

BRIEF REPORT

Tell Me About *Pangolins!* Evidence That Children Are Motivated to Learn About Kinds

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We propose that conceptual development is facilitated by an early emerging bias that leads children to privilege learning about *kinds of things* in the world (e.g., dogs, chairs). Three studies ($N = 144$) provided evidence consistent with this proposal. When given a choice between finding out about a kind or about a concrete individual from that kind, 4- and 5-year-olds preferred to find out about the kind. This preference was broad in scope, extending to both familiar (Experiment 3) and unfamiliar (Experiments 1 and 2) kinds. Children's desire to learn about kinds was also expressed flexibly rather than being automatically cued by superficial features of the task: Children who talked to an ostensibly ignorant experimenter did not favor the facts about kinds (Experiments 1 and 3). Moreover, children's preference was specific to kinds rather than extending to plural sets more generally: Children who chose between facts about a single individual and facts about multiple individuals did not favor the latter (Experiment 2). These findings suggest that conceptual development may be driven in part by a heightened motivation to learn about kinds.

Keywords: conceptual development, generic knowledge, kinds, learning, knowledge acquisition

One of the fundamental questions in the study of human concepts concerns their origins: What is the architecture of the early conceptual system, and by what process does it develop into the adult state? Over the past few decades, preliminary answers to these questions have begun to emerge. With respect to the starting-state architecture, children appear to be equipped with the crucial ability to conceive of objects that are physically distinct, and even perceptually dissimilar, as also being *equivalent* by virtue of their shared membership in a class—by virtue of being the same kind of thing. In support of this notion, infants seem to understand linguistic labels (e.g., *dax* in “That’s a *dax*”) as mapping not just onto the particular objects used to introduce these labels but rather onto more general equivalence classes—classes that are defined along nonobvious, rather than simply superficial, dimensions (e.g., Dewar & Xu, 2009; Ferry, Hespos, & Waxman, 2010; Keates &

Graham, 2008; Mandler & McDonough, 1996; Markman, 1989; but see Gliozzi, Mayor, Hu, & Plunkett, 2009; Robinson & Sloutsky, 2007). Evidence for the early availability of kind-based representations is also found in children's language production. Children start to *talk* about kinds pretty much as soon as they acquire mastery of the grammatical devices needed to do so (e.g., Gelman, Goetz, Sarnecka, & Flukes, 2008; Gelman, Taylor, & Nguyen, 2004; Pappas & Gelman, 1998). Moreover, this talk is not simply an artifact of imitating adult speech or being socialized into thinking about kinds: Even deaf children who are deprived of conventional language input produce sign sequences that seem to express kind-referring, or generic, meaning (Goldin-Meadow, Gelman, & Mylander, 2005).

With respect to development, recent evidence suggests that the growth of children's concepts may be guided in part by an early bias favoring kind information. This bias is reflected, for instance, in the facility with which information about kinds is *processed*. Children are able to evaluate claims about entire kinds (e.g., whether *girls* have curly hair) at an earlier age than analogous claims about quantified sets (e.g., whether *all girls* have curly hair), even though the conditions under which generic claims are true are vastly more complex than those under which quantified claims are true (e.g., Hollander, Gelman, & Star, 2002; Leslie, 2008; Mannheim, Gelman, Escalante, Huayhua, & Puma, 2010; Tardif, Gelman, Fu, & Zhu, 2012). Traces of this processing advantage can be found even in adults, who occasionally fall back on a generic interpretation when they are reasoning about quantified claims; tellingly, adults seldom make the opposite mistake (i.e., treating generic claims as if they were quantified; Leslie & Gelman, 2012; Leslie, Khemlani, & Glucksberg, 2011; Meyer,

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Gelman, & Stilwell, 2011). The putative bias favoring generic information is also reflected in the accuracy with which such information is *remembered*. For example, a recent study by Cimpian and Erickson (2012) found that 4- to 7-year-old children have better long-term memories for information about kinds than for content-matched information about individuals (see also Gelman & Raman, 2007).

