Young children's curiosity about what others think about the self

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Abstract

Learning about the self is one of the most challenging goals that young children face. Yet, much of the prior work on early learning and curiosity has focused on children's tendency to attend to and explore the external world. Are children actually curious about themselves? The current study examines this question by investigating whether children actively seek information about what others think of their performance. Three- to five-year-old children participated in a task where an experimenter evaluated the quality of their drawing and of another child's drawing. Children were then left alone with a folder that contained one of these drawings (Self or Other). Children were more likely to peek inside the folder when it contained their drawing than when it contained the other child's drawing. These preliminary findings suggest that children's curiosity about what others think of them may emerge early in life and manifest as active information-seeking behaviors.

Keywords: Social Cognition; Cognitive Development; Curiosity; Early Learning; Theory of Mind

Introduction

Growing up means learning about ourselves: Who am I, what can I do, and what do you think of me? Among the many feats that young learners must achieve, building a coherent, integrated sense of the self—one's identity, abilities, traits, and even one's place in the social world—is arguably one of the most elusive and challenging goals that persists into adulthood. By learning about ourselves, we can make better predictions and decisions about our everyday behaviors, improve our knowledge and skills, and navigate social interactions with those around us. But despite the essential role that this learning plays in development, we still know little about the extent to which young children are motivated and curious to learn about themselves.

Prior research on curiosity and information-seeking has largely focused on their roles in learning about the *external* world. Both classic and contemporary characterizations of curiosity primarily concern one's tendency to attend to, and seek information about, concrete aspects of their environment (e.g., Loewenstein, 1994; Berlyne, 1954; Gottlieb et al., 2013; Kidd & Hayden, 2015). For example, existing studies have examined infants' attention to visual and auditory stimuli (e.g., Kidd et al., 2012, 2014), children's motivation to seek explanations for physical phenomena (Liquin & Lombrozo, 2020), and adults' desire to seek out answers to trivia questions (e.g., Kang et al., 2009; Gruber et al., 2014). Consistent with this focus on the external world, computational approaches to formalizing curiosity and intrinsic motivation have also emphasized interactions with objects and the environment, characterizing these constructs as key drivers of exploration and learning (e.g., Haber et al., 2018; Oudeyer et al., 2007; Dubey & Griffiths, 2020).

This focus on the external world also underlies the vast literature on early learning, both in terms of the *target* of learning and the *source* of information. First, prior work has shown that young children actively explore the world and learn from self-generated evidence (e.g., Sim & Xu, 2017) by engaging in hypothesis-testing behaviors (e.g., Stahl & Feigenson, 2015) and intervening on causal systems (e.g., Schulz & Bonawitz, 2007). Second, children learn a great deal about the external world by seeking information from others, through gaze shifting (MacDonald et al., 2020), social referencing (e.g., Hembacher et al., 2020), and question-asking (e.g., Ruggeri & Lombrozo, 2015; Ronfard et al., 2018). Children also readily interpret the information provided by others depending on the context, using it to guide their own information-seeking behaviors (e.g., Bonawitz et al., 2011) and even learn about the qualities of others, such as their reliability or trustworthiness (e.g., Sobel & Kushnir, 2013; Gweon et al., 2014; Harris et al., 2018).

Collectively, past work has shed light on children's remarkable capacities as voracious information-seekers; they are curious about the external world and actively gather information from their own exploration (e.g., Gopnik, 2012; Schulz, 2012) and from other people (Gweon, 2021). In most of these studies, however, the target of learning concerned aspects of the world that are external to the child, such as causal toys, object properties, or qualities of agents. Furthermore, although prior work has investigated children's sensitivity to qualities of agents that can also be applied to the self (e.g., competence, reliability, moral disposition), these qualities were often used to study how children evaluate others, rather than as targets of information-seeking to learn about the self.

