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Children's generic interpretation of pretense

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ABSTRACT

We report two experiments investigating how 3- to 5-year-olds learn general knowledge from pretend play—how they learn about kinds of things (e.g., information about dogs) from information about particular individuals in pretend play (a certain dog in a pretend scenario). Children watched pretend-play enactments in which animals showed certain behaviors or heard utterances conveying the same information. When children were subsequently asked about who shows the behavior, children who watched pretend play were more likely to give generic responses than were children who heard the utterances. These findings show that children generalize information from pretend play to kinds even without being prompted to think about kinds, that pretend play can be informative about familiar kinds, and also that pretend play is a more potent source for general knowledge than are utterances about individuals.

Introduction

Acquiring *general knowledge* is an important part of learning about the world. General knowledge concerns *kinds* rather than individuals. For instance, it includes the knowledge that dogs are covered in fur and that they like chewing on bones (Leslie, 2011; Prasada, 2000), but not the knowledge that your neighbor's dog is a poodle. Acquiring general knowledge is particularly important because of its inferential power. The knowledge that dogs like chewing on bones shapes your expectations about many

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dogs, including dogs you have never actually encountered; in contrast, knowing that your neighbor's dog is a poodle does not support inferences about any other dogs.

Children often learn general knowledge from testimony and other forms of communication. In particular, they are especially likely to infer that information is general if it is conveyed using generic language (e.g., "*Dogs* are friendly") rather than non-generic language (e.g., "*These dogs* are friendly"; e.g., Chambers, Graham, & Turner, 2008; Cimpian & Markman, 2008; Graham, Nayer, & Gelman, 2011; Stock, Graham, & Chambers, 2009). They are also more likely to infer that information is general if it is transmitted pedagogically than if they just happen to observe it (Butler & Markman, 2012, 2014; see also Butler & Tomasello, 2016).

Children also appear to learn general knowledge when it is communicated to them through fiction. In some studies, 3- to 5-year-olds were read storybooks about unfamiliar kinds of animals (Ganea, Canfield, Simons-Ghafari, & Chou, 2014) or plants (Walker, Gopnik, & Ganea, 2015). Later, when children were asked questions about the plant and animal kinds, they based their answers on the information from the stories. Similarly, children in other studies were shown pretend-play enactments about novel kinds of animals (Sutherland & Friedman, 2012, 2013) or objects (Hopkins, Dore, & Lillard, 2015). Children in these studies later based their answers to questions about the animal or object kinds on the information in the pretend play. Together, these findings show that children learn about novel kinds from fictional scenarios. These findings are broadly consistent with a larger body of research showing that exposure to fiction allows children to learn diverse things, including the referents of novel words (Brabham, Boyd, & Edgington, 2000; Weisberg et al., 2015), problem-solving strategies (Richert, Shawber, Hoffman, & Taylor, 2009; Richert & Smith, 2011), the reality status of entities and events (Li, Boguszewski, & Lillard, 2015; Woolley & Cox, 2007), facts about specific objects (Fazio & Marsh, 2008), and abstract scientific concepts (Ganea, Ma, & DeLoache, 2011; Kelemen, Emmons, Seston Schillaci, & Ganea, 2014).

In the current study, we further investigated how children use pretend play to learn general facts. The possibility that children might learn general factual knowledge from pretense may be counterintuitive because theories of pretend play have often emphasized that the representations that support it are kept separate or "quarantined" from representations of reality (e.g., Leslie, 1987, 1994; Nichols & Stich, 2000) and because pretending has often been viewed as a mode that allows children to entertain counterfactual and fantastical situations (e.g., Dias & Harris, 1988, 1990; Lillard, 2001; Richards & Sanderson, 1999). However, the possibility that children learn general facts from pretense does not conflict with these views (Weisberg, 2015; see also Sutherland & Friedman, 2012) but emphasizes that pretense also informs children's representations of reality.

To learn more about children's learning from pretend play, we addressed three important questions pertaining to this ability. First, we investigated whether children are more likely to learn general information from pretend-play enactments than from hearing utterances with featuring non-generic language. Second, we examined whether children learn general information from pretend play when it concerns familiar kinds. Third, we examined whether children generalize information from pretend enactments when not prompted to think about kinds. We next discuss each of these questions in greater depth.

Does pretense have an advantage over non-generic language in conveying general knowledge?

