

BRIEF REPORT

A Self-Serving Bias in Children's Memories?

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Although children's initial perceptions and judgments about sociomoral situations are being actively explored, little is known about what children remember about them. In four experiments testing over 400 children, we investigated children's memories for small acts of giving and taking. When asked to recall their own giving and taking, children were relatively accurate following a number of delays. In contrast, when asked to recall a child's giving or taking, children exaggerated the child's taking after a 1-day or 1-week delay. Notably, this pattern of misremembering occurred only when children recalled the actions of a child but not an adult. We consider the idea that children spontaneously engage in social comparison, which colors their memories of the social world.

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When asked various kinds of questions, children appear to interpret the world through a positive lens (Boseovski, 2010). As early as kindergarten, children evaluate themselves very positively (Stipek & Mac Iver, 1989) and continue to do so until the late elementary school years (Benenson & Dweck, 1986). Children's evaluations of others are also positive. For example, children consider an individual to be good even after hearing of a single positive behavior followed by numerous negative behaviors performed by this individual (Rholes & Ruble, 1986). By age 5, children think a character's negative traits will become positive later in life (Lockhart, Chang, & Story, 2002), a belief that has been found cross-culturally (Lockhart, Nakashima, Inagaki, & Keil, 2009). As late as age 8, children consider another's goodness to be more stable than their badness (Heyman & Dweck, 1998).

When placed in situations that evoke social comparisons, however, children become less positive toward their peers. For example, between the ages of 7 and 13, children are more satisfied with their performance on a task after learning that another child failed compared to when they succeeded (Steinbeis & Singer, 2013). Indeed, 5- and 6-year-olds willingly incur a personal cost to ensure that another child receives less than themselves, thus putting them at a relative advantage (Sheskin, Bloom, & Wynn, 2014). Such findings show that children want to fare better relative to their peers and are consistent with the well-known feature of adult social cognition of comparing oneself to others (Festinger, 1954; Fiske, 2011).

Although initial perceptions and judgments are important, our views of the social world are also determined by what we remember. Do children's memories also reflect a parallel sensitivity to social comparison? When asked to report on past conflicts, children seem to shade the truth in self-serving ways (McGuire, Manke, Eftekhari, & Dunn, 2000; Ross, Smith, Spielmacher, & Recchia, 2004). For example, children asked to describe past family disputes claim more innocence for themselves and more harm done by their siblings (Wilson, Smith, Ross, & Ross, 2004). These findings demonstrate that children "remember" the past in ways that make them appear more favorably to others. However, studies investigating children's reports of past conflicts have not clarified whether this pattern of remembering reflects misremembering or conscious shading of the truth in the interests of self-presentation when one's actions may be under scrutiny.

When asked to recall others, children, like adults, seem to show a memory advantage for negative information (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). After learning about individuals who engaged in nice (e.g., sharing) and mean (e.g., stealing) behaviors, children show better memory for mean people (Kinzler & Shutts, 2008). Children not only show enhanced face recognition of wrongdoers, but they also better remember the details of their mean behaviors compared to the details of their nice behaviors (Baltazar, Shutts, & Kinzler, 2012). One explanation for these findings is that children find it surprising when people do not behave well; if children think that other people are good, then individuals who behave in unusual (negative) ways may be noticed and remembered. Another possibility relates to the proposal that cognitive systems have evolved to detect and remember wrongdoers (Cosmides, Tooby, Fiddick, & Bryant, 2005). According to this idea, children's memory advantage for negative information serves useful purposes because remembering individuals who have wronged in the past could reduce the possibility of being wronged in the future. However, children's superior memory for bad over good may serve other purposes beyond knowing who to avoid. In particular, this pattern of remembering may reflect a

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self-serving bias that extends beyond previous conflicts that children themselves were engaged in.