Building upon existing work on young children's motivation and ability to learn about the external world, the current work asks whether children are also driven to seek information about themselves (i.e., the *internal* world). In fact, there are reasons to believe that children's understanding of the internal world is just as much an intuitive theory as their understanding of the external world; the description of self-concept

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as a "theory" (e.g., Epstein, 1973) predates the characterization of children's knowledge about the world as naïve (folk) theories (e.g., intuitive physics, intuitive psychology) (e.g., Gopnik & Meltzoff, 1998; Carey, 1995; Keil, 1992; Gelman & Legare, 2011). This intuitive theory of the self may be more than a concept of an isolated self; research on early attachment suggests that humans, even in infancy, possess an internal "working model" of the relationship between self and others in ways that guide their expectations about themselves in the social world (e.g., Bowlby, 1969; Johnson et al., 2007). Together, these findings raise the possibility that, as much as children engage in theory-building in domains such as biology, physics, and psychology, they may also be working towards building a coherent, integrated theory of the self.

However, despite the vast literature investigating children's curiosity and describing the process by which they learn as theory-building, the majority of existing work has been primarily concerned with learning about entities that are external to the child. Surprisingly little empirical research has explored children's desire to learn about the self and how this desire fuels information-gathering and theory-building about the self in early childhood. The current work represents an initial step in this direction by characterizing the strength of children's curiosity about the self. While curiosity and information-seeking about the self might manifest in a number of ways, here we focus on children's curiosity about what *someone else* (e.g., an adult) thinks of the child's performance, for the following reasons.

First, the desire to know what others think of the self may constitute one of the strongest, deepest motivations that drive our behaviors. A recent proposal by Dweck (2017) characterizes acceptance, predictability, and competence as three basic psychological needs that fuel goal-directed behaviors and propel development. From this perspective, curiosity about what others think of oneself is intimately tied to all three. Knowing how others think of you is a crucial part of being accepted or approved by others, which is essential to building supportive social relationships (acceptance). In addition, it allows learners to predict not only the consequences of their own behaviors on others (e.g., performance on a task), but also others' responses to them (e.g., whether someone will smile, respond to your bid for attention, etc.; predictability). Finally, others' evaluations of one's behavior and performance can serve as a crucial source of information that helps learners improve by learning from their past experiences (competence). As these basic needs give rise to more complex (emergent) needs such as trust, control, self-esteem/status, and ultimately, self-coherence (Dweck, 2017), what others think of the self may continue to play a critical role in shaping the way learners think, act, and learn.

Second, social feedback from others is arguably one of the most useful sources of information about the self, especially for relatively well-constrained and defined aspects of the self, such as how well one did on a task. Although it is possible to learn about one's performance without any social input, it is harder without clear, objective markers for success (such as completing a difficult puzzle, or activating a causal mechanism). This is particularly true of many activities that children engage with in everyday life (e.g., drawing, singing a song), leaving room for subjective interpretation. From this perspective, children's frequent requests for evaluation—"Do you like it?", "What do you think?"—from parents, teachers, and siblings may reflect their attempt to obtain information from credible and rewarding sources of feedback. As such, receiving feedback, evaluation, and praise may constitute the vast majority of ways in which children are able to receive information about the self in early childhood. Indeed, research suggests that when preschool-aged children are unsure about the quality of their own drawings, they preferentially endorse feedback from someone whose feedback has been informative in the past (i.e., selectively praising good drawings) rather than indiscriminate (i.e., praising all drawings regardless of quality) (Asaba et al., 2018). Thus, children's desire to know how they performed may manifest particularly strongly when the information comes from someone else and, in particular, someone whose opinion they trust.

Third, prior work suggests that preschool-aged children begin to show self-presentational concerns and even try to manage their reputation; they tend to act more positively in front of others than in the absence of others (Engelmann & Rapp, 2018), and even demonstrate their competence to improve others' evaluations of them (Asaba & Gweon, 2022). Critically, however, wanting to "look better" (reputation management) is not the same as "wanting to know"; while being motivated to change what others think of them presupposes that children already care about it, these studies don't necessarily demonstrate their pure desire to know. Somewhat surprisingly, attempts to experimentally induce and measure the relative strength of such desire have been absent in existing work. Are children really interested to know what someone thinks of their own performance? How should we go about measuring this curiosity?

