Quit while you're ahead: Preschoolers' persistence and willingness to accept challenges are affected by social comparison

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Abstract

Many beliefs about oneself are constructed through experiences, but the kinds of evidence that inform these beliefs in early childhood are not well understood. One critical source of information that affects adults and older children's appraisals of their abilities and traits is social comparison. We found that even four- and five-year-olds (mean=56 months) spontaneously use evidence from social comparison to evaluate their abilities. Preschoolers who saw evidence that they out-performed peers on a letter-tracing task subsequently traced fewer letters than children in other conditions, and children who saw evidence suggesting they performed *either* better or worse than peers on the task were more likely to choose an easy (versus difficult) novel task relative to those who saw neutral or no evidence. This suggests that preschoolers use social comparison to draw inferences about their abilities without explicit cues from adults, and that this can have negative consequences, even in early childhood.

Keywords: social comparison; persistence; learning.

Introduction

Adults have rich representations of their abilities, weaknesses, traits, and values, forming a kind of "personal epistemology" (Brim, 1976, p. 242). Having an accurate theory of the self might allow people to predict the outcomes of future activities, maximizing the possibility of positive experiences and minimizing the likelihood of negative ones (Epstein, 1973). Indeed, adults have enhanced memories for events that encode information about the self (Symons & Johnson, 1997), suggesting that a theory of the self may serve to organize thought and action. However, although we know that young children have intuitive theories about the physical and psychological worlds (Carey, 2000; Gopnik & Meltzoff, 1997; Wellman & Gelman, 1992), much less known is about the development of children's beliefs about themselves. Do young children have an intuitive theory of the self that is affected by the evidence they observe, which in turn affects their future behavior?

Some understanding of the self as an enduring and unique entity emerges early in life. Toddlers recognize themselves in mirrors by 20 months (Amsterdam, 1972). By three-and-a-half, children compare themselves to others in spontaneous speech suggesting they understand that they have qualities and attributes that make them different from others (Mostache & Bragonier, 1981). By four and five, children have distinct orientations towards "learning" goals versus "performance" goals (Smiley & Dweck, 1994), although unlike older children, younger children tend to associate high and low achievement with "being good" or "being bad" rather than "being smart" or "being dumb" (Dweck, 1999; Herbert & Dweck, 1995; Heyman, Dweck, & Cain, 1992).

It is less clear how children develop these beliefs about themselves, although considerable evidence suggests a role for parental behavior. Praise and other extrinsic rewards affect children's intrinsic motivation (e.g., Lepper & Greene, 1975; Mueller & Dweck, 1998) and whether parents praise their infants and toddlers for ability or effort has an enduring effect on children's mindsets (Gunderson, Gripshover, Romero, Dweck, Goldin-Meadow, & Levine, 2013). However adults often give no or uninformative feedback about ability, and other clear metrics for self-evaluation, such as objective success, may be unavailable.

In contexts where people cannot estimate their own abilities using an external benchmark (i.e., whether they achieved a goal), people may instead evaluate themselves with respect to others (Festinger, 1954). For older children and adults, evaluations derived from social comparison have consequences for beliefs about the self: performing less well than peers results in lower self-evaluations, and the converse is true when people know they have performed better than their peers (Mussweiler, 2003; Ruble, Eisenberg, & Higgins, 1994). For instance, an individual will rate himself as cleaner and better prepared when sitting in a lobby before a job interview with another candidate who is sloppily dressed than when sitting alongside a well-dressed candidate (Morse & Gergen, 1970). The effects of social comparison on actual performance vary based on task type, but there is evidence to suggest that learning you are one of the best enhances performance on motor tasks, such as walking on a balance beam (Lewthewaite & Wulf, 2010). However, in other studies social comparison has been found to have detrimental effects on performance, such as increased reaction times (e.g., Rijsman, 1974).

The question of whether preschoolers use social comparison to learn about themselves remains open. Some studies suggest that children younger than six or seven do not update their beliefs about themselves based on what they observe about their peers' relative performance on the same type of task (Butler, 1989a; Ruble, 1983; Ruble et al., 1994). Children appear to be particularly immune to the effects of finding out they performed worse than their peers; unlike older children, they do not evaluate themselves negatively, nor do they show subsequent impairments in their task performance (Boggiano & Ruble, 1979; Ruble et

al., 1994; Ruble, Feldman, & Boggiano, 1976; Ruble, Parsons, & Ross, 1976). Researchers have suggested that this may be because preschoolers are less likely than older children to attribute failure to enduring traits (Lockhart, Chang, & Story, 2002; Rholes & Ruble, 1984). Instead, young children may see their poor performance relative to peers as something they can improve upon in subsequent attempts (Butler, 1989). This analysis however, becomes less tenable to the degree that research suggests that children may have stable—performance or learning—mindsets even by four and five (e.g., Smiley & Dweck, 1994).

