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Children seek out observations that can reveal a partner's generosity☆

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ABSTRACT

Humans face the adaptive challenge of assessing how much other people value them. Evidence suggests that the human mind is well-equipped for this task: people can rationally estimate, and collect information about, the weight that an interaction partner assigns to their welfare (the partner's welfare-tradeoff ratio). Here we probe the developmental origins of this ability using an information-search task with 6- to 12-year-old children ($n = 97$). Children took part in an economic game where another agent allocated rewards either to themselves or the child. The children could choose which of the agent's decisions they wanted to see. We compared children's choices to the predictions of a normative Bayesian model that maximizes expected information gain about the partner's welfare-tradeoff ratio. We found that children's information-seeking behavior was broadly aligned with the normative model, although they tended to under-weigh prior information when modeling their partner's decision-making. These findings suggest that by middle childhood, children are rational information-seekers in social contexts, strategically gathering data to inform their social judgments.

1. Introduction

Imagine the following scenario: there is a new co-worker in your office, Sam. You have had friendly interactions with Sam, but are not sure just *how much* she likes you. You may be fairly certain that she would lend you a euro if you are short on cash at the office vending machine. You may also be fairly certain that if you asked Sam to take over your workload for a month so you can go on a cruise, she would politely (albeit awkwardly) decline the request. However, there are other scenarios where you cannot be so sure how Sam would behave: for example, would she stay for an hour after work to help you finish a task when you are pushing a deadline? You may be especially curious to find out Sam's decision in this type of situation, because it would provide you with new information about her and her disposition towards you.

To navigate social interactions, people have to gauge whether and under what circumstances a partner is likely to cooperate with them. Humans are interdependent, uniquely cooperative and occasionally prosocial. Yet, given finite resources, they often face a choice of how to spend available resources: for example, there might be situations in which they could either benefit themselves, or behave altruistically. The outcomes of these types of decisions depend on features of the situation (e.g., how costly it would be to help, or how much either agent would stand to gain), but also on the relationship between agents, or more specifically, how much the prospective helper values the recipient. This intuition has been formalized with the concept of a welfare-tradeoff ratio (WTR), a psychological variable that aggregates information about context and agents, and determines how decision-makers trade off their self-interest against others' welfare. (Here, we sometimes refer to an agent's disposition or tendency to allocate resources to another as *generosity*; an agent with a high WTR with someone is likely to act generously towards that person.) Accurately estimating a partner's WTR towards oneself helps predict the partner's behavior in future interactions: it allows assessing under what circumstances one can count on the partner acting helpfully. WTR attributions can also guide one's own behavior towards the partner, as it is beneficial to invest more in a relationship with someone who is likely to reciprocate.

For this reason, obtaining information about a partner's WTR poses an adaptive challenge, and people may be especially motivated to acquire such information. To do so, they may seek out evidence that can pinpoint more precisely how much the partner values one's welfare. In a recent study, Quillien (2023) found that adults rationally chose to observe the outcomes of a partner's resource allocation decisions that were relatively more informative with regards to the partner's WTR. In the task, participants saw two decisions a partner had previously

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faced, where the partner could award resources either to herself or to the participant. Participants could find out the outcome of one of the two decisions. Their choices were compared to the predictions of a normative Bayesian model specifying optimal information search in the task.

Here, we conducted an experiment that builds on this finding, and investigated whether such rational social curiosity is already present in childhood. We adapted Quillien's design (procedure and stimuli) to be suitable for testing a sample of 6- to 12-year-old children, to see whether they would similarly seek out maximally informative observations about an interaction partner's generosity. We compare their behaviors to the normative Bayesian model from Quillien (2023). If children's information-seeking behavior matches its predictions, this would suggest that they already have a mental model of how people decide between selfish and altruistic actions, and rationally seek out observations that can more precisely inform their estimate of the partner's generosity towards them. The present research thus sheds light on children's capacity to rationally search for information in the social domain. In doing so, it contributes to the growing literature that aims to uncover the mechanisms supporting social cognition in cooperative contexts, and trace their emergence in development.

1.1. Welfare-tradeoff cognition

Humans are a uniquely social species and are unparalleled among animals in their propensity for prosocial behavior. Crucially, altruism is not deployed unconditionally: in particular, it is affected by features of agents' relationships (e.g., the degree of agents' relatedness, their interaction history; Lieberman et al., 2007; Trivers, 1971) as well as the situations in which an interaction takes place (e.g., the cost of the action and the magnitude of benefits provided to the recipient; Tooby et al., 2008). For agents in complex social environments, it is advantageous to be selective when investing their resources on behalf of another, and to interact with others who value them highly.

Human psychology has arguably been shaped by evolution to successfully navigate the challenges posed by these dynamics. Evolutionary researchers have proposed that social cognition recruits a psychological summary variable called the welfare-tradeoff ratio (WTR), which tracks and aggregates agent- and situation-specific factors and specifies how agents trade off their own welfare against that of a social partner (Delton et al., 2023; Jones & Rachlin, 2006; Tooby et al., 2008). In other words, WTRs specify how much cost an agent is willing to incur to provide benefits to another. Thus, in deciding whether to act altruistically or selfishly, people assess whether the cost they would incur (in terms of effort, investment of a resource, or opportunity cost) is outweighed by the benefits to the recipient, where this benefit is discounted by their WTR toward the recipient.

WTRs differ by the interaction partner's identity: they are higher for those we are close with (friends, family) and may even be negative for those we wish to harm. The concept captures the intuition that people are generally more willing to help if the cost of doing so is small and/or the benefit to be obtained by the recipient is very large (e.g., jumping into a lake despite wearing new shoes to save a drowning child), and that the threshold for choosing altruism depends on the relationship one has with the recipient (e.g., I would buy ice cream for my child, but not a random stranger). Moreover, it aggregates conflicting information and thereby helps agents make actionable decisions.

Because people behave as if their social-decision making is guided by WTRs, there is an important selection pressure for others to track these WTRs (Tooby et al., 2008), as shown in formal evolutionary models (Eisenbruch & Krasnow, 2022; Qi & Vul, 2022). An emerging body of evidence confirms this prediction: people extract information about other people's WTRs, and use them for prediction and evaluation (Delton & Robertson, 2012; Quillien et al., 2023; Sell et al., 2017). WTR inference can be considered a form of theory of mind (Qi & Vul, 2022): it allows observers to explain patterns of behavior across different contexts by attributing internal variables to agents, thereby making more complex forms of cooperation possible (Kleiman-Weiner et al., 2025). For this reason, people tend to rely on WTR cues in partner choice even when doing so does not maximize immediate absolute payoff (Delton and Robertson, 2012; Lim, 2012; Eisenbruch and Roney, 2017; Raihani and Barclay, 2016; for review see e.g. Delton and Robertson, 2016). For example, participants prefer interacting with a partner who shares a large fraction of a small endowment than a partner who shares a small fraction of a large endowment, even if the latter partner delivers more reward to the participant (Lim, 2012; Raihani & Barclay, 2016). The WTR of a partner is not transparently observable, and must often be inferred on the basis of sparse evidence about the partner's behavior; people seem to make these inferences efficiently, in a way that approximates normative Bayesian inference (Quillien et al., 2023).

