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 experience, but the kinds of evidence that inform these beliefs in early childhood are not well understood. One source of information that affects adults and older children's appraisals of themselves is social comparison. We found that even preschoolers (mean=57 months) spontaneously use social comparisons to guide their behavior. In Experiment 1, children who saw they out-performed peers on a task subsequently persisted less than children in other conditions. 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. In Experiment 2 children who saw peers perform better were inclined to persist more than children in other conditions. This suggests preschoolers use social comparison to draw inferences about themselves without explicit cues, and this affects their motivation.

Keywords: social comparison; persistence; learning.

Introduction

Adults have rich representations of their abilities, weaknesses, and traits, which form a "personal epistemology" (Brim, 1976, p. 242). An accurate theory of the self may allow people to predict outcomes of future activities, maximizing the possibility of positive experiences and minimizing the likelihood of negative ones (Epstein, 1973). However, while we know 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 evidence they observe, which in turn affects their 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 they have qualities and attributes that make them different from others (Mostache & Bragonier, 1981). By four and five, children have a preference for "learning" over "performance" goals (Smiley & Dweck, 1994), but unlike older children, younger children associate high and low achievement with "being good" or "bad" rather than "smart" or "dumb" (Dweck, 1999; Herbert & Dweck, 1995). It is less clear how children develop beliefs about themselves. 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 parental praise 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.

When people cannot estimate their own abilities using an external benchmark (i.e., success), they 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 vice versa (Mussweiler, 2003; Ruble, Eisenberg, & Higgins, 1994).

Whether preschoolers use social comparison to learn about themselves remains an open question. Children younger than six may not update their beliefs based on what they observe about their peers' relative performance (Butler, 1989a; Ruble, 1983; Ruble et al., 1994). Preschoolers appear unaffected by finding out they performed worse than their peers in that they do not evaluate themselves negatively, nor show subsequent impairments in task performance (Boggiano & Ruble, 1979; Ruble et al., 1994; Ruble, Feldman, & Boggiano, 1976). Researchers have suggested preschoolers are less likely than older children to attribute failure to enduring traits (Lockhart, Chang, & Story, 2002; Rholes & Ruble, 1984). Instead they may see their performance as something that they can improve upon in subsequent attempts (Butler, 1989). However, when adults make a comparison very explicit by commenting on the child's performance relative to a peer's performance is impaired when children think they did worse (rather than better) than a peer (Butler, 1998). In addition, when the peer is introduced as a member of an out-group (i.e., when girls are told they did worse than a boy or vice versa), children's performance and self-evaluations suffer (Rhodes & Brickman, 2008). Thus the findings on children's sensitivity to social comparisons are mixed.

The idea that four- and five-year-olds might be largely *in*sensitive to social comparison is 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. 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 spontaneously use data from social comparison to evaluate their own abilities, we chose a task that did not require children to respond to explicit questions, and one that preschoolers would find challenging. Children who perceive themselves as relatively skilled are likely have high confidence in their abilities, and those who are 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 are.

Experiment 1

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 focused the analysis on children who achieved intermediate ratings on this task. (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 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, we did not explicitly draw children's attention to the comparison or their own relative performance. This means that if children are affected by social comparison, it is because they spontaneously recognize and incorporate the evidence.

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 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 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. 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. Pilot testing suggested that relative to a sample of participants' letter tracings, same age children rated cursive letters as better and the messy

tracings as worse. 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. 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." Next 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.

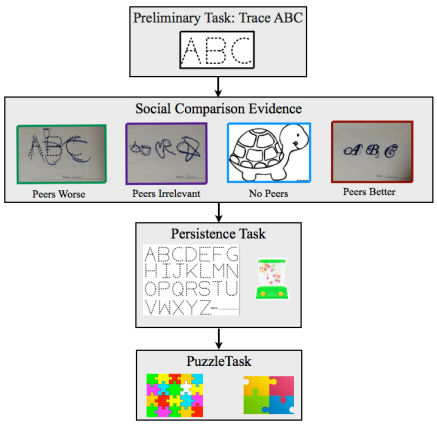

Figure 1. Schematic of Experiment 1. Children traced three letters and then saw evidence from other children (*Peers Worse*, *Peers Irrelevant*, or *Peers Better*, conditions) or pictures of animals (*No Peers* condition). The Persistence Task measured children's subsequent willingness to continue tracing letters instead of playing with a distractor toy. The Puzzle Task assessed children's preference for completing a difficult (L) or easy (R) puzzle.