The present investigation tested this idea. Four experiments examined children's memory for small acts of giving and taking that they, another child, or an adult engaged in. We focused on children between the ages of 5 and 8 given previous findings showing that children of this age are (a) remarkably positive when reasoning about themselves and others and (b) likely to engage in social comparison. Our primary question was whether children's memories reflect a self-serving bias even for unobtrusive events that do not place children in competitive or explicitly comparative contexts.

Experiment 1

Participants

The Human Subjects Committee at Yale University approved all study procedures used in Experiments 1–4. Children were recruited from the greater New Haven, Connecticut area. Parents of participating children gave written informed consent; children also provided oral assent. Sample size for all experiments was determined by how many parents provided consent and how many children participating on the first day returned on the second day (Experiments 1, 3, and 4). Children were tested individually in a quiet room at their elementary school, and all sessions were audio-recorded. Experiment 1 included 139 children (68 girls; mean age = 6.80 years; range = 5.14–8.38 years). An additional 13 children were tested but excluded because they were absent on the second day of testing.

Procedure

Children were told that they would play a short game. Children were then randomly assigned to one of the following four transaction conditions, each involving photos of smiling White male children (from LoBue & Thrasher, 2014): (a) to give stickers to a child, in which the participant was handed five stickers and provided with the opportunity to place any number in front of a child's photo (e.g., "For coming in today, you get 5 stickers. This is Jack. Jack has no stickers. Would you like to give Jack any of your stickers?"); (b) to take away stickers from a child, in which five stickers were placed in front of a child's photo and the participant was provided with the opportunity to take any number (e.g., "This is Jack. Jack has 5 stickers. Would you like to take away any of Jack's stickers?"); (c) to observe a child give another child stickers, in which the experimenter manipulated a transfer from one child's photo to another child's photo (e.g., "This is John. John has 5 stickers. This is Jack. Jack has no stickers. John gave Jack 3 stickers."); or (d) to observe a child take away stickers from another child, in which the experimenter manipulated a transfer from one child's photo to another child's photo (e.g., "This is John. John has no stickers. This is Jack. Jack has 5 stickers. John took away 3 stickers from Jack."). The design was wholly between-subjects, and we matched the number of stickers given or taken in the "self" and "other" conditions. For example, if a child gave three stickers, then the next child observed a character give three stickers. Similarly, if a child took no stickers, then the next child observed a character take no stickers. Because we framed our

study as a game, all materials remained in the testing room, so no child left with stickers.

The following day, the experimenter returned to the school and asked children how many stickers were given or taken (e.g., "Do you remember Jack? How many stickers did you take away from Jack?").

Results

Our primary measure was the difference between the number of stickers given or taken compared to what children reported as being given or taken (e.g., number recalled as given minus number actually given; see Table 1). An analysis of variance (ANOVA) on these difference scores, including Condition (self, other) \times Behavior (giving, taking), revealed an interaction between condition and behavior, $F(1, 135) = 5.66, p = .019, \eta_p^2 = .04$. Children's reports did not differ between another child's giving ($M = 0$) and their own giving ($M = -0.03$), $t(67) = 0.09, p = .93, d = .02$. In contrast, children overestimated another child's taking ($M = 1.00$) in comparison to their own ($M = -0.09$), $t(68) = 3.56, p < .001, d = .85$. There was no correlation between age and difference scores in the Other-Take condition, Pearson $r = -.26, p = .13$. Thus, children remembered the actions of another child relative to their own in a way that exaggerated how much another child took.

Experiment 2

Experiment 2 addressed the possibility that children in Experiment 1 misremembered another child's behavior simply because they did not attend to their actions. The procedure was identical to Experiment 1 with one exception: here, the delay was 1 min, during which children were asked to list as many fruits and vegetables (30 s) and animals (30 s) as they knew.

Participants

Experiment 2 included 54 children (21 girls; mean age = 7.04 years; range = 5.50–8.80 years).

