Two-Year-Olds Use the Generic/Nongeneric Distinction to Guide Their Inferences About Novel Kinds

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These studies investigated two hundred and forty-four 24- and 30-month-olds’ sensitivity to generic versus nongeneric language when acquiring knowledge about novel kinds. Toddlers were administered an inductive inference task, during which they heard a generic noun phrase (e.g., “Blicks drink milk”) or a nongeneric noun phrase (e.g., “This blick drinks milk”) paired with an action (e.g., drinking) modeled on an object. They were then provided with the model and a nonmodel exemplar and asked to imitate the action. After hearing nongeneric phrases, 30-month-olds, but not 24-month-olds, imitated more often with the model than with the nonmodel exemplar. In contrast, after hearing generic phrases, 30-month-olds imitated equally often with both exemplars. These results suggest that 30-month-olds use the generic/nongeneric distinction to guide their inferences about novel kinds.

Learning about the properties of kinds is an essential part of conceptual development. One powerful means by which children can acquire knowledge about properties associated with particular kinds is through language, that is, by hearing a speaker attribute properties to kinds (e.g., “The shark has sharp teeth”). Children, however, must distinguish between situations in which a speaker intends to refer to one particular object (e.g., a shark they are watching in an aquarium) as opposed to situations in which a speaker is referring to a property of the kind as a whole (e.g., sharks more generally). One way in which children might accomplish this task is by attending to a speaker’s kind-referring expressions, also known as generic language (Gelman, 2004). Generic noun phrases (NPs) are understood to describe information that is relevant to kinds as opposed to individuals, and thereby can license inductive inferences about the shared properties of kinds. That is, a generic utterance such as “Sharks have sharp teeth” informs an individual about a property of the category sharks that can be generalized to other members of the shark kind. By contrast, nongeneric NPs refer to a particular event or an idiosyncratic property of a category member that should not be generalized to the kind (e.g., “This shark has yellow teeth”). In the present studies, we investigated whether 24- and 30-month-old children are sensitive to the distinction between generic and nongeneric NPs when learning about the properties of novel kinds.

Distinguishing generic from nongeneric utterances is far from a straightforward task, even for an adult listener. That is, the generic/nongeneric distinction is not unambiguously signaled by linguistic factors. For example, the morphosyntactic cues of definite singulars (e.g., generic: “The cat cleans its own fur”; nongeneric: “The cat scratched up my couch”) and bare plurals (e.g., generic: “Dogs wag their tails”; nongeneric: “Dogs are ruining my grass”) can express both generic and nongeneric utterances (Gelman, 2004; Krifka et al., 1995). As such, identifying whether a generic interpretation is
appropriate often draws upon nonlinguistic considerations, such as knowledge about whether a described property is likely to be an essential or defining characteristic rather than an incidental attribute (see Krifka et al., 1995). That is, an adult would likely read a statement such as “The lion has a mane” as generic yet “The lion has fleas” as nongeneric using knowledge of the kinds of attributes that are characteristic of lions.

Despite the complexity inherent in identifying generic utterances, a growing body of research has demonstrated that preschool-age children use a range of cues to distinguish between generic and nongeneric interpretations (e.g., Cimpian & Markman, 2008; Gelman, Star, & Flukes, 2002; Gelman & Tardif, 1998; Hollander, Gelman, & Star, 2002; Pappas & Gelman, 1998). First, studies have demonstrated that preschoolers are sensitive to the linguistic cues that signal generic or nongeneric interpretations. For example, Gelman and Raman (2003) demonstrated that by 2 years of age, children recognize the difference between generic and nongeneric definite NPs marked by the article the and use these distinctions to guide their responses. Second, by 3 years of age, children are sensitive to pragmatic cues that can differentiate generic from nongeneric interpretations. In one study, they presented children with situations that either involved or did not involve a mismatch between the immediate context and the form of the linguistic information provided. For example, in a mismatch situation, children were presented with a picture of a small elephant paired with a plural NP (e.g., “Here’s an elephant. Are they big or small?”). If children were sensitive to the pragmatic mismatch, they would provide a generic response (e.g., “big”). In a match situation, children were presented with a picture of two small elephants paired with a plural NP (e.g., “Here are elephants. Are they big or small?”). In this situation, children should be more likely to provide a nongeneric response. Results indicated that 3- and 4-year-olds, but not 2-year-olds, effectively interpreted pragmatic cues for distinguishing generic from nongeneric utterances.

Finally, children can recruit their previous knowledge and information about the social context of an utterance to distinguish generic from nongeneric meanings. For example, Cimpian and Markman (2008) demonstrated that 3- and 4-year-old children produced more generic utterances when provided with a generalizable property (e.g., bears—smell things far away) compared to a nongeneralizable property (e.g., bears—are sick). In this same set of studies, Cimpian and Markman demonstrated that 4-year-olds, but not 3-year-olds, were sensitive to subtle cues about the social context of an utterance and the speaker’s knowledge when interpreting utterances as generic or nongeneric. For example, when target sentences that described the properties of animals (birds—have rocks in their tummy) were spoken by a teacher in the context of a library visit, 4-year-olds were more likely to interpret them as generic than when they were spoken by a veterinarian in the context of her office.

The research described earlier provides clear and compelling evidence that during the preschool years, children distinguish between the generic and nongeneric use of sentences. This sensitivity suggests that generic statements provide an extremely effective means for children to acquire knowledge about object kinds. In support of this notion, research using inductive inference tasks has shown that preschoolers consider generics to be a robust source of information about the characteristic properties of familiar and novel kinds. For example, Gelman et al. (2002) found that linguistic quantifiers (the universal quantifier all and the indefinite plural some) as well as generic statements influenced adults’ and 4-year-old children’s inferences about novel properties of a familiar kind. All statements (e.g., “all bears eat ants”) elicited the most inferences, some statements (e.g., “some bears eat ants”) elicited the fewest inferences, and generic statements (e.g., “bears eat ants”) elicited an intermediate number of inferences. These results indicate that 4-year-olds are sensitive to both generics and quantifiers and that they will use that information to guide their inferences about novel properties of familiar kinds.

