should go against the hypothesis that children would choose to be friends with optimists even when the optimist is not the most accurate informant. Indeed, in this situation not only would the optimist not be the most accurate, they would actually be wrong, providing children with a stronger reason to choose the pessimist.

On the third slide children were introduced to a protagonist who is about to participate in the event followed by two informants who will give their predictions about the event outcome. The predictions followed the format of ‘yes, the event will happen’, ‘maybe, the event might happen’, and ‘no, the event will not happen’. Importantly, the inclusion of both positively and negatively valenced events controlled for the possibility that a ‘yes bias’ could be conflated with a preference for the most optimistic informants. That is, predictions such as ‘yes, she will find the missing puzzle piece’, and ‘no, his kite will not get stuck’ are both positive event outcomes, and children would need to select informants who provided both response types to show a preference for optimists over realists. The ‘maybe’ predictions were conceived of as neutral or uncommitted response options to explore more nuanced predictions about whether a preference for optimists over realists is driven by a preference for optimists or an avoidance of pessimists.

On the fourth slide each informant appeared in turn accompanied by an audio clip in which they stated their prediction. Then children were asked who they would like to be friends with. Both informants for a given event were the same gender and race, but wore shirts of different colors and differed in hair color, style, or eye color. Which prediction was paired with which informant was counterbalanced between children. Children’s informant choice, either via pointing or verbal description (e.g., the one in the blue shirt) served as the dependent variable. See Supplement 2B for the full task script and list of subjects and outcomes used in each trial.

4. Results

4.1. Coding & analytic strategy

Children's informant choices were coded from video by a researcher blind to the base-rate and compared to the live-coded responses. Agreement was near perfect (Cohen's kappa = .98) with discrepancies resolved by a third blind coder. For each trial one informant's prediction was more desirable than the other. Responses were scored such that children's choice of the informant who provided the more desirable response = 1 and less desirable response = 0. For simplicity, informants who made the most desirable predictions are labeled optimists; those who made the least desirable predictions are labeled pessimists. Across trials the likelihood of a desirable event outcome occurring either most closely matched the prediction from the optimist (*match trials*), was 'sometimes' and thus fell in the middle (*ambiguous trials*), or conflicted with the prediction from the optimist (*conflict trials*). The conflict trials are thus of key importance as those are the trials for which children could choose to be social partners with the optimist when the optimist provided a more desirable yet inaccurate prediction over an informant who was more accurate. Informant pairs were further broken down into three outcome responses. The primary contrast consisted of responses in which an optimist (1) was pitted against a pessimist (0). The secondary contrasts consisted of an optimist (1) pitted against a neutral informant (0), and a neutral informant (1) pitted against a pessimist (0).

Preliminary analyses indicated no significant difference in children's responses as a function of event valence; thus valence was collapsed across trial type for all subsequent analyses. A series of Generalized Estimating Equations (GEEs) were conducted to model the probability of selecting the more optimistic character by trial type (match, ambiguous, conflict). GEEs were used to account for multiple trials for each child with binomial response options. All models included age and sex as covariates. To include the maximal number of data points in a single model, Model 1 examined the probability of children choosing of the more optimistic character as a function of trial type with the data collapsed across the three contrasts. Models 2–4 provide targeted analyses of the three response contrasts separately (optimist vs. pessimist, optimist vs. neutral, pessimist vs. neutral). Finally, binomial probability tests were used to determine whether children's responses were significantly different than chance (.5). This latter analysis strategy is of particular import as these findings could elucidate children's absolute social preference for or against a particular informant. The Benjamini-Hochberg procedure with the false discovery rate (FDR) set at .05 was used to control for multiple comparisons in all secondary (exploratory) contrasts.

4.2. Overall analyses

Model 1 revealed that children were significantly more likely to select the optimist on match trials than conflict trials ($B = -.59$, $SE = .16$, $z = -3.61$, $p < .001$), and on ambiguous trials than conflict trials, ($B = -.37$, $SE = .16$, $z = -2.38$, $p = .017$), but not between match and ambiguous trials ($B = -.22$, $SE = .16$, $z = -1.37$, $p = .170$; Fig. 2). There were no significant effects of age or sex (see Supplement 3 for full model details). These findings demonstrate that children incorporated base-rate information into their social choices and were more likely to select the optimist when the optimist was also the most accurate. Children also

appeared to treat the ambiguous ‘sometimes’ trials more similarly to the match trials than to conflict trials, preferring optimists over pessimists when neither informant was necessarily more accurate than the other.

