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## Possession is not always the law: With age, preschoolers increasingly use verbal information to identify who owns what

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### ABSTRACT

Children can identify owners either by seeing a person in possession of an object (a visual cue) and inferring that they are the owner or by hearing testimony about a claim of ownership (a verbal cue). A total of 391 children between 2.5 and 6 years of age were tested in three experiments assessing how children identify owners when these two cues are in conflict. Children were presented with stories using two dolls and a toy. One doll possessed the toy, and children were told that the toy was either the possessor's or the nonpossessor's. Two forms of ownership statement were used: a third-person statement, "That is Billy's ball", and a first-person statement by one of the dolls, "That is my ball". The results show that by 4 years of age, children prioritize the verbal statements as a more reliable cue to ownership than physical possession. Younger children did not prioritize possession over the verbal cue to ownership but rather gave mixed responses. These results are discussed in terms of children's social experience outside of the home and their acceptance of testimony in other domains.

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### Introduction

Social interactions frequently involve objects that are owned by others, and children must learn to behave in appropriate ways toward those objects (Gralinski & Kopp, 1993). For children to understand

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the norms of private property, they must be able to identify who owns particular objects. Recognizing ownership can be problematic because ownership is not an obvious property of objects (Gelman, 2009; Kalish, 2005; Searle, 1995). No visible feature of an object invariably connects it with a particular owner, although physical possession of an object frequently provides a plausible cue to ownership. Indeed, recent research has shown that children do use physical possession to infer ownership (Blake & Harris, 2009; Friedman & Neary, 2008). However, this cue is often misleading; Billy may be in physical possession of a ball in that he is playing with it, but the ball may belong to Sally. When physical possession does not reflect ownership, verbal statements can clarify the situation. An adult can explain, "Billy is playing with Sally's ball", or Sally can make the claim herself by saying, "That's my ball". In such situations, children must choose which information to follow: the visual cue of physical possession or the verbal claim about ownership. The current study investigated how children identify owners when these cues to ownership conflict.

Whether the cue to ownership is visual or verbal, people must encode this information about an object at the representational level. Adding ownership information to an object representation allows us to remember who owns that object so that we can subsequently act appropriately toward it. However, the two cues to ownership may have different representational formats. Visual cues to ownership may result in a simple association between the representation of a person and the representation of an object. By contrast, verbal cues to ownership may be encoded directly as a verbal fact such as an object label or a descriptor. In addition, the two representational formats might have different weights that would result in prioritizing one form of ownership information over the other.

The relative impact of visual and verbal information has been assessed in domains other than ownership. Several experiments have demonstrated the potency of verbal information when young children categorize animals based on nonobvious properties. In one classic experiment, 4-year-olds were asked to categorize pictures of animals and draw inferences about their behavior or other non-obvious characteristics (Gelman & Markman, 1986). Children could categorize the animals either on the basis of perceptual similarity to another exemplar or by using a category label provided by an adult. Children tended to rely on the testimony from the adult (the category label) over perceptual similarity when drawing inferences about the animals. Similar studies have replicated these findings with 3- and 4-year-olds (Jaswal, 2004), 2.5-year-olds (Gelman & Cooley, 1990), and even 24-month-olds (Jaswal & Markman, 2007).

A similar reliance on verbal information also emerges quite early in search tasks. When 23-month-olds were told about a change in the location of an object, they failed to update their representation of the object's location and searched in the place where they last saw it (Ganea & Harris, 2010). By contrast, 30-month-olds accepted the verbal information and searched in the new location. Thus, by 30 months of age, children prioritized verbal information (the new location of the object) over previously encoded visual information (the original location witnessed by the children).

With respect to ownership, little is known about how children resolve conflicting forms of information about who owns an object. Several studies provide evidence that children use physical possession as a cue to ownership; indeed, children may even equate these two concepts. In an open-ended survey about the meaning of possession, American and Israeli kindergartners frequently linked physical possession to the rights of ownership (Furby, 1978). Observations of preschoolers during free play show that physical possession influences the outcomes of conflicts over objects. For example, when 3- and 4-year-olds attempt to take toys from their peers, they seldom win possession of the toys (Bakeman & Brownlee, 1982; Weigel, 1984). Furthermore, in one study, 3-year-olds seemed to recognize a right of prior possession; that is, they were more likely to relinquish a toy to the prior possessor than to other children (Bakeman & Brownlee, 1982). Children's intuitions about first possession have been explored in experimental studies as well. When children were told stories using pictures where one child plays with a toy and then another child plays with it, they identified the first possessor as the owner despite the lack of any other information about ownership (Friedman & Neary, 2008).

Possession remains a powerful cue to ownership even for adults, as the idiom "possession is 9/10ths of the law" suggests. Legal rulings support rights of possessors over those of nonpossessors (Dukeminier, Krier, Alexander, & Shill, 2006), and adults use possession as a cue to ownership when other information is absent. For example, in a direct study of this issue, undergraduates were told a story about a divorcing couple where both spouses lay claim to a particular possession (e.g., a TV)

(Beggan & Brown, 1994). When shown pictures of one of the spouses with the TV and the other spouse alone, participants indicated that whichever spouse was pictured with the TV had a stronger claim on it. Indeed, adults give priority to possession even when it is verbally described rather than directly observed. When told stories about hunting and fishing and asked to identify either a pursuer who first saw the animal or a current possessor who captured the animal as the owner, participants favored the current possessor over the pursuer (Friedman, 2008). Nevertheless, adults will often prioritize verbal statements of ownership over visual cues of possession. For example, in the absence of any other information about the people and object in question, if one sees John holding a book but is told that Jane owns the book, one would ordinarily accept the verbal statement as the true indication of ownership as opposed to physical possession. It is not known yet whether the same is true for children. Can children overcome their focus on physical possession as a visual cue to ownership when provided with a verbal statement of ownership that conflicts with that visual cue?