Moreover, when adults make a comparison very explicit, such as commenting on the child's performance relative to a peer's, children's task performance is impaired when they think they did worse (rather than better) than a peer (Butler, 1998). Children's performance and self-evaluations are also impaired when they find that they performed worse than a peer introduced as a member of an out-group (i.e., when girls are told they did worse than a boy and vice-versa; Rhodes & Brickman, 2008). Thus the findings on children's sensitivity to social comparison information are somewhat mixed.

The idea that four- and five-year-olds might be largely *in*sensitive to social comparison is somewhat surprising from the perspective of evidence-based learning. If children's intuitive theory of the self resembles theory formation in other domains (see Gopnik & Wellman, 2012; Schulz, 2012; and Tenenbaum, Kemp, Griffiths, & Goodman, 2011 for reviews), we might expect children to spontaneously integrate their prior beliefs about themselves with new data (including data about peers' achievement) to draw inferences about their own abilities. Note however, that children might be resilient to upward social comparison—when their peers did better—because they are insensitive to the evidence or because they have higher initial confidence in their abilities, or the flexibility of their abilities, than older children. In general, young children tend to be optimistic and overestimate their future performance, especially with respect to novel tasks (Cimpian, 2010; Schneider, 1998; Smiley & Dweck, 1994). Insofar as children's beliefs are jointly influenced by the strength of the data and the strength of their initial beliefs about themselves, evidence should be more influential to the degree that children's prior beliefs are less certain.

Because we were interested in whether preschoolers would spontaneously use data from social comparison to evaluate their own abilities, we chose a task that preschool children would find challenging even on the first attempt. We reasoned that children who initially perceive themselves as relatively skilled at a task would be likely to have high confidence in their abilities, and children who are completely incapable of performing a task are likely to have high confidence in their *in*ability. Children at an intermediate level of performance may have real uncertainty about how good they actually are at a task. Thus children's tendency to experience some difficulty in performing a task might serve as a proxy for their certainty about their ability.

To see whether children are sensitive to social comparison when their estimate of their own abilities is noisy, we asked preschoolers to trace three letters of the alphabet. We had blind coders assess their performance, and we focused the analysis on children who achieved intermediate ratings on this task. (As intended, children found the task doable but challenging and most children performed in the intermediate range.) We then provided children with evidence relevant, or irrelevant, to social comparison. Specifically, children saw one of four types of evidence: 1) tracings from four children who traced the letters very poorly (*Peers Worse* condition), 2) tracings from four children who traced elaborate cursive letters (*Peers Better* condition) 3) tracings from four children who traced abstract designs (*Peers Irrelevant* condition), or 4) four drawings of cartoon animals (*No Peers* condition). The *Peers Irrelevant* condition was included to ensure that any behavioral effects of social comparison were specifically due to evidence relevant to social comparison, and not merely due to the distraction of looking at peers' performance generally. In contrast to previous work (Butler, 1998; Rhodes & Brickman, 2008), we did not explicitly draw children's attention to the comparison or their own relative performance.

We assessed children's sensitivity to the evidence by evaluating both their subsequent persistence at the target task and their willingness to choose either an easy or difficult novel task. For the Persistence Task, children were given a sheet with all 26 letters of the alphabet and a novel toy (a push button water toy with floating rings). Children were told to trace as many letters as they liked with the understanding that they could play with the toy whenever they decided to stop. After the Persistence Task, children were given a choice of an easy (six-piece) puzzle or a hard (30-piece) puzzle (borrowing from Smiley & Dweck, 1994). In previous work (Smiley & Dweck, 1994), approximately half the preschoolers chose each type of puzzle, suggesting that children differ with respect to performance goals (manifest by choosing the easy puzzle) or learning goals (manifest as choosing the hard puzzle). Any significant deviations from this distribution would suggest a generalizable effect of social comparison on children's willingness to take on challenging tasks.

If preschoolers are insensitive to social comparison then their behavior in the social comparison conditions (*Peers Worse* and *Peers Better*) should not differ from their performance in the control conditions (*Peer*s *Irrelevant* and *No Peers*). We predicted instead that children would integrate the evidence, and perform differently in the social comparison conditions relative to both control conditions. However, given the exploratory nature of this study (seeing if preschoolers would spontaneously react to social comparison information *at all*), we were agnostic about the direction of the effect. One possibility is that children who saw that their peers performed worse than they did (*Peers Worse* condition) might than find the target task relatively more enjoyable, and thus be more motivated on both the target and the generalization task. However, given that we

intentionally chose a challenging task for this age, children who believe they already established relative competence might persist less and opt to spend more time on a novel, enjoyable, activity. The reverse predictions apply to the *Peers Better* condition. If children believe they have done worse than their peers they might be less motivated given their failure or more motivated to demonstrate mastery.