Binomial probabilities demonstrate that children chose the optimist more frequently than expected by chance on match ($p < .001$), ambiguous ($p < .001$), and conflict trials ($p = .013$). Children’s selection of the optimist at above chance rates for conflict trials provides direct support for the hypothesis that children prefer to be friends with optimistic but inaccurate informants. Moreover, children chose the optimist on 69 % of match trials and on 56 % of conflict trials. The score of 69 % on match trials likely captures children’s combined preference for optimistic and accurate informants, individual preferences in social partners (e.g., informant shirt color), and task variance. If so, and if children weighed these variables similarly on the conflict trials, they should have chosen the accurate informant on 31 % of conflict trials. However, at 56 %, children chose optimist significantly more often, $\chi^2(1, N = 133) = 49.52, p < .001$. Together, these findings indicate that children weigh optimism more heavily in their social preferences than accuracy.

4.3. Targeted analyses of response contrasts

4.3.1. Primary contrast (Optimist vs. Pessimist)—Model 2 revealed that children chose the optimist more frequently than the pessimist on both match and ambiguous trials relative to conflict trials ($B = -1.00, SE = .28, z = -3.63, p < .001$ and $B = -.073, SE = .33, z = -2.21, p = .027$ respectively). Further, children chose the optimist more frequently than expected by chance on match ($p < .001$), ambiguous ($p < .001$), and conflict trials ($p = .003$).

4.3.2. Secondary contrasts—Models 3–4 did not find any significant differences in informant choice when the optimist was pitted against a neutral informant or when the neutral informant was pitted against the pessimist.

Together, these analyses qualify the overall findings by demonstrating that when optimists are contrasted with pessimists, not only do children have a robust preference for informants who are both optimistic and most accurate (match trials), but *also* that children prefer optimistic yet inaccurate informants over informants who more accurate (conflict trials). The patterns of responses across the secondary contrasts, although not significant, are largely in line with those from the primary contrast. Thus, whereas preferences for optimists over pessimists might only be evident when the two are in direct contrast, it is also possible that the more subtle distinctions between neutral and optimistic or pessimistic informants in this task were too difficult for children to fully grasp.

Children’s differential responding in the match relative to conflict trials for the overall and primary contrast indicate that children learned the base-rates of the event outcomes and, at least to some extent, incorporated these base-rates into their social preferences. However, an alternative explanation is that for conflict trials some children misremembered the base-rate as desirable whereas others remembered it accurately. If so, it is possible in the former situation that children mistakenly believed they were choosing the accurate informant. A stronger test of the prediction that children prefer to be social partners with someone who is optimistic yet inaccurate over someone who is simply more accurate is therefore to establish

that children chose to be social partners with the optimist while also understanding that the optimist was inaccurate. Thus, the Accuracy Identification follow-up was implemented to directly test children's ability to correctly identify the most accurate informant on the same trials for which they previously provided a social preference.

5. Method: follow-up (Identification of Accurate Informant)

5.1. Participants

Participants were 93 3- to 6-year-old children who successfully completed the Social Preference experiment (20 3-year-olds, 26 4-year-olds, 47 5- & 6-year-olds; 70 % of the original sample). The Accuracy Identification follow-up was added onto the Social Preference protocol partway through data collection, with attempts made to contact and include all previous participants. There were no significant differences between samples with regard sex, race, or household income, although children in the follow-up were slightly older ($M = 5;1$). Accuracy Identification was administered to children approximately one week after their completion of Social Preference, and preliminary analyses verified there were no significant effects of time between tasks on children's responses.

The decision to administer the follow-up to the same children instead of recruiting another sample was twofold. First, the diverse composition of the original sample would have been difficult to adequately match in a second sample given practical constraints of time and funding. Second, assessing whether the same children who demonstrated a preference for inaccurate optimists over accurate pessimists are able to correctly identify the most accurate informant is a more powerful test of the prediction that children choose to befriend optimists even when they recognize the optimist is inaccurate. This approach allows for direct conclusions to be drawn regarding children's social preferences in the context of their ability to determine the accuracy of the informant. Importantly, any carryover effects between Social Preference and Accuracy Identification would most likely bias *against* this prediction as children would be expected to choose the same (usually optimistic) informant in the Accuracy Identification that they had previously selected to befriend.

5.2. Design and procedure

A different researcher from the Social Preference experiment presented children with the same warm-up and experimental trials. The procedure was the same as for Social Preference except that children were asked to identify which informant was correct in their prediction (i.e., "*Who was right?*") instead of with whom they wanted to be friends.