Children can also apply generic language to learn about the properties of unfamiliar kinds (Chambers, Graham, & Turner, 2008; Gelman & Bloom, 2007; Hollander, Gelman, & Raman, 2009; Stock, Graham, & Chambers, 2009). For example, Chambers et al. (2008) demonstrated that 4-year-olds were sensitive to generic and nongeneric utterances when learning about novel creatures (e.g., “These pagons are friendly” vs. “Pagons are friendly”). Most strikingly, even when an exception case was explicitly provided (e.g., “Except this pagon. This pagon isn’t friendly”), children continued to generalize properties described in generic utterances (e.g., “Pagons are friendly”) to subsequent exemplars. Similarly, Hollander et al. (2009) found that 4- and 5-year-olds used the generic/nongeneric distinction to guide their extensions of novel labels to new category instances. For example, children who heard “Bants
have stripes” were more likely to select another striped animal as being a *bant*, compared to children who heard “This *bant* has stripes.” Thus, generic wording seems to imply a more kind-relevant connection between a novel category and a property.

In the present studies, we pursued the question of the development of young children’s appreciation of the generic/nongeneric distinction. In particular, we investigated 2-year-olds’ sensitivity to generic versus nongeneric language when making inductive inferences about the properties of novel kinds. We focused on 2-year-olds for two reasons: First, given 2-year-old children’s exposure to, and production of, generic language, as well as their rudimentary understanding of generics, it seems plausible that younger children could also use the generic/nongeneric distinction to guide their inductive inferences. Yet, no research to date has investigated this question. Second, the distinction between generic and nongeneric language can provide a rapid and efficient means to learn about unfamiliar kinds. Hearing a generic utterance about an unknown category (e.g., “emus don’t fly”) or an unknown property of a category (e.g., “cows have four stomachs”) can provide young children with the opportunity to gain knowledge about a kind as a whole with having limited exposure to that kind. Similarly, hearing a nongeneric utterance (e.g., “This *blick* has spots”) can lead children to infer that the utterance refers to a property that should not be generalized beyond the individual.

In three experiments, 2-year-olds (24 and 30 months) were administered variations of an imitation-based inductive inference paradigm (Mandler & McDonough, 1996). In each experiment, children were randomly assigned to one of two conditions: (a) a generic condition and (b) a nongeneric condition. During the demonstration phase, the child was introduced to a novel model exemplar (e.g., a blue *blick*) with either a generic NP (e.g., “*Blicks drink milk*”) or a nongeneric NP (e.g., “*This blick drinks milk*”) while a target action was modeled (a drinking motion with a cup held up to the exemplar). During the generalization phase, the child was then prompted to imitate the target action and was presented with the model exemplar (e.g., the blue *blick*) and a novel nonmodel exemplar (e.g., the orange *blick*). The number of target actions performed on the model and nonmodel exemplars was measured. We predicted that children would be more likely to generalize the novel property to the model versus the nonmodel exemplar in the nongeneric NP condition. By contrast, we expected that children would generalize to both the model and nonmodel exemplars in the generic NP condition. In Experiment 1, we investigated 30-month-olds’ use of the generic/nongeneric distinction when making inductive inferences about the properties of novel kinds. In Experiment 2, we investigated 24-month-olds’ sensitivity to generics and nongenerics in a supportive linguistic context. Finally, Experiment 3 was a control for plurality in the generic and nongeneric NPs.

**Experiment 1**

The goal of Experiment 1 was to investigate 30-month-olds’ sensitivity to the distinction between generic NPs and nongeneric NPs when making inductive inferences about novel kinds within two linguistic contexts: one in which children received a sentence prompt and one in which children received a sound effect prompt. Within the sentence prompt group, children received four repetitions of the generic or nongeneric NP, one of which occurred just prior to children’s imitation of the target actions as a prompt (e.g., “Show me: *Blicks drink milk*”). It is conceivable that without such a prompt, children may be unable to recall the information initially provided to them, and hence be unable to use the generic or nongeneric information to guide their inductive inferences during imitation. Indeed, the cognitive demands of this task are substantially high for young children. In addition to remembering the generic or nongeneric information, children must: learn about two novel exemplars, learn and remember the novel exemplars’ label (e.g., *blick*), and track which exemplar is the model and which is the nonmodel. To reduce the demands of the task, children were provided with a repetition of the generic or nongeneric NP just prior to imitation.

Within the sound effect prompt group, we investigated children’s sensitivity to the nature of the NP by eliminating the generic or nongeneric NP prompt at test. It is possible that young children’s imitative behavior could be shaped exclusively by the sentence prompt provided. That is, children may not be using the information initially provided to them to shape their inductive inferences. Rather, children may be influenced solely by the last utterance that occurs just prior to imitation (e.g., “Can you show me: *Blicks drink milk*”) and thus may not have learned about the property during the demonstration phase. To rule out this possibility, we replaced the generic or nongeneric NP prompt with a general elicitation of imitative behavior (e.g., “Show me sip . . . sip”).
Our predictions were as follows: First, we expected that 30-month-olds in the nongeneric wording condition would imitate the target actions (e.g., drinking milk) significantly more often with the model exemplar than with the nonmodel exemplar, as the nongeneric NP only applies to the model exemplar. Second, we expected that 30-month-olds in the generic wording condition would imitate equally often with the model and nonmodel exemplars, as the generic utterance implies that the property is generalizable to the kind as a whole. Finally, children’s sensitivity to generics may or may not interact with the type of context provided. That is, if children require a supportive linguistic context for making inductive inferences about novel kinds or if children are simply illustrating the meaning of the sentence prompt, we expected that children would perform differently in the sentence prompt group than in the sound effect prompt group. More specifically, children in the sentence prompt group/generic condition would imitate significantly more often with the model exemplar than with the nonmodel exemplar. In addition, children in the sentence prompt group/generic condition would imitate equally often with the model and nonmodel exemplars. By contrast, children in the sound effect group would perform similarly in both wording conditions as the prompt provided is identical (i.e., either imitate equally often with the model and nonmodel exemplars or imitate more with the model than the nonmodel).