Method

Seventy-eight children (mean: 56 months; range: 48-66 months) participated in the study. All of the children were recruited from an urban children's museum. In the first part of the study, the experimenter handed children a sheet with dashed outlines of the letters A, B, and C and asked the children to trace the letters. This was designed to 1) provide children with information about their own letter tracing ability and 2) allow a coder blind to condition to rate the quality of the letter tracings to determine how much children struggled with tracing letters. All children were thanked for completing the tracing, but the experimenter did not comment on their performance. Next, the experimenter showed children four pieces of evidence. In the *Peers Worse*, *Peers Better*, and *Peers Irrelevant* conditions, children were told, "Do you know that other kids your age come and do these activities with me? Let's look at what they did when they came to play." The experimenter then placed a sheet on the table in front of the child and said, "This is a child named Tony, and these are his letters." This was repeated three times, for a total of two girl and two boy confederate children, each of whom wrote in a different color. In the *Peers Worse* condition, the confederate children's letters were messily traced. The evidence from in the *Peers Better* condition were neat tracings of cursive letters. In the *Peers Irrelevant* condition, the tracings were made over random line drawings, in two different patterns, labeled as designs. The experimenter did not mention other children in the *No Peers* condition.

The experimenter then introduced the Persistence Task saying, "Here I have a sheet with the alphabet on it. You can trace all of the letters, none of the letters, or some of the letters. It's totally up to you how many you want to trace. And whenever you're done tracing, you can take a turn with this toy." The experimenter placed the alphabet sheet in front of the child and the water ring toy behind the sheet of paper. The alphabet sheet had smaller outlines of all 26 letters. To dispel any sense of being evaluated during the free choice task, the experimenter told the child she had some reading to do while they "looked at those things." The experimenter did not look at the child again during the Persistence Task. The Persistence Task ended when the child stopped writing for approximately 20 consecutive seconds (either because they started to play with the water toy or because they simply quit). If the child had not already started playing with the toy, the experimenter said, "If you're all done, you can take a turn with the toy." The child was allowed to play briefly with the toy and then the experimenter introduced the Puzzle Task. The experimenter presented children with two unassembled puzzles, in counterbalanced order. The easy and difficult puzzles were made from the same picture, and cut from the same size board. The easy puzzle had been cut into 6 large, interlocking pieces; the difficult puzzle had been cut into 30 small, interlocking pieces. The experimenter said, "Now you can choose which puzzle to do. They both make the same picture of a playground. This puzzle has a few big pieces, and this puzzle has a bunch of small pieces." After children chose a puzzle, the experimenter helped them assemble it. Finally, children were praised for completing the puzzle and thanked for participating. See Figure 1.

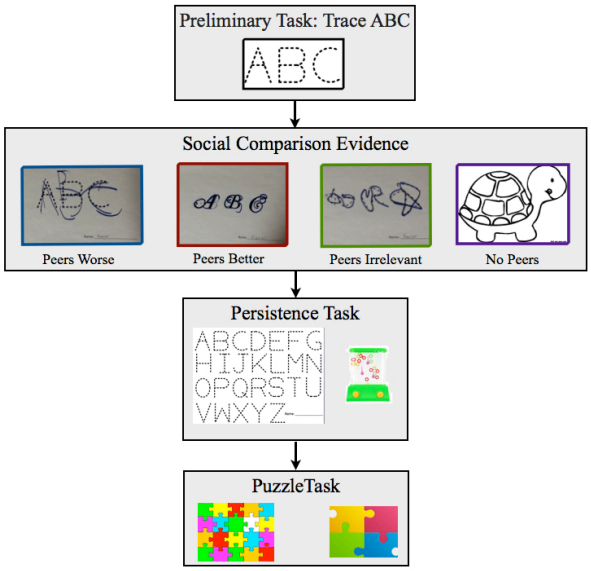

Figure 1. Schematic of study design. Children first traced the letters A, B, and C, and then saw evidence from other children (*Peers Worse*, *Peers Better*, or *Peers Irrelevant* conditions) or pictures of animals (*No Peers* condition). The Persistence Task measured children's subsequent willingness to continue trace the letters of the alphabet instead of playing with the distractor toy. The Puzzle Task assessed children's preference for completing a difficult (left) or easy (right) puzzle.