6. Results

6.1. Coding & analytic strategy

Children's informant choices were coded from video and compared to the live-coded response with near perfect agreement (Cohen's kappa = .98). As with Social Preference, children's selection of the informant who provided the more desirable response = 1 and less desirable response = 0. This scoring allowed for direct comparisons between experiments. Thus, for match trials, children who chose the optimist or accurately identified the correct

informant received a score of 1. However, for conflict trials, children who chose the optimist received a score of 1, but those who selected the correct informant received a score of 0 (Fig. 3).

To compare children's responses across experiments, a series of GEEs were conducted to model the probability of selecting the more optimistic character by trial type (match, ambiguous, conflict) and experiment (Social Preference, Accuracy Identification). All models included age and sex as covariates and interaction terms for trial type by experiment. Model 1 examined the probability of children choosing of the more optimistic character as a function of trial type and experiment with the data collapsed across the three contrasts. Models 2–4 provide targeted analyses of the three response contrasts separately (optimist vs. pessimist, optimist vs. neutral, pessimist vs. neutral). Binomial probability tests were used to determine whether children's responses were significantly different than chance (.5). As with Social Preference, the Benjamini-Hochberg procedure was used to control for multiple comparisons within the secondary contrasts. Primary results are reported in text with all results reported in Supplement 4.

6.2. Overall analyses

Model 1 revealed a significant interaction between match and conflict trials by experiment such that for match trials children selected the optimist more frequently for Accuracy Identification than Social Preference, but for conflict trials children selected the optimistic informant *less* frequently for Accuracy Identification than Social Preference ($B = -2.65$, $SE = .43$, $z = -6.24$, $p < .001$). A similar interaction between ambiguous and conflict trials indicates that children were more likely to identify the optimistic informant as accurate on ambiguous trials ($B = -1.74$, $SE = .42$, $z = -4.11$, $p < .001$). An interaction between match and ambiguous trials did not survive corrections for multiple comparisons. As with Social Preference there were no significant effects of age or sex (see Supplement 5 for an exploratory figure depicting experiment by age).

6.3. Targeted analyses of response contrasts

6.3.1. Primary contrast (Optimist vs. Pessimist)—Consistent with Model 1, Model 2 revealed a significant interaction between match and conflict trials by experiment such that for match trials children selected the optimist more frequently for Accuracy Identification than Social Preference, but for conflict trials children selected the optimistic informant less frequently for Accuracy Identification than Social Preference ($B = -2.18$, $SE = .90$, $z = -2.41$, $p = .016$; see Fig. 4). Further, for match trials children selected the optimist more frequently than chance for both experiments ($ps < .001$), but for conflict trials children selected the optimist more frequently than chance for Social Preference ($p = .050$) but *less* frequently than chance for Accuracy Identification ($p < .001$). That is, for conflict trials children were more likely to select the optimist as a friend but identify the non-optimist as accurate. Together, these findings support the main prediction that children choose to be social partners with optimists even when they know the optimist is not providing accurate information.

Children also identified the more accurate informant significantly more frequently for match trials than conflict trials, $\chi^2(1, N = 93) = 14.28, p < .001$. Thus, even though children chose optimists as social partners even when they identified the pessimist as being more accurate, when children made identification mistakes they were significantly more likely to misremember the optimist as having been accurate. This misidentification could reflect (1) an initial failure to learn the undesirable event outcome, (2) an inability to inhibit selecting the optimist, and/or (3) a change in base-rate knowledge after hearing the optimist's prediction.

6.3.2. Secondary contrasts—Model 3 revealed significant interactions between match and conflict trials by experiment ($B = -5.29, SE = 1.22, z = -4.32, p < .001$) and between ambiguous and conflict trials by experiment ($B = -3.51, SE = 1.07, z = -3.28, p < .001$) when the optimist was pitted against a neutral informant. These interactions appear driven by children more frequently choosing the optimist for Accuracy Identification than Social Preference for conflict trials but equivalently between the optimist and the neutral informant for match and ambiguous trials (see Supplement 6 for figure). Model 4 did not find any significant differences in informant choice when the neutral informant was pitted against the pessimist as a function of experiment.