One useful approach for gauging children's curiosity about the self may be to measure it in comparison to their curiosity about another child. If the same person provided feedback on the same kind of task, would children be more motivated to find out how the person evaluated the child's own performance over, say, a peer's performance? Here, we ask whether children are more eager to seek social information about the self (specifically, their abilities at drawing) versus another child. Our task was inspired by the delay of gratification task (e.g., W. Mischel et al., 1989); however, rather than using a tangible reward to assess how long children would resist its temptation (i.e., eat the marshmallow), our task treats an experimenter's evaluation of a drawing as a potential reward. We hypothesized that if children are more curious about how the experimenter evaluated their own work than their peer's work, they might be more tempted to peek at this information when left alone, suggesting a relative privileging of self-relevant social information.

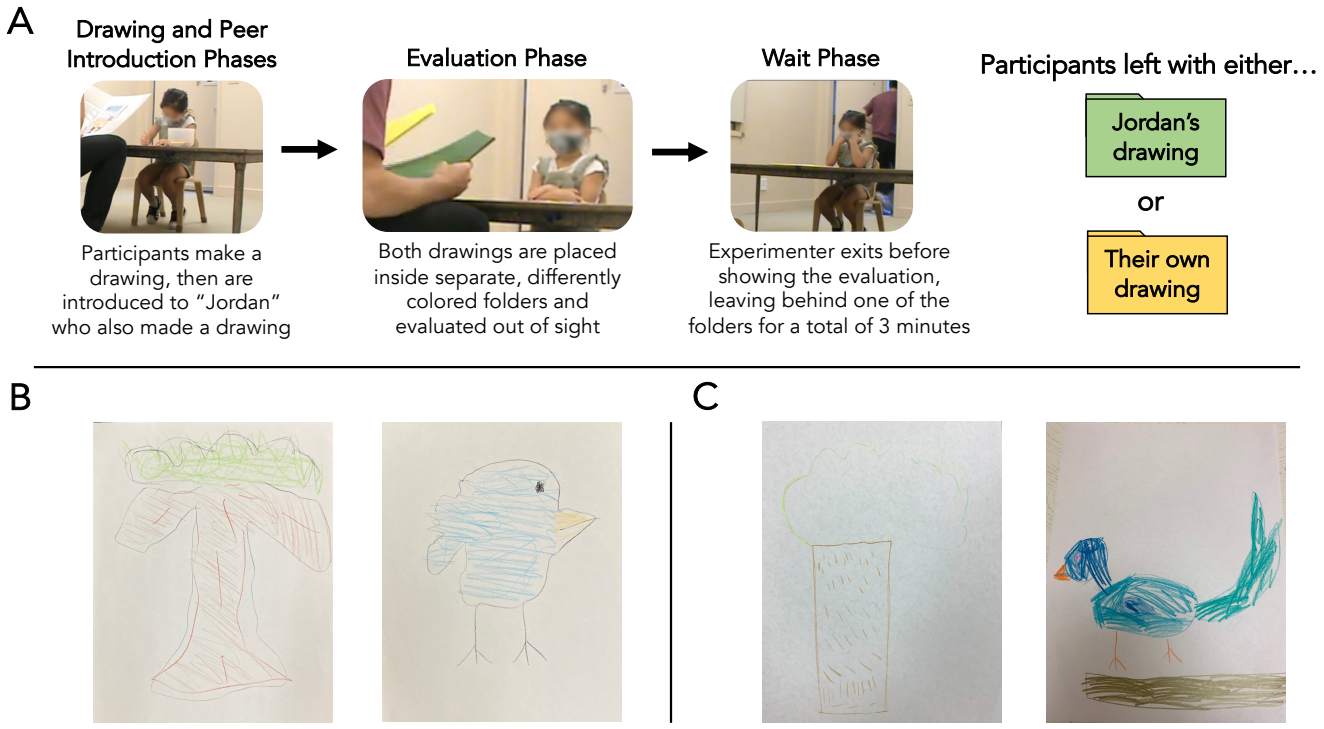

Figure 1: (A) Study procedure. (B) Jordan's drawings, either a tree or a bird. (C) Sample drawings made by participants.

Experiment

Children were assigned to one of two conditions: either the "Self" condition, where the child could peek at the experimenter's evaluation of their own work, or the "Other" condition, where the child could peek at the experimenter's evaluation of another child's work. Our key dependent measure was whether children peeked rather than waiting for the experimenter to return. We also looked at the latency: how long they waited before peeking. We predicted that children in the Self condition would be more likely to peek—a form of information-seeking behavior—than children in the Other condition, and show a shorter latency to peek on average. Given prior work suggesting that children's concerns about what others think of them emerges between 3 and 5 years of age (e.g., Asaba & Gweon, 2022; Fu et al., 2016; Engelmann et al., 2012), we begin our investigation with this age group.