Children can learn who owns objects from verbal statements alone, either first-person claims (“That’s my ball”) or third-person statements (“That’s Billy’s ball”). Encoding these verbal statements as ownership information requires an understanding of possessive phrases, and it has been shown this comprehension appears early in development. When 20-month-olds were shown pictures with different possible objects and owners, they were able to identify the correct pairings when asked, for example, “Where is the girl’s shoe” (Golinkoff & Markessini, 1980). Similarly, 2-year-olds can identify the owners of familiar objects from home (e.g., mommy’s toothbrush) and even objects owned by the experimenter after being told whose objects they are (Fasig, 2000). Diary studies have reported children’s statements of proper noun possessive phrases such as “mommy’s pillow” at 17 months of age (Tomasello, 1998) and 23 months of age (Brown, 1973). Standardized measures of language acquisition based on parental reports place children’s use of proper noun possessive phrases at 22 months of age on average (Fenson et al., 1994). Children also use possessive pronouns such as “my ball” during their second year (Bates, 1990; Fenson et al., 1994; Tomasello, 1998) and, according to parent reports, comprehend possessive pronouns by 30 months of age (Fenson et al., 1994). However, a recent experiment demonstrated that even 12-month-olds understand the use of “my” (Saylor, Ganea, & Vázquez, 2011). After infants witnessed two experimenters playing with separate balls and referring to “my ball”, they were able to return the correct ball to the correct experimenter after she requested “my ball”.

Verbal statements of ownership also influence how children behave with new possessions they have been given. For example, 3- and 4-year-olds will defend toys more and share them less when they are told by an adult that the toys are theirs compared with when they are given the toys without any statement of ownership (Eisenberg-Berg, Haake, Hand, & Sadalla, 1979; Eisenberg-Berg, Haake, & Bartlett, 1981). However, naturalistic observations have not revealed whether young children also alter their behavior toward a toy when they are told that the toy is owned by another person, for example, a sibling or peer (Hay, 2006; Ross, 1996).

In sum, preschool-age children are capable of inferring ownership both using the visual cue of physical possession and hearing verbal statements about ownership. Both cues can influence how children behave toward objects, but it is not clear which cue children prioritize when they conflict. The relative weight of visual and verbal cues to ownership is relevant when there are conflicts between the two cues. For example, a preschooler may see Sally playing with a toy but be told that the toy is “Billy’s toy”. Similarly, Billy may state his claim on the object himself by saying, “That’s my toy”. Given the conflict between visual and verbal information, which party will children identify as the owner?

In the current study, we assessed the representational weight of verbal and visual information about ownership by presenting stories similar to the situation described above. Children watched as an experimenter narrated the stories and acted them out with dolls and props. For example, children saw one doll character in physical possession of a toy but were told that a second doll character owned the toy. To assess whether young children could understand verbal statements of ownership to identify owners correctly in these stories, participants in Experiment 1 received only verbal statements about ownership with no conflicting visual information about ownership. They heard either a proper noun possessive phrase such as “That’s Billy’s toy” or a first-person possessive pronoun phrase, “Billy says, ‘That’s my toy’”. In Experiment 2, children were presented with stories in which there was a conflict between visible evidence of physical possession and a third-party verbal

statement of ownership (“That’s Billy’s toy”). If one form of information has greater weight than the other, children should show either a visual bias (favoring the possessor) or a verbal bias (favoring the stated owner). In this experiment, we also varied the order in which the two forms of information were given to test children’s ability to update ownership information. During the stories, children needed to encode the initial ownership information (visual or verbal) as an attribute of the object representation and then overwrite or update that attribute with the new information (Ganea & Harris, 2010; Ganea, Shutts, Spelke, & DeLoache, 2007). If children have difficulty in overwriting any initial evidence of ownership (whether visual or verbal), they should favor the first information given. Conversely, overwriting ownership representations might be easy and children might favor the most recent information given as a correction of the initial information. Finally, in Experiment 3, we assessed whether children would favor a first-person claim to ownership, “That’s my toy”, over the visible possessor when these two cues were in conflict.

## Experiment 1

### Methods

#### Participants

In total, 84 children between 2 years 6 months (2;6) and 6 years of age were recruited at a local science museum and taken to an area set aside for research with children. Participation was voluntary, and parents were present throughout the experiment. Children received a sticker for their participation. To compare the responses of children by age, we grouped children by age in years, thereby creating four age groups: 2-year-olds (range = 28–35 months, mean = 2;9,  $n = 19$ , 5 girls and 14 boys), 3-year-olds (range = 36–47 months, mean = 3;5,  $n = 28$ , 14 girls and 14 boys), 4-year-olds (range = 48–57 months, mean = 4;5,  $n = 25$ , 16 girls and 9 boys), and 5-year-olds (range = 60–71 months, mean = 5;5,  $n = 12$ , 9 girls and 3 boys). Although researchers are not permitted to gather socioeconomic status information from parents, visitor surveys conducted by the museum indicate that approximately 68% of the visitors come from Boston and the surrounding areas, including Rhode Island and New Hampshire. The majority of the visitors are White and fall into either a middle- or upper middle-class income bracket. This general information about recruiting procedures and the sample demographics applies to all three of the experiments in this article.