Pretend play may be well-suited for conveying general knowledge because it readily allows information about particular agents or objects to be conveyed without using language. Consider a pretense enactment in which two dogs are afraid of some raccoons and run away from them. In language, this event would typically be expressed with a non-generic statement such as "the two dogs were afraid of the raccoons." As mentioned above, children resist inferring that non-generic statements like this express general knowledge (e.g., Chambers et al., 2008; Cimpian & Markman, 2008; Graham et al., 2011; Stock et al., 2009). Pretense, in contrast, might not be subject to the same interpretive resistance (i.e., because it can express information without using non-generic language) and might allow children to use information about the particular individuals in the pretend scenarios to draw generalizations about kinds.

However, it is also possible that pretense has no advantage over information conveyed with non-generic language in conveying general information. Previous studies have compared children's interpretation of statements with non-generic noun phrases with other kinds of noun phrases (e.g., Cimpian & Markman, 2008), but no past work has directly compared them with children's interpretation of pretend-play enactments. Therefore, it is possible that pretense and non-generic language might both be interpreted as referring to individuals without being informative about kinds. In addition, although previous studies do suggest that children acquire general knowledge from pretend play (Hopkins et al., 2015; Sutherland & Friedman, 2012, 2013), these studies have typically used different measures from studies examining children's interpretation of non-generic language. One goal of the current research was to test this possibility by directly comparing children's interpretation of pretend-play enactments with their interpretation of non-generic language.

Does pretend play support learning about familiar kinds?

Pretend play may be particularly well-suited for conveying general knowledge because its content can be flexibly adjusted. Pretend enactments are typically improvised and not bound to a pre-established plot or script, so they can be used to convey information about diverse kinds such as sharks and dinosaurs that children might not otherwise have direct experience with. However, this potential benefit of pretend play would not amount to much if children used pretense only to learn about a limited set of kinds. The previous studies examining how children learn general knowledge from pretend play leave this possibility open. They only examined how children learn about novel kinds (Hopkins et al., 2015; Sutherland & Friedman, 2012, 2013), and so it is unknown whether children also use pretense to learn about familiar kinds. (This focus on novel kinds is also shared by studies showing that children learn general facts from storybooks; Ganea et al., 2014; Walker et al., 2015).

We might expect that children would readily learn about familiar kinds from pretense because children more readily draw inductive inferences about familiar properties and kinds than about novel ones (e.g., Farrar & Boyer-Pennington, 2011; Farrar, Raney, & Boyer, 1992; see also Davidson & Gelman, 1990). Alternatively, children might resist learning about familiar kinds from pretense because new information presented in pretense could compete with their existing knowledge or because children could feel that if the information is true, they should have already encountered it. When children see pretense about a novel kind of agent or object, they have little other information available for answering questions about its kind; however, if children instead see pretense about a familiar kind of agent or object, they can instead answer questions by drawing on their existing knowledge and experiences. Although these factors could also affect children's learning about familiar kinds from other information sources, pretense (and other forms of fiction) offers children an easy way to reject new information; they can assume that it is only true in the fiction and not in real life.

Does learning from pretend play occur without prompts to consider kinds?

If pretend play is a robust source of general knowledge for children, they should not require much prompting to generalize information from it. However, in past work suggesting that children acquire general knowledge from pretend play, children were asked questions that explicitly prompted them to think about kinds (e.g., "What do lorises like to eat?"; Hopkins et al., 2015; Sutherland & Friedman, 2012, 2013). These kind-based questions may have invited children to generalize the information presented in pretense. Do children learn about kinds from pretend play if not explicitly prompted to think about kinds?

Our approach in addressing this question was strongly influenced by Cimpian and Markman's (2008) investigation of the cues that 3- and 4-year-olds use to infer generic meaning. In their studies, children were shown pictures of two animals of the same kind and were told some fact about them via a sentence with an ambiguous scope. For instance, children were shown pictures of two dogs and were told "They are afraid of raccoons." The scope of this statement is ambiguous because it could refer either to the particular dogs shown (specific interpretation) or to dogs in general (generic interpretation). Cimpian and Markman provided children with additional cues to disambiguate the scope and found that children were sensitive to these cues. When children were asked what they had learned,

those who were given cues to generic meaning often gave generic responses (e.g., "*Dogs* are afraid of raccoons"); in contrast, children who were given cues signaling specific meaning more often gave non-generic responses (e.g., "*These dogs* are afraid of raccoons"). In the current experiments, we took a similar approach to examine how children learn general knowledge from pretend play.