Here, we propose that information about kinds is privileged in children's cognition not only by being handled efficiently and remembered faithfully but also by being *preferentially sought out*. That is, we hypothesize that the early emerging bias for generic information extends to acquisition as well. On this view, children display a heightened motivation to learn generic facts—a deeper curiosity for information about kinds than for information at other levels of granularity. This is not to say, however, that kind information will always be preferred, in all circumstances. Rather than being reflexive and automatic, children's motivation to learn about kinds should be sensitive to the context in which learning takes place. To take an example, this hypothesized motivation may be dampened in conversations with people who appear to be unreliable or ignorant because the information learned in such contexts would be of uncertain quality (e.g., Jaswal & Malone, 2007; Sabbagh & Baldwin, 2001; see also Experiments 1 and 3). Thus, although we propose that children are particularly motivated to learn about kinds, we also expect that this motivation will be expressed in a flexible, context-sensitive manner.

It is important to point out that our present hypothesis goes beyond claiming that children have the *capacity* to acquire information about kinds. Much evidence already suggests that they do: For example, even though only instances of kinds are available to our senses, never kinds themselves, children can derive kind-level information via inductive generalization (e.g., Gelman & Coley, 1990; Keates & Graham, 2008); they are sensitive to subtle interactional cues that signal others' intent to convey generic knowledge (e.g., Butler & Markman, 2012; Csibra & Gergely, 2009), and they can decode the kind-relevant information contained in adult speech (e.g., Cimpian & Markman, 2008; Cimpian, Meltzer, & Markman, 2011; Gelman & Raman, 2003; Graham, Nayer, & Gelman, 2011). Nevertheless, the fact that children are able to acquire generic information does not speak to the issue of whether this information holds any extra appeal to them relative to, say, information about individuals. Capacity to acquire does not entail preference.

Our present hypothesis is also distinct from the claim that children are *generally* motivated to learn new things. There is no doubt that children are curious, as evidenced by the frequency and persistence of their questions (e.g., Callanan & Oakes, 1992; Chouinard, 2007; Frazier, Gelman, & Wellman, 2009; Greif, Kemler Nelson, Keil, & Gutierrez, 2006). The claim tested here, however, is more precise—namely, that children may be particularly curious about information that pertains to kinds. Although this predicted curiosity may not necessarily be apparent in children's everyday questions—because questions about more practical matters (e.g., “Where are my shoes?”) are likely to vastly outnumber ones about kinds—a more focused test may nevertheless reveal evidence consistent with our hypothesis.

The test we devised was as follows: On each of several trials, 4- and 5-year-olds were asked whether they would like the experimenter to tell them something about an *individual* from an unfamiliar kind or something about the *kind* to which that individual

belongs. Children's selections in this context provided a simple means of operationalizing their motivation to learn about kinds. Importantly, the use of facts about individuals as foils afforded a strong test of our hypothesis: The individual option was the more concrete of the two, which may have increased its appeal to young children, and there is also evidence that a robust motivation to learn about individual people and objects is present as early as the first few months of life (e.g., Buresh & Woodward, 2007; Hamlin, Wynn, & Bloom, 2007; Luo & Baillargeon, 2005).

To investigate the context-sensitivity of children's preference for kind information, and to further guard against alternative low-level interpretations, we also tested a separate group of children in a control condition in which the experimenter professed ignorance and asked children whether they would like her to *make a guess* about the individual versus its kind. If children are automatically drawn to kind information, or if their preference is triggered by some superficial feature of our task (e.g., the wording of the response options), then they should select the kind facts as often in this control condition as they do when the experimenter is knowledgeable. In contrast, if children's responses are guided by a more flexible, context-sensitive curiosity about kinds, then they should select the kind facts less often in this condition (in which the facts may be inaccurate) than in the condition in which the experimenter is knowledgeable.

Experiment 1

Method

Participants. Forty-eight children participated in this study (25 girls and 23 boys; $M = 4.87$ years; $SD = 0.60$; range = 4.03–5.97). Children were recruited in a small midwestern city and were socioeconomically diverse; most were European American. Because our task relied on rather complex language (see below), we did not test any children below the age of 4, and we also instituted a ± 2.5 standard deviations outlier exclusion criterion on our main dependent variable to safeguard against potential failures to understand the task. One additional child, whose score was 3.07 standard deviations away from the mean of all others in her condition, was excluded on this basis.¹ Another four children were excluded from the final sample because they refused to complete the study.