Method

Participants Participants were 40 (n = 20 per condition) 3- to 5-year-old children tested at a local preschool (M_{age} = 4.75, SD_{age} = .57, 20 females, 50% White, Range = (3.52, 5.97)). We excluded 7 participants for experimenter error (n = 5) and not completing the procedure (n = 2).

Stimuli Two folders (yellow and green) were used to enclose the evaluated drawings. We also prepared stock-image photos of two preschool-aged children (one girl and one boy); the photo that matched the participant's gender was used in the procedure, to be introduced as "Jordan." Finally, we created a drawing of a bird and a tree that matched the quality of a typical preschool-aged child (Fig. 1B); one of them was shown to the participant as the drawing made by Jordan.

Procedure All children were tested in a quiet room at their preschool. The procedure unfolded in four phases (Fig. 1A).

1. Drawing Phase: Children were first presented with a stack of blank white paper and colored pencils. The experimenter told children that they were going to play a drawing game, and that they could draw a tree or a bird (Fig. 1C).[1]

2. Peer Introduction Phase: After children finished their drawing, the experimenter took their drawing and casually moved it to one side of the table; it was placed on the left side from the child's perspective in the Self condition, and the right side in the Other condition, such that the target folder (see Waiting Phase) was placed on the left side in both conditions. Children were then shown a photo of Jordan, who was unknown to the child but described as "a kid, just like you!" The photo of Jordan matched the gender of the participant. The experimenter said, "Jordan also made a drawing," and showed it to the child (either a tree or a bird).

[1] A few minor modifications to the procedure were introduced midway through data collection (after the first 16 participants). First, many children asked to draw something other than a tree or a bird, therefore the task was changed so they could draw anything they wanted. Second, the camera was placed behind a one-way mirror, rather than in the testing room. The results before and after the changes are indistinguishable, and here we report results collapsing across both versions.

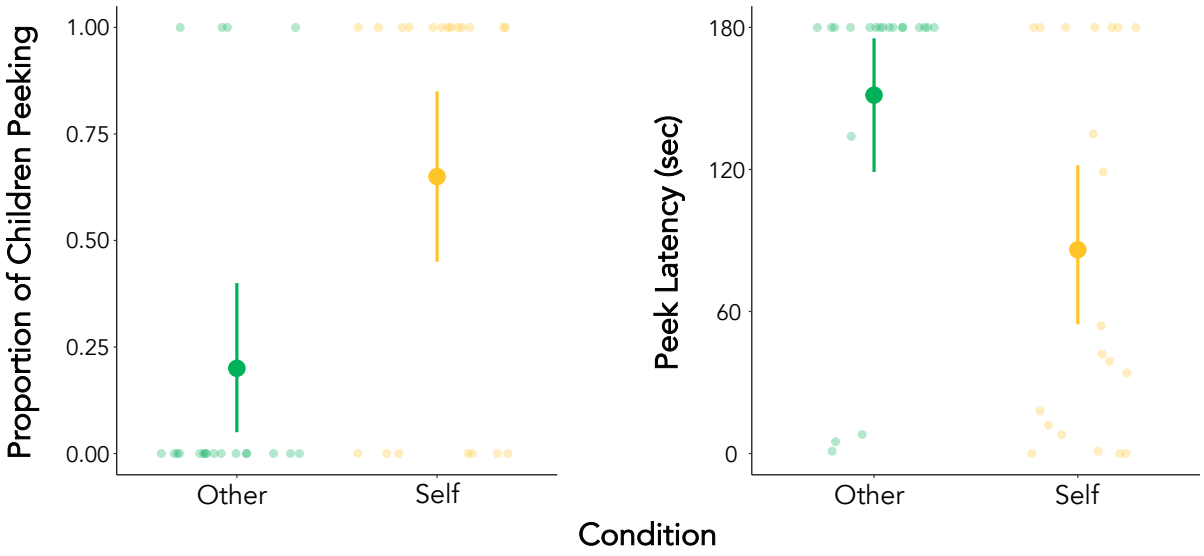

Figure 2: Plots showing the proportion of children who peeked at the folder during the wait phase (left), and peek latency in seconds (right). Children who did not peek were assigned a peek latency of 180 seconds. Error bars are 95% bootstrapped CIs.

