Children's responses to yes-no questions

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Do Young Children Always Say Yes to Yes–No Questions? A Metadevelopmental Study of the Affirmation Bias

V. Heather Fritzley and Kang Lee

The present study investigated whether yes–no questions would lead to a yes bias in young children. Four experiments were conducted in which 2- to 5-year-olds were asked comprehensible and incomprehensible yes–no questions concerning familiar and unfamiliar objects. Consistent findings were obtained: (a) 2-year-olds displayed a consistent yes bias; (b) 4- and 5-year-olds exhibited no response bias toward comprehensible questions and a nay-saying bias toward incomprehensible questions; and (c) 3-year-olds' results were mixed, suggesting that the age of 3 years is a period of developmental transition in response tendency toward yes–no questions. The findings suggest that yes–no questions are suitable for older children, providing they are comprehensible, but may result in biased results when used with younger children and when incomprehensible.

Questioning is one of the major methods used to obtain information from children for parenting, educational, medical, and forensic purposes. Questioning is also one of the primary data-collection methods in developmental research involving young children. We surveyed the 1,360 studies published between 1995 and 1998 in *Child Development* and *Developmental Psychology*. Of the 1,360 studies, 509 involved children between the ages of 2 and 6 years. Of those studies, 377 (74%) used questions within their methodologies, suggesting that questioning plays an important role in developmental studies involving preschool children. Of all questions asked, yes–no questions were used most frequently, representing 43.3% of all questions asked. In contrast, "how"? questions represented 13.8% (including "how much and how many", which represented 3%), and all forms of wh- questions represented 42.9%.

Despite the extensive use of the questioning method in empirical research involving children, limited empirical research has been conducted to examine the questioning method itself. Little is known about how young children respond to questioning and whether they have certain biases when responding to various types of questions. Evidence regarding this issue is important to developmental researchers because the questioning method is one of the primary data-collection tools in developmental psychology and much of our knowledge about cognitive and social development derives from the use of this method. Understanding children's response bias to questions can help developmental researchers design appropriate questions to obtain, from children, information critical to their theories and hypotheses. Failure to do so may lead to both the misinterpretation of children's responses and to unwarranted acceptance or rejection of hypotheses (Siegal, 1997).

Research on children's response to questioning has important theoretical implications in its own right. Questioning is a major form of speech act in interpersonal communication (Goody, 1978). Theorists have argued that the answering of a question is more than a simple process of comprehending the question and supplying the information that is requested in the question (Goody, 1978; Lee & Eskritt, 1999; Siegal, 1997). Lee and Eskritt (1999) suggested that questioning calls for the use of knowledge at multiple levels. First, to respond appropriately to a question, the respondent must have knowledge about the syntax of questioning. Second, the respondent must understand the semantics of the question. Third and equally important, the respondent must appreciate and adhere to various social conventions regarding conversation in general and questioning in particular. Sometimes,

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one is required to adhere to such Gricean maxims (Grice, 1980) as the maxim of quality (to inform, not misinform) and thus give a truthful response to a question. Other times, contexts dictate a respondent not to respond truthfully to be polite (Lakoff, 1973).

To address these methodological and theoretical issues, the present study focused on whether young children display a bias in their responses to yes–no questions. The yes–no question was chosen as the focus of the present study for several reasons. First, as the previous survey indicates, the yes–no question is the most commonly used type of question in current developmental research with preschool children. Second, children tend to comprehend and produce the yes–no question the earliest, at 2 years of age (Bloom & Lahey, 1978; Brown, 1973; Ervin-Tripp, 1970; Ingram & Tyack, 1979; Tyack & Ingram, 1977). Third and most important, there is a common belief among developmental researchers that asking young children yes–no questions is a problematic data-collection method because young children are thought to have a tendency to exhibit a strong yes bias when asked this type of question.

Evidence is mixed regarding the validity of this belief (e.g., Brady, Poole, Warren, & Jones, 1999; Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999; Steffensen, 1978). Some evidence supports this belief. For example, Steffensen (1978) followed two infants longitudinally up to 2.5 years of age and found a strong yes bias in the children's responses to their parents' yes–no questions. As well, Peterson et al. (1999) reported that children between 3 and 5 years of age were more inclined to respond yes than no in simulated forensic interviews when yes–no questions are asked. However, in a similar study, Peterson and Biggs (1997) found that 2- to 5-year-olds were biased toward saying no. Finally, Brady et al. (1999) found no clear response bias across different types of yes–no questions and conditions for children between 3 and 7 years of age.

Several reasons are possible for the discrepancies regarding children's response biases. One factor concerns the subject matter about which children are questioned. The subject matter tends to vary from one study to another. For instance, children may have different levels of knowledge or familiarity with the issue about which they are being questioned in different studies. Research conducted on adults has shown that the respondent's level of knowledge is closely related to the yes bias: A yes bias tends to occur when the respondent is not knowledgeable about the information in question (Krosnick & Fabrigar, in press).

A second possible factor is that some studies involved a long delay between the event in question and the interview (Peterson & Biggs, 1997; Peterson et al., 1999), whereas other studies did not (Brady et al., 1999). Adding a time delay of any length brings an additional factor to the issue of response bias: memory. Young children's memory of certain events, objects, and people involved may not be as accurate as that of older children, and most likely decays more quickly, which may in turn lead to biased responses by the children.

A third possible factor is that children may have a particular bias on questions regarding a particular issue (e.g., the properties of an object: ''Is this warm?'') but not for another issue (e.g., children's attitude toward the object: ''Do you like to drink warm soda?''). It is possible that a response bias may be suppressed in one study and manifested in another, because in the existing studies children were questioned on a variety of issues and the issues covered by the questions varied from one study to another.

Finally, the inconsistent findings among the various questioning studies may result because children at different ages have different response tendencies to yes–no questions. Steffensen (1978) followed children only up to 2.5 years of age, an age range not covered by Brady et al. (1999). Peterson et al. (1999) and Peterson and Biggs (1997) divided children according to their chronological ages, whereas Brady et al. grouped children between 3 and 7 years of age into a younger (37–64 months) and an older (65–95 months) group. This grouping strategy may have contributed to the discrepant findings among these studies.

The present study was conducted to clarify the inconsistencies in the literature regarding the yes bias and to delineate the conditions under which this bias may or may not occur. We recruited children between 24 and 72 months of age and divided them into four age groups: 2-year-olds, 3-year-olds, 4-year-olds, and 5-year-olds. We focused on whether young children display a yes bias when asked yes–no questions concerning the properties of an object. The choice of object properties as the focus of questioning is motivated by the language development literature that suggests that children are familiar with and interested in object names and properties (e.g., Nelson, 1973). In addition, many cognitive development studies, when involving young children, probe children's understanding of objects and their properties. Moreover, as mentioned earlier, children may have different response tendencies to questions concerning different entities

(e.g., objects, people and animals, events). Given the inconsistencies in the literature, focusing on objects serves as a starting point for clarifying whether young children indeed have response biases toward yes–no questions, and if they do, which factors contribute to their response biases.

We were also interested in whether children would provide "I don't know" answers when given the explicit instruction that such responses were acceptable. The existing literature has shown that children are reluctant to admit their ignorance by spontaneously using the "I don't know" response (Hughes & Grieve, 1980; Poole & White, 1993; Pratt, 1990; Waterman, Blades, & Spencer, 2001). Moston (1987, 1990) and Mulder and Vrij (1996) found that explicitly instructing children to say "I don't know" if they did not know the answer increased the number of such responses. This finding is, however, controversial. Waterman et al. (2000, 2001) used similar instructions and found that such instruction did not increase the number of "I don't know" responses.