Procedure and materials. Children were tested individually in a quiet room in the lab or in their school. Half were tested in a knowledgeable-adult condition and half in an ignorant-adult condition; assignment to condition was random.

Knowledgeable-adult condition. At the beginning of the session, the experimenter announced that she was going to show the child “some pictures of animals that I brought with me from home.” These pictures were also said to be of “some animals that

¹ To verify that our results are robust, we also performed our analyses (for all studies) using another common method of dealing with extreme values: Rather than excluding such values, we replaced the top and bottom 10% of the scores in the conditions that had outliers with the scores at the 90th and 10th percentiles, respectively—a procedure known as *Winsorizing* (e.g., Reifman & Keyton, 2010; Tukey, 1962). Analyses on these Winsorized data replicated all of the significant differences reported in the text. In sum, our results held up across different methods of dealing with outliers and are thus likely to be robust.

I know a lot about.” There were four such pictures, each one consisting of a single animal from an unfamiliar category (e.g., a pangolin; see Appendix A for the full list). On each trial, the experimenter brought out one of these four pictures and said that she knows, for example, “lots of things about the pangolin in this picture” and “lots of things about pangolins.” The experimenter then continued:

But, in this game, I can only tell you *a few* of the things I know. And you’re gonna have to choose if you want me to tell you something about *this one pangolin in the picture*, or if you want me to tell you something about *this kind of animal, pangolins*.

The order of these two options (individual vs. kind) was counter-balanced across children, as was the order of the four pictures. Children were allowed to make three choices for each of the four pictures/trials, for a total of 12 choices (see Appendix B for a sample trial).

Because the answer options were lengthy, we encouraged children to respond nonverbally by touching either their ears (e.g., for the individual fact) or their chins (e.g., for the kind fact). These gestural response options were reiterated with each question; that is, children did not have to remember how they mapped onto the kind and individual options. Across children, the ear and chin gestures were paired equally often with the individual and the kind facts. After children made a choice, the experimenter provided a fact in the appropriate format. For example, a child who chose to learn about the individual would hear, “The pangolin in the picture likes to roll itself into a ball,” whereas a child who chose to learn about the kind would hear, “Pangolins like to roll themselves into a ball.” Aside from the individual versus kind format, the facts provided were identical regardless of children’s selections.

To prevent distraction by irrelevant details in the pictures, these were placed on a small cardboard easel that faced toward the experimenter and away from the children. Children were allowed to inspect the picture used on a trial after they made their three choices on that trial.

Ignorant-adult condition. The ignorant-adult condition was identical to the knowledgeable-adult condition, with two main exceptions. First, at the beginning of the study, the experimenter announced that she had forgotten at home the pictures she was planning to show the child, but, because she still wanted to play the game, she had decided to use other pictures instead, even though she did not know anything about them. Second, on each trial, the experimenter reminded the child of her ignorance and then asked the child to choose, for example, “if you want me to guess something about *this one pangolin in the picture*, or if you want me to guess something about *this kind of animal, pangolins*.”

Results and Discussion

As predicted, children in the knowledgeable-adult condition preferred to learn facts about kinds ($M = 63.9\%$ kind selections vs. 50% chance), $t(23) = 3.27, p = .003, d = 0.67$ (see Figure 1). Also as predicted, children in the ignorant-adult condition did not prefer the facts about kinds ($M = 45.1\%$), $t(23) = 1.11, p = .278, d = 0.23$. Children selected the facts about kinds significantly more often in the knowledgeable-adult than in the ignorant-adult condition, $t(46) = 3.07, p = .004, d = 0.89$. In sum, children seemed particularly motivated to acquire knowledge about kinds, but only when it was plausible to assume that this knowledge was accurate.