Table 1
Children's Reports of What Was Given or Taken by Themselves or a Child in Experiments 1–3, M (SD)

	1-min delay (Experiment 2)	1-day delay (Experiment 1)	1-week delay (Experiment 3)
Self-give			
Reported	1.93 (1.00)	2.11 (1.05)	2.92 (1.21)
Actual	1.93 (1.00)	2.14 (1.06)	2.75 (1.15)
Difference	0.00 (0.00)	-0.03 (0.62)	0.17 (0.48)
Self-take			
Reported	1.54 (1.66)	1.71 (1.67)	1.27 (1.46)
Actual	1.54 (1.66)	1.80 (1.68)	1.35 (1.65)
Difference	0.00 (0.00)	-0.09 (0.28)	-0.08 (0.48)
Child-give			
Reported	1.86 (1.03)	2.18 (1.57)	2.53 (1.20)
Actual	1.93 (1.00)	2.18 (1.19)	2.71 (1.08)
Difference	-0.07 (0.27)	0.00 (1.81)	-0.18 (0.82)
Child-take			
Reported	1.54 (1.66)	2.77 (1.96)	3.04 (1.87)
Actual	1.54 (1.66)	1.77 (1.66)	1.17 (1.53)
Difference	0.00 (0.00)	1.00 (1.78)	1.87 (2.07)

Results

Remembered-Actual difference scores are shown in Table 1. Of the 54 children, 53 reported the correct number of stickers that was given or taken (one child reduced another child's giving by one). These findings demonstrate that children in Experiment 1 likely paid sufficient attention to the stimuli to encode the relevant information about the giving and taking by themselves and another child.

Experiment 3

The difference in outcomes between Experiment 1 and Experiment 2 suggests that the tendency to inflate how much another child took increases with time. To confirm that children's memories exaggerate another child's taking with time and assess whether the effect grows over time, Experiment 3 replicated Experiments 1 and 2 with a longer delay of 1 week.

Participants

Experiment 3 included 101 children (51 girls; mean age = 6.97 years; range = 5.40–8.55 years). An additional 15 children were tested but excluded because they were absent on the second day of testing.

Results

Remembered-Actual difference scores are shown in Table 1. An ANOVA including Condition (self, other) \times Behavior (giving, taking) revealed an interaction between condition and behavior, $F(1, 97) = 25.81, p < .001, \eta_p^2 = .21$. Children slightly minimized another child's giving ($M = -0.18$) relative to their own ($M = 0.17$), $t(50) = 1.81, p = .076, d = .50$, and, as in Experiment 1, overestimated another child's taking ($M = 1.87$) in comparison to their own ($M = -0.08$), $t(47) = 4.65, p < .001, d = 1.33$. There was no correlation between age and difference scores in the Other-Take condition, Pearson $r = -.01, p = .95$. We also conducted a linear trend on children's reports of another's taking over the three delays (1 min, 1 day, 1 week), which confirmed the impression that the tendency to inflate how much another child took increased with time, $F(1, 68) = 9.74, p = .003$.

Experiment 4

Does children's pattern of misremembering in the previous experiments reflect an implicit comparative self-serving bias? Because people seek social comparisons with individuals who are similar to themselves (Goethals & Darley, 1977; Suls, Martin, & Wheeler, 2002; Wood, 1989)—and age is an important dimension by which children engage in social comparison (Dijkstra, Kuyper, van der Werf, Buunk, & van der Zee, 2008; Suls, Gastorf, & Lawhon, 1978)—Experiment 4 tested whether children differentially remember the giving and taking behaviors of a child versus an adult.

Participants

Experiment 4 included 104 children (50 girls; mean age = 6.33 years; range = 5.01–8.32 years). An additional three children were

tested but excluded because they were absent on the second day of testing.

Procedure

The procedure was identical to Experiment 3, with one exception: here, children were randomly photos to observe the giving or taking of a child or an adult (photos of smiling White male young adults were taken from Tottenham et al., 2009), and their memory was tested 1 week later. We matched "child" and "adult" conditions by using the distributions of another child's giving or taking in Experiment 3.