Four experiments were conducted. In Experiment 1, children were presented with familiar objects and unfamiliar objects and asked yes–no questions. To ensure that all children understood each of the questions, we used a simple questioning format, for example, "Is this X?," which all children older than 2 years of age are able to understand (Bloom & Lahey, 1978; Brown, 1973; Ervin-Tripp, 1970; Ingram & Tyack, 1979; Schuman, Bala, & Lee, 1999; Tyack & Ingram, 1977). In addition, the questions consisted of words that young children can understand. This design was used to ascertain that any yes bias, if one exists, is not due to children's lack of understanding of the questions asked, but rather to the nature of the yes–no question format. Experiment 2 replicated and extended Experiment 1 by including nonsense words in half of the questions (e.g., "Is this for nirking?"). This nonsense word condition was included to simulate situations in interviews in which children may not understand the words used by the interviewer. This condition allowed for the assessment of whether the lack of understanding of a question leads to a yes bias. Experiment 3 replicated Experiment 2 with a new set of objects and, correspondingly, a new set of questions, and was conducted to examine the generalizability of the findings of Experiments 1 and 2. Experiment 4 involved children observing and being questioned about various objects and then being asked the same questions 1 week later (with the objects no longer in view), which allowed for the investigation of whether children's response biases change when they have to rely on their memory to respond to the questions.

Experiment 1

Two questions are examined in Experiment 1: Do preschoolers display a yes bias in their responses to yes–no questions concerning familiar and unfamiliar objects? When the explicit instruction is given that "I don't know" responses are acceptable, do preschoolers give more "I don't know" responses? Based on the existing literature, we hypothesized that a bias would be present in children's responses to yes–no questions. However, because of the inconsistencies in the literature, we were hesitant to predict the specific direction in which the bias would occur. Second, we hypothesized that the bias, if present, would be more pronounced in the unfamiliar object condition than in the familiar object condition because the children were not knowledgeable about the objects. Third, based on the existing, albeit inconsistent, literature, we hypothesized that younger children would exhibit a stronger yes bias than older children. Finally, based on the findings of Moston (1987, 1990) and Mulder and Vrij (1996), we predicted that explicit instructions about the acceptability of an "I don't know" response would lead children to opt for this response, though we were also mindful of the findings of Waterman et al. (2000, 2001).

Method

Participants. Participants were 135 children: 33 two-year-olds (16 females; M age = 2.58 years), 37 three-year-olds (23 females; M age = 3.42 years), 32 four-year-olds (14 females; M age = 4.5 years), and 33 five-year-olds (15 females; M age = 5.33 years). The children in the present and all subsequent experiments came from families of middle socioeconomic status. No children in this experiment and any of the following experiments participated in more than one experiment.

Materials and procedure. A pilot study was conducted to select objects that were either familiar or unfamiliar to children between 2 and 5 years of age. A small group of children ($N = 10$) ranging in age from 2 to 5 years was asked to name and describe the functions of series of objects. Based on the pilot testing, 3 familiar objects and 3 unfamiliar objects were selected (see Appendix A for the complete list of objects). Children were interviewed individually. Each child first took part in a pretest session to determine whether they were familiar with the

objects that were designated as familiar (e.g., a red cup) and unfamiliar with the objects that were designated as unfamiliar (e.g., a fuse). The experimenter randomly chose one of the six objects and asked children to identify their its and function. If children failed to identify a particular unfamiliar object, the experimenter informed them of its name and function immediately. They were then asked to repeat the name and function of the object to ensure that they had at least some knowledge about the unfamiliar object. As expected, children were familiar with the familiar objects (responding correctly about names and functions of the objects) and unfamiliar with the unfamiliar objects (failing to name and describe the functions of these objects).

In the testing phase, children were randomly assigned to one of two orders of questioning (see Appendix A for the exact wording of the questions asked). In the first order, the experimenter asked four questions concerning a familiar object, followed by four questions concerning an unfamiliar object, followed by four questions concerning another familiar object, and so on. In the second order, the experimenter also alternated between objects but began with questions about an unfamiliar object. For both orders, the experimenter randomly chose the familiar and unfamiliar objects for questioning. A subset of the children (12 children per age group) were explicitly instructed that ''I don't know'' responses were acceptable before the questions for each object were asked. For each object, the experimenter asked questions concerning its properties and function. For two of the questions, the correct answer was yes (yes questions), and for the remaining two, the correct answer was no (no questions). The words used in the questions were chosen based on pilot testing and the word acquisition literature (e.g., Fenson et al., 1994; Morrison, Chappell, & Ellis, 1997) to ensure that they are understood by children as young as 2 years of age.

Results and Discussion

As shown in Table 1, children at all ages seldom responded ''I don't know.'' Because the explicit instruction about the permissibility of responding ''I don't know'' did not increase the likelihood of this response being chosen, the results for the two groups were combined for the subsequent analyses.

Table 1
Summary of "I Don't Know" Responses for Each Age Group in Each Condition

		Age group			
Experiment	Condition	2 years	3 years	4 years	5 years
Regular word questions					
Experiment 1					
No instruction	Familiar	0	0	0	1
	Unfamiliar	0	0	0	3
Instruction	Familiar	0	0	0	0
	Unfamiliar	1	0	0	0
Experiment 2	Familiar	0	0	1	0
	Unfamiliar	0	0	1	0
Experiment 3	Familiar	0	0	0	0
	Unfamiliar	0	0	0	1
Experiment 4	Familiar	0	0	1	0
1st interview	Unfamiliar	0	1	1	1
Experiment 4	Familiar	1	0	2	2
2nd interview	Unfamiliar	1	0	2	9
Nonsense Word Questions					
Experiment 2	Familiar	0	0	3	4
	Unfamiliar	0	0	4	4
Experiment 3	Familiar	0	0	2	6
	Unfamiliar	0	0	1	7
Experiment 4	Familiar	0	0	2	10
1st interview	Unfamiliar	0	0	2	12
Experiment 4	Familiar	1	0	2	8
2nd interview	Unfamiliar	2	0	2	11

To examine whether children had a response bias, a response bias score was calculated for each child. To do so, a yes score and a no score were first obtained. The yes score was obtained by assigning a score of 1 to any yes response to a yes question and a score of −1 to any no response to a yes question. The no score was obtained by assigning a score of 1 to any no response to a no question and a score of −1 to any yes response to a no question. An ''I don't know'' response received no scores. The yes score was then divided by the number of yes questions to which children gave either yes or no responses to derive a proportional yes score. The same was done to derive a proportional no score. The proportional no score was then subtracted from the proportional yes score, resulting in a maximum response bias score of 1 and a minimum score of −1. The response bias score for a child with no response bias should be zero. A positive response bias score suggests a yes bias, whereas a negative response bias score suggests a nay-saying bias. The term *nay-saying bias* instead of *no bias* is used throughout this article to avoid a potential confusion in describing the lack of such a bias.

A 4 (age) × 2 (familiarity) mixed-design analysis of variance (ANOVA) was performed on children's response bias scores with the familiarity factor as the repeated measure. The age effect was significant, $F(3, 131) = 41.49$, $p < .001$, $\eta^2 = .49$. As age increased, the mean response bias scores decreased (Figure 1). Although the familiarity effect was not significant, $F(1, 131) = 3.39$, $p > .05$, $\eta^2 = .03$, the interaction between familiarity and age group was, $F(3, 131) = 12.95$, $p < .001$, $\eta^2 = .23$.