Experiment 2

In Experiment 2, we tested an alternative interpretation of these results: Perhaps children in the first study favored the kind-level facts not because they were about kinds per se but rather because they conveyed information about *more things* than did the facts about individuals (e.g., Cimpian, Brandone, & Gelman, 2010). To test this alternative, we asked a group of children to choose between facts about a *plurality of individuals* versus a single individual (the plurality condition) and compared their selections with those of another group who were asked to choose between

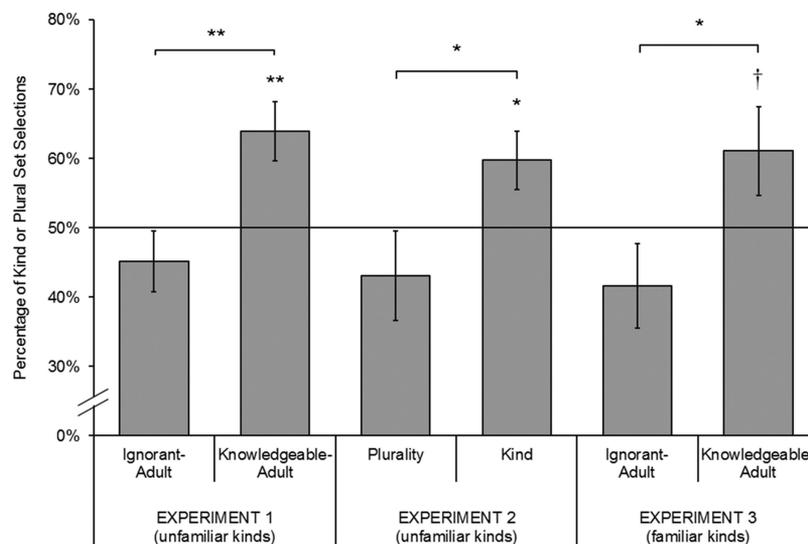


Figure 1. The mean percentage of trials on which children chose to learn a fact about a kind or a plural set in Experiments 1, 2, and 3. The error bars represent ± 1 standard error of the mean. $\dagger p < .10$. $* p < .05$. $** p < .01$. (For independent-samples or one-sample, vs. chance, t tests.)

facts about a *kind* versus a single individual (the kind condition). If the alternative interpretation described above is correct, children should prefer both the facts about plural sets and the facts about kinds. However, if our original hypothesis is correct, children should prefer only the facts about kinds.

A secondary goal of this experiment was to test whether children's preference for facts about kinds would replicate in a context in which no explicit mention was made of the adult's knowledge level—a context that might better approximate children's everyday experiences. Because children often assume that adults are knowledgeable even in the absence of explicit information to that effect (e.g., Jaswal & Neely, 2006; Taylor, Cartwright, & Bowden, 1991), we predicted that children would want to find out about kinds in this pared-down context as well.

Method

Participants. Forty-eight children participated in this study (24 girls and 24 boys; $M = 4.87$ years; $SD = 0.49$; range = 4.01–5.97). None of these children had participated in Experiment 1, but they were demographically similar to the children from Experiment 1. An additional four children were tested but excluded from the final sample because they refused to complete the study ($n = 3$) or because their scores surpassed the 2.5 standard deviations outlier exclusion criterion described in Experiment 1 ($n = 1$).

Procedure and materials. The *kind* condition ($n = 24$) was modeled on the knowledgeable-adult condition from Experiment 1, with the main difference being that we removed all explicit statements about the experimenter's knowledge. The *plurality* condition ($n = 24$) was identical to the kind condition, except that the option to find out about a kind was replaced with an option to find out about a plural set. Specifically, children chose whether to find out about the animal in the picture or about a few other animals that were not in the picture (e.g., “a few pangolins you cannot see in the picture”). To clarify, neither the individual nor the plural set was in fact visually accessible to children when they were making their choices because the pictures always faced away from them until the end of a trial.

Results and Discussion

As predicted, children in the kind condition preferred the facts about kinds even though their interlocutor's knowledge was not made explicit ($M = 59.7\%$ kind selections vs. 50% chance), $t(23) = 2.31$, $p = .030$, $d = 0.47$ (see Figure 1). In contrast, children in the plurality condition showed no trace of a preference for the facts about multiple individuals ($M = 43.1\%$ plural set selections), $t(23) = 1.08$, $p = .292$, $d = 0.22$. Comparing the two conditions with each other revealed that children chose the facts about kinds significantly more often than the facts about multiple individuals, $t(46) = 2.17$, $p = .036$, $d = 0.63$. In sum, children seemed particularly motivated to acquire knowledge about *kinds*, not just about any plural set.