### Method

**Participants**

The final sample consisted of ninety-six 30-month-old children ($M = 30.07$ months, range = 29.30–30.79 months) who were randomly assigned to one of two groups: a sentence prompt group and a sound effect prompt group. Within each group, children were randomly assigned to one of two wording conditions: a generic condition and a nongeneric condition. (See Table 1 for the demographics for each group and condition.) Children were from predominantly middle-class, English-speaking households and were recruited through advertisements within the community. Twenty-two additional children were tested but excluded from the final sample for the following reasons: failure to complete two or more practice trials ($n = 6$), not completing the experiment due to fussiness or refusal ($n = 12$), experimenter error ($n = 3$), and parent interference ($n = 1$).  

**Materials**

Six objects were used in the warm-up trials including: a plastic cup and a block, a plastic cylinder ring holder and a ring, and two plastic stackable blocks. For the test trials, the props used to illustrate the properties consisted of: a toy cookie to depict *eats cookies*, a yellow plastic toy cup to depict *drinks milk*, a toy wooden bed to depict *sleeps*, and a

### Table 1

Demographics for Children in Experiments 1–3

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean age (SD)</th>
<th>Gender</th>
<th>Total CDI vocabulary</th>
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</thead>
<tbody>
<tr>
<td><strong>Experiment 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Reminder group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generic condition</td>
<td>24</td>
<td>30.18 (0.30)</td>
<td>12 boys</td>
<td>488.45 (147.90)</td>
</tr>
<tr>
<td>Nongeneric condition</td>
<td>24</td>
<td>30.19 (0.28)</td>
<td>12 boys</td>
<td>522.52 (140.40)</td>
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<tr>
<td>No reminder group</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generic condition</td>
<td>24</td>
<td>29.90 (0.31)</td>
<td>12 boys</td>
<td>491.87 (185.60)</td>
</tr>
<tr>
<td>Nongeneric condition</td>
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<td>30.02 (0.35)</td>
<td>12 boys</td>
<td>492.09 (157.47)</td>
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<td><strong>Experiment 2</strong></td>
<td></td>
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<tr>
<td>Generic condition</td>
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<td>12 boys</td>
<td>346.00 (154.26)</td>
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<tr>
<td>Nongeneric condition</td>
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<td>24.11 (0.33)</td>
<td>12 boys</td>
<td>248.46 (177.81)</td>
</tr>
<tr>
<td><strong>Experiment 3</strong></td>
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<td>Stringent procedure group</td>
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<tr>
<td>Generic condition</td>
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<tr>
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<td>14 boys</td>
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<tr>
<td>Nongeneric condition</td>
<td>25</td>
<td>29.93 (0.52)</td>
<td>13 boys</td>
<td>488.09 (146.09)</td>
</tr>
</tbody>
</table>

*Note. CDI = Communicative Development Inventory.*
purple plastic toy cell phone to depict talks. Two novel animate-like exemplars were paired with each prop. The exemplars were stand-alone figurines created out of polymer hardening modeling clay. The items in each pair were identical in shape and size but differed in color. All exemplars were intended to be animate representations. Please refer to Figure 1 for pictures of the exemplar pairs and props.

**Design**

Each child was presented with four experimental trials (drinking, eating, sleeping, and talking) with order of trials counterbalanced across participants. The model exemplar was counterbalanced across participants. That is, half of the participants received one exemplar as the model and the other half of the participants received the other exemplar as the model. The side on which the model exemplar was placed (left of the prop vs. right of the prop) alternated for each trial. The prop associated with each exemplar pair and the pairing of the novel words and actions with the different exemplar and prop sets remained constant across participants.

**Procedure**

Children sat either in a booster chair or on their parents’ lap across the table from the experimenter. Parents were instructed not to encourage or reward their child during the task, nor to label, touch, pick up, or point to any of the items. An inductive inference task similar to that of Mandler and McDonough (1996) was used.

**Practice trials.** Each child received three practice trials intended to familiarize him or her with the imitation task. On each trial, the child observed the experimenter perform an action three times: once to the left, once to the right, and once in the center of the table, relative to where the child was seated. Each action was paired with a vocal sound. On the first warm-up trial, the experimenter demonstrated stacking two blocks while saying, “boom.” On the second trial, the experimenter demonstrated putting a ring through a ring holder while saying, “whoop.” On the third trial, the experimenter demonstrated a cup covering a block while saying, “oh oh.” Following the demonstration of each action three times, the child was given the objects and encouraged to imitate the action (e.g., “Can you show me whoop?”). The experimenter praised the child for each successful imitated action. Children imitated on the vast majority of the practice trials (\(M = 94.45\%, \ SD = 12.48\)), demonstrating that they were familiar with the imitation task prior to the experimental trials.

**Test trials.** The test trials consisted of three phases: baseline, demonstration, and generalization. The baseline phase provided the child with the opportunity to explore the novel objects and also provided a baseline measure of the child’s spontaneous ability to demonstrate target actions with the exemplars prior to the target actions being modeled. During the baseline phase, the child was presented with two novel exemplars and an accompanying prop (e.g., a blue and orange blick and the cup). The prop was positioned in the middle of the two exemplars and in front of the child. The child was then given the opportunity to explore and play with the exemplars and prop for 30 s. No instructions or demonstrations were provided. If the child failed to examine the exemplars after the first 10 s, the experimenter highlighted the

![Figure 1. Exemplar pairs and accompanying props used in Experiments 1 and 2.](image-url)
children using a general attentional prompt (e.g., “Look at these”). An additional attentional prompt was provided after 20 s if the child still had not examined the exemplars. Children rarely required such prompts and typically explored the exemplars spontaneously. Once 30 s had elapsed, the experimenter removed the two exemplars and the prop from the table.