3. Evaluation Phase: The experimenter then told the participant that the drawings would be evaluated and placed into the folders, adding that the participant's drawing would be placed in one folder and Jordan's drawing in the other (yellow and green in the Self condition, respectively, and the reverse in the Other condition). The experimenter then said: "Okay, I'm going to take a real close look at both of these drawings; if I think a drawing is *really good*, I'm going to put a star sticker on the inside of my folder. But if I think a drawing is just okay, I won't put a star sticker."

The experimenter then went to the back of the room, out of sight, and pretended to evaluate the drawings ("Hmm... what did I think of Jordan's drawing? Okay! Hmm... what did I think of [participant]'s drawing? Okay!"; evaluation order reversed in the Other condition). This procedure made it clear that the experimenter was evaluating each drawing independently, rather than giving one sticker to the drawing that was better. Unbeknownst to the participant, the experimenter placed a star sticker in both folders.

4. Wait Phase: The experimenter then returned to the table with the folders and reminded the participant that their drawing was in the yellow (or green) folder and that Jordan's drawing was in the green (or yellow) folder. The experimenter then offered to look inside to see if the drawings had a star sticker. The experimenter then suggested looking at one of the two drawings first: either the child's own drawing in the Self condition, or Jordan's drawing in the Other condition. The experimenter placed the folder down on the table in front of the child as if to open it, but then received a phone call and had to step outside. The experimenter said, "I'll be right outside if you need me, and I'll be back!" and took the other folder with them as they left the room (i.e., Jordan's folder in the Self condition, and the child's folder in the Other condition). Thus, the participant was left with just the folder that was offered to be shown first by the experimenter.

The experimenter returned to the room after three minutes. Note that typical delay of gratification tasks in prior work (e.g., H. N. Mischel & Mischel, 1987; W. Mischel et al., 1989; Kidd et al., 2013) used a longer wait period (15 minutes) with the option to end the wait period prematurely by ringing a bell. We omitted the bell because the experimenter's exit was unexpected, and chose a shorter period of waiting to avoid boredom. After the 3-minute wait phase, the experimenter returned to the room and offered to show the contents of both folders to the children.

The key dependent measure was whether children peeked at the folder while the experimenter was away. A "Peek" was defined as a deliberate attempt by the participant to open up the folder and peer inside to view its contents. "Peek Latency" was also measured, defined as the time taken to peek from the moment the experimenter exited the room. Following prior work (Kidd et al., 2013), for children who never peeked, we assigned the maximum latency (180 seconds). Indeed, the average latency is largely driven by the number of children who peeked; thus, rather than treating these as two independent measures, we consider them as two different ways of looking at the same data.

It is important to note that children in our study had little reason to peek at either folder when the experimenter was away, beyond satisfying their own curiosity of knowing what was inside. The experimenter clearly communicated to the child that they would return to the room when they were finished with their phone call, signalling an implicit agreement not to look inside of the folder until they returned. Anecdotally, a number of children who peeked at the folder during the wait period acted surprised or happy to see the sticker

once the experimenter returned to the room, despite having seen the sticker at least once before. Thus, across the two conditions, participants had ample reason to wait until the experimenter returned in order to see the contents of the folder.

Results

Our key question was whether children's peek behaviors differed across conditions. We found that children were more likely to peek in the Self condition (n = 13/20) than in the Other condition (n = 4/20), suggesting that they were more curious about the experimenter's evaluation of their own drawing than that of an unknown child's ($p = 0.0095$, Fisher's Exact Test; Fig. 2). Consistent with this, peek latency was also lower in the Self condition (M_{peek} = 86.1s) than in the Other condition (M_{peek} = 151.4s; $Z = 2.65, p = .0074$, Exact Wilcoxon-Mann-Whitney Test). Unsurprisingly, the difference in latency was largely driven by the proportion of children who did not peek in the Other condition.[2]

Discussion

The current study examines the emergence of children's social curiosity about the self. Using a modified delay of gratification task, we found that preschool-aged children were more likely to "peek" before the experimenter returned when the folder in front of them contained an evaluation of their own drawing than when it contained the same person's evaluation of a peer's drawing. Even though it was clear that children would eventually learn about the evaluation, children nonetheless went out of their way to peek inside the folder when it contained information about themselves. These results suggest that preschool-aged children are curious about and actively seek out others' evaluation of themselves.