#### Materials

Each child was told four brief stories that were acted out by the experimenter using dolls and small toys. For each story, one boy doll and one girl doll were used, with a different pair used for each story. Different gender dolls were used to make it easier for children to distinguish them. In addition, to prevent confusion about particular doll pairs and to facilitate the shift to a new story, children saw a pair of large dolls first, followed by a pair of small dolls, then large and then small again.

Because different gender dolls were used in each story, it was important that the toys used in each story were not “gendered”. After pilot testing several toys, four that children viewed as appropriate for both boys and girls were selected for the study: a ball, a Gumby horse, a Tic-Tac-Toe game, and a crayon. Each toy was used with a pair of dolls based on the size of the items.

#### Procedure

The experimenter sat at a table across from the child. For each of the four stories, both dolls were introduced by name, and then the toy was placed in front of the dolls, toward the child and equidistant from both dolls. The experimenter then gave the child ownership information. In two stories, the experimenter stated the ownership claim using a proper noun possessive phrase (“That’s Sally’s ball”) and then made a neutral statement about the other doll (“Billy is right here”). In the other two stories, one of the dolls claimed the toy using the first-person possessive adjective (“That’s my ball”) and the other doll made a neutral statement (“That’s a nice ball”). The child was then asked two questions: “Whose ball is it?” and “Who can keep the ball?”

For each session, several components of the stories were counterbalanced. The target (correct) doll appeared twice on the left and twice on the right, and this doll was female twice and male twice. In

addition, the last doll mentioned (or the last doll to “speak”) was the target twice and the nontarget twice. The order of the questions also alternated so that each came first twice. All of these variations were prewritten, and the data sheets were randomized so that children were randomly assigned within age groups. For each child, the ages of his or her siblings, if any, were collected for later analysis.

### Results and discussion

Children were scored for the number of correct answers they gave (two questions per story for a maximum score of 8). A three-way analysis of variance (ANOVA) of Age (2-, 3-, 4-, or 5-year-olds)  $\times$  Statement (My or Noun Phrase)  $\times$  Question (Whose or Keep) revealed a main effect of age only,  $F(3,80) = 5.30$ ,  $p = .02$ ,  $\eta_p^2 = .17$ . One-sample  $t$  tests were used to determine whether children at each age performed above chance for both types of statement (My and Noun Phrase). All age groups were significantly above chance levels for both types of ownership claim: for 2-year-olds, My,  $p = .019$ , and Noun Phrase,  $p = .001$ ; for 3-, 4-, and 5-year-olds, all  $ps < .001$  (Fig. 1).

To summarize, children at all ages used verbal statements of ownership to identify the correct owner of the toy, and this performance improved with age. Children performed equally well for both types of ownership claim: a first-person possessive phrase (e.g., “my ball”) and a noun phrase (e.g., “Sally’s ball”). Furthermore, children performed equally well for both the Whose question and the Keep question. Both questions were used in the subsequent experiments.

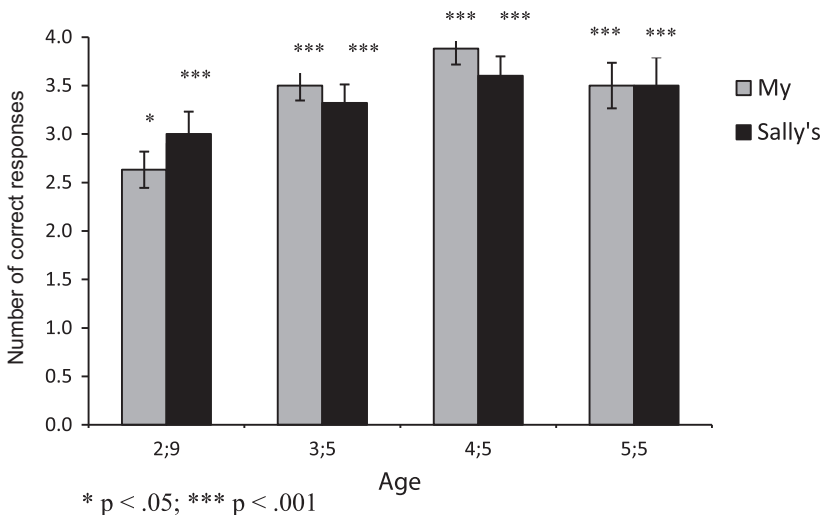
With this baseline established for children’s acceptance of verbal statements of ownership, the next two experiments added a visual cue of possession to create a conflict between the two forms of ownership information. Thus, children were shown one character in possession of a toy but were told that the toy belonged to the other character.

## Experiment 2

### Methods

#### Participants

In total, 228 children between 2;6 and 6 years of age were recruited at a local science museum. Four age groups were again used for comparison: 2-year-olds (range = 26–35 months, mean = 2;8,



**Fig. 1.** Experiment 1: Mean numbers of correct responses to verbal statements of ownership (maximum of 4 per type of statement). Error bars show standard errors.