During the demonstration phase, the experimenter demonstrated a target action three times with one of the exemplars (the model exemplar; e.g., modeling a drinking motion with the cup and the blue blick); once to the left, once to the right, and once in the center relative to where the child was seated. In the sentence prompt group, the target action modeled on the model exemplar was accompanied by either (a) a generic NP (e.g., “Blicks drink milk”) or (b) a nongeneric NP (e.g., “This blick drinks milk”). In the sound effect prompt group, the target action modeled on the model exemplar was accompanied by either (a) a generic NP and a verbal sound effect (e.g., “Blicks drink milk . . . sip . . . sip”) or (b) a nongeneric NP and a verbal sound effect (e.g., “This blick drinks milk . . . sip . . . sip”). In total, the target action was modeled three times and the generic or nongeneric NP was repeated three times in the demonstration phase for both reminder and no reminder groups. The other exemplar (the nonmodel exemplar; e.g., the orange blick) was placed out of sight during the demonstration phase.

Following completion of the demonstration phase, the model exemplar (e.g., the blue blick) and the prop were removed from the table and promptly reintroduced with the nonmodel exemplar (e.g., the orange blick). The two exemplars and the prop were then placed in front of the child. In the sentence prompt group, the experimenter encouraged the child to imitate the target action by saying either (a) a generic NP (e.g., “Can you show me: Blicks drink milk”) or (b) a nongeneric NP (e.g., “Can you show me: This blick drinks milk”). In the sound effect prompt group, the experimenter encouraged the child to imitate the target action without the NP (e.g., “Can you show me: sip . . . sip?”). The child was then given 30 s to imitate the target action. The experimenter repeated the encouragement sentence a second time once 10 s had elapsed and a third time once 20 s had elapsed, if the child had failed to perform at least one target action. No further encouragement was given if the child successfully imitated the target action at least once. If the child attempted to push away the objects prior to the 30-s time limit, the experimenter repositioned the objects in their initial locations, with the verbal cue “It’s still your turn.” The child was not given any verbal or nonverbal feedback during test trials.

Three cautionary measures were taken to ensure that one exemplar was not inadvertently highlighted over another exemplar by the experimenter. First, each pair of exemplars was placed on and removed from the table together. Second, if an exemplar fell on the floor, the other exemplar that remained on the table was immediately removed from the table, and subsequently both exemplars were placed back in their initial locations at the same time. Third, if an exemplar was pushed out of reach from the child, the experimenter picked up both exemplars simultaneously and placed them back in their initial locations.

Following completion of the task, parents were asked to complete the MacArthur-Bates Communicative Development Inventory: Words and Sentences (CDI Advisory Board, 1992) to obtain a measure of language development and ensure that the groups and conditions were equated on language proficiency. The parent was given the CDI form to complete at home and return by mail within 1 week of their visit. The majority of CDI forms were returned within 2 weeks; however, six forms were not returned and two were incomplete. Please refer to Table 1 for the total vocabulary scores. A series of $2 \times 2$ analyses of variance (ANOVAs) with prompt group and condition performed on total vocabulary produced and subscale mean percentiles (words produced percentile, irregular words percentile, longest sentences percentile, and sentence complexity percentile) revealed no significant main effects or interactions, all $p > .10$.

Coding

Videotapes were coded without sound to ensure that coders were unaware of group assignment and condition. Both performance of target actions on the practice trials and the four experimental trials were coded. A successful completion of a target action required clear and intentional (eye–hand coordination) behavior. For the eating trial, the target action consisted of touching the mouth region of the exemplar with the cookie. The cookie touching any other area of the exemplar was not coded as a target action (e.g., placing the cookie on top of the exemplar). For the drinking trial, the target action consisted of touching the mouth region of the exemplar with the cup and/or tilting the cup as to imitate a drinking motion. The cup being held
up to the exemplar, and the exemplar being held up to the cup were also considered target actions. The cup touching any other area of the exemplar was not coded as a target action (e.g., putting the cup upside down on top of the exemplar). For the sleeping trial, the target action consisted of placing the exemplar lying down, either with the head or feet first, lengthwise on the bed. Placing the exemplar standing up on the bed or on the bedpost were not considered target actions. For the talking trial, the target action consisted of placing the phone to the head of the exemplar. The phone touching any other area of the exemplar was not coded as a target action.

A second coder coded 20% of the data for reliability purposes. The interrater reliability for the sentence prompt group (as calculated by an intraclass correlation coefficient) was .92 \( (p < .001) \) and the interrater reliability for the sound effect prompt group (intraclass correlation coefficient) was .92 \( (p < .001) \).

Results

Figure 2 illustrates the mean summed frequency of target actions by phase, exemplar, and condition. Analyses of infants’ performance of target actions during the baseline phase revealed no significant differences as a function of group (sentence prompt, sound effect prompt), wording condition (generic, nongeneric), or exemplar (model, nonmodel). Importantly, however, children performed significantly more target actions at generalization \( (M = 4.72, SD = 1.93) \) than at baseline \( (M = 2.21, SD = 1.81) \), \( t(95) = 10.43, d = 1.33, p < .001 \), indicating that children’s imitative actions were influenced by the information provided to them during the demonstration phase.

Our primary analyses thus focus on the frequency of target actions performed with the model and nonmodel exemplars summed across the experimental trials during the generalization phase. Recall we predicted that 30-month-olds in the nongeneric condition would perform significantly more target actions with the model exemplar than with the nonmodel exemplar at generalization. By contrast, we predicted that 30-month-olds in the generic condition would perform an equivalent number of target actions with the model and nonmodel exemplars at generalization. In addition, we predicted that the pattern of results in the sentence prompt and the sound effect prompt groups would significantly differ if children required a linguistically rich context to effectively use the generic/nongeneric distinction to guide their inductive inferences.