Cognitive adaptations for solving the adaptive challenge of accurately assessing an interaction partner's generosity towards oneself might already be operating in childhood (Powell, 2022). First, children might have an understanding of welfare trade-offs because it will be useful to them in adulthood, and this early understanding gives them time to calibrate their internal mental models of social dynamics, and learn the structure of their social world. Second, the adaptive challenge of selective cooperation arguably already affects children. Children receive support from their parents but also, crucially, from non-related alloparents (Hrdy & Burkart, 2020). They play an active role in soliciting care and are in competition with other dependents for available resources. Moreover, children frequently interact with non-related peers. Even within a family, fitness interests are not entirely aligned, creating a need to closely monitor relative resource allocation (Trivers, 1974). For these reasons, it is advantageous to express selectivity in social behaviors and preferentially engage with those who are likely to have a higher level of generosity, either as a general trait or towards oneself specifically, even very early in childhood (Kuhlmeier et al., 2014).

1.2. Children's social cognition and cost-benefit calculus

Is there experimental evidence for early welfare-tradeoff cognition in human children? Research in the last years has made progress in our understanding of the principles that underlie children's reasoning about social behaviors. Among such principles are the tendency to attribute observed behaviors to internal causes and to reason about costs and benefits of actions to explain and predict them, which is a prerequisite for assessing how agents trade off these parameters for themselves and others. A "naive utility calculus" has been hypothesized to underlie children's and possibly even infants' social cognition (Gergely & Csibra, 2003; Jara-Ettinger et al., 2016; Liu et al., 2017; Lucas et al., 2014). According to this account, children see agents as utility-maximizers who aim to maximize the rewards obtained from reaching their goals while minimizing the costs required to do so. Leveraging this assumption, children can infer other agents' goals, preferences, beliefs, and competences by observing their behaviors, and predict future actions on this basis.

Young children understand that agents sometimes perform costly actions on behalf of others, to cooperate or act altruistically (Dahl & Paulus, 2019; Powell, 2022; Warneken, 2018). For example, three-year-olds attribute a social goal to an agent whose behavior is best explained as motivated by the goal of helping another agent (Schlingloff-Nemecz et al., 2025a). Even preverbal infants ascribe the social goal of giving to an agent who moves a resource into the vicinity of another, and possibly rationalize this behavior by positing a relationship between interactants, wherein proximate costs are offset in the long-term by reciprocal exchange (Tatone & Csibra, 2024; Tatone et al., 2015). While children consider prosociality obligatory under some circumstances (as Dahl et al., 2020 found with 3- to 5-year-old preschoolers), they do not anticipate or adhere to a standard of indiscriminate altruism.

Instead, from the second year of life, children calibrate their own behavior as well as their expectations and evaluations of others' actions to the costs of helping and benefits received by the helpee (Eisenberg-Berg & Neal, 1981; Jara-Ettinger et al., 2015; Paulus, 2020; Radovanovic et al., 2023, 2025; Sierksma et al., 2014; Sommerville et al., 2018; Woo et al., 2024; Zhao & Kushnir, 2023).

Children also appreciate that relationships can modify the social cost-benefit calculus (de Cooke, 1992; Killen & Turiel, 1998; Liberman & Shaw, 2017; Lu & Chang, 2016; Mammen et al., 2021; McPhee et al., 2022), and possess nuanced intuitions about fairness and acceptable resource allocations. While young children prefer inequity that is advantageous for them, they generally predict (and prefer) fair distributions in third-party contexts (Shaw et al., 2012), even in infancy (Lucca et al., 2018; Sloane et al., 2012). However, they also expect agents to be biased and favor specific recipients: from the preschool years, children use relationship information to guide their predictions of how agents will (or should) behave (Mammen et al., 2021; Spokes & Spelke, 2017), and use partiality in resource distribution to infer social relations (e.g., McPhee et al., 2022; Liberman and Shaw, 2017). In their own behavior, preschoolers are more prosocial the closer they are with the recipient (Engelmann et al., 2019; Lu & Chang, 2016; Moore, 2009; Paulus & Moore, 2014). A study by Howard et al. (2018) tested more directly that children's self- vs. other-regarding decisions are guided by a WTR psychology. They found that like adults, 4- to 11-year-old children abide relatively consistently by a specific ratio to decide whether to allocate rewards to themselves or a partner, and that this ratio varies by the closeness of their relationship with the recipient.

The information that children glean about other agents' behavioral dispositions, such as their generosity or fairness, influences their social decision-making. Infants prefer to interact with agents who previously shared fairly (e.g. Lucca et al., 2018; Burns and Sommerville, 2014), and preschoolers from three years of age reciprocate a prosocial act by preferentially allocating a scarce resource to an agent who previously shared or helped (Kenward & Dahl, 2011; Olson & Spelke, 2008). When choosing partners for cooperative endeavors, children from this age were shown to select relatively more advantageous partners (Grueneisen et al., 2023; Martin et al., 2022; Myslinska-Szarek & Warneken, 2025; Prétôt et al., 2020; Schlingloff-Nemecz et al., 2025b; Woodward et al., 2022). Thus, from early on, children assess prospective partner quality by evaluating agents' behaviors, and are selective in who they choose to interact with.

1.3. Social curiosity

The evidence required to draw conclusions about someone's prosociality may not always be readily available from incidentally observed behaviors. In such cases, people may seek out observations that can provide them such evidence. This is especially crucial when interacting with novel acquaintances whose behavior may be hard to predict, and in conditions of interdependence with a partner. Prior research has found that when querying information about others, people generally prioritize morally relevant information, and adjust their information-seeking strategies to obtain it (Brambilla et al., 2011; Kawamura & Barclay, 2025; Wojciszke et al., 1998). In a recent study, Quillien (2023) found that adult participants search for information about a social interaction partner in a rational manner, by seeking out observations that are maximally informative with regards to a partner's WTR towards them. This study showed that participants' information-seeking was near optimal in this context, possibly indicating that the human mind is particularly adept at assessing another agent's quality as a cooperation partner.

Developmental research on exploration and active learning has found that from very early in life, children are competent learners who strategically seek out relevant information. Even young infants preferentially attend to stimuli that allow them to maximize learning (Kidd et al., 2012; Poli et al., 2024, 2020). From the preschool years, children test hypotheses by selecting and executing interventions that are likely to yield the most informative outcomes (Cook et al., 2011; Gweon & Schulz, 2019; Ruggeri et al., 2019; Schulz & Bonawitz, 2007; Siegel et al., 2021). Moreover, young children are ecological active learners, who can flexibly adapt their learning strategy to the context (Ruggeri, 2022; Ruggeri & Feufel, 2015; Ruggeri et al., 2017). Research from this framework has highlighted that both features of experimental tasks as well as the target domain may influence children's information-seeking behavior.

On the other hand, children's information-seeking often falls short of normative standards for optimal search, and undergoes substantial development in middle childhood (Mosher & Hornsby, 1966; Ruggeri & Lombrozo, 2015). For example, younger children often search exhaustively and continue to pose queries even if they do not yield further information gain Davidson (1991), Gregan-Paxton and John (1997), Howse et al. (2003), Ruggeri et al. (2016). Different factors may underlie children's shortcomings in information-seeking and question-asking tasks. One possibility is that necessary cognitive mechanisms undergo protracted development. Another is that characteristics of experimental paradigms mask children's competences, and that appropriate scaffolding can boost their performance (Howse et al., 2003; Ruggeri & Feufel, 2015; Ruggeri et al., 2019; Swaboda et al., 2022).