$n = 50$ , 28 girls and 22 boys), 3-year-olds (range = 36–47 months, mean = 3;6,  $n = 84$ , 45 girls and 39 boys), 4-year-olds (range = 48–59 months, mean = 4;6,  $n = 62$ , 31 girls and 31 boys) and 5-year-olds (range = 60–73 months, mean = 5;5,  $n = 32$ , 20 girls and 12 boys).

### Procedure

Using the same dolls and toys from Experiment 1, children were told four stories. Children were assigned to one of two conditions: Visual First or Verbal First (see Fig. 2 for a presentation of the procedure described below). For all of the stories in the Visual First condition, children were introduced to the characters and then shown one character playing with the toy (as in Friedman & Neary, 2008), thereby providing a visual cue of physical possession. The accompanying narrative also made reference to this visual cue. For example, children were told, “Right now Billy is playing with the ball and Sally is watching”. Children then received a verbal statement about ownership of the toy using a noun phrase possessive: “That’s Sally’s ball and Billy is right here”. In the Verbal First condition, the order of these two cues to ownership was reversed. Thus, the verbal statement of ownership was given first while the toy was between the two characters and not physically associated with either



**Fig. 2.** Story sequences with images. The two conditions for presenting the visual and verbal cues to ownership in Experiment 2 are shown: (A) Visual First, where the visual information is given first; (B) Verbal First, where the verbal information is given first.

doll. Next, the visual cue of possession was presented by moving the toy next to one of the characters and referring to this in the accompanying narrative, “Right now Billy is playing with the ball and Sally is watching”. In summary, each story had three segments: (a) each doll was introduced; (b) one cue to ownership was given, either the visual cue of possession (accompanied by the narrative) or the verbal statement of ownership; and (c) the other cue was given. Each character was mentioned in each segment, and the experimenter drew attention to each doll as it was named by bouncing it manually.

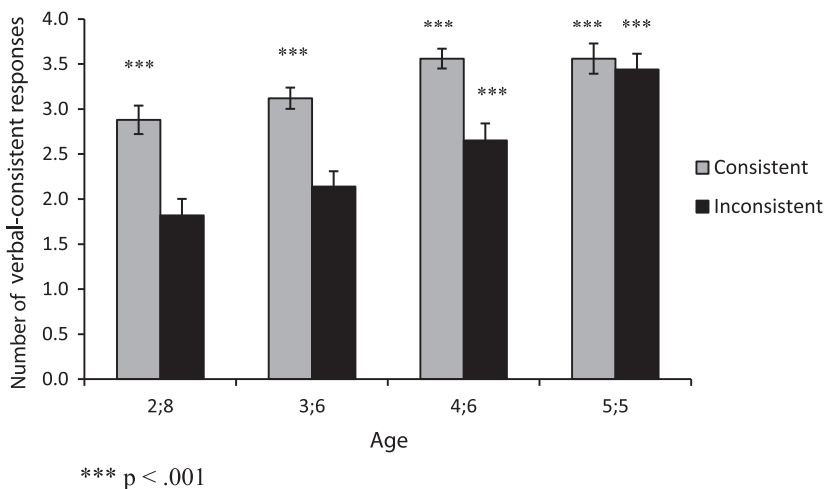
In addition to this between-participants manipulation, children received two within-participants conditions. In two of the stories visible possession and the statement of ownership were consistent with one another (Consistent condition), and in two of the stories visible possession and the statement of ownership were inconsistent (Inconsistent condition); that is, children were told that the nonpossessor was the owner of the toy. For example, in the Inconsistent condition, children saw Billy playing with the ball but were told, “That’s Sally’s ball and Billy is right here”.

In similar story studies, the position of the toy during the question phase was shown to affect children’s answers in some experiments (Friedman & Neary, 2008). In the current study, this was a particular concern because the visual cue of possession would be present while children were asked to identify the owner. To control for this possibility, while the questions were asked the toy was kept with the possessor in two of the stories (Toy with Possessor) and was moved to the middle in two of the stories (Toy in Middle). These final positions were crossed with the ownership conditions to produce four different stories. Eight different orders of the stories were created and presented randomly to children within each age group. In addition, three other elements of the stories were counterbalanced: side of the target doll (the owner identified verbally), gender of the target, and the last character mentioned (target or not).

After hearing each story, children were asked the same two questions as in Experiment 1. For two stories the Whose question came first, and for two stories the Keep question came first.

### Results and discussion

Children’s responses to the questions were scored as verbal-consistent if they identified the owner named in the verbal statement. Each child answered eight questions (two per story  $\times$  four stories). A four-way ANOVA of Age (between participants: 2-, 3-, 4-, or 5-year-olds)  $\times$  Order (between participants: Visual First or Verbal First)  $\times$  Consistency (within participants: Consistent or Inconsistent)



**Fig. 3.** Experiment 2: Mean numbers of verbal-consistent responses (identifying the stated owner) when the visible possessor and the stated owner are consistent and inconsistent (maximum of 4 per condition). Error bars show standard errors.

tent)  $\times$  Position at End (within participants: Possessor or Middle) revealed main effects of age,  $F(3,220) = 17.02$ ,  $p < .001$ ,  $\eta_p^2 = .19$ , and consistency,  $F(1,220) = 36.76$ ,  $p < .001$ ,  $\eta_p^2 = .14$ . Fig. 3 illustrates these main effects. Order and position at end did not produce significant main effects,  $F(1,220) = 3.00$  and  $F(1,220) = 0.14$ , respectively. The Age  $\times$  Consistency interaction fell short of significance,  $F(3,220) = 2.12$ ,  $p = .10$ , and there were no other significant interactions. Separate three-way ANOVAs were run to test for gender and sibling effects; age and consistency were included in all tests. Three different sibling variables were tested individually: any, older, and younger. No effects were found for gender or any of the sibling variables.