7. General discussion

Children in the present study demonstrated a robust preference for optimists as social partners. Critically, this preference extended to scenarios in which the optimist provided inaccurate information about the likelihood of a future event outcome *and* children recognized that the optimist was inaccurate. Previous research found that when a positive characteristic (competence) was directly contrasted with a negative characteristic (meanness), children selected mean but accurate informants only when they were able to explicitly indicate which informant was the smarter one (Johnston et al., 2015). In contrast, our study found that even when children correctly identified that the most accurate informant was *not* the optimist they were still more likely to befriend the optimist. This finding is striking given the literature on young children's tendency to choose reliable informants and highlights the value placed on optimistic social partners.

Children's preference for optimists was tempered by the relative accuracy of the informants' predictions such that children were *even more* likely to befriend the optimist when the optimist was also the most accurate informant. This suggests children integrate accuracy and a preference for optimists into their social evaluations. Children's preferences were also tempered by the relative levels of optimism or pessimism exhibited by the informants. Specifically, children's preferences for the more optimistic yet inaccurate informant were strongest when that informant was contrasted with a more pessimistic yet accurate informant relative to a more neutral informant.

Children also made significantly more mistakes identifying the most accurate informant when the accurate informant was not the most optimistic relative to when the accurate informant was the most optimistic (conflict trials). Although these findings do not supersede those that children prefer optimists over realists, they nevertheless point to processes or

mechanisms that guide children's learning from others. Specifically, children may be biased to expect others to provide positive information. In line with this account, when presented with information about the high likelihood of a negative event outcome, children may have failed to attend to or integrate this information into their knowledge of the event outcome and thus subsequently 'defaulted' to selecting the informant who provided the most optimistic information. This explanation is similar to the construct of asymmetric updating of beliefs where individuals are more likely to update their beliefs when presented with information that is more positive than their current belief relative to information that is more negative (see Sharot & Garrett, 2016 for a review). It is also possible that children correctly remembered the undesirable outcome but were unable to inhibit selecting the optimistic informant. Either explanation would result in children holding expectations of event outcomes that are more positive than reality. Determining how and when children make these mistakes will be an important direction for future research.

Children also show a bias toward positivity such that they tend to hold positive perceptions of themselves and others. This bias emerges in early childhood and persists, peaking in middle childhood (see Boseovski, 2010 for a review). As similarity is a strong driver of social preferences (e.g., Fawcett & Markson, 2010; Rubin, Lynch, Coplan, Rose-Krasnor, & Booth, 1994), it is possible that children's own optimistic tendencies – as a specific type of positivity – led them to favor the optimist as a social partner. This explanation has implications for the formation and maintenance of optimism, as it suggests that being optimistic confers early social benefits such as increased desirability as a social partner. This in turn could increase relationship quantity and/or quality by providing optimistic children with more friendship options. Befriending optimists also provides more exposure to optimistic predictions, which could normalize them and further foster optimism in both parties. It is also possible that social feedback from peers might lead children to exaggerate the likelihood of positive outcomes to foster those relationships. In contrast, children who espouse more accurate but less desirable predictions might be less liked by their peers. Early friendships lay the groundwork for children to form social connections outside the family, practice social skills, and learn sociocultural rules (Rubin, Bukowski, & Laursen, 2009). Evaluating the role of children's own optimism on social preferences is thus another direction for future research.

No age differences were found for children's social evaluations or abilities to correctly identify the more accurate informant, suggesting that a preference toward optimists is present in children as young as 3 years. This preference broadly aligns with adults' preferences for optimists (e.g., Helweg-Larsen et al., 2002; Milhabet & Verlhac, 2011; Vollmann & Renner, 2010) and suggests that a preference to affiliate with optimists could influence children's earliest friendships. Although it is surprising that older children were not better than younger children at correctly identifying the more accurate informant, the near-ceiling responses for the match trials might have overpowered smaller more subtle differences in accuracy identification in the conflict trials.

That these questions were tested in a socio-economically and racially diverse community sample of young children is important both for generalization and scientific progress. However, given that this sample is less homogeneous than most, we recognize that effect

sizes might be smaller and nuanced distinctions more difficult to detect (e.g., differences between neutral and optimistic or pessimistic informants). Although the present sample size was double that of similar experiments for precisely these reasons, the role of these factors on children's social preferences remains an open question.