Results

All children's initial tracing of the three alphabet letters were rated by a blind coder with a whole number rating on a scale of 1 (no semblance of letters) to 10 (perfect, adult-like letters). The coder also rated the letters used as evidence in the *Peers Worse* condition, which had an average rating of 4. Because the *Peers Worse* manipulation would not be effective if children did not actually perform better than their peers, we excluded any children who had a rating at or below 4 (n=2). In addition, we excluded children whose letters were rated a 9 or a 10 on the grounds that children who were confident in their ability to write letters would likely be insensitive to the evidence from social comparison (n=16). The children included in the analysis (n=60) thus had scores between 5 and 8 with a mean score of 6.82

(*SD*=1.05). The average age and letter rating did not differ by condition (Age: β=.03, 95% CI [-0.13, 0.06], Letter Rating: β=.00, 95% CI [-0.11, 0.10]; *Peers Worse*: n=15, m_{age}=56 months, $m_{letter\ rating}$=7.0; *Peers Better*: n=16, m_{age}=55 months, $m_{letter\ rating}$=6.5; *Peers Irrelevant*: n=14, m_{age}=55 months, $m_{letter\ rating}$=7.00; *No Peers*: n=15, m_{age}=56 months, $m_{letter\ rating}$=6.80).

For the Persistence Task, we counted the number of complete letters children traced before quitting and used the same bootstrapping method to estimate the 95% confidence interval for the mean number of letters traced and assessed overlap between the means of each condition and the confidence intervals of the other conditions. Children in the *Peers Worse* condition traced fewer letters than children in the other three conditions, which did not differ statistically from one another (Mean *Peers Worse*: 9.20 letters, 95% CI [3.67, 14.2]; Mean *Peers Better*: 20.43 letters, 95% CI [16.25, 25.25]; Mean *Peers Irrelevant*: 22.39 letters, 95% CI [19.36, 26.00]; Mean *No Peers*: 22.22 letters, 95% CI [19.2, 26.00]). See Figure 2. In addition, a linear regression with condition as the predictor revealed that the evidence children saw affected children's tracing in the Persistence Task, β=4.058, 95% CI [2.04, 6.31].[1] Additionally, a lower proportion of children completed all 26 letters in the *Peers Worse* condition (26%, 95% CI [0, 47]) than in any other condition (*Peers Better*: 69%, 95% CI [50, 94], *Peers Irrelevant*: 71%, 95% CI [50, 93], and *No Peers*: 73%, 95% CI [53, 93]), and this was confirmed with a logistic regression, β=.63, 95% CI [-.05, 1.13]. The results of the Persistence Task provide some support for our hypothesis, where children who believed they had already established their superiority to their peers were less likely to persist on the target task. However, against our prediction, but consistent with previous research suggesting children's relative resilience in the face of upward comparison, children who did worse than their peers performed comparably to children in the control conditions.

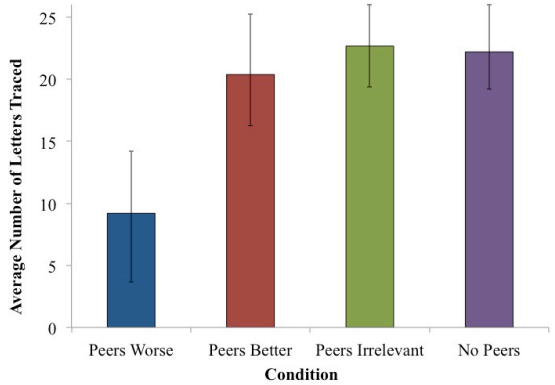

Figure 2. Mean number of letters completed in the Persistence Task by condition with 95% confidence intervals.

[1] We report 95% confidence intervals of means, bootstrapped with 10,000 samples (see Cumming, 2008 for discussion of confidence intervals). For consistency with previous literature, we also note that all the regression analyses reported are significant, *p*s<.02.

Next, we considered whether any effect of social comparison generalized to a novel domain in which children did not have information about their own abilities relative to others, and found that condition did indeed have an effect on children's puzzle choice as evidenced by a logistic regression (choice of easy puzzle coded as "0" and hard puzzle coded as "1"), β=.97, 95% CI [.20, 1.46]. The mean proportions of children who chose the difficult puzzle were similar in the relevant social comparison conditions (*Peers Worse*: 0%, 95% CI [0, 0]; *Peers Better,* 18%, 95% CI [0, 38]), but differed from the proportions of children in the two control conditions, (*Peers Irrelevant:* 43%, 95% CI [14, 64]); *No Peers:* 47%, 95% CI [20, 73]). The results of the Puzzle Task suggest that children are in fact sensitive to downward and upward social comparisons. In particular, contra findings (including our own in the Persistence Task) that children are simply insensitive to evidence that they under-perform compared to their peers, social comparison appears to make preschoolers less inclined to attempt novel difficult tasks, whether they compare favorably to their peers or not.