Chance levels for each consistency condition were determined using one-sample  $t$  tests with a test value of 2. In the Consistent condition, where the visible possessor was also the stated owner, children at all ages performed significantly above chance levels (all  $ps < .001$ ). In the Inconsistent condition, 2- and 3-year-olds performed at chance levels, whereas 4- and 5-year-olds selected the verbal-consistent option at above-chance levels ( $p = .001$  and  $p < .001$ , respectively). Within each age group, the Consistent and Inconsistent conditions were compared using post hoc tests. More verbal-consistent behavior was found in the Consistent condition for all but the oldest age group: 2-year-olds,  $F(1,224) = 16.94$ ,  $p < .001$ ; 3-year-olds,  $F(1,224) = 24.14$ ,  $p < .001$ ; 4-year-olds,  $F(1,224) = 15.80$ ,  $p < .001$ ; and 5-year-olds,  $F(1,224) = 0.15$ ,  $ns$ .

A second analysis examined children's responses in the Inconsistent condition only to identify age-related shifts in their preference for the visual cue of physical possession or the verbal statement of ownership. We used a more lenient criterion to identify two patterns of responses: (a) Verbal Statement, where children answered three or four of the questions favoring the verbal statement, and (b) Visible Possessor, where children answered three or four of the questions in favor of the visible possessor. The results reveal that, with age, children increasingly accept the verbal claim of ownership (Table 1). The percentages of children with the Verbal Statement pattern were as follows: 22% of 2-year-olds, 41% of 3-year-olds, 55% of 4-year-olds, and 81% of 5-year-olds. By contrast, the Visible Possessor pattern was not dominant at any age: 30% of 2-year-olds, 30% of 3-year-olds, 21% of 4-year-olds, and 3% of 5-year-olds.

Given the relatively poor performance of the 2- and 3-year-olds, an additional analysis extends the examination of patterns of responses described above but focuses only on the younger ages. The low percentage of Verbal Statement responses for this younger group could have been due to difficulty with updating ownership information that was already encoded. For example, in the Verbal First condition, children did not need to update their initial encoding in light of the subsequently provided visual information (in order to provide a verbal-consistent response). By contrast, in the Visual First

**Table 1**

Percentage of children at each age in Experiments 2 and 3 and both experiments combined ( $N = 307$ ) using each strategy when responding to questions in the Inconsistent condition.

Age	Verbal statement	Visible possessor	Guessing	Last named	Other
<i>Experiment 2</i>					
2-year-olds	22.0	30.0	20.0	12.0	16.0
3-year-olds	40.5	29.8	16.7	7.1	6.0
4-year-olds	54.8	21.0	11.3	0	12.9
5-year-olds	81.3	3.1	12.5	0	3.1
<i>Experiment 3</i>					
2-year-olds	17.6	35.3	17.6	17.6	11.8
3-year-olds	23.1	23.1	19.2	15.4	19.2
4-year-olds	50.0	35.0	10.0	0	5.0
5-year-olds	81.3	6.3	0	0	12.5
<i>Total combined</i>					
2-year-olds	20.9	31.3	19.4	13.4	14.9
3-year-olds	36.4	28.2	17.3	9.1	9.1
4-year-olds	53.7	24.4	11.0	0	11.0
5-year-olds	81.3	4.2	8.3	0	6.3

Note: The categories are mutually exclusive.

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condition, children did need to update their initial encoding in light of the subsequently presented verbal information. To explore possible differences between these two orders, chi-square tests were used to compare the percentages of children who followed a particular pattern of responses in the Visual First and Verbal First conditions. The Verbal Statement and Visible Possessor patterns were defined using the three or four criterion described above. A third category was added for all other patterns in order to categorize all of the children within each age group. There were no significant differences between the Visual First and Verbal First conditions at either age: 2-year-olds,  $\chi^2(2, N = 50) = 2.86, ns$ ; 3-year-olds,  $\chi^2(2, N = 84) = 0.77, ns$ .

The responses of 2- and 3-year-olds were also analyzed by trial to determine whether the performance of younger children declined over trials. A  $2 \times 4$  ANOVA of Age Group (between participants: 2- or 3-year-olds) and Trial (within participants: 1, 2, 3, or 4) revealed a marginal effect of age,  $F(1, 132) = 3.834, p = .052, \eta_p^2 = .03$ , and a marginal effect of trial,  $F(3, 130) = 2.465, p = .065, \eta_p^2 = .05$ . The interaction was not significant. An analysis of the simple effects of age showed that 2-year-olds had fewer verbal-consistent responses than 3-year-olds (means = 1.18 and 1.32, respectively). An analysis of the simple effects of trial revealed that performance on Trial 4 (mean = 1.23) did not differ significantly from performance on Trial 1 (mean = 1.33). This indicates that performance did not decline over trials.