Just as for adults, the social domain may be particularly relevant and salient for children. To date, only a few studies have investigated children's curiosity or search for information about other agents (cf. Camhy and Ruble, 1994; Fitneva et al., 2013; Lewis et al., 2025; Wang et al., 2021; Way and Taffe, 2024; Yonas and Heiphetz Solomon, 2024). For instance, Lewis and colleagues (2025) recently found that preschoolers preferred to watch videos of social interactions over those of agents performing actions by themselves. However, not much is known about children's behaviors that strategically maximize information gain about social partners, where the target of the information search are features of agents that are not immediately accessible. Extant research suggests that while very young children show curiosity about certain features of other agents, the ability to seek out relevant and informative observations about them may become more sophisticated across early and middle childhood, and at least partly depends on specific domain-specific beliefs children hold (e.g., the extent to which they think other agents' behavior is determined by stable internal dispositions) (Camhy & Ruble, 1994; Dunn, 1988; Fitneva et al., 2013; Lewis et al., 2025; Wang et al., 2021). To date, research on children's curiosity and active learning about social interaction partners has not compared their information-seeking behaviors to normative benchmarks of rationality.

We hypothesize that children may be, like adults, motivated to seek information that allows them to infer agents' WTR, especially when these agents are unfamiliar. As the previously reviewed literature attests, children have early-emerging intuitions about prosocial behavior in the context of relationships, and, at least by preschool age, expect agents to invest more resources on behalf of relatives (e.g., offspring) and friends (Liberman & Shaw, 2017; Mammen et al., 2021; McPhee et al., 2022; Spokes & Spelke, 2017). This makes plausible the conjecture that children would, conversely, appreciate the relative evidentiary value of specific observations for inferring an unfamiliar agent's disposition towards them. Moreover, if gauging an interaction partner's generosity constitutes an adaptive problem for children, it is possible that they are adept at making optimal queries in this domain even at an age when their information-seeking behavior often falls short from the normative standard. In this case, WTR cognition designed to navigate complex social environments and interactions would support children's rational exploration, learning and decision-making in the social domain.

1.4. The current study

In this study, we investigated whether 6- to 12-year-old children, like adults, choose to uncover outcomes that are maximally informative about an interaction partner's WTR. We thus aimed to investigate the developmental roots and trajectory of rational information-seeking in the context of a social interaction. To do so, we built on a prior study by Quillien (2023), who found that adults can make rational information search decisions in an economic game, and adapted his experimental paradigm to be comprehensible and engaging for children (see Fig. 1 for a schematic depiction of the experimental task). Children played a resource allocation game (the "welfare-tradeoff task", WTT) with a partner, who could allot rewards either to herself or to the child. The decision options ("take" or "give") were visualized on cards, which featured the outcome of the decision hidden on the back side. Across 12 trials, children selected for which of two cards they wanted to see the partner's decision outcome, making a total of 12 queries from 24 cards. For some of the decisions, the outcome could be predicted with relative certainty, based on one's assumptions about how generous people are in general, and the circumstances under which they are likely to behave altruistically. For example, in one card used in a trial, the partner could either allocate either 15 stars to herself or 3 stars to the child - it is reasonable to assume that even a somewhat generously inclined agent would not forgo such a large number of rewards to provide only a modest benefit to another. Other decisions the partner faced were less easy to predict, and thus either possible outcome that could result from them (the partner choosing to take or give) would be informative. In the previous example, the other card used in that trial indicates that the partner could either allocate 1 star to herself or 3 stars to the child. Here, the outcome of the partner's decision is not as straightforward to anticipate. An observer who seeks to narrow down her estimate of the partner's generosity level – the partner's welfare-tradeoff ratio (WTR) – should opt to observe decision outcomes of the latter type, and turn over the second card.

This intuition was formalized as a normative Bayesian model (the same as in Quillien, 2023), whose predictions were compared to children's choices in the task. This model describes an ideal observer, who integrates new information about a partner's behavior with prior knowledge according to Bayes' rule. When the ideal observer engages in rational information-seeking about the partner's WTR, it should seek out observations (i.e., allocation outcomes) that maximize the expected information gain. Specifically, an observation is relatively more informative if it has a larger effect on shifting the observer's belief about the partner's WTR. The relative value of an observation is weighted by how likely it is to occur. In short, the normative model, which describes an optimal search strategy, expresses that rational learners should seek out observations of events that have the potential to shift or refine their pre-existing beliefs, constrained by how likely it is that these events will happen. Quillien (2023) found that adult participants' choices in an information-seeking task fit the predictions of this model. We predicted that children, too, would select the relatively more informative query.

We determined the target age range for our study (6- to 12-year-olds) as a previous study by Howard et al. (2018) had tested children of similar age (4- to 11-year-olds) in an allocation task similar to the one we used, and found evidence for WTR cognition across this range. However, we hypothesized that the information-seeking task in our experiment, where children had to predict, draw inferences from, and compare the outcomes of different hypothetical allocation decisions made by a partner, might be more challenging for young children than merely comparing reward options and making an allocation decision. The research reviewed earlier indicates that while children's intuitions about prosocial behavior and cost-benefit-calculations emerge early in life (potentially even in infancy), while the cognitive capacities required for rational information-seeking may undergo protracted development in middle childhood. For this reason, we chose to test slightly older children than Howard et al. (2018). We did not have a specific prediction regarding developmental patterns in our results: on the one hand, it is possible that children's information-seeking gets closer to the normative standard as they approach adolescence; on the other hand, it may be that this aspect of WTR cognition already operates at the youngest age we tested.

2. Methods

The experiment was preregistered on the OSF. The materials (including the testing script and decision cards), data, and model and analysis code are accessible at https://osf.io/ny4m2/?view_only=654f0a3687494ae8a62cc24a22ce6d1d.

2.1. Overview of the task

Children played a simple reward allocation game, the Welfare-Tradeoff Task (WTT; Delton, 2010). In the WTT, if Alice is the decision-maker and Bob is the recipient, Alice chooses how two allocate rewards to herself and Bob. In a given trial, Alice has to choose between two possible allocations of payoffs:

- X stars for Alice, OR
- Y stars for Bob.

where the number of stars X and Y vary across trials. In the main phase of our experiment, the **Query** phase, children played as the recipient. Children were shown pairs of trials in which their partner had made a decision. Children could see the payoffs involved for each trial in the pair, but not their partner's decision. For each pair we asked children for which trial they would most like to see what their partner had chosen to do.

We give an example in Fig. 1, panel 2. Here the child can decide to uncover what their partner chose, either in:

- A trial where the partner had to choose between 11 stars to themselves vs 6 stars for the child,
- A trial where the partner had to choose between 1 stars for themselves vs 6 stars for the child.

We predict that children will request to observe the decision that is most informative about their partner's WTR, as determined by the normative Bayesian model. For the pair of decisions above for example, if the child suspects that their partner is selfish, the best option is to observe the outcome of the second decision (see Fig. 1 panel 3).