Results

Children's initial tracings of the three letters were rated by a blind coder with a whole number rating on a scale of 1 (no semblance of letters) to 10 (perfect letters). The coder also rated the 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 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 (n=16). Children included in the analysis (n=60) had scores between 5 and 8 with a mean score of 6.82 (*SD*=1.05).[1] The average age and letter rating did not differ by condition (Age: β=.05, 95% CI [-0.14, 0.05], Letter Rating: β=.02, 95% CI [-0.09, 0.13]; *Peers Worse*: n=16, m_{age}=57 mo., $m_{\text{letter rating}}$=6.87; *Peers Better*: n=16, m_{age}=55 mo., $m_{\text{letter rating}}$=6.50; *Peers Irrelevant*: n=16, m_{age}=55 mo., $m_{\text{letter rating}}$=6.92; *No Peers*: n=15, m_{age}=55 mo., $m_{\text{letter rating}}$=6.87).

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*: 8.94 letters, 95% CI [3.50, 13.63]; Mean *Peers Better*: 20.44 letters, 95% CI [16.44, 25.38]; Mean *Peers Irrelevant*: 22.47 letters, 95% CI [19.67, 26.00]; Mean *No Peers*: 22.44 letters, 95% CI [19.62, 26.00]). See Figure 2. In addition, a linear regression with condition as the predictor revealed that the evidence children saw affected their tracing in the Persistence Task, β=4.24, 95% CI [2.38, 6.34].[2] 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.

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. A logistic regression, with choice of easy puzzle coded as 0 and hard puzzle coded as 1, revealed that condition did indeed have an effect on children's puzzle choice, β=.93, 95% CI [.22, 1.29]. 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,* 19%, 95% CI [0, 38]), but differed from the proportions of children in the two control conditions, (*Peers Irrelevant:* 40%, 95% CI [13, 67]); *No Peers:* 44%, 95% CI [19, 69). The results of the Puzzle Task

[1] Results are still significant when no data points are excluded.

[2] 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, *ps*<.05.

suggest that children are in fact sensitive to downward and upward social comparisons. In particular, contra findings that children are simply insensitive to evidence showing 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.

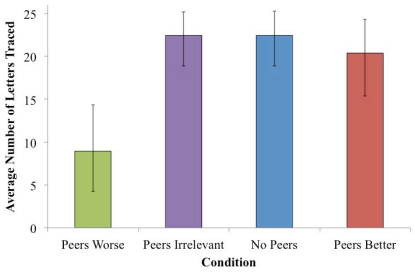

Figure 2. Mean number of letters completed in the Persistence Task in Experiment 1 by condition with 95% confidence intervals.

Experiment 2

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 in Experiment 1. 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. To address this, we designed a task that was similar to Experiment 1, but where children might show varying degrees of persistence at baseline (in the *No Peers* condition), as well as where all children in the sample would be uncertain about their abilities. In Experiment 2 children counted small sets of fish on a piece of paper and saw evidence in three conditions: *Peers Worse,* where the other children counted some of the sets incorrectly, *Peers Better*, where the other children counted larger sets of fish, or *No Peers,* where children saw line drawings. Then using a child-operated card dispenser in the Persistence Task children counted as many pairs of cards with different set sizes as they wished before playing with the water toy.

Method

Fifty children (mean: 59 months; range: 48-66 months) participated in the study. Ten additional children were excluded because of parent or sibling interference (n=5), machine malfunction (n=2), experimenter error (n=1) and inability to complete the initial counting sheet (n=2). In the first part of the study, children counted three sets of fish, numbering 4, 2 and 7. All children were told that they counted each of the sets correctly, and received a star on their paper for each set as a visual marker of their performance. The experimenter then showed children evidence from other children in the social comparison conditions. In the *Peers Worse* condition, the confederates counted only one or two sets correctly, receiving only one or two stars on their papers. The evidence from in the *Peers Better* condition showed children who counted sets of 16, 13, and 22 fish perfectly. In these evidence conditions, children often spontaneously commented on the peers' counting or their own counting, saying "I got them all right" in the *Peers Worse* condition and, "Wow, that's a lot of fish" in the *Peers Better* condition, suggesting they interpreted the evidence as it was intended although they were not prompted. In the *No Peers* condition, children were showed line drawings of animals.