Discussion

In the current study, we asked whether preschoolers would spontaneously use evidence from social comparison to inform their beliefs about themselves, as measured by their persistence on a target task and their motivation to do a challenging task in a different domain. Despite having equivalent actual abilities, when children could infer they were relatively more successful than their peers, they demonstrated less persistence on the target task than children who believed they were relatively worse than their peers, or children who had no relevant information. Furthermore, children were disinclined to attempt a challenging novel task if they saw any relevant social comparison, regardless of whether the social comparison reflected positively or negatively on their abilities. The effects of social comparison held even though information about peers' performance was presented without any explicit comparison to the child's performance. Thus these results suggest that at least in conditions where children start with potential uncertainty about their abilities, preschoolers, like older children and adults, spontaneously use evidence about others to inform how they think about themselves, and that comparison with others can impact both children's immediate task persistence and their motivation to take on difficult tasks more globally.

We observed an effect of social comparison on children's task persistence only in the *Peers Worse* condition, but not (as we had predicted) in the *Peers Better* condition. This finding is consistent with previous research suggesting young children's relative resilience to negative information (e.g., Flavell, Friedrichs, & Hoyt, 1970). In this case however, it is possible that the absence of any effect on children's persistence may have been due to a limitation of the task. Children had a sheet of 26 letters and the

prevalence of children performing at ceiling may have limited our design's sensitivity to condition differences. Future work could assess which of these two accounts best explains the pattern of persistence we observed in the *Peers Better* condition.

In addition, future work might consider how social factors relating to the experimenter's presence and potential implicit evaluation of the child might have contributed to the pattern of results. When for instance, children persisted less given evidence that they had out-performed their peers (in the *Peers Worse* condition), we cannot know if this was because children had already satisfied themselves of their ability and therefore lost interest in continuing the task, or whether they believed that they had already secured the experimenter's good opinion and thus had no motivation to continue. Similarly, when children opted for the easier puzzle in both social comparison conditions, it is not clear whether the chance to perform well was attractive because it helped children to maintain a good opinion of themselves, or because it helped them maintain their reputation with the experimenter. Future research might look at whether social comparison affects children's persistence and choice of future challenging tasks, even when no adult (or a naïve adult) is present.

Collectively however, these results suggest that preschoolers are not indifferent to social comparison. Although the results contrast with some previous studies of social comparison, which often asked children to explicitly evaluate their own abilities (Boggiano & Ruble, 1979; Ruble, et al., 1980; Ruble et al., 1994; Ruble, et al., 1976), the results are consistent with some more recent work (Butler, 1998; Rhodes & Brickman, 2008). These results also support previous research suggesting that an understanding of the self emerges over the preschool years (Bélanger et al., 2014, Heyman & Dweck, 1998; Heyman, et al., 1992). Finally, these results align with the broader perspective that children construct intuitive theories, integrating data and prior knowledge (Gopnik & Wellman, 2013; Schulz 2012; Tenenbaum et al., 2011). In this case, we propose that children use evidence from social comparison to inform their beliefs about themselves and that these beliefs in turn affect children's subsequent behavior and learning.

Consistent with that perspective, we proposed that children might be particularly sensitive to evidence from social comparison when their prior beliefs about their own abilities were uncertain, and we found that children who performed at an intermediate level were indeed sensitive to social comparison evidence. However, future research might directly compare children's responses to social comparison evidence among children of high, low, and intermediate ability (and thus arguably confidence) to provide a stronger test of the role of prior knowledge in children's sensitivity to social comparison.

Finally, the current work suggests that information from social comparison has a generally negative impact on preschoolers' persistence and task motivation. This is consistent with the detrimental effect of performance goals relative to learning goals more broadly (Dweck, 2000). However, peers play a large role in children's lives and in many contexts, these roles are positive**.** The presence of peers allows children to learn through observation (Butler, 1989a), and both competition and cooperation benefit children's learning under different circumstances (Butler, 1989b; Slavin, 1983). Thus, many questions remain regarding children's sensitivity to social comparison and its role in shaping children's beliefs about the self. Given that children's beliefs about their own learning abilities have ramifications for educational outcomes, a better understanding how these theories develop in early childhood may enable us to support children's persistence, increase children's motivation, and foster positive expectations for children as learners.

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