The current approach

In two experiments, we showed children pretend-play scenarios in which two familiar animals showed a certain behavior in relation to some object. We then asked children about *who* shows that reaction. For instance, we showed children a scenario where two dogs were afraid of raccoons and then asked "Who is afraid of raccoons?" If children generalize information presented in pretend play to kinds, they should give a generic answer and respond "dogs." However, if children do not extend the events in pretend play to kinds, they should give a response that is more specific and indicates the particular dogs in the scenario. To get a sense of how often children generalized information, we compared responses to pretend play with responses to non-generic language. For example, rather than seeing a pretend-play scenario about two dogs, children were told a non-generic utterance asserting that two dogs were afraid of raccoons and were then likewise asked who is afraid of raccoons.

This design allowed us to simultaneously address our three major questions. First, the comparison between information in pretend play and non-generic language allows us to assess whether pretend play offers an advantage in supporting children's learning of general knowledge. Second, because the information always concerned familiar animals rather than novel ones, finding that children learned general knowledge will show that pretend play supports learning about familiar kinds. Finally, because the test question does not prompt children to think about kinds, if children give generic responses, this will show that they generalize information from pretend play without such prompting.

Experiment 1

Method

Participants

A total of 85 children (M_{age} = 4;5 [years;months], range = 3;0–5;11, 36 girls) were tested in a quiet area at their schools and day-care facilities. An additional 2 children were tested but could not be included due to audio equipment failure. Most participants were Caucasian and from middle-class families, although demographic information was not formally collected.

Design and procedure

Children were first introduced to a stuffed moose toy that was going to hide underneath the table and were told that while under the table the moose could neither hear nor see what was going on. This procedure has been found to encourage the production of noun phrases (Matthews, Lieven, Theakston, & Tomasello, 2006). Children then watched four scenarios using photos of real animals mounted on foam backings. In each scenario, the experimenter conveyed information about two animals. Scenario 1 conveyed that two dogs are afraid of raccoons, Scenario 2 conveyed that two fish like to hide behind rocks, Scenario 3 conveyed that two birds are afraid of mice, and Scenario 4 conveyed that two cats like to play with toy cars. Children were randomly assigned to see the information conveyed in either of two ways: through pretend play or through non-generic language. Much of this procedure was based on Cimpian and Markman's (2008) Experiment 1; the key difference is that their procedure did not include a condition in which information was conveyed using pretense.

In the Pretend condition, the experimenter conveyed the information by moving the photos while talking in time with a high-pitched voice (see Friedman, Neary, Burnstein, & Leslie, 2010). For instance, to pretend that two fish like to hide behind rocks, the experimenter enacted a scenario in which two fish hid behind one rock and then behind a second rock. Photos of the target objects (e.g., rocks) were propped on opposite sides of the table, and the pictures of the fish were brought out and moved about the table. In the Non-Generic Language condition, the experimenter conveyed the information through

Experiment 1

We're going to play a game with my friend Mr. Moose, and this is Mr. Moose right here. So what's going to happen is Mr. Moose is going to hide underneath the table, and when he's under the table, he can't hear us and he can't see us, so he doesn't know what we're doing, okay? Would you like to put Mr. Moose under the table for me? Thank you! So now what's going to happen is I'm going to show you some animals, and then Mr. Moose is going to ask you some questions, okay?

Pretend Condition	**Specific Language Condition**
Here is a dog, and here is another dog. "Hello, Hello." "Look! A raccoon!" (*Dogs shown running away from raccoon*) "And look, another raccoon!" (*Dogs run from the raccoon*)	Here is a dog, and here is another dog. And these two dogs are afraid of raccoons. So, these two dogs are afraid of raccoons. Okay?

And now let's get out Mr. Moose [again], and he has a question for you. "Who is afraid of raccoons?"

Experiment 2

I'm going to show you some things with these animals.

Pretend Condition	**Specific Language Condition**
Here is a dog, and here is another dog. "Hello, Hello." "Look! A raccoon!" (*Dogs shown running away from raccoon*) "And look, another raccoon!" (*Dogs run from raccoon*)	Here is a dog, and here is another dog. And these two dogs are afraid of raccoons. So, these two dogs are afraid of raccoons. Okay?

So now I have a question for you. Who is afraid of raccoons?

Fig. 1. Sample scripts from Experiments 1 and 2.

non-generic language. In this condition, the experimenter conveyed that the fish liked to hide behind rocks by telling children "These two fish like to hide behind rocks." The target objects were not present, and the animals remained flat on the table and did not move or speak during this condition. See Fig. 1 for sample scripts from each experiment, and see the online supplementary material for pictures of the materials.