To examine this significant interaction further as well as to ascertain whether a yes bias was present, one-sample t tests were conducted to compare the mean response bias score of each age group to a score of zero (i.e., no response bias) within each condition (Table 2). Two- and 3-year-olds' mean response bias scores were significantly above zero in both the familiar and unfamiliar object condition, suggesting a yes bias. In contrast, 4- and 5-year-olds did not show a response bias in either the familiar or unfamiliar condition.

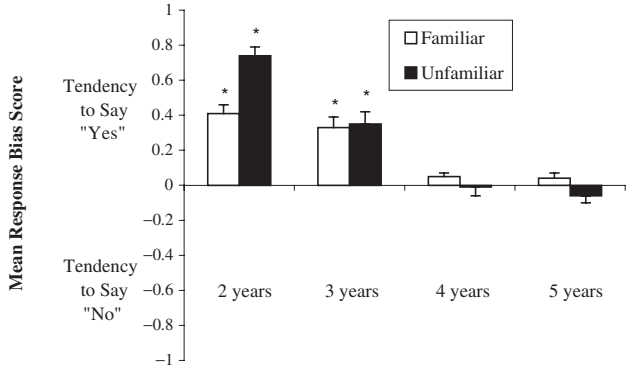

Figure 1. Mean response bias scores in Experiment 1.

The present results partially confirmed our hypotheses. A strong yes bias in 2- and 3-year-olds' responses was found. Their yes bias was more pronounced in the unfamiliar condition than in the familiar condition as confirmed by post hoc analyses. Four- and 5-year-olds did not show a significant response bias in either of the conditions. We failed to confirm the hypothesis that explicit instructions about the acceptability of an ''I don't know'' response would lead children to opt for this response when they were unfamiliar with the object in question. The explicit and repeated instruction that ''I don't know'' responses were acceptable had no effect on the number of such responses given by children in all age groups. This result is consistent with the findings of Waterman et al. (2000, 2001) and inconsistent with the findings of Moston (1987, 1990) and Mulder and Vrij (1996). However, only 12 children in each age group were given this instruction. Perhaps if more children were instructed that ''I don't know'' responses were acceptable, the results would have been different.

Experiment 2

Experiment 2 was conducted with several goals. First, we investigated whether the expected yes bias in the younger children could be replicated. Second, we explicitly instructed all children that the ''I don't know'' response was acceptable to examine whether increased sample size would allow us to replicate the findings of Moston (1987, 1990) and Mulder and Vrij (1996). Third, we further modified the procedure used in Experiment 1 so that a proportion of the questions asked involved words that children could not possibly understand (i.e., nonsense words). The purpose of this procedural modification was to simulate an interviewing situation in which interviewers use words that are beyond child respondent's comprehension. Based on the findings of Experiment 1, we hypothesized that there would be a significant nonsense word effect: Younger children would display a stronger yes bias when the questions contained nonsense words (the nonsense word condition) than when the questions contained regular words (the regular word condition). If the children were displaying a yes bias when they understood the question and should have known the correct response, it seems reasonable to suggest that

Table 2
T-Test Scores and Means (MSE) for Each Age Group in the Regular Word Condition

		Age group			
Experiment	Condition	2 years	3 years	4 years	5 years
Experiment 1	Familiar	$t(32) = 7.74^*$	$t(36) = 5.54^*$	$t(31) = 1.96$	$t\ (32) = 1.32$
		$\mu = 2.45\ (.32)$	$\mu = 1.97\ (.36)$	$\mu = .28\ (.14)$	$\mu = .23\ (.17)$
	Unfamiliar	$t(32) = 14.49^*$	$t(36) = 5.03^*$	$t(31) = -.22$	$t(32) = -1.44$
		$\mu = 4.41\ (.30)$	$\mu = 2.11\ (.42)$	$\mu = -.06\ (.28)$	$\mu = -.36\ (.25)$
Experiment 2	Familiar	$t(19) = 4.93^*$	$t(19) = 1.87$	$t(19) = 1.33$	$t(19) = 1.00$
		$\mu = 1.35\ (.27)$	$\mu = .55\ (.30)$	$\mu = .22\ (.17)$	$\mu = .05\ (.05)$
	Unfamiliar	$t(19) = 11.00^*$	$t(19) = 3.20^*$	$t(19) = 1.59$	$t(19) = .37$
		$\mu = 2.20\ (.20)$	$\mu = 1.05\ (.33)$	$\mu = .28\ (.18)$	$\mu = .05\ (.14)$
Experiment 3	Familiar	$t(19) = 4.15^*$	$t(19) = .22$	$t(19) = 1.75$	No variability
		$\mu = 1.55\ (.37)$	$\mu = .05\ (.22)$	$\mu = .25\ (.14)$	$\mu = .00\ (.00)$
	Unfamiliar	$t(19) = 7.11^*$	$t(19) = 2.43^*$	$t(19) = 1.81$	$t(19) = .60$
		$\mu = 2.60\ (.37)$	$\mu = 1.05\ (.43)$	$\mu = .55\ (.30)$	$\mu = .12\ (.20)$
Experiment 4					
1st interview	Familiar	$t(19) = 10.81^*$	$t(19) = 1.92$	$t(19) = -1.88$	$t(19) = -2.55$
		$\mu = 2.64\ (.24)$	$\mu = .40\ (.21)$	$\mu = -.32\ (.17)$	$\mu = -.32\ (.13)$
	Unfamiliar	$t(19) = 5.42^*$	$t(19) = .24$	$t(19) = -1.52$	$t(19) = -1.16$
		$\mu = 2.36\ (.44)$	$\mu = .11\ (.44)$	$\mu = -.47\ (.31)$	$\mu = -.23\ (.20)$
Experiment 4					
2nd interview	Familiar	$t(19) = 3.63^*$	$t(19) = -.19$	$t(19) = -2.34^*$	$t(19) = -2.02^*$
		$\mu = 1.91\ (.52)$	$\mu = -.08\ (.43)$	$\mu = -.73\ (.31)$	$\mu = -.65\ (.32)$
	Unfamiliar	$t(19) = 2.42^*$	$t(19) = -.94$	$t(19) = -3.70^*$	$t\ (19) = -5.22^*$
		$\mu = 1.61\ (.67)$	$\mu = -.68\ (.73)$	$\mu = -2.32\ (.63)$	$\mu = -3.28\ (.63)$

$^*p < .05$.

this bias would be even more pronounced when they could not understand the question. This nonsense word effect would be stronger in the unfamiliar object condition than in the familiar word condition. In contrast, based on the findings of Experiment 1 regarding older children, we hypothesized that older children would have no significant response bias in the nonsense word condition. Alternatively, because of the lack of comprehension of the question asked, it may be possible that the older children would resort to the ''I don't know'' response.

Method

Participants. Participants were 20 two-year-olds (10 females; *M* age = 2.42 years), 20 three-year-olds (11 females; *M* age = 3.58 years), 20 four-year-olds (7 females; *M* age = 4.5 years), and 20 five-year-olds (9 females; *M* age = 5.5 years).

Materials and procedure. The procedure and materials were similar to the procedure and materials used in Experiment 1 except for modifications made to two of the four questions concerning each object (see Appendix B for a complete list of the questions asked in the Experiment 2). For these two questions (one a yes question and the other a no question), the letters of the last word were switched around until the word became a pronounceable nonsense word (the nonsense word condition). For the remaining one yes question and one no question, no changes were made (the regular word condition) and they were therefore identical to those used in Experiment 1. All children were instructed explicitly everytime an object was introduced that they could respond ''I don't know'' if they did not know the answer to a question.