The normative information search model predicts that the optimal query can depend on the child's prior beliefs about their partner's WTR. To test this prediction, we experimentally manipulated children's prior beliefs by letting them observe two decisions their partner had made, in an **Observation** phase that came before the main **Query** phase. In the Selfish condition they observed their partner allocate the stars to themselves; in the Generous condition they observed their partner allocate the stars to the child.

2.2. Participants

Ninety-seven children participated in the experiment (mean age: 9.1 y, SD: 2.1 y, range: 6.0–12.9 years (17 6-year-olds, 16 7-year-olds, 17 8-year-olds, 16 9-year-olds, 6 10-year-olds, 12 11-year-olds, 13 12-year-olds), 43 girls). The sample size was determined prior to data collection. As traditional power analysis would not be straightforward for our analysis plan, we conducted a power analysis for comparing the proportion predicted by the model (with the best-fitting parameters from Quillien, 2023) to chance (.5) in one of the test trials where the predicted proportion differs from chance but with a relatively small effect size (.627), using a binomial test. According to this analysis, a sample of 94 participants was needed for statistical power level of .8 (alpha = .05, one-sided). We had preregistered a sample size of 96 participants (12 for each of the 8 combinations of counterbalanced factors); one additional child asked to participate on the last day of testing and was included. An additional 7 children were tested, but were excluded from the final sample due to experimenter error (n = 1), missing age data and/or video processing consent (n = 4), or falling outside the prespecified age range (n = 2). Participants were German-speaking children recruited and tested at a local science museum and at a zoo. Prior to taking part, caregivers gave informed consent, and children were asked whether they wanted to play a game. They received stickers or other small prizes as a reward at the end. The study was approved by the ethics committee of the Technical University of Munich.

2.3. Materials

Stimuli were presented in the form of decision cards that display the distribution options as white stars on red and blue rectangles, printed in A5 size (148 × 210 mm) (Fig. 1). The colors on the cards represented the two players in the game (red: child, blue: partner). The number of stars depicted on the cards corresponded to the number of physical rewards (small wooden star tokens) players could collect, which were placed into (red or blue) plastic containers. Decision cards for the test trials (Query task) had identical distribution options printed on both the front and back sides; on the back sides, a black sticker was placed on the blue or red background, indicating the decision previously made by the partner. Partners were represented by puppets (partner 1: "Toma", a green monster, partner 2: "Kiki", a yellow monster; both approximately 35 cm tall). After the game, children could exchange the stars they collected for a small prize (stickers or crayons, cf. Howard et al., 2018; Blake and Rand, 2010).

The entire testing session was video-recorded, and children's responses were coded off-line from the recordings; 60% of the videos were recoded by a second coder. There was high agreement between the different coders' results in the Query task (99% agreement, Cohen's kappa: .98); initial disagreements were resolved through communication.

2.4. Procedure

The script for the experimental procedure can be found on the OSF https://osf.io/ny4m2/overview.

In the **Introduction phase**, the experimenter explained the welfare-tradeoff task. Children were told that they would play a "star game" with a partner, in which they could distribute stars which would be exchanged for prizes at the end. The number of stars players could obtain was depicted on decision cards. If children allocated rewards to themselves, the number of stars shown on the card's red background would be placed in their red container; if rewards were given to the partner, the amount of stars shown on the blue background were placed into the partner's blue container. The experimenter highlighted that from each card, only one player (not both) could receive stars. Children were then asked comprehension questions about the game (e.g., how the colors on the cards correspond to payouts for the players, and the fact that only one player can obtain rewards from a card), which were repeated up to 3 times if they gave an incorrect response. The comprehension questions can be found in the experimental script on the OSF (https://osf.io/ny4m2/overview).

After the introduction, children were presented with five tasks: the Allocation task, the Prediction task, the Evaluation task, the Query task (this was the main experimental task), and the Partner choice task. These tasks were always presented in the same sequence. The distribution options (amounts of potential rewards to be allocated) for all tasks are described in the section "Stimuli". We counterbalanced the order of trials in the Allocation task (1–6 vs. 6–1), the order of trials in the Query task (1–12 vs. 12–1), and the location of the test trial cards (card A on the left vs. right side).

Allocation task. In the first phase, which served as a familiarization with the welfare-tradeoff task, children decided whether they or their partner ("Toma") would receive rewards. Children were sequentially presented with six decision cards. For each card, they chose who would get the stars by placing a sticker on their selected side: blue to give the stars to the partner, red to take the stars for themselves.

After children made choices on all six cards, the experimenter distributed stars into the containers accordingly. Next, children were told they would now play with a new partner, "Kiki" (to prevent any expectation of reciprocity), who would make the allocation decisions from that point. The decisions Kiki had made earlier were marked by stickers she had placed on the back of each decision card.

Prediction task. Children were shown a decision card and asked to guess which decision Kiki had made for that card. After making their guess, the card was turned over to reveal Kiki's decision. This procedure was repeated with a second decision card. For children in the Generous condition, Kiki gave the stars to the child on both trials; in the Selfish condition, Kiki took the stars for herself both times.

Evaluation task. Children were now asked to evaluate the decisions made by Kiki. The experimenter presented children with a 5-point Likert scale featuring smiley faces ranging from very negative to very positive. The experimenter asked (1) how nice children thought Kiki's behavior was, and (2) how happy they were about what Kiki did.

Query task. The Query task constituted the main test phase (see Fig. 1). The experimenter told children that, going forward, not all of Kiki's decisions would be revealed. Instead, two decision cards would be presented side by side, and children could indicate which one they wanted to see. The outcome of the card not selected would remain hidden. All the chosen cards would be turned over only at the end of the game. Children were also told that, after the game, they could decide whether to play another game with the same partner, Kiki, or with a new partner they had not met before. This was meant to motivate children's information seeking, as accurately assessing someone's WTR is a valuable indicator of whether that person would be a good partner in future interactions.

Children participated in 12 trials in the Query task. After completing all trials, the experimenter reviewed the cards the children had selected, turning them over to reveal the outcomes of Kiki's decisions.

Partner choice task. The experimenter reminded the children that they could play another game, and decide whether to continue with the same partner or with a new one. After children answered, the experimenter said that, unfortunately, there was no more time to play the new game. Children were then told that they would receive a prize for all the stars they collected (stickers or crayons) and were thanked for their participation.

2.5. Stimuli

Decision cards depicting different distributions of stars were used in the experimental tasks. Detailed information about these cards, particularly for the auxiliary tasks, can be found in the supplementary information.

In the **Allocation task**, the cards featured distribution ratios ranging from 0.08 to 5.5, a wider range of ratios than that presented in the Query task.

In the **Prediction task**, our aim was to show decision outcomes that were moderately informative with regards to the partner's WTR (in order to elicit different priors in children in the two conditions), but were ambiguous enough to warrant further information search. The outcomes set a lower bound on the WTR estimate in the Generous condition (i.e., the WTR is probably as large as or larger than the biggest ratio for which the partner previously gave rewards), and an upper bound in the Selfish condition (i.e., the WTR is probably as small as or smaller than the smallest ratio for which the partner previously took rewards). The ratios in the Generous condition were 1(partner) / 8(child) (ratio: 0.13) and 2(partner) / 6(child) (ratio: 0.33); in the Selfish condition, 6(partner) / 6(child) (ratio: 1) and 8(partner) / 11(child) (ratio: 0.73).