What is motivating children to peek in this task? One might reasonably ask whether children's peeking behavior simply reflects their desire to attain a sticker: a tangible reward, like a marshmallow. This explanation is unlikely, however; in our procedure we made it explicit that the folders belonged to the experimenter and that the stickers would be placed on the folder (rather than directly on the drawing). We also were careful not to use any language that suggested that children would be able to take the sticker (or even their drawing) home. Nonetheless, it is possible that children's peeking still reflects their curiosity about whether they received a sticker, not as a form of evaluation, but as a simple tangible reward. To address this concern more directly, we are conducting a pre-registered replication of the study that uses slips of paper marked with circles (i.e., an item with no intrinsic value to children) to indicate a "good" drawing, instead of stickers.

Even if we can rule out the possibility that children were drawn more towards a tangible reward for themselves than for Jordan, one might still wonder whether the current results nonetheless reflect children's desire to attain an expected *social* reward: the experimenter's praise. Note however that the sticker was not guaranteed or expected in this task. The experimenter explicitly noted not just the possibility of receiving a sticker if the drawing was "really good," but also the possibility of not receiving it if the drawing was "just okay." The experimenter also pretended to ponder the drawing's quality during evaluation in the back of the room ("Hmm... what did I think of [participant]'s drawing?"), and their standards for evaluation were unknown to participants. Thus, it is unlikely that children in the Self condition were simply drawn by the desire to acquire an expected social reward.

Rather than a simple desire to attain a tangible reward (sticker) or social reward (praise), we suggest that the current findings likely reflect children's curiosity about whether they received praise or a sticker as a form of social *feedback* on their drawings. Indeed, extensive research suggests that children consider praise as more than just a reward that feels good; it is a ubiquitous and consistent source of information about the self. For example, children respond differently to various kinds of praise (e.g., Mueller & Dweck, 1998; Henderlong & Lepper, 2002), suggesting that children are interpreting the underlying meaning of praise based on what is being praised (e.g., effort or ability). Preschool-aged children also selectively endorse others' praise on their drawings depending on their past history of praise (e.g., indiscrminate vs. selective; Asaba et al., 2018). Furthermore, despite the fact that children (and adults) tend to show optimistic evaluations of themselves and demonstrate fundamental attribution biases (e.g., Mezulis et al., 2004; Boseovski, 2010), there are reasons to believe that children are also motivated to acquire accurate information about themselves. Thus, praise is likely more than just simple social reward; it is also a source of information for children to learn about themselves from others.

Taken together, our findings are consistent with the possibility that children's peeking behavior reflects a desire to learn about the self from others. As parents, teachers, and scientists, we have often assumed this was the case—our everyday experiences are riddled with children asking about their abilities or work. However, despite the prevalence of this curiosity in our lives, little prior work has been done to induce it experimentally. Importantly, children in our task had good reason to peek across both conditions and, if anything, had a greater gap in knowledge for Jordan's abilities than their own. However, children were more likely to peek at the evaluation of their own drawing, suggesting that they privilege information about the self over information about unknown others.

Such desire is also relevant to, and consistent with, prior work on how others' beliefs of the self affect children's thoughts and behaviors (e.g., Asaba & Gweon, 2022; Engelmann et al., 2012; Shaw et al., 2014; Fu et al., 2016). Our approach, however, differs from this literature in one key aspect. Rather than leveraging this desire to investigate children's self-presentational behaviors, our work treats others' beliefs of the self as a target of learning and curiosity; children not only try to manage and improve others' beliefs of them, but they also go out of their way to seek such infor-

[2] All analysis scripts and data can be found at: https://github.com/pzhu222/socialcuriosity_cogsci_2023

mation out. From this perspective, our work presents an initial step in exploring this learning by investigating children's spontaneous information-seeking behavior in a setting where they can acquire feedback about how they did on a task.