Experiment 3

In Experiment 3, we tested whether children's motivation to acquire generic knowledge extends to *familiar* kinds as well.

Familiar kinds are likely to provide a stringent test of our hypothesis, as we explain next. Facts are often true of a kind without being true of all its members (e.g., Brandone, Cimpian, Leslie, & Gelman, 2012; Cimpian et al., 2010; Hollander et al., 2002; Leslie, 2008). For instance, the generic fact that ducks lay eggs is true even though less than 50% of all ducks actually lay eggs (only the healthy adult females do). As a result, the knowledge that children already possess about a familiar kind does not apply to every single instance of that kind. In a real sense, then, children know more about a familiar kind than they know about most individual members of that kind. This asymmetry might motivate children to ask about *individuals*, about which they know less. Thus, if we still find that children prefer to learn about familiar kinds over the (arguably less-familiar) individuals belonging to those kinds, such a preference would provide strong evidence for the hypothesized bias in favor of generic knowledge.

Method

Participants. Forty-eight children participated in this study (23 girls and 25 boys; $M = 4.80$ years; $SD = 0.47$; range = 4.21–5.85). None of these children had participated in previous experiments, but they were demographically similar to the children in previous experiments. One additional child was tested but excluded from the final sample because he did not comply with the experimenter's instructions (e.g., he consistently chose an answer before listening to her questions).

Procedure and materials. The design was identical to that of Experiment 1, in that we contrasted a knowledgeable-adult condition with an ignorant-adult control condition ($n = 24$ each). However, the unfamiliar animals used in previous experiments were replaced with familiar ones (e.g., a frog, a shark; see Appendix C for the full list). In addition, the experimenter provided only one fact per picture, instead of three facts as in previous experiments. We used six pictures in this study, and thus children had six opportunities to choose whether they wanted to learn about the individuals in those pictures or about the kinds to which they belong. The switch to a single choice per picture was designed to eliminate any demands that might arise when children are repeatedly presented with the same choice in the context of the same picture. (For example, children might feel that, if they are asked the same question several times, they should change their answers; e.g., Poole & White, 1991.²)

² Does this potential task demand undermine our conclusions so far? To examine this question, we went back and analyzed the data from the *first* choice children made on each of the four trials in Experiments 1 and 2. (We focused on the first choice because it is not susceptible to concerns about repeated questioning.) The results obtained using these first-choice data closely paralleled those reported in the main text. For example, looking at the first choices in Experiment 1, children selected the kind fact on 67.7% of the trials in the knowledgeable-adult condition and on 41.7% of the trials in the ignorant-adult condition. For comparison, the analogous percentages from the aggregate data were 63.9% and 45.1%. In sum, the first-choice data rule out the possibility that our conclusions so far were undermined by task demands arising from repeated questioning. Instead, these additional analyses provide consistent support for the hypothesis that children have a heightened motivation to learn about kinds.

Results and Discussion

As predicted, children in the knowledgeable-adult condition preferred the facts about familiar kinds over the facts about individuals belonging to those kinds ($M = 61.1\%$ kind selections), although the t test against chance was only significant at the $\alpha = .10$ level in this study, $t(23) = 1.74, p = .096, d = 0.35$ (see Figure 1).³ In contrast, children in the ignorant-adult condition did not show a similar preference for the facts about kinds ($M = 41.7\%$ kind selections), $t(23) = 1.37, p = .185, d = 0.28$. Also consistent with our hypothesis, children were significantly more likely to select the facts about kinds in the knowledgeable-adult condition than in the ignorant-adult condition, $t(46) = 2.20, p = .033, d = 0.63$. In sum, children's heightened motivation to acquire generic knowledge extends to familiar kinds as well and is thus likely to be quite broad in scope.

General Discussion

The three studies reported in this article support the claim that children are motivated to learn about kinds. When faced with a choice between finding out something about an abstract kind or about the concrete individual in the experimenter's picture, 4- and 5-year-olds wanted to find out about the kind. Importantly, children's curiosity about kinds is attuned to the circumstances in which learning occurs rather than being automatic or due simply to superficial features of the task: In Experiments 1 and 3, children were not partial to the kind facts when interacting with an ignorant experimenter. Moreover, as shown in Experiment 2, children's preference was specific to kinds and did not extend to other plural sets of individuals. Our studies also suggested that children's curiosity about kinds is broad in scope, applying not just to novel kinds (Experiments 1 and 2) but to familiar kinds as well (Experiment 3).