Results

Remembered-Actual difference scores are shown in Table 2. An ANOVA including Character (adult, child) \times Behavior (giving, taking) revealed an interaction between character and behavior, $F(1, 100) = 7.46, p = .007, \eta_p^2 = .07$. Children's reports did not differ between an adult's giving ($M = -0.23$) and a child's giving ($M = -0.20$), $t(50) = 0.10, p = .92, d = .03$. In contrast, children overestimated a child's taking ($M = 1.41$) in comparison to an adult's taking ($M = 0.16$), $t(50) = 3.21, p = .002, d = .89$. There was no correlation between age and difference scores in the Other-Take condition, Pearson $r = -.24, p = .23$. Thus, children's pattern of misremembering in the present investigation occurred when children recalled the actions of another child but not an adult.

Discussion

These experiments provide strong evidence that children remember other children as having taken more than they actually took. In contrast, children were quite accurate in remembering their own giving and taking, as well as the giving and taking of an adult. Taking is a canonical moral violation in childhood (e.g., Smetana, Killen, & Turiel, 1991), and the present findings suggest that even this very mild negative action is subject to systematic memory distortion.

Table 2

Children's Reports of What Was Given or Taken by an Adult or a Child in Experiment 4, M (SD)

	<i>M (SD)</i>
Adult-give	
Reported	2.44 (1.12)
Actual	2.67 (1.07)
Difference	-0.23 (0.80)
Adult-take	
Reported	1.36 (1.44)
Actual	1.20 (1.47)
Difference	0.16 (0.55)
Child-give	
Reported	2.48 (1.08)
Actual	2.68 (1.11)
Difference	-0.20 (0.82)
Child-take	
Reported	2.56 (1.89)
Actual	1.15 (1.43)
Difference	1.41 (1.86)

What might account for our findings? One possibility is that people remember exceptional information (Hunt, 2006); if children believe that others are good, then negative information may be noticed and remembered. It is possible that findings showing a negativity bias in children's memories (Baltazar et al., 2012; Kinzler & Shutts, 2008) reflect a memory advantage for unusual information about others. If so, children in our experiments should have been more, not less, accurate in remembering the surprising—taking—behavior.

Another possibility is that children's memory reflects their initial interpretation of a situation and/or the schemas invoked during remembering (Bransford & Johnson, 1973). Introducing negative information about an individual can distort memory for specific behaviors, resulting in an exaggeration of their wrongdoing after a delay (Pizarro, Laney, Morris, & Loftus, 2006). Perhaps children in the present study created their own explanations for why the character gave or took and "remembered" consistent with the explanation they generated (an *interpretive narrative* account). For example, children observing a character that took stickers might have judged this character as "bad" and thus, in remembering, exaggerated the number of stickers taken. Indeed, children make behavior-to-trait inferences about the niceness and meanness of others from an early age (Liu, Gelman, & Wellman, 2007). However, several children reported a child taking one or more stickers when *no* stickers were taken, suggesting the influence of a factor that needs little evidence to get started. One possibility is that children interpreted the situation as "sharing," assuming it was "fair" to take stickers and thus misremembered that stickers were taken even when they were not. Again, children did not misremember that they or an adult had taken stickers when they had not.

What else, then, could explain our findings? Perhaps observing another child giving or taking invokes implicit social comparison; indeed, similarity in age influences whether children compare themselves with others (Dijkstra et al., 2008; Suls et al., 1978). Thus, children's memory in this situation may reflect a self-serving bias, suggesting that other children take more than they themselves would. Although a self-serving bias is well documented among adults (Pronin, 2007; Pronin, Gilovich, & Ross, 2004), little is known about its developmental origins and its role in remembering. For example, previous work indicates that self-serving *judgments* are rooted in adults' overly charitable view of themselves (Epley & Dunning, 2000); might their self-serving *memories* be based on an overly cynical view of others? One possibility is that self-serving memories occur more often for negative than positive behaviors in mild situations such as ours. For example, taking little may imply generosity in a sharing situation; hence, taking may need to be exaggerated in order to achieve a self-serving effect. If someone gave little to begin with, it may not seem necessary to minimize their giving further (i.e., their selfishness is self-evident). If so, we would expect that another's giving would be minimized in situations where their generosity challenges one's self-image.