In summary, children at all ages correctly identified the owner of the toy when the character who visibly possessed the toy was also named as the owner (Consistent condition). Age differences appeared when the possessor was not the stated owner (Inconsistent condition). Here, the younger children did not perform above chance levels. However, some proportion of the youngest children chose the verbally named owner for most of the questions, and this pattern increased with age. Thus, beginning at 2 years of age, some children appeared to be sensitive to verbal claims of ownership, although the low percentage of children following this pattern could be due to chance. By 4 years of age, they prioritized verbal information as the determinant cue of ownership even when a visible cue of possession was inconsistent with the verbal information. Nevertheless, children of this age still found it easier to assign ownership when the verbal and visual/physical cues were consistent with each other. At 5 years of age, children's understanding of verbal claims to ownership become more robust, enabling them to systematically rely on such cues even when visual cues about physical possession contradicted them.

One possible explanation for the difficulty that children had in the Inconsistent condition concerns the particular possessive phrase used. Children may discount statements of ownership made by third parties even when the third party is an adult. Observations of parental interventions in property disputes with peers (Ross, Tesla, Kenyon, & Lollis, 1990) and siblings (Ross, 1996) have shown that parents do not consistently endorse the owner when conflicts over toys arise. For example, parents will sometimes propose that an owner share his or her toys. It is possible, therefore, that children are more sensitive to first-person claims of ownership ("That's my toy") given that they use this phrasing themselves to claim toys and hear this kind of statement from other children in direct interactions. Thus, children may be more likely to accept the claims of other children, particularly when no other child challenges the claim. In addition, children appear to understand third-party references to objects ("my ball") as early as 12 months of age (Saylor et al., 2011), which suggests that first-person claims may be highly salient to young children. To assess this possibility, we changed the narrative so that one of the characters in the story made the verbal statement of ownership using the first-person possessive phrase "my toy".

### Experiment 3

#### Methods

##### Participants

In total, 79 children between 2;6 and 6 years of age were tested and divided into four age groups for comparison: 2-year-olds (range = 26–34 months, mean = 2;6,  $n = 17$ , 9 girls and 8 boys), 3-year-olds (range = 36–47 months, mean = 3;5,  $n = 26$ , 16 girls and 10 boys), 4-year-olds (range =

48–59 months, mean = 4;4,  $n = 20$ , 12 girls and 8 boys), and 5-year-olds (range = 60–71 months, mean = 5;4,  $n = 16$ , 8 girls and 8 boys).

### Procedure

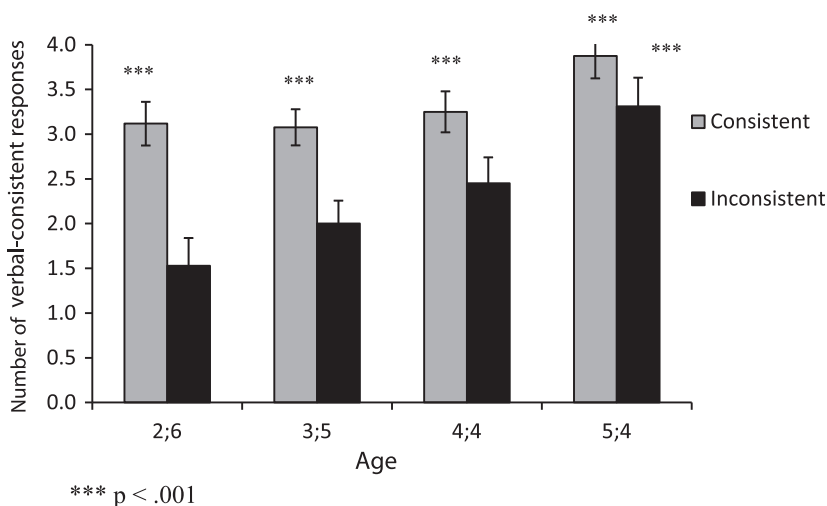
The Visual First stories from Experiment 2 were used with modifications made to the verbal statements of ownership. No third-person statements of ownership were used. Instead, the experimenter narrated the stories and the characters each made a statement, for example, “Sally says, ‘That’s my ball’ and Billy says, ‘That’s a nice ball’”. The experimenter moved the characters while they “spoke” their lines. All other elements of the procedure were kept the same.

### Results and discussion

A three-way ANOVA of Age (2-, 3-, 4-, or 5-year-olds)  $\times$  Consistency (Consistent or Inconsistent)  $\times$  Position at End (Possessor or Middle) revealed main effects of age,  $F(3,75) = 9.25$ ,  $p < .001$ ,  $\eta_p^2 = .27$ , and consistency,  $F(1,75) = 26.23$ ,  $p < .001$ ,  $\eta_p^2 = .26$ . The Age  $\times$  Consistency interaction was not significant,  $F(3,75) = 1.12$ . The main effects of age and consistency are illustrated in Fig. 4.

Separate three-way ANOVAs were run for gender and the three sibling variables. Results revealed a main effect for gender,  $F(1,71) = 4.14$ ,  $p < .05$ ,  $\eta_p^2 = .06$ ; overall, girls had more verbal-consistent responses than boys. A significant Age  $\times$  Older Sibling interaction was also found,  $F(3,71) = 2.95$ ,  $p < .05$ ,  $\eta_p^2 = .11$ . Tests for the simple effect of older sibling for each age group revealed that only 4-year-olds showed a significant difference,  $F(1,71) = 4.26$ ,  $p < .05$ ,  $\eta_p^2 = .06$ . The 4-year-olds with an older sibling had more verbal-consistent responses than children at the same age who did not have an older sibling.