A \( 2 \times 2 \times 2 \) mixed factors ANOVA was performed with group (sentence prompt, sound effect prompt) and wording condition (generic, nongeneric) as the between-subject variables and exemplar (model, nonmodel) as the within-subject variable. This analysis yielded only a significant interaction between condition and exemplar, \( F(1, 92) = 10.15, \eta^2 = .10, p < .01 \). As predicted, follow-up comparisons with a Bonferroni correction \( (p = .025) \) indicated that children in the generic condition imitated equally often with the model exemplar \( (M = 4.44, SD = 2.46) \) and the nonmodel exemplar \( (M = 5.08, SD = 2.50) \) at generalization, \( p > .18 \). Children in the nongeneric condition, however, imitated significantly more often with the model exem-
plar \((M = 5.50, SD = 3.03)\) than with the nonmodel exemplar \((M = 3.85, SD = 2.47)\) at generalization, \(t(47) = 3.00, d = 0.59, p < .01\).

In the final set of analyses, we used planned comparisons to examine whether the influence of wording condition held up within each prompt type group. Within the sentence prompt group, children in the generic condition performed significantly more numbers of target actions with the model exemplar \((M = 4.79)\) and the nonmodel exemplar \((M = 4.67)\) at generalization, \(p > .87\). By contrast, children in nongeneric condition performed significantly more target actions with the model exemplar \((M = 5.88)\) than with the nonmodel exemplar \((M = 3.71)\), \(t(23) = 2.28, d = 0.73, p < .05\). Within the sound effect prompt group, children in the generic condition performed significantly more target actions with the nonmodel exemplar \((M = 4.08)\) than with the model exemplar \((M = 4.00)\), \(t(23) = 2.05, d = 0.43, p = .052\). Thus, consistent with the results of the overall ANOVA, children in the nongeneric wording condition performed a similar across wording conditions, given that they generalized proper-noun distinctions to guide their inductive inferences about novel kinds. That is, children generalized properties to a new exemplar (the nonmodel exemplar; e.g., the orange blick) and to the original modeled exemplar of a novel category (the model exemplar; e.g., the blue blick) when they heard a generic NP (e.g., ‘Blicks drink milk’). By contrast, when 30-month-olds heard a nongeneric NP (e.g., ‘This blick drinks milk’), they were more likely to imitate with the model exemplar rather than with a new exemplar from the same novel category.

Discussion

Children in the nongeneric condition performed significantly more target actions with the model exemplar than with the nonmodel exemplar at generalization. By contrast, children in the generic condition performed an equivalent number of target actions with the model exemplar \((M = 5.12)\) than with the nongeneric condition \((M = 4.00)\), \(t(23) = 2.05, d = 0.43, p = .052\). Thus, consistent with the results of the overall ANOVA, children in the nongeneric wording condition in both prompt groups were more likely to imitate with the model exemplar than the non-model exemplar.

Experiment 2

Participants

Forty-eight 24-month-old infants \((M = 24.09\) months, range = 23.26–24.62 months) were randomly assigned to two conditions: a generic wording con-
dition (n = 24) and a nongeneric wording condition (n = 24). (See Table 1 for demographics.) Six additional participants were tested but excluded due to: failure to complete two or more practice trials (n = 2), fussiness/refusal (n = 3), and parent interference (n = 1). All other participant information is identical to Experiment 1.

Materials and Design

The materials and design are identical to Experiment 1.

Procedure and Coding

The procedure was identical to that used in Experiment 1 in the sentence prompt group. As in Experiment 1, children imitated on the vast majority of the practice trials (M = 93.06%, SD = 15.31). All but two of the CDI forms were returned. (See Table 1 for the total vocabulary scores.) The difference in total vocabulary scores across the conditions was marginally significant, p = .054, and the percentile of total number of words produced differed significantly across conditions, t(44) = 2.23, d = 0.66, p = .03. The percentile of words produced was used as a covariate variable in subsequent analyses to equate the two conditions on expressive language proficiency. The coding procedure was identical to that used in Experiment 1. The interrater reliability (intraclass correlation coefficient) for 20% of the data was .98 (p < .01).

Results

Figure 3 illustrates the mean summed frequency of target actions by phase, exemplar, and condition. As described earlier, the CDI percentile of words produced was used as the covariate variable in all analyses. For ease of interpretation, the unadjusted means are reported. Analyses of infants’ performance of target actions during the baseline phase revealed no significant differences as a function of exemplar but did indicate a significant main effect of wording condition, F(1, 45) = 4.21, η² = .09, p < .05. Children in the nongeneric condition (M = 1.94, SD = 1.57) produced significantly more target actions at baseline than children in the generic condition (M = 1.10, SD = 1.51). Importantly, however, children in both wording conditions performed significantly more target actions at generalization (generic condition: M = 4.91, SD = 2.39; nongeneric condition: M = 4.39, SD = 1.54) than at baseline (generic condition: M = 1.10, SD = 1.51; nongeneric condition: M = 1.93, SD = 1.57), t(23) = 6.30, d = 1.91, p < .001 and t(23) = 7.97, d = 1.58, p < .001, respectively.

As in Experiment 1, our primary analyses focused on the frequency of target actions during the generalization phase. A 2 (wording condition) × 2 (exemplar) mixed factors analysis of covariance (ANCOVA) with CDI percentile of words produced used as the covariate variable yielded no significant effects or interactions. In contrast to Experiment 1, children in both wording conditions imitated equally often with the model exemplar and the nonmodel exemplar.

Discussion

Results indicated that 24-month-olds in the generic and nongeneric conditions imitated equally often with the model and nonmodel exemplars during the generalization phase. These findings sug-

Figure 3. Mean summed frequency of target actions by phase and condition for Experiment 2.
gest that 24-month-olds are not sensitive to generic and nongeneric NPs when making inductive inferences about the properties of novel kinds. There are a number of possible explanations for this result. For example, it is possible that the task was too difficult for children of this age. That is, they may not have understood the language input, they may have forgotten the identity of the model, or they may have been too overwhelmed by task demands to attend to the input. These factors could have led them to focus on the perceptual similarity between the model and nonmodel and thus imitate the target action on both. These findings may also suggest that when the cognitive demands of a task are high, children use a generic interpretation as a default, consistent with the results of other recent studies (Gelman, Goetz, Sarnecka, & Flukes, 2008; Hollander et al., 2002).