Stimuli used for the **Query task** are described in Table 1; Figure S3 in the Supplementary Information depicts the decision cards used

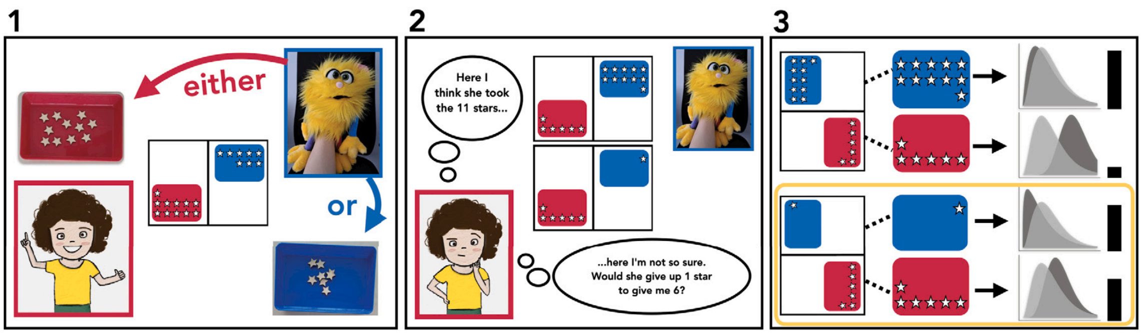

Fig. 1. Schematic depiction of our task and model. (1) The welfare-tradeoff task (with the child as recipient): A monster called Kiki can allocate stars as depicted on distribution cards. She can either give the number of stars depicted on the red background to the child, or take the number of stars on the blue background for herself. (2) In the Query task, children have to decide which of two decision cards to turn over to find out how Kiki allocated the stars from that card. (3) Normative information search model. For each possible outcome on each of the cards, the model computes information gain (i.e., how much observing this outcome would shift the prior probability distribution over possible WTRs, light gray, to yield the posterior distribution, dark gray), as well as the probability of observing this outcome (represented by black bars). The model selects the card with the higher expected information gain (= probability-weighted average of the information gain for each outcome). In this example, the possible outcomes on the first card differ in how much they would influence one's assessment of the partner's WTR: seeing Kiki take 11 stars for herself is highly likely, but would not shift one's prior very much; and while seeing Kiki give 6 stars would lead to attributing a higher WTR to her, this outcome is unlikely. The second card, on the other hand, contains outcomes that are each relatively plausible, and would each yield non-negligible information gain. Therefore, the second card is selected. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

in all tasks. Most of the trials were designed such that the optimal query would be different depending on whether the child was in the Selfish-partner or Generous-partner condition. In 8 out of 12 trials, the potential payoff for the child was identical across the two decision cards, following the design in Quillien (2023) (so, for example, the child stands to gain 6 stars from either of the two decision cards, but the potential rewards for the partner—and thus the ratio of rewards—differs between the cards). The remaining 4 trials varied the potential payoffs to the child across decision cards, which allowed us to explore if children were especially curious about outcomes of decisions where they stood to gain more, or decisions where they could gain no rewards. In the Results section, we report the main analysis both with all 12 trials as well as with only those 8 trials with identical payoffs to the child. Because in the original study by Quillien (2023), potential payoffs for players were always identical on the two decision options, the former analysis with all 12 trials (for 4 of which payoffs for the child varied) can be considered exploratory compared to the original, while the analysis with the 8 identical-payoff trials is more closely aligned with Quillien's design. However, because we forgot to preregister this as such, it is technically the latter analysis, which leaves out data from 4 trials, that should be considered exploratory. (We note this as a caveat, though results are qualitatively similar for the two analyses.) The decision cards in this task are identified by a number indicating the trial position (1–12) and, within a trial, with an arbitrary marker ("A" or "B").

Table 1
Potential reward allocations depicted on the decision cards in the Query task. Cards were randomly labeled A or B. For each card, we specify the amount of stars that either the child or partner could obtain, as well as the ratio of these rewards (reward-Partner/reward-Child).

Trial	Card A			Card B		
	Partner	Child	Ratio	Partner	Child	Ratio
1	12	10	1.2	1	10	0.1
2	3	6	0.5	6	0	NA
3	11	6	1.83	1	6	0.17
4	2	2	1	8	2	4
5	15	6	2.5	1	6	0.17
6	0	6	0	4	6	0.67
7	12	3	4	2	3	0.67
8	1	3	0.33	15	3	5
9	8	2	4	8	6	1.33
10	0	6	0	0	12	0
11	1	10	0.1	5	10	0.5
12	1	5	0.2	2	10	0.2

3. Computational modeling

Optimal information search in our query task can be formalized using the normative model described in Quillien (2023). Here we give a formal description of the model and refer readers to the original paper for a more intuitive explanation (see also Fig. 1). For general background on models of optimal information search see e.g. Nelson (2005), Oaksford and Chater (1994). The model assumes that participants have a causal model of the way other agents make welfare-tradeoff decisions. Specifically, if Alice is the decision-maker and Bob the potential recipient, she tries to maximize the utility of her action A, given by:

$$U_{\text{alice}}(A) = \pi_{\text{alice}}(A) + \lambda \pi_{\text{bob}}(A) \tag{1}$$

where $\pi_i(A)$ refers to the payoff to agent i that results from action A, and λ is Alice's welfare-tradeoff ratio (WTR) toward Bob.

Remember that in the WTT we have $\pi_{\text{alice}}(A = \text{Give}) = 0$ and $\pi_{\text{bob}}(A = \text{Take}) = 0$. For conciseness we denote the other, non-zero payoffs as $\pi_{alice}(A = \text{Take}) = \pi_{\text{alice}}$ and $\pi_{bob}(A = \text{Give}) = \pi_{\text{bob}}$. Assuming that Alice's choices are not perfectly deterministic, the likelihood that she chooses action $A \in \{\text{Give}, \text{Take}\}$ is then given by:

$$P(A|\lambda, \pi_{\text{alice}}, \pi_{\text{bob}}) = \begin{cases} P(\lambda > \frac{\pi_{\text{alice}}}{\pi_{\text{bob}}} + \epsilon) & \text{if } A = \text{Give} \\ P(\lambda < \frac{\pi_{\text{alice}}}{\pi_{\text{bob}}} + \epsilon) & \text{if } A = \text{Take} \end{cases} \tag{2}$$

where $\epsilon \sim \mathcal{N}(0, \sigma_\epsilon)$ is a random noise term. We set $\sigma_\epsilon = .16$ following past work indicating it is consistent with the way people play the welfare-tradeoff task (see Quillien et al., 2023). This causal model can be 'inverted' using Bayes' rule to compute a posterior distribution over Alice's WTR, given that we observe her choose action $A \in \{\text{Give}, \text{Take}\}$:

$$P(\lambda|A, \pi_{\text{alice}}, \pi_{\text{bob}}) \propto P(A|\lambda, \pi_{\text{alice}}, \pi_{\text{bob}}) P(\lambda) \tag{3}$$

where $P(\lambda)$ is a prior distribution over λ. This Bayesian update is used both in the observation phase (when participants see some of their partners' decisions), and in the query phase, when the model anticipates what it would learn about Alice's WTR if she chose Take or Give.