Relative Versus Absolute Preference for Generic Facts

To be clear, these studies measured children's relative preference for kind-wide facts over individual-specific facts. Thus, they provide only indirect evidence for the *absolute* level of children's motivation to learn about kinds. Inferences about this absolute level can still be made from evidence of a relative preference, but they depend on further assumptions about whether the bar for relative comparison was set low or high. Are children ordinarily motivated to learn about individuals? Much evidence suggests that they are—and thus that our studies used a conservative standard of comparison. As mentioned before, even infants routinely keep track of the features and behaviors of individuals in their environments (e.g., Buresh & Woodward, 2007; Hamlin et al., 2007; Luo & Baillargeon, 2005). Closer to the context of our study, there is also evidence that preschool-age children are typically quite eager to find out specifics about the individual objects in an experimenter's photographs (e.g., Greif et al., 2006). In light of these considerations, it seems likely that children's motivation to learn about kinds is strong in absolute terms as well: Children preferred the kind information over a type of information about which they would also be very curious under other circumstances.

The Origins of Children's Preference for Generic Facts

Another important question concerns the origins of children's motivation to learn about kinds. We have argued that this motivation is part of a broader bias in the structure of the early cognitive system, a bias that also facilitates the processing and storage of information about kinds (e.g., Cimpian & Erickson, 2012; Hollander et al., 2002). However, one might also argue that the preference identified in our studies is simply a learned strategy, not a basic aspect of the human mind. For example, exposure to schooling environments may inculcate in children the importance of generic facts. Or perhaps children prefer generic facts because they have learned that adults provide such facts when introducing novel animals or objects (e.g., "A wok is how people in China cook"; see Gelman, Coley, Rosengren, Hartman, & Pappas, 1998). Although our data are in principle open to both of these interpretations (early bias vs. learned strategy), there are several reasons why the early bias interpretation may be more plausible.

First, there was no change in the strength of children's preference for generic information over the 2-year age range tested in our studies (i.e., between 4 and 6). To test for such a change with sufficient statistical power, we pooled the data across all relevant conditions in our three studies: the knowledgeable-adult conditions of Experiments 1 and 3 and the kind condition of Experiment 2 (see Figure 2). In these pooled data, children's preference for the kind facts was uncorrelated with their age, $r(70) = .003, p = .981$. If children's preference for kind information were shaped entirely by their social environments, there should have been at least some hints of an increase over the 2-year period that includes many children's first exposure to formal schooling—especially given that their preference was not at ceiling at the beginning of this period (see the intercept of the regression line in Figure 2). The absence of any such increase speaks against the learned-strategy alternative.

A second reason to doubt the learned-strategy alternative is that children preferred generic facts in the context of both familiar and unfamiliar kinds. Intuitively, it seems that adults provide different sorts of input in these two contexts, with generic information being more prevalent for unfamiliar objects (e.g., a wok) than for familiar ones (e.g., a spoon).⁴ Thus, if children modeled their preference for generic information on the patterns of adult input, they should have displayed a stronger preference for generic information in the unfamiliar (Experiments 1 and 2) than in the familiar (Experiment 3) context—which they did not, $t(70) = 0.11, p = .911, d = 0.03$.

Finally, it is important to note that the early bias hypothesis provides a unified explanation for multiple phenomena—not only the present findings but also the processing and memory advantages for generic information (e.g., Cimpian & Erickson, 2012; Hollander et al., 2002; Leslie et al., 2011). In contrast, the hypoth-

³ One potential reason why this difference was only marginally significant in this study was that we reduced the number of choices per child from 12 to six. This change is likely to have decreased the precision of our estimates (see the larger error bars for Experiment 3 in Figure 1), thereby decreasing power.

⁴ We are grateful to one of our anonymous reviewers for suggesting this possibility.