Experiment 3

An alternative explanation for the results found in Experiment 1 may be that 30-month-old children rely only on sentence plurality (in the generic NP) or singularity (in the nongeneric NP) rather than on genericity or nongenericity, to guide their inductive inferences about novel kinds. In that experiment, a distinguishing characteristic between the conditions was the plurality of the subject in the generic NP or the singularity of the subject in the nongeneric NP (“Blicks drink milk” vs. “This blick drinks milk”). Thus, the plurality of the subject may influence children’s propensity to imitate the target action with more than one exemplar in the generic condition. Analogously, the singularity of the subject may influence children to imitate with only one exemplar in the nongeneric condition.

In Experiment 3, we addressed this issue by keeping the plurality of the subject constant across the generic and nongeneric NPs. Children in both the generic (e.g., “Blicks drink milk”) and nongeneric (e.g., “These blicks drink milk”) conditions heard plural NPs, and the target actions were demonstrated with two, rather than one, model exemplars. Children were then presented with the two model exemplars and one nonmodel exemplar and asked to imitate the target action. Because of the increased complexity of this task, we tested children in two procedures: one in which all three exemplars were presented together in a straight line during the test phase (the stringent procedure group) and one in which the model exemplars were physically separated from the nonmodel exemplar (the supportive procedure group). The procedure used in the stringent group required the child to remember the identity of the two model exemplars with little support but is most analogous to that used in Experiment 1. The procedure used in the supportive group gave children a clear demarcation between the model exemplars and the nonmodel exemplars, which may assist them in tracking the various exemplars over time. We predicted that if 30-month-old children are sensitive to the generic/nongeneric nature of the NP when sentence plurality remains constant, then children in the nongeneric condition would imitate significantly more often with the model exemplars than with the nonmodel exemplar. By contrast, children in the generic condition would imitate equally often with the model and nonmodel exemplars.

Method

Participants

The final sample consisted of one hundred 30-month-olds (mean age = 30.00 months, range = 28.46–30.95 months) who were randomly assigned to two groups: a stringent procedure group (n = 46) and a supportive procedure group (n = 54). Within each group, children were randomly assigned to two wording conditions: a generic condition and a nongeneric condition. Please refer to Table 1 for the demographics. All other participant information is identical to the previous experiments. Eighteen additional participants were tested but excluded due to: failure to complete two or more practice trials (n = 2), fussiness or refusal (n = 11), statistical outliers (infants with frequency of target action standard scores > 3 SD above or below the mean; n = 2), parental interference (n = 1), and experimenter error (n = 2).

Materials

The materials were identical to those used in the previous experiments. However, four exemplars that differed in color from the other exemplars were added to the object sets.

Design

The two exemplars used as models were counterbalanced across children for each trial. That is, one third of the participants received one set of model exemplars, another third received a different
set, and the final third received a third set. The first demonstration of the target action with one of the model exemplars was counterbalanced across children as well. That is, half of the participants saw one model exemplar used as the model first, and the other half saw the other model exemplar being used as the model first. The location of the nonmodel exemplar alternated for each trial (left, middle, right) with the nonmodel appearing on the left side a third of the time, in the middle a third of the time, and on the right side a third of the time, across the participants. All other counterbalancing was identical to the previous studies.

Procedure and Coding

The inductive inference task was similar to that used in previous experiments. In the stringent procedure group, the procedure was identical to that used in previous experiments with the following adaptations: During the baseline phase, the child was given three novel exemplars and an accompanying prop (e.g., a blue, orange, and green blick, and the cup). The third exemplar was placed out of sight (nonmodel exemplar; e.g., the green blick). The experimenter demonstrated the target action twice, once with each model exemplar for every generic or nongeneric NP. The target actions were accompanied by either (a) a generic NP (e.g., “Blicks drink milk’) or (b) a nongeneric NP (e.g., “These blicks drink milk”). The generic or nongeneric NPs were repeated three times during the demonstration phase as in previous experiments. During the generalization phase, the experimenter reintroduced the child to the three exemplars (the two model exemplars and the one nonmodel exemplar) and the prop. The three exemplars were positioned together in a line diagonally across from the prop in the stringent group. The experimenter then encouraged the child to imitate the target action by uttering either (a) a generic NP (e.g., “Can you show me: blicks drink milk”) or (b) a nongeneric NP (e.g., “Can you show me: these blicks drink milk”). Note that we elected to use the sentence prompt to make the procedure comparable to that of both Experiments 1 and 2.

For children in the supportive procedure group, a number of changes were made to the stringent procedure methodology to reduce the cognitive demands of the task. First, the child was initially introduced to the novel referent and the novel word prior to the inductive inference paradigm (e.g., ‘Here are my blicks from home. Now I’m going to tell you something about blicks’). This introduction provided the child with more exposure to the novel word and referents. Second, the child was provided with a “remember” statement just prior to the generalization phase (e.g., “Remember, blicks drink milk. Show me who drinks milk”). Third, the model and nonmodel exemplars were separated from each other during the generalization phase. That is, the two model exemplars and the nonmodel exemplar were separated by the prop in the middle, providing children with a visual reminder of which exemplars were the models and which exemplar was the nonmodel. As the three exemplars and the prop were placed in front of the child, the experimenter reminded the child by tapping the two model exemplars and uttering the phrase appropriate for the condition (e.g., “Remember, these blicks drink milk” or “Remember, blicks drink milk”). She then moved the exemplars and the prop toward the child and prompted the child with a nonspecific prompt (e.g., “Show me who drinks milk”).

In both procedure groups, to ensure that the three exemplars were placed on, and removed from the table at the same time, a black place-holder was used. All three exemplars in the stringent group, and all three exemplars and the prop in the supportive group were placed on the place-holder before and after each trial for easy and consistent positioning of the objects.

As in the previous two experiments, children imitated on the majority of the practice trials (M = 96.33%, SD = 10.48). All but seven CDI forms were returned within 2 weeks of the test date. (See Table 1 for scores.) No significant differences were found for any of the vocabulary measures, ps > .16.