Our task constrained children's curiosity about the self to a particular method (peeking), target (drawing ability), and source (social evaluation). But of course, children's learning about themselves goes beyond peeking, ability, and evaluation: How might children learn about themselves in their daily lives? First, children may seek social feedback in various ways: rather than violating an implicit social norm (e.g., sneakily peeking), caregivers and teachers may witness more benign versions of these information-seeking behaviors (e.g., "How is my drawing? Is it good?"), especially in cases where seeking feedback is relatively low cost. Second, social evaluation is just one of the ways in which children can learn about themselves. In the absence of others' feedback, children may learn about themselves through self-guided exploration and play, learning what they can do by trying it themselves (e.g., seeing if they can make a block tower). Indeed, prior work has suggested that even very young children may learn about the limits of their motor capabilities in a kind of "learning by doing" (e.g., Adolph et al., 1993). Finally, while our task focused on a particular kind of curiosity in a specific population of participants, children's curiosity about the self may be modulated by various sociocultural and individual factors that change both what they are curious about, and how they satisfy their curiosity. Thus, children's curiosity about the self in everyday life may manifest in diverse ways that depend on the context they find themselves in.

For many of us, we often observe children seeking or eliciting feedback—yet, their bids are mostly directed at those they are close to, such as their teachers or caregivers. Why is this the case? Beyond the fact that children are simply around these individuals more often, children may be selective in the people they ask for feedback: that is, only asking individuals whose opinions matter to them. In our study, the participant was familiar with the experimenter (they were present in children's classrooms), and as such, children may have been motivated to peek in order to understand how the experimenter evaluated them. Children may also down-weight feedback from individuals whom they have never met or who do not have relevant domain knowledge. Consistent with this, recent work has suggested that adolescents value encouragement most from individuals who have knowledge both of their abilities and the task domain, suggesting that we don't value feedback equally from everyone (Asaba et al., 2022). If younger children reason about feedback in the same way, this may help explain their tendency to direct these attempts for feedback towards their close relationships.

As children get older, the form and manner in which they learn about themselves may change. One way in which their learning may differ is in the valence of the feedback they receive. In our task, children were able to learn from positive feedback (i.e., a star sticker). We chose this mechanism as it is easy for children to understand and because we wanted participants to have a positive experience in the study. However, children may begin learning from *negative* feedback, especially in school (e.g., seeing marks off on a test). In the case of negative feedback, children's information-seeking behaviors may change: as adults, we often experience a feeling of *not* wanting to know how we scored on an exam or what someone thought of our work, perhaps when we hold expectations that the result will be negative. However, negative evaluation or feedback may also be important for young learners: it gives them information on what they did wrong and how they can improve in the future. Thus, desire for information about the self in the form of negative evaluation may cut two ways: we may avoid this feedback in order to protect our own perceived integrity and positivity, or we may be drawn to it in order to receive accurate information on how to improve.

Finally, we often don't just want to learn about ourselves in a vacuum: we want to learn about our performance relative to others around us. As children grow up and find themselves in situations where an evaluator may give feedback to multiple children at once, they may become curious not just about their own performance, but also about the performance of those around them. In the current study, we made Jordan an unfamiliar child for simplicity, but it is possible that children's behavior would change if the comparison child was, for example, another child in their classroom. The effect of peeking across conditions may be attenuated: children may have a desire to compare themselves to a peer, or they may genuinely care about how their friend performed. Furthermore, the strength of our desire to know how others performed may also change as a function of other context-specific factors, such as whether the environment is competitive or collaborative. As such, our curiosity may be influenced by social comparison, and we may even learn about others to learn about the self.

In sum, curiosity and early learning are more than just understanding the external world: We are also eager to learn about ourselves, and in particular, to learn about ourselves from others. Indeed, this curiosity may also extend to aspects of ourselves beyond our abilities, such as our identity, values, traits, preferences, and more. Taken together with prior work in curiosity, early learning, and social development, we provide evidence that this variety of "social curiosity about the self" (above and beyond a social curiosity about others) emerges early in life and may be a strong motivator behind early learning. This curiosity may enable children to navigate their social world and build relationships with others.

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