Results and Discussion

As shown in Table 1, children seldom used the ''I don't know'' response in the regular word condition despite the repeated explicit instruction that they could do so. The number of the ''I don't know'' response increased only slightly among the older children when they failed to comprehend the questions in the nonsense word condition. Overall, the present results confirmed the findings of Experiment 1 that children were reluctant to use the ''I don't know'' response even when given the explicit instruction that they could do so.

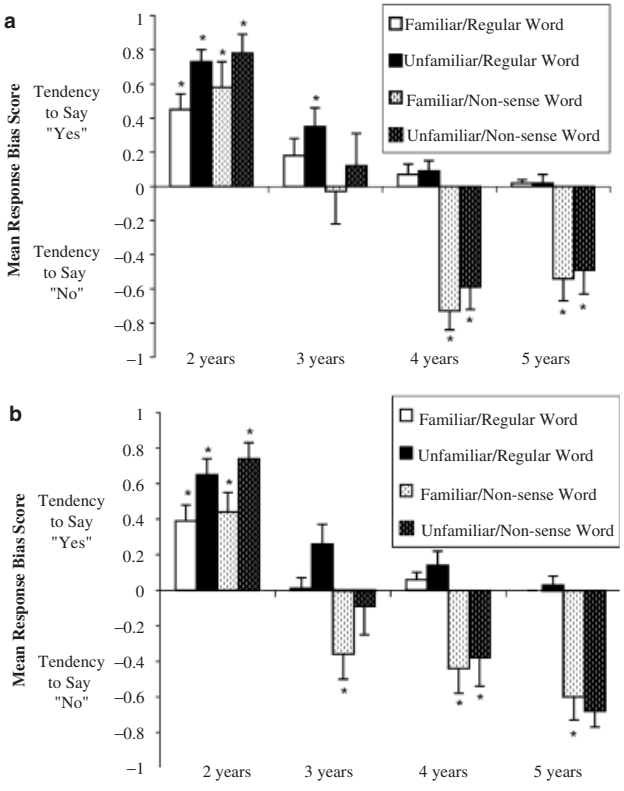

Figure 2. (a) Mean response bias scores in Experiment 2. (b) Mean response bias scores in Experiment 3.

A response bias score in the regular word condition was obtained for each child, using the same procedure as that used in Experiment 1. A similar procedure was used to obtain the response bias scores for the nonsense word questions: A yes response received a score of 1, a no response received a score of −1, and an "I don't know" response received no score; all the scores were then added and divided by the total number of the nonsense word questions that children gave either yes or no answer. A 4 (age) × 2 (familiarity) × 2 (question type) mixed-design ANOVA was performed on the bias scores (see Figure 2a) with the familiarity and question type factors as the repeated measures. The age effect was significant, $F(3, 76) = 21.43$, $p < .001$, $\eta^2 = .46$. As age increased, the response bias scores decreased (Figure 2a). In addition, we found significant effects for familiarity, $F(1, 76) = 14.22$, $p < .001$, $\eta^2 = .16$; question type, $F(1, 76) = 45.48$, $p < .001$, $\eta^2 = .37$; and the interaction between question type and age group, $F(3, 76) = 12.20$, $p < .001$, $\eta^2 = .33$.

To examine further these significant effects and to ascertain whether children displayed a response bias, one-sample t tests were performed to compare the mean response bias scores of each age group to a score of zero (Tables 2 and 3). In terms of the regular

Table 3
T-Test Scores and Means (MSE) for Each Age Group in the Nonsense Word Condition

Experiment	Condition	Age group			
		2 years	3 years	4 years	5 years
Experiment 2	Familiar	$t(19) = 3.92^*$	$t(19) = -.18$	$t(19) = -6.68^*$	$t(19) = -4.13^*$
		$\mu = 3.50$ (.89)	$\mu = -.20$ (1.13)	$\mu = -4.40$ (.66)	$\mu = -3.26$ (.79)
	Unfamiliar	$t(19) = 7.02^*$	$t(19) = .61$	$t(19) = -4.67^*$	$t(19) = -3.56^*$
		$\mu = 4.70$ (.67)	$\mu = .70$ (1.14)	$\mu = -3.56$ (.76)	$\mu = -2.93$ (.82)
Experiment 3	Familiar	$t(19) = 3.92^*$	$t(19) = -2.66^*$	$t(19) = -3.21^*$	$t(19) = -4.62^*$
		$\mu = 3.50$ (.89)	$\mu = -2.90$ (1.09)	$\mu = -3.54$ (1.10)	$\mu = -4.81$ (1.04)
	Unfamiliar	$t(19) = 8.39^*$	$t(19) = -.54$	$t(19) = -2.35^*$	$t(19) = -7.15^*$
		$\mu = 5.90$ (.70)	$\mu = -.70$ (1.30)	$\mu = -3.00$ (1.28)	$\mu = -5.40$ (.76)
Experiment 4					
1st interview	Familiar	$t(19) = 6.08^*$	$t(19) = -.46$	$t(19) = -3.99^*$	$t(19) = -6.06^*$
		$\mu = 2.32$ (.38)	$\mu = -.28$ (.61)	$\mu = -2.04$ (.51)	$\mu = -3.58$ (.59)
	Unfamiliar	$t(19) = 4.66^*$	$t(19) = -1.07$	$t(19) = -3.42^*$	$t(19) = -3.65^*$
		$\mu = 2.24$ (.48)	$\mu = -.64$ (.60)	$\mu = -1.96$ (.57)	$\mu = -3.09$ (.85)
Experiment 4					
2nd interview	Familiar	$t(19) = 2.53^*$	$t(19) = .32$	$t(19) = -2.76^*$	$t(19) = -2.83^*$
		$\mu = 1.61$ (.64)	$\mu = .20$ (.63)	$\mu = -1.27$ (.46)	$\mu = -1.65$ (.58)
	Unfamiliar	$t(19) = 1.75$	$t(19) = .06$	$t(19) = -2.26^*$	$t(19) = -4.44^*$
		$\mu = 1.29$ (.74)	$\mu = .04$ (.70)	$\mu = -1.48$ (.66)	$\mu = -2.87$ (.65)

$^*p < .05$.

word questions, 2-year-olds showed a significant yes bias in both the familiar and unfamiliar conditions, with post hoc analyses revealing the bias to be stronger in the latter condition. Although 3-year-olds displayed no significant response bias in the familiar condition, they displayed a significant yes bias in the unfamiliar condition. Four- and 5-year-olds displayed no significant response bias in either condition. Experiment 2 thus replicated the findings of Experiment 1 for the regular word questions.

In terms of the nonsense word questions, 2-year-olds showed a significant yes bias in both the familiar and unfamiliar conditions, with the bias stronger in the unfamiliar condition. Three-year-olds displayed no significant response bias in either condition. Four- and 5-year-olds displayed a significant nay-saying bias in both the familiar and unfamiliar conditions. These findings partially confirmed our hypotheses regarding children's response tendency when they have difficulty understanding the question. It is interesting that instead of responding with ''I don't know,'' most 4- and 5-year-olds responded no and thus displayed a strong nay-saying bias. According to post hoc analyses, 4-year-olds' nay-saying bias was stronger in the familiar object condition than in the unfamiliar object condition (see the General Discussion).

Experiment 3

It should be noted that our findings regarding children's response tendencies to yes–no questions were obtained from only one set of objects. It is unclear whether these findings are object specific or whether they are the result of a general effect that can be generalized to other objects. In particular, the finding that 4- and 5-year-olds did not show a significant response bias in the regular word conditions might be due to the objects and questions used in Experiments 1 and 2. To address these issues, the same procedure used in Experiment 2 was employed in the Experiment 3 except that a new set of objects replaced those used in the previous experiments. Correspondingly, a new set of questions (yes, no, and nonsense questions) was asked. We hypothesized that if the findings obtained in Experiments 1 and 2 are not object and question specific, they should be replicated in Experiment 3.