The experimenter introduced the Persistence Task saying, "Here I have a machine with a lot of cards inside. Let me show you how it works." The experimenter demonstrated how the machine, from the children's game *Zingo*, dispensed two cards, each of which had a set of between 6-11 shapes; sets differed by 1 or 2 shapes. She showed how to place the card with more shapes in the larger of two cups set up on the table, and the card with fewer shapes in the smaller cup. As in Experiment 1, children were told they could count as many cards as they wanted and to take a turn with the water toy whenever they were done counting. Again, the experimenter read while children did they activities. After the Persistence Task, which ended after a maximum of 27 trials, children were told they did an excellent job counting. Children in the *Peers Better* condition were told that the experimenter had mistakenly shown them the counting of children who were older to dispel any negative emotions they may have felt. Finally, children were given a timed number identification task adapted from the Test For Early Mathematics-3 (TEMA-3) to assess their general ability to recognize cardinal values.[3]

Results

Age and average symbolic number ability, as measured by the TEMA-3 task, did not differ by condition (Age: β=.14, 95% CI [-0.01, 0.28], Letter Rating: β=-3.25, 95% CI [-8.73, 2.63]; *Peers Worse*: n=17, m_{age}=57 mo., m_{time}=27.00s; *No Peers*: n=16, m_{age}=60 mo., m_{time} =29.27s, *Peers Better*: n=17, m_{age}=60 mo., m_{time}=20.81s).

For the Persistence Task, we counted the number of pairs of cards children counted and assessed overlap between the means of each condition and the confidence intervals of the other conditions (Mean *Peers Worse*: 6.06 trials, 95% CI [2.12, 9.18]; Mean *No Peers*: 9.19 letters, 95% CI [4.94, 12.94]; Mean *Peers Better*: 13.59 trials, 95% CI [9.71, 17.29]). See Figure 3. Children who saw that their peers did better persisted more than those who saw their peers do

[3]We administered the Puzzle Task after the Persistence Task. However, only 6 of 50 children chose the hard puzzle. We believe children were somewhat depleted from counting leading children to choose the easy puzzle much more often than in Experiment 1.

worse, while children who saw no social comparison evidence persisted at an intermediate level. In addition, a linear regression with condition as the predictor suggests that seeing how well other children counted affected children's own motivation to count as predicted, β=3.77, 95% CI [2.12, 9.24]. These results indicate that, in addition to persisting less when they can infer they are better than their peers, preschoolers seem to also persist more when they observe peers who performed superiorly.

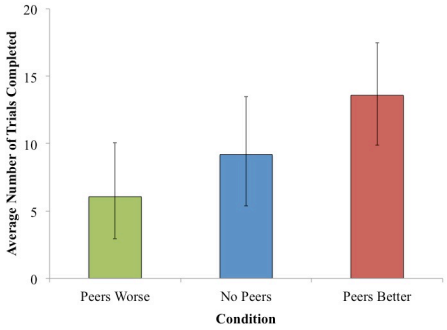

Figure 3. Mean number of pairs of cards counted in the Persistence Task of Experiment 2 by condition with 95% confidence intervals.

Discussion

In the current study, we asked whether preschoolers spontaneously use evidence from social comparison to inform their beliefs about themselves, as measured by their persistence on a target task, as well as 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 in Experiment 1 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. Results from Experiment 2 suggest that preschoolers who saw they performed worse than peers demonstrate more persistence relative to baseline and children who saw they when they performed better than peers. These results suggest that social comparison influences preschoolers' motivation even though information about peers' performance was presented without any explicit reference about a comparison to the child's performance. At least in cases 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.

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, in Experiment 1 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.

Collectively these results suggest that preschoolers are not indifferent to social comparison. Although the results contrast with some previous studies where children were asked to explicitly evaluate their own abilities (e.g., Ruble, et al., 1980), the results are consistent with some more recent work (Butler, 1998; Rhodes & Brickman, 2008). They 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). In this case, we propose that children do use evidence from social comparison to inform their beliefs about themselves and that these beliefs in turn affect children's subsequent behavior and learning.

Finally, the current work suggests that information from social comparison can have a negative impact on preschoolers' motivation, in that doing well relative to others decreases children's persistence and willingness to accept challenges. 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 of how these theories develop in early childhood may enable us to support children's persistence, increase motivation, and foster positive expectations for children as learners.

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