One potential limitation of the current study is the complexity of reconciling research on social preferences with the developmental literature on testimony endorsement. In one sense, the present study is only tangentially situated in the trust and testimony literature, via methodological similarities. However, whereas in isolation children might select different social partners for different purposes – such as choosing optimists as social partners, but turning to realists for information acquisition and learning – it is also the case that children should learn the most from those individuals with whom they surround themselves. Although children are unlikely to ever have to directly choose between an optimist and a realist, all individuals make predictions about future events that are either more positive, precisely aligned with, or less positive than reality, and the types of predictions one makes are likely to be fairly stable over time (e.g., Sharot, 2011). Thus, the finding that children prefer to befriend optimists over realists could have implications for how children learn from and about the world around them. However, we do not yet have information on children's expectations about optimists with regard to epistemic trust, and it is possible that evaluations pertaining to epistemic trust and social trust may not be based on same goals. The extent to which optimism affects who children choose to befriend and/or learn from, and how optimism intersects with epistemic trust, thus remains an open empirical question.

A second limitation concerns whether children were aware that the informants had access to the base-rate information. On the target trials, children were not explicitly told that informants knew the base-rate. However, three measures were taken to convey that the informants were aware of the base-rate. First, during the warm-up trials the informants directly observed the event (e.g., Emily going down the slide) before making their contrasting statements (e.g., Emily was/was not going down the slide). This was done to make the warm-up trials as concrete as possible and ensured children knew the informants were knowledgeable about the event. Second, for target trials the base-rate information was presented using generic language with the goal of conveying to children that the base-rate is an intrinsic property of the object. This approach does not rule out the possibility that the informant was unaware of the base-rate, however it was implemented to convey that the base-rate is a property that is known by others. Third, and perhaps most compelling, the base-rate is repeated to children on the third slide where the two informants are present. This approach both reminded children of the base-rate right before the test question and presented the base-rate in the presence of the informants. Therefore, it is highly likely that children believed the informants knew the base-rate even though this knowledge was not made explicit.

In the present study the base-rate was presented using the linguistic terms *almost always*, *sometimes*, and *almost never*, and accompanied by images that depicted six event outcomes such that the outcome uniformly always occurred, occurred for half of the events, or never occurred. As discussed previously, the decision to depict *almost always* and *almost never* using uniform event outcomes was made to increase the likelihood that children

would focus on and learn the most likely outcome and not be distracted by the rare or unexpected outcome (e.g., one non-broken crayon versus five broken crayons). However, whether depicting the outcomes in this manner was necessary in order for children to learn the base-rate, or if the manner in which the base-rate is presented affects how children interpret or utilize that base-rate remains an open question. It might be the case that having a visual representation of rare or unexpected outcomes make those outcomes appear less unlikely; however, it might also be the case that viewing those rare or unexpected outcomes would highlight the more frequent outcome. Moreover, it is also possible that these visual depictions could interact with age in their impact on children's understanding or utilization of the base-rate in their subsequent decisions. These questions will be important to examine in future studies to gain a more robust understanding of the factors that children consider in their learning about event outcomes, and potentially their affiliative relationships.

To recap, children's social choices are complex and integrate multiple cues – including optimism and accuracy – when deciding who makes a good social partner. That children prefer optimists to realists – even when they are able to identify optimists as inaccurate – informs our knowledge of children's reasoning about other people. A preference to affiliate with optimistic individuals shapes children's earliest friendships and may impact how they learn from others and the world around them, including reasoning about the likelihood of future event outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Fig. 1.

An example of an optimist vs. pessimist conflict trial. The likelihood of the event occurring (glitter crayons *almost always* break) was followed by one informant making an optimistic yet more inaccurate prediction about a future instance of the event (no, her crayon will not break) and the other informant making a pessimistic yet more accurate response (yes, her crayon will break). The analogous match trial, counterbalanced between children, teaches that glitter crayons *almost never* break.

Fig. 2.

Estimates of children's selections of each informant as a function of trial type in the Social Preference task for the overall (combined) data and broken down by response contrast. For match trials the optimist was also the most accurate informant, for ambiguous trials neither informant was more accurate, and for conflict trials the optimist was not the most accurate informant. Higher scores indicate greater frequency of choosing the more optimistic informant. Asterisks indicate significant differences between children's informant choices as a function of trial type and conditions in which children chose the more optimistic informant more frequently than would be expected by chance.

Fig. 3. Depicts the response patterns expected if children either always chose the most optimistic informant (left) or always chose the most accurate informant (right).

Fig. 4. The probability of selecting the more optimistic character for Social Preference and Accuracy Identification for the primary optimist vs. pessimist contrast. Higher scores indicate greater frequency of choosing the optimist. Asterisks indicate significant differences in children's response choices as a function of trial type and experiment.