Method

Participants. Participants were 20 two-year-olds (8 females; *M* age = 2.50 years), 20 three-year-olds (11 females; *M* age = 3.58 years), 20 four-year-olds (9 females; *M* age = 4.42 years), and 20 five-year-olds (11 females; *M* age = 5.58 years).

Materials and procedure. The procedure for the Experiment 3 was similar to that of Experiment 2 except for the objects used and questions asked (see Appendix C for details).

Results and Discussion

Response bias scores were obtained using the same procedure described in Experiment 2 (Figure 2b). A 4 (age) × 2 (familiarity) × 2 (question type) mixed-design ANOVA was performed on the response bias scores with the familiarity factor and question-type factor as the repeated measures. The age effect was significant, $F(3, 76) = 20.05$, $p < .001$, $\eta^2 = .44$. As age increased, the bias score decreased. In addition, we found significant effects for familiarity, $F(1, 76) = 20.91$, $p < .001$, $\eta^2 = .22$; the interaction between familiarity and age group, $F(3, 76) = 5.20$, $p < .01$, $\eta^2 = .17$; question type, $F(1, 76) = 65.30$, $p < .001$, $\eta^2 = .46$; and the interaction between question type and age group, $F(3, 76) = 11.99$, $p < .001$, $\eta^2 = .32$.

To examine these significant effects and to ascertain whether children had a response bias, one-sample *t* tests were performed to compare the mean response bias scores of each age group with a score of zero (Tables 2 and 3). In the regular word condition, 2-year-olds' response bias scores for the familiar and unfamiliar object conditions were significantly greater than zero, indicating a strong yes bias. Also, the bias was stronger in the unfamiliar condition than in the familiar condition. Although 3-year-olds in the present experiment showed no bias in the familiar condition, they displayed a significant yes bias in the unfamiliar condition. In contrast, 4-year-olds did not display a bias in either the familiar or unfamiliar condition. Similarly, 5-year-olds displayed no significant response bias in the unfamiliar condition. Five-year-olds' mean score was zero with no variability in the familiar condition and thus no *t* test was performed. Thus, despite the use of new objects and questions, the results of the present experiment for the regular word questions were highly similar to those of Experiments 1 and 2.

In the nonsense word condition, 2-year-olds displayed a significant yes bias for both the familiar and unfamiliar condition with the bias stronger in the unfamiliar condition. Both 4- and 5-year-olds displayed a significant nay-saying bias in both the familiar and unfamiliar conditions. The present results for these three age groups replicated those

found in Experiments 1 and 2 even though a new set of objects and questions was used. Three-year-olds in the present experiment showed no significant bias in the unfamiliar object condition, which is also consistent with the finding of Experiment 2. These consistent findings suggest that the phenomenon is robust. However, there is a discrepancy between Experiments 2 and 3 with respect to the 3-year-olds' responses in the familiar object, nonsense word condition. In the present experiment, 3-year-olds showed a significant nay-saying bias in the familiar object condition, but 3-year-olds in Experiment 2 displayed no significant response bias to nonsense word questions (see the General Discussion for a possible explanation).

As shown in Table 1, despite repeated explicit instruction that they could respond "I don't know" if they did not know the answer to the questions asked, children seldom chose this response in the regular word condition. The number of the "I don't know" response increased only slightly among the older children in the nonsense word condition. Again, it seemed that children were reluctant to respond "I don't know" despite the repeated, explicit instruction that they could do so.

Experiment 4

In Experiments 1, 2, and 3, children were asked questions about the properties of objects that were fully in view. They could answer the questions by directly observing the objects. Experiment 4 used the same procedure as Experiment 3, but a memory component was added. In this experiment, children were first shown a set of familiar and unfamiliar objects and were interviewed about the properties of the objects as was done in Experiments 1, 2, and 3. Then, 1 week later, they were questioned again about the objects they had observed 7 days earlier (when the objects were no longer present). This procedure allowed for the examination of the role of delay in children's response to yes–no questions and therefore addressed the question of whether children display a yes bias toward questions about object properties when the correct information must be retrieved from long-term memory.

Method

Participants. Participants were 25 two-year-olds (14 females; *M* age = 2.67), 25 three-year-olds (17 females; *M* age = 3.5), 25 four-year-olds (13 females; *M* age = 4.33), and 25 five-year-olds (17 females; *M* age = 5.5).

Materials and procedure. The procedure for the present experiment was similar to that of Experiments 2 and 3 with the following modifications: (a) a subset of the objects used in the previous experiments (two familiar and two unfamiliar objects from Experiments 1 and 2, and two familiar and two unfamiliar objects from Experiment 3) was selected for this experiment; (b) children were asked questions about the objects twice—once with the objects present and once without the objects being shown to them 1 week later—thus, in the second interview, children had to rely on their long-term memory to respond to the questions; and (c) the questions were altered so that certain questions that had obvious answers were eliminated (e.g., "is/was the cup for drinking"). For the complete list of objects used and questions asked, see Appendix D.

Results and Discussion

Response bias scores were obtained using the same procedure described in Experiment 2. Because children were interviewed twice, four bias scores (Figure 3a and Figure 3b) were obtained for each child. A 4 (age) × 2 (familiarity) × 2 (question type) × 2 (interview: first vs. second interview) mixed-design ANOVA was performed with the familiarity, question-type, and interview factors as the repeated

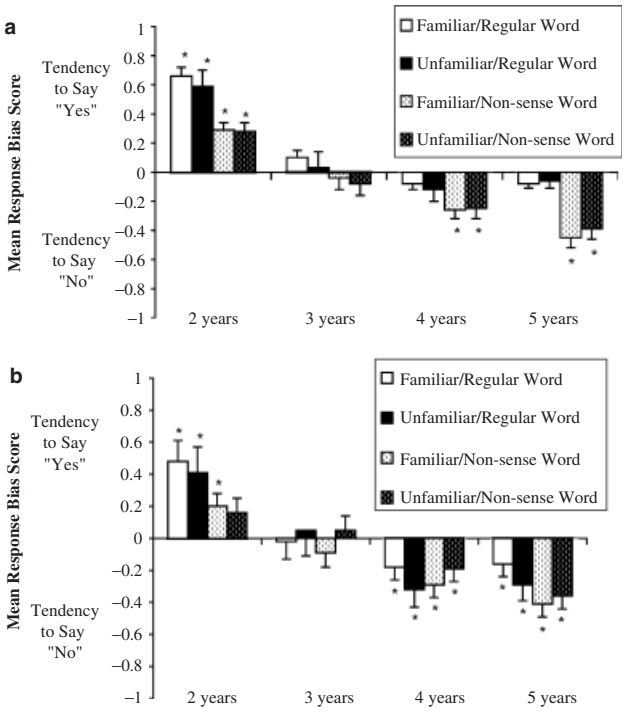

Figure 3. (a) Mean response bias scores for the first interview in Experiment 4. (b) Mean response bias scores for the second interview in Experiment 4.

measures. The age effect was significant, $F(3, 96) = 18.53$, $p < .001$, $\eta^2 = .37$. As age increased, the bias scores decreased. In addition, we found significant effects for the question type, $F(1, 96) = 50.18$, $p < .001$, $\eta^2 = .34$; the interaction between question type and age, $F(3, 96) = 5.44$, $p < .01$, $\eta^2 = .15$; the interaction between familiarity and question type, $F(1, 96) = 5.22$, $p < .05$, $\eta^2 = .05$; and the interaction between question type and interview, $F(3, 96) = 9.19$, $p < .01$, $\eta^2 = .09$ (Figure 3a and Figure 3b).