The same coding procedure from previous experiments was used. A second coder coded 10% of the data for reliability purposes. The intraclass correlation coefficient was .97 (p < .01).

Results

Figure 4 illustrates the mean summed frequency of target actions by phase, exemplar, and condition. Analyses of infants’ performance of target actions during the baseline phase revealed no significant differences as a function of procedure (stringent, supportive), wording condition (generic, nongeneric), or exemplar (model1, model2, nonmodel). Children performed significantly more target actions at generalization (M = 3.73, SD = 1.69) than
at baseline \((M = 1.33, SD = 1.35)\), \(t(99) = 12.98, d = 1.57, p < .001\).

As in previous experiments, our primary analyses focus on the frequency of target actions during the generalization phase. A 2 (procedure) \(\times\) 2 (wording condition) \(\times\) 3 (exemplar) mixed factors ANOVA yielded a significant main effect of exemplar, \(F(2, 192) = 3.41, \eta^2 = .04, p < .05\). Of greatest relevance to the hypotheses was the significant two-way interaction among wording condition and exemplar, \(F(2, 192) = 3.18, \eta^2 = .04, p < .05\). No other significant interactions or main effects were found. Notably, the main effect of procedure was not significant and the procedure did not interact with any other variables.

To understand the source of the two-way interaction, we conducted separate repeated measures ANOVAs within the generic and nongeneric conditions. The results of a repeated measures ANOVA within the generic condition revealed no significant main effect of exemplar, indicating that children in the generic condition imitated equally often with the model exemplars as with the nonmodel exemplar at generalization, \(p > .78\). By contrast, analysis of performance in the nongeneric condition revealed a significant main effect of exemplar, \(F(2, 98) = 6.47, \eta^2 = .12, p < .01\). Follow-up comparisons with a Bonferroni correction \((p = .017)\) indicated that children in the nongeneric condition imitated significantly more often with the first model exemplar \((M = 3.90, SD = 1.89)\) than with the nonmodel exemplar \((M = 2.98, SD = 1.52)\) at generalization, \(t(48) = 3.03, d = 0.53, p < .004\), and with the second model exemplar \((M = 3.76, SD = 1.60)\) than with the nonmodel exemplar, \(t(48) = 2.96, d = 0.50, p < .005\). By contrast, children imitated equally often with the two model exemplars, \(p > .58\).

In the final set of analyses, we used planned comparisons to examine whether the influence of wording condition held up within each procedure type group. Within the stringent procedure group, children in the generic condition performed similar numbers of target actions with the model exemplars \((M_{model1} = 4.14, M_{model2} = 4.23)\) and the nonmodel exemplar \((M = 3.86)\) at generalization, \(ps > .38\). In the nongeneric condition, children performed similar numbers of actions with the two model exemplars \((M_{model1} = 4.00, M_{model2} = 3.83)\), \(p > .65\), and significantly more with the two models than on the nonmodel exemplar \((M = 2.92)\), \(t(23) = 2.23, d = 0.64, p < .04\) and \(t(23) = 1.98, d = 0.59, p = .059\), respectively. This same pattern held within the supportive procedure group, with children in the generic condition performing similar numbers of target actions with the model exemplars \((M_{model1} = 3.66, M_{model2} = 3.93)\) and the nonmodel exemplar \((M = 4.03)\) at generalization, \(ps > .40\). Again, in the nongeneric condition, children performed similar numbers of actions with the two model exemplars \((M_{model1} = 3.80, M_{model2} = 3.68)\), \(p > .75\), and more with the two models than with the nonmodel exemplar \((M = 3.04)\), \(t(24) = 2.02, d = 0.42, p = .054\) and \(t(24) = 2.43, d = 0.39, p < .03\), respectively. Altogether then, the patterns of findings were consistent with the results of the overall ANOVA in that children in both nongeneric groups were more likely to imitate with the model exemplars versus the nonmodel exemplar.

**Discussion**

Results indicate that children in the nongeneric condition performed significantly more target actions with the model exemplar than with the non-
model exemplar at generalization. By contrast, children in the generic condition performed an equivalent number of target actions with the model and nonmodel exemplars at generalization. These results provide evidence that 30-month-old children use the generic/nongeneric distinction to guide their inductive inferences about novel kinds when sentence plurality remained constant.

There were no main effects or interactions with procedure type, indicating that children in the stringent procedure group and the supportive procedure group performed similarly on the inductive inference task. Moreover, further analyses indicated that children in both procedures showed similar patterns of performance. Thus, children were sensitive to generic and nongeneric information, regardless of the amount of support provided.

**General Discussion**

These studies were designed to examine the developmental emergence of young children’s sensitivity to the generic/nongeneric distinction. Experiment 1 was an initial investigation of 30-month-olds’ sensitivity to generic and nongeneric NPs when generalizing properties of novel kinds. Experiment 2 investigated 24-month-olds’ use of generic and nongeneric information within a supportive linguistic context. Finally, Experiment 3 investigated 30-month-olds’ attention to generic versus nongeneric information when plurality of the generic and nongeneric NP was controlled.

As predicted, in Experiment 1, after hearing a nongeneric description of a property, 30-month-olds performed significantly more target actions with the model exemplar than with the nonmodel exemplar at generalization. By contrast, after hearing a generic description of the property, 30-month-olds performed an equivalent number of target actions with the model and nonmodel exemplars at generalization. Similar results were found in Experiment 3 when the plurality of the NPs was equated across generic and nongeneric wording conditions. These results provide clear evidence that 30-month-olds use the generic/nongeneric distinction to guide their inductive inferences about novel kinds. That is, when hearing a generic NP, children will attribute properties to the exemplar model(s) as well as generalize properties to new exemplars of the same category. By contrast, when children hear a nongeneric NP, they are more likely to restrict the attribution of properties to the model exemplar(s) and are less likely to generalize properties to other members of the same category.