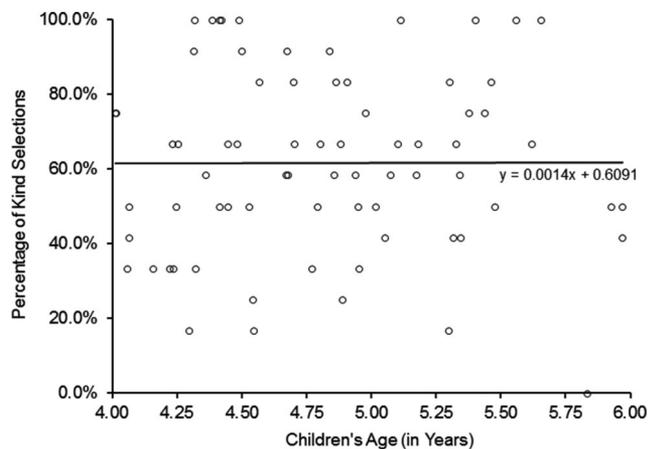


Figure 2. Scatterplot of children's preference for kind facts against their age. The fitted line represents the linear regression predicting children's kind selections on the basis of their age.

esis that children's curiosity about kinds is a learned strategy cannot easily be extended to these other phenomena. It is unclear, for instance, how this alternative could explain why 3-year-olds are better able to evaluate claims about kinds (e.g., "Do dogs have brown spots?") than claims about broad quantified sets (e.g., "Do all dogs have brown spots?"), despite the latter's simpler truth conditions (Hollander et al., 2002; Tardif et al., 2012). This sort of finding, however, fits quite naturally with the proposal of a privileged cognitive status for kind information. In sum, considerations of parsimony and scope also lead us to favor the early bias hypothesis.

Broader Implications

The present studies bear on key questions about the origins of human concepts. By suggesting that young children are motivated to seek out information about kinds, the present findings support the notion that kind-based representations are central to human cognition from its earliest stages (e.g., Cimpian & Erickson, 2012; Csibra & Gergely, 2009; Dewar & Xu, 2009; Gelman, 2003; Keates & Graham, 2008). In contrast, these findings are inconsistent with proposals on which early thought operates largely over exemplar-based representations that store the perceptual features of previously encountered items (e.g., Fisher & Sloutsky, 2005; Samuelson & Perone, 2010; Sloutsky & Fisher, 2004). On the exemplar view, kind-based reasoning emerges late in development (after the age of 7) and is a product of extensive learning, perhaps even direct instruction by teachers and parents. Our evidence of a motivational bias that favors information about kinds but not information about other plural sets, that is sensitive to the knowledge state of one's interlocutor, and that is present in children as young as 4 seems contrary to any account on which conceptual development is driven by computations over item-specific perceptual features.

Conclusion

To conclude, the present research suggests that young children may be particularly motivated to acquire information about kinds.

Considering the ease with which children process this information and the accuracy with which they remember it, this desire to learn about kinds is likely to be an important engine of conceptual development.

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(Appendices follow)

Appendix A

Items in Experiments 1 and 2

Item and accompanying facts ^a	Children's selections of the kind fact in the . . .	
	Knowledgeable-adult condition of Exp. 1 ^b	Kind condition of Exp. 2 ^b
Echidna	63.9%	61.1%
Fact 1: lives in Australia		
Fact 2: likes to swim		
Fact 3: has no teeth		
Jerboa	62.5%	52.8%
Fact 1: is scared of owls		
Fact 2: built her burrow underground		
Fact 3: likes to hop in the sand		
Pangolin	63.9%	62.5%
Fact 1: cannot see very well		
Fact 2: likes to roll itself into a ball		
Fact 3: has sand and rocks in its tummy		
Tarsier	65.3%	62.5%
Fact 1: really likes to sing		
Fact 2: hunts for birds		
Fact 3: lives in a place called Sumatra		

Note. The experimenter provided each fact, in the appropriate form, only *after* children chose whether they wanted to hear about the individual in the picture or about the kind to which this individual belongs (see [Appendix B](#) for script). Exp. = Experiment.