First interview. To examine further these significant effects, one-sample *t* tests were performed to compare the mean response bias scores of each age group with a score of zero in each condition (Tables 2 and 3). For the regular word questions, 2-year-olds displayed a significant yes bias in both the familiar and unfamiliar conditions, with the bias equally strong in both conditions. Three-, 4-, and 5-year-olds displayed no significant bias in either condition. As shown in Figure 3a, this pattern of results is generally consistent with the previous experiments concerning the yes and no questions in the regular word condition. However, unlike the results of previous experiments, 3-year-olds did not show a significant yes bias in the unfamiliar condition (see the General Discussion for a possible explanation).

For the nonsense word questions, 2-year-olds displayed a significant yes bias in both the familiar and unfamiliar condition, with the bias equally strong in both conditions (Figure 3a). Four- and 5-year-olds displayed a significant nay-saying bias in both the familiar and unfamiliar conditions. The results for these three age groups thus replicated the general result pattern of the previous experiments for the nonsense word questions. Three-year-olds displayed no significant response bias in either the familiar or unfamiliar condition, which replicated only partially the findings of Experiments 1 through 3. Despite these discrepancies among the experiments, the overall pattern of results for the nonsense word questions were consistent among the four experiments: Younger children in both experiments displayed a strong yes bias, and as age increased, this bias became a strong nay-saying bias (see Table 4).

Second interview. To examine whether children had a response bias in the second interview after a 1-week delay, one-sample *t* tests were performed to compare the mean response bias scores of each age group with a score of zero (Tables 2 and 3). In the regular word condition, 2-year-olds displayed a significant yes bias in both the familiar and

Table 4
Summary of Response Tendencies for Each Age Group

		Age group			
Experiment	Condition	2 years	3 years	4 years	5 years
Regular word conditions					
Experiment 1	Familiar	Y	Y	-	-
	Unfamiliar	Y	Y	-	-
Experiment 2	Familiar	Y	-	-	-
	Unfamiliar	Y	Y	-	-
Experiment 3	Familiar	Y	-	-	-
	Unfamiliar	Y	Y	-	-
Experiment 4	Familiar	Y	-	-	-
1st interview	Unfamiliar	Y	-	-	-
Experiment 4	Familiar	Y	-	N	N*
2nd interview	Unfamiliar	Y	-	N	N
Nonsense word conditions					
Experiment 2	Familiar	Y	-	N	N
	Unfamiliar	Y	-	N	N
Experiment 3	Familiar	Y	N	N	N
	Unfamiliar	Y	-	N	N
Experiment 4	Familiar	Y	-	N	N
1st interview	Unfamiliar	Y	-	N	N
Experiment 4	Familiar	Y	-	N	N
2nd interview	Unfamiliar	-	-	N	N

Note. Y = a significant yes bias; N = a significant nay-saying bias; - = no significant bias.
*A marginally significant nay-saying bias, $t(24) = 2.02$, $p = .055$.

unfamiliar delayed conditions, with the bias equally strong in both conditions. Three-year-olds displayed no significant bias in either of the conditions. These results are consistent with those of the first interview, suggesting that the 1-week delay had limited effect on 2- and 3-year-olds' response tendencies. In contrast, the delay appeared to have a significant effect on both 4- and 5-year-olds in the regular word condition: Four-year-olds displayed a significant nay-saying bias in both familiar and unfamiliar conditions; 5-year-olds displayed a marginally significant nay-saying bias in the familiar object condition and a significant nay-saying bias in the unfamiliar object condition. Both age groups did not show any bias 1 week earlier.

In the nonsense delayed condition, the 2-year-olds displayed a significant yes bias in the familiar condition but not in the unfamiliar condition, which only partially replicated the results of the first interview, suggesting some effect of the delay. For 3-year-olds, consistent with the results from the first interview, no bias was found in either the familiar or unfamiliar condition. In addition, 4- and 5-year-olds' results were consistent between the first and second interviews: They displayed a significant nay-saying bias in both conditions. The 1-week delay seemed to have limited effect on the response tendencies of the three older age groups.

With regard to the "I don't know" response, as shown in Table 1, the present results replicated the findings of Experiments 2 and 3 concerning 2-, 3-, and 4-year-olds. Most of the children in these three age groups in the present experiment did not use this response regardless of whether the questions were comprehensible or whether they were questioned in the first or second interview. Five-year-olds seldom used the "I don't know" response in the regular word condition, again consistent with the findings of the previous experiments. However, when they failed to understand the question, many responded "I don't know." It was unlikely that this increase in the number of the 5-year-olds who used the "I don't know" response was due to the introduction of the delay manipulation because the same children used the response in both the first interview and the delayed second interview. Thus, the finding regarding the 5-year-olds in the present experiment was not consistent with the findings of Experiments 2 and 3, even though the procedure and objects used in the present experiment were highly similar to those in the previous experiments. We do not have a ready explanation for this discrepancy.

General Discussion

In the present study, four experiments investigated children's response tendencies toward yes–no questions concerning object properties. We also investigated whether children's familiarity with objects, their comprehension of the question, and delay had an effect on their answers to yes–no questions. Although there were some minor discrepancies in the findings among the experiments, the four experiments produced three important and highly consistent results (see Table 4 for a summary of the results).

First, children demonstrate a tendency to respond to yes–no questions in a particular manner. Second, this tendency changes dramatically with age. Two-year-olds have a strong and consistent yes bias toward yes–no questions regardless of whether they are familiar or unfamiliar with an object or whether they can comprehend the question itself. In general, their yes bias is stronger when objects in question are unfamiliar and when the questions asked are incomprehensible. Overall, 4- and 5-year-olds did not exhibit a response bias to yes–no questions regardless of their familiarity with the objects in question as long as they understood the questions. When the questions were incomprehensible, 4- and 5-year-olds consistently showed a nay-saying bias. In addition, when an interview was held 1 week later, 4- and 5-year-olds continued to display a nay-saying bias.

The results concerning the 3-year-olds are the least consistent among those of the four age groups under study. In Experiments 1, 2, and 3, they had a yes bias in situations in which they were unfamiliar with the object in question but could comprehend the questions posed. When questions are incomprehensible, Experiment 2 revealed that 3-year-olds exhibit no apparent bias in both familiar and unfamiliar object conditions, whereas Experiment 3 revealed a small, yet significant, nay-saying bias in the familiar object condition. Experiment 4 added more inconsistencies in that 3-year-olds did not display a bias of any kind in any of the conditions. This inconsistency is unlikely due to sampling error. Analyses of the distributions of the 3-year-olds' bias scores in the four experiments revealed that the distributions in most conditions were not significantly different from what would be expected by normal distribution. It appears that the inconsistent findings may suggest a genuine developmental phenomenon. One possibility is that the 3-year-olds may undergo a transition in terms of response tendency. Some of the 3-year-olds might be similar

to the 2-year-olds displaying a yes bias, whereas other 3-year-olds might be similar to the older children without any bias when questions were comprehensible and with a nay-saying bias when questions were incomprehensible. Yet another group of 3-year-olds might be in transition and therefore have yet to have any consistent response bias. The proportions of these types of children might have varied from one experiment to another and thus resulted in the inconsistent findings. This explanation is, however, highly speculative, and needs verification by specifically designed studies.