In the query phase, the information value I of a (simulated) observation $d = \{A, \pi_{\text{alice}}, \pi_{\text{bob}}\}$ is the Kullback–Leibler divergence (Kullback & Leibler, 1951) between the observer's posterior belief about Alice's WTR and its prior belief:

$$I(d) = D_{\text{KL}}(P(\lambda|d) \parallel P(\lambda)) \tag{4}$$

$$= \int P(\lambda|d) \log \frac{P(\lambda|d)}{P(\lambda)} d\lambda \tag{5}$$

The model computes the value $U(q)$ of query q as its expected information gain, i.e. the information gain for each potential action multiplied by the estimated probability that Alice will choose that action:

$$U(q) = \mathbb{E}[I] = \sum_i P(d_i) I(d_i) \tag{6}$$

$$= P(\text{Take}) I(\text{Take}) + P(\text{Give}) I(\text{Give}) \tag{7}$$

Finally, the model selects query q with probability given by a softmax over the expected information value of queries:

$$P(q) \propto \exp(\beta U(q)) \tag{8}$$

where β is an inverse temperature parameter regulating the stochasticity of query selection.

Before observing any data about the partner, the model has a prior $P_0(\lambda)$ over the partner's WTR. We operationalize this prior as a skewed Laplacian distribution with location 0, dispersion σ and skew ν. In total the model has three free parameters β, σ and ν that we fit to the data using Maximum Likelihood Estimation.

We also compare participants' choices to a model that is nearly identical to the Normative model, except that it does not update its WTR estimates when observing evidence of the partner behaving generously or selfishly in the observation phase; instead, it just retains its initial prior (No-updating model). In an exploratory analysis, we also consider another, intermediate option: a Conservative model that updates the WTR prior from observations, but does so to a lesser extent than the Normative model. Additionally, we pre-registered alternative computational models that assess whether simpler hypotheses could explain participants' selections. We describe these alternative models in the Supplementary Information (Section A). We also consider a random baseline which assumes that participants select each trial randomly.

4. Results

Data were analyzed in R (Team, 2023), using the lme4 package for mixed-effects models (Bates et al., 2015). Visualizations were created with the ggplot2 package (Wickham, 2016).

4.1. Main results: Query task

We first analyzed data on all 12 trials from the query task, using mixed-effects logistic regressions with participant-level random intercepts. Likelihood-ratio tests show that the best-fitting regression includes as predictors model choice (predicted choice proportion of the normative model) as well as the potential reward for the child; including age as a predictor did not improve model fit. The normative model significantly predicted children's choices (b = 2.4, SE = 1.02, p = .017). The potential reward for children also strongly predicted their choice (possible reward on card A: b = 0.13, SE = 0.03, p <.001; on card B: b = −0.15, SE = 0.02, p <.001), suggesting that children were especially keen on observing outcomes where they stood to gain relatively more. At the item-level, predictions of the normative model were marginally correlated with children's average choices, r(22) = .39, p = .057.

These results suggest that children are both interested in the magnitude of their potentials payoffs and in gaining information about the partner's WTR. To better isolate children's capacity for identifying high information gain queries, the remainder of our analysis focuses on the 8 trials where potential rewards on the two decision cards for children were identical (as in Quillien, 2023).[1] In these trials, children's curiosity about their own payoffs cannot compete with their motivation to acquire information about the partner's WTR.

Table 2
Model comparison using Maximum Likelihood estimation. Low negative LL and BIC indicate better fit.

Model	Negative Log-Likelihood	BIC
Normative	532.31	1084.58
No-update	**531.67**	1083.30
Falsification	536.13	1092.23
Confirmation	537.83	1095.62
Surprise	538.34	1096.65
Extreme-ratio	536.97	1080.59
Random	537.88	**1075.76**

For this analysis, the best-fitting mixed-effect logistic regression model included normative-model choice and the potential reward to the partner as predictors; again, age did not improve model fit. Model choice was a significant predictor, showing that children selected informative queries (b = 3.63, SE = 1.30, p = .005). The reward that the partner could obtain also had a small significant effect on children's choices: they were more likely to select the card where the partner's payoff was lower (b = 0.04, SE = 0.018, p = .017). At the item-level, predictions of the normative model were marginally correlated with children's average choices, r(14) = .49, p = .052.

Table 2 shows the fit of each computational model we tested, in the analysis with those 8 trials where payoff for children was identical. We find that the model with the closest fit to children's choices is the 'No-update' model, which does not update its WTR estimate in the observation phase. At the item-level, the predictions of this model were correlated with children's choices, r(14) = .54, p = .03.[2] Consistent with this finding, a permutation test[3] found no significant difference between the choices made by children in the Generous-partner compared to the Selfish-partner condition, p=.23.

Despite this, children's choices seemed to somewhat differ by condition in the direction predicted by the Normative model, see Fig. 2. We also find that the evidence in favor of the 'No-update' relative to the normative model was not substantial (BF = 2; see Supplementary Information, Section B; see Kass & Raftery, 1995 for interpretation of Bayes Factors). This observation motivated us to test the possibility that children made choices that were 'in between' the choices predicted by the Normative and the No-update model. To this end we ran an exploratory analysis testing a 'Conservative' model, which updates its WTR estimates from the evidence in the observation phase, but does so to a lesser extent than the normative model. We find that this model had a better fit to the data than either the Normative or the No-update model (comparison with Normative: BF = 5.56, comparison with No-update: BF = 2.50; see Supplementary Information, Section C, for formal model specification and model comparison). Fig. 2 shows the predictions of these models as well as average participant responses across trials.

[1] A fuller analysis of the data from all 12 trials is available in the Supplementary Information, Section D.

[2] With all twelve test trials, the item-level correlation was also significant: r(22) = .51, p = .01).

[3] We computed the mean value of $|P(A|\text{Selfish}) - P(A|\text{Generous})|$ across trials, i.e. the average difference in the proportion of participants selecting A in the Selfish-partner and Generous-partner condition. To assess whether this value could have arisen by chance, we ran 10^4 simulations, in each of which we randomly re-assigned the condition label for each participant and then computed the mean $|P(A|\text{Selfish}) - P(A|\text{Generous})|$. The p-value is the number of simulations where this value exceeded the empirically observed value.