^aThe facts are listed here in individual-specific form. If children chose to find out about the kind, they heard these facts in kind-wide form (e.g., "Echidnas live in Australia"; see [Appendix B](#)). ^b*t* tests against chance (50%) with items as the random variable revealed a significant preference for kind facts, $t(3) = 24.32, p < .001$ (Experiment 1), and, $t(3) = 4.16, p = .025$ (Experiment 2). The *t* tests with participants (rather than items) as the random variable are reported in the main text.

(Appendices continue)

Appendix B

Script for the Pangolin Trial in Experiment 1

The following is the script for a sample trial from the knowledgeable-adult condition in Experiment 1. In this trial, the individual option is provided first. (The order of this option was counterbalanced across subjects.)

Okay, I'm looking at a picture now. I'll show it to you later, but for now it will stay here. [*Experimenter points to the cardboard easel.*]

[*Experimenter points to the picture and says:*] And you know what? The animal in this picture is a pangolin. It is a pangolin—that's what this kind of animal is called.

So what animal is this? Can you say it for me? [*Experimenter corrects child if needed.*]

Okay, so I know lots of things about the pangolin in this picture, and I know lots of things about pangolins. But, in this game, I can only tell you a few of the things I know. And you're gonna have to choose if you want me to tell you something about this one pangolin in the picture, or if you want me to tell you something about this kind of animal, pangolins. Those are the rules of the game.

Okay, so now I'm ready to tell you the first thing. But you have to choose: do you want me to tell you something about this one pangolin in the picture, or do you want me to tell you something about this kind of animal, pangolins?

If you want me to tell you something about this one pangolin in the picture, touch your chin. [*Experimenter puts her finger on her chin.*] If you want me to tell you something about this kind of animal, pangolins, touch your ear. [*Experimenter puts her finger on her ear.*]

So which do you want to find out about: this one pangolin in the picture [*finger to chin*] or this kind of animal, pangolins [*finger to ear*]?

[*Child chooses an answer.*]

Okay! So here's what I wanted to tell you:

[*If child chooses to find out about the kind:*] Pangolins cannot see very well.

[*If child chooses to find out about the individual:*] The pangolin in the picture cannot see very well.

Interesting, huh?

Okay, so now I'm ready to tell you another thing. But you have to choose: do you want me to tell you something about this one pangolin in the picture [*finger to chin*], or do you want me to tell you something about this kind of animal, pangolins [*finger to ear*]?

[*Child chooses an answer.*]

Okay! So here's what I wanted to tell you:

[*If child chooses to find out about the kind:*] Pangolins like to roll themselves into a ball.

[*If child chooses to find out about the individual:*] The pangolin in the picture likes to roll itself into a ball.

Neat, huh?

Okay, so now I'm ready to tell you another thing. But you have to choose: do you want me to tell you something about this one pangolin in the picture [*finger to chin*], or do you want me to tell you something about this kind of animal, pangolins [*finger to ear*]?

[*Child chooses an answer.*]

Okay! So here's what I wanted to tell you:

[*If child chooses to find out about the kind:*] Pangolins have sand and rocks in their tummies.

[*If child chooses to find out about the individual:*] The pangolin in the picture has sand and rocks in its tummy.

Pretty cool, huh?

Ok, here's the picture! Let's see what's next!

[*Experimenter shows the child the picture before moving on to the next trial.*]

(*Appendices continue*)

Appendix C

Items in Experiment 3

Item and accompanying fact ^a	Children's selections of the kind fact in the knowledgeable-adult condition ^b
Ant Fact: never sleeps	45.8%
Cricket Fact: has ears on his legs	75.0%
Flamingo Fact: can only eat if its head is upside down	70.8%
Frog Fact: never closes its eyes, even when it sleeps	58.3%
Giraffe Fact: has a purple tongue that's covered in hair	66.7%
Shark Fact: doesn't have any bones in its body	50.0%

Note. The experimenter provided each fact, in the appropriate form, only *after* children chose whether they wanted to hear about the individual in the picture or about the kind to which this individual belongs.

^a The facts are listed here in individual-specific form. If children chose to find out about the kind, they heard these facts in kind-wide form (e.g., "Ants never sleep"). ^b A *t* test against chance (50%) with items as the random variable revealed a marginally significant preference for kind facts, $t(5) = 2.33$, $p = .067$. The *t* test with participants (rather than items) as the random variable is reported in the main text.

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