Thus, the current findings highlight potential motivational factors that may influence memory. According to the source-monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993), memories are judgments about our subjective experience during remembering that may reflect source misattributions contaminated by information from other events or from prior schemas and motives. For example, adults misremember past events based on desired outcomes (Barber, Gordon, & Franklin, 2009; Gordon,

Franklin, & Beck, 2005), engage in choice-supportive memory distortion about past decisions (Mather, Shafir, & Johnson, 2000), and selectively recall positive information to regulate their mood (Mather & Carstensen, 2005) or maintain a desirable self-view (Sanitioso, Kunda, & Fong, 1990). However, relatively little work has been done on such motivational factors in children's memories.

Although children are sometimes motivated to derogate individuals—for example, out-group members (Buttelmann & Böhm, 2014)—children in the current study received no additional information beyond the giving or taking of another child. Unlike previous studies that have put children in comparative contexts (e.g., Steinbeis & Singer, 2013), each child in our study either engaged in a behavior or observed another child engage in a behavior. Thus, whatever motives were activated were relatively implicit. Of course, it is possible that children purposefully exaggerated the taking of another child; children may have misreported (i.e., lied) rather than misremembered, which is still consistent with the idea that children spontaneously engage in social comparison. If so, future studies may find that fabricated responses are later misremembered as what actually happened (e.g., Ackil & Zaragoza, 1998).

In contrast to the few studies exploring the influence of motives in children's memory, many have shown that children's memories can be distorted by extra-event information, including stereotypes and suggestions (Bruck & Ceci, 1999; Leichtman & Ceci, 1995; Lindsay, 2002). Critically, our questioning was not suggestive; children were not induced to generate inaccurate reports by exposing them to misleading or confusable additional information. However, children were tested in schools, raising the question of whether they exchanged information following their individual sessions. For example, if a child heard from the experimenter that John took one sticker and heard during the retention interval from another participant that John took three stickers, then this child might misremember "three stickers." However, if there is no self-serving bias operating, then a child who heard from the experimenter that John took three stickers and heard during the retention interval from another participant that John took one sticker should sometimes misremember "one sticker," which should not produce an overall bias to exaggerate another child's taking. On the other hand, if negative behaviors are more salient than positive ones (Baumeister et al., 2001; Rozin & Royzman, 2001), another child's taking may be more likely to be passed along to others than their giving. This *gossip* account could help explain why children distorted only the taking, but not the giving, of another child. Note, however, that children did not also distort an adult's taking; social group membership may not only induce spontaneous comparison of self to another group member but also prompt conversation that becomes a potential source of memory distortion. Thus, understanding the ways in which self-serving biases arise spontaneously from viewing others' behaviors or may prompt asymmetric communications presents many questions, especially when considering the ways in which these two factors may or may not interact.

Taken together, these studies highlight the importance of memory in elucidating early social cognition. Studying what children remember should contribute to a more complete understanding of what, and how, they think about the everyday social world and the mechanisms that contribute to their evolving views.

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Call for Papers: *Behavioral Neuroscience* Special Issue on Behavioral Neuroscience of Sleep

Sleep is increasingly recognized as a major factor in awake psychological functioning. Nighttime brain activation reflects information processing of stimuli encountered the previous day(s), and also prepares the brain for optimal information processing the next day. Fundamental human and animal studies have shown mechanisms of sleep-related interactions with cognitive processes; in neurological and psychiatric disorders, sleep abnormalities appear to contribute to cognitive and emotional disturbances. Novel imaging approaches and sensitive behavioral tasks have begun to show the intricate relations between sleep and the functioning of the awake brain.

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- Memory consolidation with sleep
- Cognitive effects of sleep deprivation (experimentally-induced; insomnia)
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