In the Consistent condition, where the possessor was also the stated owner, children at each age selected the verbal-consistent option at above-chance levels (all  $ps < .001$ ). In the Inconsistent condition, only the 5-year-olds provided verbal-consistent responses at higher than chance levels ( $p < .001$ ). Post hoc comparisons revealed more verbal-consistent responses in the Consistent condition as compared with the Inconsistent condition for all but the oldest age group: 2-year-olds,  $F(1,75) = 14.55$ ,  $p < .001$ ; 3-year-olds,  $F(1,75) = 10.23$ ,  $p = .002$ ; 4-year-olds,  $F(1,75) = 4.34$ ,  $p < .05$ ; and 5-year-olds,  $F(1,75) = 1.72$ , *ns*.



**Fig. 4.** Experiment 3: Mean numbers of verbal-consistent responses (identifying the stated owner) when the visible possessor and the stated owner are consistent and inconsistent (maximum of 4 per condition). Error bars show standard errors.

With age, children increasingly relied on the verbal claim of ownership. The percentages of children with the Verbal Statement pattern of responses were as follows: 18% of 2-year-olds, 23% of 3-year-olds, 50% of 4-year-olds, and 81% of 5-year-olds (Table 1). Thus, although 4-year-olds as a group performed no better than chance when the claimant and the visible possessor were different, half of the children favored the verbal claimant in their responses. By contrast, the Visible Possessor pattern was stronger than the Verbal Statement pattern only for the youngest children—35% of 2-year-olds, 23% of 3-year-olds, 35% of 4-year-olds, and 6% of 5-year-olds—and was never displayed by a majority of children.

Performance across trials was also analyzed for the 2- and 3-year-olds to determine whether the younger children had fewer verbal-consistent responses in later trials. A  $2 \times 4$  ANOVA of Age Group (between participants: 2- or 3-year-olds)  $\times$  Trial (within participants: 1, 2, 3, or 4) revealed only a significant Age  $\times$  Trial interaction,  $F(3, 39) = 3.501$ ,  $p = .024$ ,  $\eta_p^2 = .21$ . Inspection of the means revealed that there were significant differences between trials only for the 3-year-olds. Specifically, children had more verbal-consistent responses on Trial 3 (mean = 1.69) compared with Trial 1 (mean = 1.00,  $p = .004$ ) and Trial 4 (mean = 1.04,  $p = .008$ ), but there were no significant differences between Trial 1 and Trial 4. In sum, children's performance did not decline over trials.

Given the similar trend in the results of Experiments 2 and 3, an omnibus analysis was conducted using the data from both experiments. This combined sample ( $N = 307$ ) increased the power of the analyses such that smaller effects could be detected. Two kinds of analyses were conducted. First, children were categorized more thoroughly to identify the strategies used by each child. In addition to the two categories described above, Verbal Statement and Visible Possessor, three new categories were added: (a) Guessing, where children identified each character once as the owner for each story (alternating for the two questions); (b) Last Named, where children identified the character last mentioned as the owner (because this factor was counterbalanced such that in two of the stories the last character mentioned was the target character and in two stories the last character was not, children who always named the last character mentioned fell into a unique category); and (c) Other, for less common patterns such as gender bias, side bias, and inconsistent responses. The categories, presented in Table 1, are mutually exclusive. The results show a clear pattern, with age of children increasingly prioritizing the verbal statement of ownership. A substantial portion of the younger children—approaching one third—identifies the visible possessor of the toy as the owner for most of the questions, but this strategy decreases with age.

A second analysis examined the effects of gender and siblings. Using the total verbal-consistent score for each child as the dependent variable, six independent variables were tested in regression models: age (in months), gender, and four sibling variables: any, older, younger, and number. Age was a continuous variable and was treated as the covariate in all of the models. Gender, any, older, and younger were categorical variables, and number of siblings was ordinal (ranging from zero to four). Each predictor variable was tested in a regression model separately, and then each sibling variable was tested with gender in the model to examine interaction effects. Only the effect of age was significant in all models (all  $ps < .001$ ).

## General discussion

The three experiments in this study provide a clear picture of children's developing ability to resolve conflicting information about ownership. Specifically, between 2 and 5 years of age, children become more likely to accept verbal statements of ownership over visual cues of possession when these two types of information are in conflict. Experiment 1 showed that children 33 months of age and older could use verbal statements of ownership to identify owners when there was no conflicting visual information. Experiments 2 and 3 further showed that children at all ages were also able to identify owners as long as the verbal statement of ownership applied to the visible possessor of the toy, that is, the verbal and visual cues were consistent in indicating the same character. However, when the verbal claim indicated that the nonpossessor was the owner, such that the verbal and visual cues were inconsistent, younger children performed poorly. By 4 or 5 years of age, children favored the verbal statement of ownership over the conflicting visual cue of possession. Indeed, 5-year-olds were just

as systematic in identifying the owner whether or not verbal and visual cues were consistent with one another.