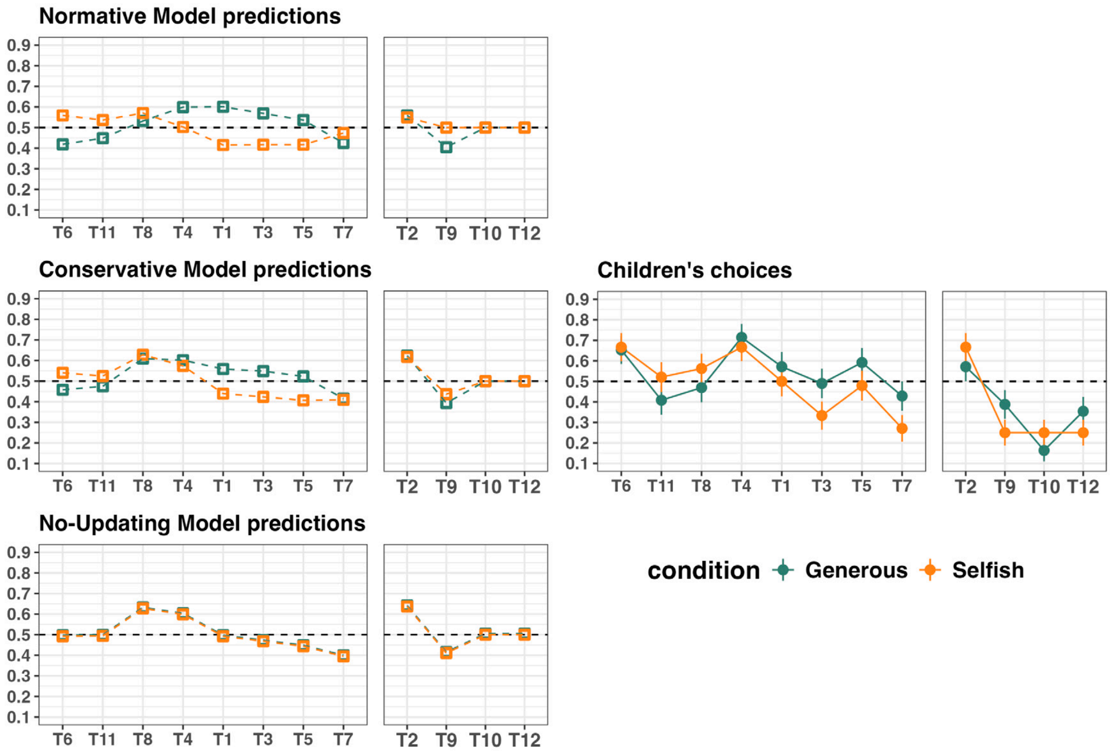

Fig. 2. Predictions of the normative, conservative, and no-updating models (left) and average proportions of participant choices (right) for selecting decision card A across all 12 test trials, by condition (teal: Generous, orange: Selfish). The first eight trials are ordered by their ratio of $\pi_{\text{partner}}/\pi_{\text{child}}$ for option A. The last four trials on the far-right side of each figure (2, 9, 10, 12) are those where payoff for participants was not identical. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

None of the other models fit the data better than the models discussed above, when assessed by their negative log-likelihoods. However, when computing model fit using the BIC (a measure that penalizes the number of free parameters to guard against overfitting), simpler models with only one or no free parameters had the best fit, raising the possibility that the good fit of the more complex models comes from overfitting. Therefore, as a robustness check we conducted an exploratory model comparison by computing marginal log-likelihoods, a procedure that does not require fitting parameters to the data (Lewandowsky & Farrell, 2010). This analysis finds that the Normative, No-update and Conservative models fit better than all other models, confirming that their success is not due to excessive flexibility (see Supplementary Information, Section B).

4.2. Further results: Other tasks

In the following, we briefly describe key findings from the other tasks children participated in over the course of the experiment, which mainly served as warm-up and framing for the main task. The analyses, detailed results, and discussion can be found in the Supplementary Information (Section F), which is also uploaded on the OSF at https://osf.io/ny4m2/?view_only=654f0a3687494ae8a62cc24a22ce6d1d.

In the Allocation task, where children distributed rewards either to themselves or to the partner, they overall chose to give rewards to the partner less than half of the time. However, as predicted, they were more likely to give when the ratio of rewards was smaller (i.e., when the partner stood to gain relatively more and the opportunity cost of giving was small). Children's decisions may actually have been primarily determined by the absolute amount of rewards children could gain (rather than the ratio); our stimuli in this particular task were not designed to tease apart these two factors (unlike in the Query task where the payoff to participants in the eight critical trials was identical on both cards).

In the Prediction task, where children guessed whether the partner had taken the stars for herself or given stars to them, children overall expected the partner to take. In the first trial (i.e. before children had observed any of their partner's decisions), children in the Generous condition were more likely to expect the partner to give than those in the Selfish condition; this finding is consistent with the fact that the payoff ratios were designed such that a 'Give' outcome was more likely in the Generous condition. In the second trial, this pattern unexpectedly reversed; speculatively this might have been due to children having an expectation that their partner would alternate between Giving and Taking (such that observing the selfish partner Take in the first trial would lead some children to expect they would Give in the second trial). Finally, in an exploratory analysis, we found that children who themselves gave to one partner more frequently in the Allocation task were more likely to expect a novel partner to be generous towards them.

In the Evaluation task, as expected, children in the Generous condition evaluated the partner's behavior more positively than those in the Selfish condition; ratings in the latter clustered around the center of the scale, indicating that children evaluated the partner's selfish behavior neither positively nor especially negatively.

Finally, in the Partner choice task, where children could opt to play another game with the same partner or switch to a novel partner, we found that while children in the Selfish condition overwhelmingly opted to switch, children in the Generous condition were split: half of them wanted to continue playing with the same partner.

5. Discussion

Other people vary in the extent to which they take our welfare into account when making decisions. As a result, successfully navigating social life requires being able to judge how much someone values us, and flexibly use this information to predict their behavior across different circumstances (Delton et al., 2023; Eisenbruch & Krasnow, 2022; Qi et al., 2025; Quillien et al., 2023; Tooby et al., 2008).

Here we explored the developmental origins of this capacity in the context of information search. We assessed whether 6- to 12-year-old children, like adults, can rationally seek out observations that are more likely to reveal an interaction partner's level of generosity towards them—their welfare-tradeoff ratio.

To this end, we designed an age-adapted version of a task that had found rational information search in adults (Quillien, 2023). We find that children's choices were significantly aligned with the prescriptions of the normative model, indicating that they tend to make queries that have the potential to reveal the most information about a partner's WTR.

Children's information-seeking seemed to be less influenced by prior information about the partner's behavior than was observed in adults. According to the normative model, prior belief about the partner's WTR should guide which queries are most informative, leading to our prediction that children would adjust their queries depending on whether they had previously observed their partner act generously or selfishly. In practice, however, there was only weak evidence that this manipulation affected children's choices. Consistent with this, the computational model that best accounted for children's query patterns was a more "conservative" model that relied less on prior information than the full normative model.

One possible explanation for this finding is a difference in task design: Unlike in the adult version of the task, we did not display the outcomes of the initially revealed decisions throughout the Query task. We made this choice because displaying all outcomes could be distracting for children, requiring them to keep track of four cards with eight different decision outcomes (two actual, two counterfactual, and four hypothetical). As a result, it is possible that children gradually forgot this information, or at least that it was not salient to them during the Query task. Relatedly, the initial evidence may not have been sufficient to influence children's prior beliefs strongly enough for this to affect their subsequent information search (e.g., they may not have considered the choices in the Selfish condition particularly selfish, or the Generous partner's behavior as particularly generous).