Nevertheless, this inconsistency in the findings for 3-year-olds and the highly consistent findings for 2-, 4-, and 5-year-olds across the four experiments explain and reconcile the inconsistency in the existing, albeit limited, literature concerning children's response tendency to yes–no questions. Our results regarding 2-year-olds are consistent with the conclusion of Steffensen (1978) that children under 3 years of age have a strong yes bias to yes–no questions. Our results regarding 3-year-olds are also in line with the mixed findings of Peterson and colleagues: Although Peterson et al. (1999) found a yes bias for children at 3 years of age, Peterson and Biggs (1997) reported a nay-saying bias for 3-year-olds. Our results regarding 4- and 5-year-olds are also consistent with those of Brady et al. (1999). In their study, 4- and 5-year-olds, similar to the older children in the regular word condition of the present study, were asked questions that they clearly understood. No apparent response bias was found among those children.

The seemingly contradictory conclusions by Steffensen (1978), Peterson and colleagues (Peterson & Biggs, 1997; Peterson et al., 1999), and Brady et al. (1999) may be due to the four reasons discussed in the introduction (e.g., knowledge, subject matter, delay of interview, and age range of child participants). Specifically, children's response tendencies may be influenced by their familiarity with the issue in question, their comprehension of questions, the amount of time that passes between their exposure to an event and the subsequent interview about that event, and their developmental level (as indexed by their chronological age). Because the studies in the literature tend to differ from each other on these dimensions, discrepant findings result.

The nay-saying bias found in the older children in response to the nonsense questions is worth noting. Several forensic studies reported that children in some situations (e.g., sexual abuse interviews) tend to respond "no" indiscriminately to yes–no questions (e.g., Peterson & Biggs, 1997; Warren, Boyd, & Walker, 1992). Researchers have speculated that children respond "no" because they are either fond of nay-saying (e.g., to show noncompliance) or they may have learned that nay-saying is an effective strategy to terminate questioning by adults (Peterson & Biggs, 1997). These two explanations cannot account for the results obtained in the present study. First, there was no overall nay-saying bias among our 4- and 5-year-olds. The children did not display any response bias when they understood the questions asked, refuting the general nay-saying bias hypothesis. Second, the order in which the yes, no and nonsense questions were asked was randomized. Thus, the 4- and 5-year-olds were often asked a yes question after responding "no" to a nonsense question. If they were responding "no" to terminate questioning, they should have responded "no" to the yes questions as well.

We speculate that the children responded "no" to the nonsense questions for both social and cognitive reasons: Socially they, like adults, may be unwilling to indicate that they do not understand a question (Goody, 1978; Krosnick & Fabrigar, in press; Siegal, 1997). Cognitively, they might have realized that they have never heard of the nonsense words before or have never heard adults using the words to describe those objects. Thus, they inferred that the object in question must have nothing to do with the nonsense word and concluded that a no response is possibly the correct answer. This explanation is consistent with the fact that, overall, children showed a slightly stronger nay-saying bias in the familiar object condition than in the unfamiliar object condition. This speculation, however, needs to be confirmed with specifically designed studies in the future. This nay-saying bias in the question type condition parallels the findings of two recent studies conducted by Waterman et al. (2000, 2001). They found that when 5- to 9-year-olds were asked nonsensical yes–no questions, they used the no response more frequently than the yes response.

The third important finding of the present study is that children in general are reluctant to use the "I don't know" response, which is consistent with previous findings. Few children responded "I don't know" either spontaneously (Experiment 1) or after repeated suggestion that this response was permissible (Experiments 1–4). Even when they clearly failed to understand the questions, few 2-, 3-, and 4-year-olds opted for this response. There was an increase in the use of the "I don't know" response among 5-year-olds when the nonsense word questions were asked and when the same interview was held 1 week later. Nevertheless, the proportion of this response was relatively small.

There are at least three explanations for children's reluctance to respond "I don't know." One is that children misinterpret the implications of a yes–no question. They assume such a question requires a definitive answer. This explanation is inconsistent with both the present and several previous findings that explicit instruction or training does not increase the "I don't know" response dramatically in young children. However, it is possible that the instruction that such responses are acceptable is not sufficiently salient to rid children of their tendency to provide a yes or no response. Another possibility is that children are motivated by the general cooperative metamaxim of communication ("to help, not to harm"; Sweetser, 1987) to cooperate with and to help the interviewer. To act helpful, they hesitate to resort to the noncooperative "I don't know" alternative. A third explanation is that children are unwilling to appear ignorant in front of an interviewer who is testing their knowledge (Lee & Eskritt, 1999). Children's unwillingness to admit ignorance has been documented for nearly a century. For example, Piaget (1928) reported that young children often respond to questions with a definitive answer even though they have no basis for making such a response. Hughes and Grieve (1980) also found that children always try to give definitive answers to such bizarre questions as "Is milk bigger than water?" and "Is red heavier than yellow?" More recently, Waterman et al. (2001) interviewed both children between the ages of 5 and 9 and adults. They found that the children almost always attempted to answer the unanswerable closed-ended questions but then indicated that they did not know the answer when asked unanswerable open-ended questions (e.g., "Which yellow is heavier?"). In addition, Waterman et al. (2001) that a little more than one fifth of adults attempted to answer the unanswerable closed-ended questions, whereas almost all of the adults correctly responded "I don't know" to the unanswerable open-ended questions. It is possible that children's reluctance to respond "I don't know" in the present study is a manifestation of a general tendency in children and adults to avoid admitting ignorance when faced with closed-ended questions.

These three explanations are not mutually exclusive and may together explain the low proportion of the "I don't know" responses in our study. Also, because both children and adults more readily admitted their ignorance in response to the open-ended questions, it is possible that there is something about closed-ended questions that prompts them to answer. Future research should focus on the quality inherent in closed-ended questions that makes both children and adults provide definitive answers.

Another point of interest with respect to the "I don't know" response is that most studies (including the present one) include only Western children. The tendency to give definitive answers in lieu of admitting ignorance may be a cultural norm for children living only in the West, perhaps because of the Western culture's emphasis on the promotion of self-confidence and self-esteem in children (e.g., Lee, Xu, Fu, Cameron, & Chen, 2001). Children in some parts of the world (e.g., China, Japan) may be much more inclined to volunteer "I don't know" answers, as these cultures tend to emphasize modesty. Specifically designed studies are needed to examine whether the findings of the present study can be replicated in other cultures and whether cultural norms and values affect children's response to yes–no questions.

The findings of our study have important implications for designing developmental studies as well as for conducting forensic interviews with preschool children. Researchers and forensic interviewers tend to have mixed feelings about using yes–no questions (see Brady et al., 1999; Poole & Lamb, 1998). On the one hand, a yes–no question tends to elicit information from young children for whom other types of questions (e.g., open-ended questions) may be inappropriate or ineffective. On the other hand, there is a general impression that yes–no questions tend to elicit a yes bias in young children. Our study, along with other studies that have examined the yes bias directly or indirectly (e.g., Brady et al., 1999; Peterson & Biggs, 1997; Peterson et al., 1999; Steffensen, 1978), indicates that the yes–no question is appropriate for use when interviewing 4- and 5-year-olds, as well as older children. In contrast, our results also indicate that the yes–no question should be avoided when the child is 2 years of age. Its usefulness for 3-year-olds is also questionable because of the inconsistent findings of the present and earlier studies. Furthermore, our results suggest that efforts must be made to ensure that children understand every word used in a yes–no question. Failure to comprehend a yes–no question inevitably leads children to exhibit strong response biases that will in turn distort the results of developmental research or forensic investigation. In addition, it is also important that children are interviewed immediately after the event in question whenever possible, as memory decay in young children may introduce response biases as well.