This robust developmental pattern raises the question of what changes with age that induces older, but not younger, children to prioritize verbal information about ownership when it conflicts with possession. Two potential explanations can be ruled out based on our findings. First, it is unlikely that younger children have a general problem with updating representational information. Several studies have shown that by 30 months of age, children accept verbal information about an object's new location despite having seen the object hidden in a different location (Ganea & Harris, 2010, *in press*). In these searching tasks, children first watched an experimenter hide a toy and, thus, encoded visual information about the object's location. They then subsequently heard a verbal report that the toy was moved to a new location. When asked to find the toy, 30-month-olds went to the correct verbally reported location, but younger children went to the original location that they had witnessed as the hiding place. Thus, by 30 months of age, children were able to overwrite their representation of the initial hiding place with the new verbal information and find the toy on the first try. Given that children this young can succeed in a location updating task, a general inability to update representations cannot be the reason why the younger children in the current study performed poorly. Experiment 2 in the current study also provides evidence against the updating hypothesis. To provide verbal-consistent answers in the Verbal First condition, children did not need to update their representation of ownership. Yet children performed similarly whether the task involved updating of initial information (Visual First condition) or not (Verbal First condition).

A second possible explanation concerns a bias, or heuristic, that favors the visual cue of possession over other kinds of cues. On this account, a possessor bias would direct younger children to favor visual cues to ownership such as physical possession, but this bias would be unlearned with experience. Other studies have found that young children tend to identify the first possessor of a toy as the owner when two characters play with the toy in sequence (Friedman & Neary, 2008). If children followed a "first possessor heuristic" in the current study, we would expect them to identify the one and only possessor as the owner and discount the verbal statements of ownership. As shown in Table 1, although a substantial minority of 2- and 3-year-olds do use such a "visible possessor" strategy, when faced with conflicting information about ownership, most younger children follow some other pattern of response. Thus, although a first possessor bias may operate under certain conditions, it is apparently easily negated by additional information.

In contrast to these cognitive accounts, children's social experience may provide a more straightforward explanation of our results. Specifically, children's increasing reliance on verbal information over the cue of possession may be driven by social experience outside of the home. Observations of children's interactions with peers and siblings in a home setting show that children receive evidence that verbal statements of ownership are frequently incorrect or ineffective. For example, in one study pairs of siblings were observed at play when one sibling was 2 years of age and the other was 4 years of age (Ross, 1996). When property disputes arose, 2-year-olds tended to claim that a toy was "mine" even when this was not the case. However, this argument often did not result in retaining or gaining control of the toy. In a different observational study, pairs of 20- and 30-month-old peers played in one of their homes while both mothers watched. When disputes over toys occurred, mothers were inconsistent in supporting the ownership claims of the children, favoring the other child regardless of who the toy belonged to (Ross et al., 1990).

Given these experiences at home, children may learn to distrust verbal statements of ownership whether they are claims by other children ("It's my toy") or statements made by adults ("That's Sally's toy"). This could explain younger children's preference for visual cues to ownership over verbal cues that may be judged as less convincing. However, once children begin to expand their social environment beyond the home (e.g., by attending preschool), they encounter more situations in which verbal statements will correctly designate ownership in the absence of, or ahead of, physical possession (e.g., "Ms. Smith's classroom", "Billy's locker", "Carol's lunchbox"). This account could explain why older children begin to accept verbal reports of ownership over visual cues. It also leads to a prediction that children who have more experience outside of the home, regardless of age, will begin to rely on verbal claims about ownership earlier than children who spend most of their time at home. Indeed, if distrust of verbal reports is the main reason why younger children fail to resolve the conflicting cues of

ownership in favor of the verbal claims, it might be possible to convince 2- and 3-year-olds to accept the verbal cues by adding a phrase such as “You may not believe this, but that ball is actually Sally’s ball”.

## Conclusion

The current study adds to the growing body of research concerning children’s understanding of ownership by clarifying how children resolve conflicting cues to ownership. The 2- and 3-year-olds were able to use possessive phrases to identify the owners of objects as long as the verbal information did not conflict with the visual cue of physical possession. By 4 years of age, children accepted the verbal statements of ownership over possession as a more reliable means of identifying the owners of objects. By implication, these older children have come to realize that verbal testimony—whether supplied by the owner or by a third party—is a more trustworthy source of evidence concerning ownership than their direct observation of physical possession.

Future research could use measures of overt behavior in addition to verbal judgments about ownership. Such indexes are feasible in research on ownership (Rossano, Rakoczy, & Tomasello, 2011) and offer potential extensions to the current study. For example, children could witness another child playing with a desirable toy or, alternatively, could be told that it is owned by another child. The relative potency of each cue could then be assessed by measuring the extent to which children avoid the toy themselves and/or protest when a third child appropriates the toy. Such a design would also constitute a more “pure” test of verbal versus visual cues to ownership given that in the current experiments the visual cue of possession is always accompanied by a verbal description. A similar method could be used to test how verbal claims fair against other known cues to ownership such as creative labor (Kanngiesser, Gjersoe, & Hood, 2010) or other verbal evidence such as who controls permission to use a toy (Neary, Friedman, & Burnstein, 2009). How children use these various cues to guide their behavior in the world has real consequences for social interactions with peers and potential friends.

A greater reliance on verbal report marks a mature position for many kinds of information. Much scientific, historical, and religious information is best learned via testimony. Children eventually learn to rely on verbal report for other kinds of nonobvious information such as group affiliations and the value of objects. Children’s ability to resolve conflicting cues to ownership in favor of verbal testimony fits with this broader trend in learning to trust the testimony of others (Harris & Koenig, 2006).

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