The finding that 30-month-olds use the generic/nongeneric distinction to guide their inferences about the properties of novel kinds is particularly impressive when one considers the difficulty of the task used in the present experiments. That is, children were presented with two or three novel objects that were identical in all respects except color. During the demonstration phase, children were required to learn about the properties of these novel objects based on relatively subtle differences in input. Although there were several linguistic markers that distinguished generic (e.g., “Blicks drink milk”) from nongeneric (e.g., “This blick drinks milk”) NPs in Experiment 1, including: (a) the absence or presence of the demonstrative pronoun “this,” (b) singularity and plurality of the subject (blicks vs. blick), and (c) singularity and plurality of the verb (drink vs. drinks), there was only one linguistic difference between the generic (e.g., “Blicks drink milk”) and nongeneric (e.g., “These blicks drink milk”) NPs in Experiment 3 (the absence or presence of the demonstrative pronoun “these”). The exemplars were completely unfamiliar to the children and thus children could not recruit any real-world knowledge to assist them in interpreting the NPs. Moreover, the properties used (i.e., eating, drinking, talking, sleeping) could be plausibly applied to most animate kinds. Thus, children were required to shift their attention away from the salient similarity between the exemplars and disregard their knowledge about the scope of the properties presented and attend to the distinction between generic and nongeneric NPs.

In contrast to the 30-month-olds, 24-month-olds in both the generic and nongeneric conditions imitated equally often with the model and nonmodel exemplars. This suggests that 24-month-olds were not sensitive to the generic/nongeneric distinction in guiding their inductive inferences about novel kinds. This raises the question of what develops between 24 and 30 months of age. The present findings, in conjunction with other research, suggest that the period between 24 and 30 months may be a time of critical developments in the sensitivity to the generic/nongeneric distinction. Indeed, inspection of data from the MCDIs for the 24-month-olds indicated that while all parents reported that their children were producing plurals, only a minority reported that their children were producing the articles the (15% of children) and these (11% of the children). By contrast, about half of the parents of
the 30-month-olds in Experiments 1 and 3 reported that their children were producing the articles the (52% of children) and these (59% of children). This increase in production of articles between 24 and 30 months is also evident in the standardization sample for the lexical development norms for the MCDI (Dale & Fenson, 1996). Thus, there is a marked increase in the production of articles, which is a key component of expressing generic NPs in English, between 24 and 30 months of age.

It may be, then, that 24-month-old children are only beginning to learn about the components of generic language and how the distinction between generics and nongenerics can guide their inductive inferences about novel kinds. In particular, recall that the 24-month-olds in the nongeneric condition generalized to both the model and nonmodel exemplars. This suggests that children of this age do not yet appreciate the linguistic distinction between generics and nongenerics—even though generic concepts are easily grasped. This claim that 24-month-olds are only beginning to interpret the generic/nongeneric distinction is consistent with the results of research investigating 2-year-olds' production and understanding of generic language. That is, 2-year-olds' low incidence of generic production in everyday speech, which significantly increases between 3 and 4 years of age, may indicate an emerging understanding of generic language during the 2nd year of life (Gelman et al., 2008). In addition, research indicates that 32-month-olds can interpret linguistic cues, but not pragmatic cues, for distinguishing generic from nongeneric NPs, illustrating that older 2-year-old children may only be beginning to understand how to identify cues to generic language (Gelman & Raman, 2003). By 2½ to 3 years of age, children frequently use generic language in everyday speech and in play sessions (Gelman, 2004; Gelman, Chesnick, & Waxman, 2005).

Our finding that 30-month-olds reliably used the distinction between generic and nongeneric NPs to guide their inductive inferences adds critical insight into our understanding of the development of category-based reasoning in young children. A large body of evidence suggests that prior to the emergence of an understanding of generic language, children engage in category-based reasoning. That is, infants readily form kind concepts and make inductive inferences about the shared properties of kinds using cues such as perceptual similarity and shared novel labels (Baldwin, Markman, & Melartin, 1993; Gelman & Coley, 1990; Graham, Kilbreath, & Welder, 2004; Keates & Graham, 2008; Welder & Graham, 2001). As children develop, they will limit the inferences they make based on factors such as previous knowledge about a particular category, property generalizability, and category homogeneity (Gelman, 1988). For example, preschoolers will not draw inferences about shared properties when two objects are labeled with a term that describes a transient state rather than with a category label (e.g., “This is sleepy” vs. “This is a bird”; Gelman & Coley, 1990). Preschoolers will also attend to the nature of the property to be generalized and will not generalize those properties that are arbitrary (e.g., “fell on the floor this morning”) or that reference transient properties (e.g., “hungry”; Gelman, 1988; Graham, Cameron, & Welder, 2005; Graham, Welder, & McCrinnmon, 2003; Waxman, Lynch, Casey, & Baer, 1997). Our findings add to this literature by demonstrating that the emergence of the ability to identify and understand the distinction between generic and nongeneric language around 30 months of age provides young children with a rapid and efficient means to learn about whether or not a property relates to an individual versus a kind. In our experiments, we speculate that children are using their sensitivity to the information contained in the nongeneric sentence to limit their generalizations. That is, given that the properties used in our experiments are readily generalizable to most animate kinds, it may be that children used the sentence information to restrict their generalizations of these properties to the individuals. If the properties described had been more idiosyncratic (e.g., “eats shoes”) or if they were not able to draw upon their preexisting knowledge about the general nature of the properties (e.g., “has leukocytes”), generics may have helped children move from a position that the property is to be restricted to an understanding that the property was typical of the kind.

Although our findings demonstrate that toddlers are sensitive to the distinction between generic and nongeneric NPs, it remains to be established how children actually construe the information they learn from generic and nongeneric sentences. For example, do toddlers, like preschoolers, appreciate that the properties conveyed in generic sentences are more conceptually central than the information conveyed in nongeneric sentences (e.g., Cimpian & Markman, 2009; Hollander et al., 2009)? Do toddlers appreciate that generic statements refer to an abstract concept that is not tightly linked to actual experience with individual exemplars? Investigating these and other issues will shed light on the emergence of the understanding and use of generics during the toddler and preschool years.
References