The present study represents only a small step toward a comprehensive understanding of children's response tendencies toward yes–no questions. Our study only deals with yes–no questions concerning objects. Future research needs to investigate whether preschool children have specific response tendencies in answering yes–no questions concerning people and events. Also, given that pragmatic development and conversational understanding proceeds beyond the age of 4 to 5 years (Siegal, 1997), similar response biases may also exist among older children. Moreover, additional studies are needed to examine children's response tendencies toward other commonly used question types. For example, cognitive developmentalists frequently use a two-alternative question ("Is it A or B?" or "Is it A or not A?") when interviewing preschool children. However, only one study (Peterson & Grant, 1999) with a small sample of children ($N = 32$) has examined this issue. Peterson and Grant compared children's responses to yes–no and multiple-choice questions. They found that children demonstrated a yes bias when answering yes–no questions but displayed no bias when answering multiple-choice questions. Future studies need to replicate this finding and compare the relative appropriateness of using the yes–no and two-alternative questions to question preschool children. Such comparisons are important because, for example, many findings regarding preschool children's cognitive abilities (e.g., appearance–reality distinction, false belief understanding, and conservation) have been obtained with the use of either yes–no questions or two-alternative questions or a combination of both. Knowledge about the effectiveness and inherent biases of each type of questions may allow us to reassess the existing conclusions about preschoolers' cognitive abilities and to design better tasks to reveal their actual competence.

Children's understanding of the different pragmatic implications of questioning (Goody, 1978; Siegal, 1997) is also worth further empirical investigation. Lee and Eskritt (1999) suggest that questioning entails several implications depending on the context in which a question is asked. In an information-seeking context, the questioner who does not have a particular piece of information questions the respondent in hope of obtaining that information. A forensic interview is an excellent example of such a context. Another example is a knowledge-assessment context in which the questioner who already knows the answer asks questions to evaluate whether the respondent holds the knowledge. A developmental research interview is such a context. When children are interviewed, these implications are often not made clear to, or are assumed to be understood by, the children. This presumption often leads to misunderstanding and inappropriate responses (e.g., a child may think experimenters are insincere when they ask a question to which the adults obviously know the answer; see Siegal, 1997, for detailed discussion). Empirical studies are needed to examine, for example, whether children are able to differentiate between a knowledge-assessment context and an information-seeking context and whether it is necessary for developmental researchers or forensic interviewers to declare in which context their questions will be asked.

The present study also illustrates the benefits of empirical research on the effectiveness and appropriateness of empirical methods used in developmental research. Child developmental psychology as a branch of scientific research has been in existence for more than a century. During this period, the vast majority of empirical research has been devoted to understanding child development per se. There is a paucity of research devoted to the empirical investigation into how developmental phenomena are studied. As is evident in our study, this kind of investigation can both dispel misconceptions about developmental research methods and inform developmental researchers of a method's potential problems, which in turn will lead to a better understanding of child development. The issues that such a study can address are not limited to questioning. Any methodological issues that are common across different research areas are worthy of empirical investigation (e.g., the effect of interviewer quality on the outcome of developmental research). For example, it is commonly believed that an experimenter bias tends to result in a research finding in favor of the experimenter's own hypothesis. Limited empirical research has been devoted to substantiate this notion. Future studies may investigate such questions as whether an interviewer who is aware of a key research hypothesis tends to elicit responses from children that favor the hypothesis, whether the interviewer's familiarity with a child participant affects the outcome of the interview, and whether untrained interviewers (e.g., teachers and parents) are necessarily worse in obtaining accurate information than are trained interviewers (see Fenson et al., 1994, for discussion). Given that developmental psychologists have accumulated a tremendous amount of experience with methodological success and failure in the last century, we

believe that the new millennium is high time for devoting some of our research effort to metadevelopmental research, that is, the empirical study of how child development is studied.

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Appendix A

Objects Used and Test Questions Asked in Experiment 1

Familiar object condition		Unfamiliar object condition	
Object	Question	Object	Question
Red cup	Is this red?	Baster	Is this for cooking?
	Is this for drinking?		Is this used in the kitchen?
	Is this made of glass?		Is this full of water?
	Is there water in this?		Is this for opening cans?
Green apple	Is this hard?	Fuse	Is this found in houses?
	Is this for eating?		Is this small?
	Is this rotten?		Is this made of wood?
	Is this red?		Is this found in telephones?
Book	Is this full of pictures?	Coffee filter (plastic)	Is this for making coffee?
	Is this for reading?		Is this empty?
	Is this tiny?		Is this for making cakes?
	Is this round?		Is this made of paper?

Appendix B

Objects Used and Test Questions Asked in Experiment 2

Familiar object condition		Unfamiliar object condition	
Object	Question	Object	Question
Red cup	Is this red?	Baster	Is this for cooking?
	Is this for nirking?		Is this used in the nechtik?
	Is this made of sslag?		Is this full of water?
	Is there water in this?		Is this for opening ancs?
Green apple	Is this darh?	Fuse	Is this found in sesouh?
	Is this for eating?		Is this small?
	Is this rotten?		Is this made of doow?
	Is this der?		Is this found in telephones?
Book	Is this full of pictures?	Coffee filter (plastic)	Is this for making coffee?
	Is this for daering?		Is this tempy?
	Is this yint?		Is this for making cakes?
	Is this round?		Is this made of repap?

Appendix C

Objects Used and Test Questions Asked in Experiment 3

Familiar object condition		Unfamiliar object condition	
Object	Question	Object	Question
Toothbrush	Is this for brushing your teeth?	Pressure gauge	Is this for tires?
	Is this lepurp?		Is this made of letam?
	Is this made of glass?		Is this made of plastic?
	Is this for cleaning your hueso?		Is this welloy?
Key	Is this for opening scolk?	Anchor	Is this ulbe?

	Is this small?		Is this for shelves?
	Is this for drinking?		Is this urdon?
	Is this kenorb?		Is this for cleaning?
Spoon	Is this made of stalpic?	CPU	Is this found in sterupmoc?
	Is this for eating?		Is this square?
	Is this ridty?		Is this made of wood?
	Is this green?		Is this gehu?
Ball	Is this round?	Clevis	Is this for towing cars?
	Is this for counbing?		Is this vehay?
	Is this black?		Is this for grawind?
	Is this for making socokie?		Is this made of paper?

Appendix D

Objects Used and Test Questions Asked in Experiment 4

Familiar object condition		Unfamiliar object condition	
Object	Question	Object	Question
Red cup	Is/was the cup red?	Baster	Is/was the baster plastic?
	Is/was the cup nirking?		Is/was the baster nechtik?
	Is/was the cup sslag?		Is/was the baster full of oil?
	Is/was there water in the cup?		Is/was the baster ancs?
Book	Is/was the book about bears?	Fuse	Is/was the fuse hueso?
	Is/was the book daering?		Is/was the fuse round?
	Is/was the book yint?		Is/was the fuse doow?
	Is/was the book small?		Is/was the fuse big?
Spoon	Is/was the spoon stalpic?	Pressure gauge	Is/was the pressure gauge shiny?
	Is/was the spoon white?		Is/was the pressure gauge letam?
	Is/was the spoon ridty?		Is/was the pressure gauge square?
	Is/was the spoon dirty?		Is/was the pressure gauge welloy?
Ball	Is/was the ball soft?	Clevis	Is/was the clevis heavy?
	Is/was the ball counbing?		Is/was the clevis vehay?
	Is/was the ball black?		Is/was the clevis grawind?
	Is/was the ball socokie?		Is/was the clevis wood?