Alternatively, the weak influence of prior information might reflect a fundamental difference between children and adults. Children might update their beliefs more conservatively, perhaps due to lower cognitive resources (Zhu & Griffiths, 2026). They may also be somewhat less inclined to interpret observed behavior as evidence of a stable trait, such as a partner's welfare-tradeoff ratio (WTR), that predicts future actions. Research has found that prior to middle childhood, children do not tend to spontaneously ascribe traits to agents on the basis of observed actions, and/or predict future behaviors from such attributed traits (Heyman, 2009; Liu et al., 2007; Schlingloff-Nemecz et al., 2025b). Children may be more willing than adults to discount the initial evidence from the observation phase as random variability in the partner's choices, rather than as strong indicator of the agent's true WTR. Consequently, children may have selected queries that were less informative according to the model, because they assigned higher probability than adults to unlikely outcomes. Future research could examine this possibility more directly by determining how much evidence is required for children to revise their WTR estimates.

A caveat to these developmental accounts is that we did not observe a significant age effect within our sample, which we might expect if there were a developmental change across middle childhood. To address this, future studies could include both younger and older participants to probe whether and in what ways children's information-seeking about a partner's dispositions develops with age. Future research could also assess more directly the influence of prior beliefs about a partner on their information search; in particular, this research could aim to determine how the amount of prior evidence children receive, and how they update their assessment as they accumulate information over time, affects their search behavior.

Beyond seeking information about the partner's WTR, the prospect of receiving a larger reward also had a strong influence on children's choices. When the two decision cards offered different potential rewards, children tended to pick the card that showed more stars for themselves. This is consistent with prior research: while children can pay attention to ratios of rewards distributed in economic games, they often focus primarily on maximizing their own absolute payoff (McCrink et al., 2010; Perner, 1979). In our paradigm, some children may also have interpreted the Query task such that they would only obtain the rewards shown on the cards they selected to uncover, which would naturally motivate them to choose cards with higher potential rewards. Note that this interpretation cannot explain our key finding that participants made queries that are informative about the partner's WTR, as in the critical trials the decision cards presented equal rewards for the children. We also found that the absolute payoff their partner could obtain had a small significant effect on children's choices, such that they were more likely to turn over cards on which the partner stood to gain relatively less. This may be because in our stimuli, the relatively higher partner payoff was often substantially higher to make the difference striking, making it likely that the partner would take rather than give on this decision, while the outcome for the card with the lower payoff was less certain. Future research could try to pinpoint more precisely the role of absolute payoff magnitudes and the kinds of heuristics they may support; though note that children's behavior was not solely driven by such a heuristic strategy.

Our findings should be interpreted in light of several limitations. First, our sample consisted of German-speaking children in a large German city, and is thus drawn from a culturally homogeneous WEIRD population. To support generalizable claims about how children query a partner's generosity, data should also be collected from participants of different cultural and socioeconomic background (for cross-cultural research on welfare trade-off ratios see e.g. Delton et al., 2023; Sell et al., 2017). Such research could also shed light on how different norms around resource distribution could inform children's prior beliefs about how an agent is likely to behave, and to what extent their information seeking is calibrated to such environmental factors (Amir et al., 2026). A second limitation to our study is that it may not have been sufficiently powered to detect an age or condition effect. We predetermined a sample size that would allow us to test whether children's queries differ from chance, so that we could assess whether their behaviors match the predictions of the normative model. In particular because we tested a wide age range, it is possible that we would have needed a substantially larger sample to accurately assess developmental changes. We chose this age range on the basis of the study by Howard et al. (2018) and because we did not have a strong prior hypothesis about when children would behave systematically in this task. This highlights a third limitation of our findings: as we only included children from age 6, the current study does not allow us to make claims about the early ontogenetic roots of rational information-seeking in the social domain. Follow-up work could further simplify the experimental design to test whether younger children are also relatively more curious about the outcomes of specific, informative social behaviors.

Overall, our results suggest that children are capable of rationally seeking information about an interaction partner's welfare-tradeoff ratio, even if their choices differ somewhat from those of adults. This demonstrates that children are not just passive observers of others' behaviors in a social context, but leverage their active learning abilities to assess their partner's dispositions. Below we briefly consider some key implications of this finding.

First, children performed well in the task although they received no explicit instructions about how to search for information or what to focus on—specifically, the partner's welfare-tradeoff ratio. Previous research suggests that younger children often require scaffolding, e.g. through training that highlights task-relevant features, to conduct effective information searches (Howse et al., 2003; Ruggeri & Feufel, 2015; Ruggeri et al., 2019). Despite this, not only did children's behavior align with the predictions of a normative model, but we did not find a significant variation in response patterns across the age range in our sample. The reasons for this age-invariant performance remain unclear. One possibility is that the non-verbal format of the information search task helped children (Ruggeri et al., 2019; Swaboda et al., 2022). Another potential reason is that the social context played a key role. Interacting with a partner and reasoning about the partner's allocation decisions might have activated cognitive mechanisms specialized for social information search (see also Cosmides, 1989). If such cognitive mechanisms confer fitness benefits to humans as they navigate complex social environments, it is possible that they operate already in young children from elementary school age (or even before). This domain-specific support could have enabled children to engage in effective, rational information-seeking even without explicit guidance. Further research could explore the limits of children's rational information-seeking about a partner's generosity; for instance, under conditions of ambiguity or deception, or when faced with more complex social tradeoffs.

Second, our finding suggests that key elements of welfare-tradeoff cognition are present early in childhood (see also Howard et al., 2018). We found that children did not select observations at random, and among the computational models we explored, those that best account for children's queries all assume that children represent other agents as using welfare-tradeoff ratios to guide their social decisions. This assumption implies a sophisticated understanding of interpersonal dynamics: children do not just expect agents to be fully altruistic or selfish, but have fine-grained intuitions about how others calibrate their generosity to the circumstances at hand. Moreover, they understand that the conclusions that can be drawn about an agent from observing them make a generous or selfish decision depend on the options the agent faced. Future work could test these hypotheses more directly, for example by asking children to predict a partner's future decisions on the basis of sparse data about that partner's previous behavior (e.g. Quillien et al., 2023).

Taken together, the present study demonstrates that children can strategically apply their active learning skills in social contexts to infer others' dispositions towards them. Rather than merely observing agents' behaviors they happen to come across, children recognize that certain actions are more informative than others, and selectively seek out evidence for an agent's generosity level. This rational social curiosity reflects children's proficiency as social and moral agents. From an early age, they navigate complex interpersonal dynamics, make informed decisions about whom to trust, and engage in mutually beneficial cooperative relationships. How children actively search for information to help them with these challenges, has not yet received much attention in the literature, though active learning is likely to play a crucial role in children's social behaviors and development. Our findings contribute to a growing understanding of children's sophisticated social cognition and information-seeking. This work also raises further questions about children's curiosity and exploration in the social domain, and how these develop across diverse contexts and cultures.

CRediT authorship contribution statement

Laura Schlingloff-Nemecz: Writing – original draft, Visualization, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Tadeg Quillien:** Writing – original draft, Visualization, Software, Methodology, Formal analysis, Conceptualization. **Azzurra Ruggeri:** Writing – original draft, Supervision, Resources, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.evolhumbehav.2026.106887.

Data availability

The data is uploaded on this OSF page: https://osf.io/ny4m2/overview (under "Data").

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