Following the presentation of information, the moose toy was brought out from under the table. The experimenter, speaking as the moose, asked a question about the target object. For instance, after trials where the experimenter conveyed that fish liked to hide behind rocks, children were asked "Who likes to hide behind rocks?" While the questions were asked, the animals from the scenario (e.g., the fish) remained on the table and the objects from the scenario (e.g., the rocks) were placed out of view. In piloting, we found that keeping the animals visible reduced the number of irrelevant answers that children gave. Children's responses were audio-recorded.

We expected children to respond to this question by referring to the animals from the relevant scenario. Of key interest was whether children would respond using generic language or non-generic language—whether children would give answers like "fish," which is generic, or answers like "those fish," which is non-generic. However, some children did not give the relevant animals and instead gave other answers (e.g., naming other animals, saying "I do"). When this happened, the experimenter asked the follow-up question "Who else?" or "Is there anyone else who likes to hide behind rocks?" The trial ended when children produced the correct type of animal or indicated that they were finished answering. In addition, if children were silent for more than 5 s, the experimenter

repeated the question. Occasionally, children would not produce an answer at all, and the trial was cut off after three prompts.

Coding

A research assistant blind to the hypothesis transcribed each trial starting at the experimenter's target questions (e.g., "Who is afraid of raccoons?") and ending when the experimenter started the next trial. This removed any reference to the condition from the transcript so that coders would be blind to the condition. An independent coder and the first author coded children's responses from all trials, and disagreements were resolved through discussion. Recordings from 15 individual trials were unclear and could not be transcribed or coded, although the remaining trials for the affected children were retained and coded. An additional 3 trials were also excluded because the experimenter made errors in the follow-up questions, and again the remaining trials from these children were retained and coded. Thus, of 340 total trials, responses from 322 were coded.

Each trial was coded on three different dimensions. First, children's final answers were coded into four categories following the coding procedures devised by Cimpian and Markman (2008, Experiment 1): *generic* answers, which included bare plural noun phrases (e.g., "dogs")[1]; *non-generic* answers, which included definite articles, demonstrative pronouns, or numerals (e.g., "those dogs," "the two dogs"); *ambiguous* answers, which included bare nouns or nouns with an indefinite article (e.g., "dog," "a dog"); or *no response*. Second, trials were coded on whether children gave irrelevant responses when first asked the test question (e.g., responding with a noun phrase that did not refer to the target animal or a relevant pronoun). If such "brainstorming" responses occurred more in one condition, this could indicate that children did not view the information conveyed in that condition as relevant to the test question. Third, we coded whether the experimenter asked children a follow-up question on each trial (e.g., by asking "Who else?" or repeating the question). The type of prompt given was not coded separately, and we did not include prompts for children to say their answers aloud or repeat their answers louder. Kappa statistics for all categories were excellent: final response, $\kappa = .98$; irrelevant, $\kappa = .94$; follow-up, $\kappa = .97$ (all $ps < .001$).

Results and discussion

Generic answers were given a score of 1, non-generic answers were given a score of 0, and ambiguous answers were given a score of 0.5. These values were then averaged for each child to reduce the influence of non-responses (e.g., trials in which the child did not answer or produced irrelevant answers, trials that were excluded).[2] Thus, the averages presented here represent how often generic responses were given in trials where the child mentioned the target animal.

We wanted to examine whether scores were affected by condition and by age. To examine the effects of age, while maximizing power, we divided children in each condition into Younger and Older groups using a median split; Table 1 shows the mean ages and age ranges for Younger and Older children in each condition and also the total numbers of responses coded as generic, non-generic, and ambiguous for each group.

We then used a generalized linear model (ordinal logistic) to test whether scores were influenced by age (Younger or Older), condition (Pretend or Non-Generic Language), or their interaction. This analysis revealed that scores were predicted by condition, Pretend ($M = 0.80$) > Non-Generic Language ($M = 0.62$), Wald $\chi^2 = 8.05$, $df = 1$, $p = .005$, but not by age or the interaction between age and condition (both $ps > .36$) (see Fig. 2).

Children's increased use of generic language for information presented in pretense compared with the same information presented in non-generic language indicates that children see pretend as

[1] For the fish trials, we followed Cimpian and Markman (2008) in treating responses with the base noun phrase "fish" as generic because this is the appropriate pluralization of the singular "fish".

[2] We also conducted the analyses using a sum of the four trials, a sum of the generic answers only, and a sum of the non-generic answers only. These measures were all highly correlated (r range = .586–.958, all $ps < .001$), so we present the results using the average scores because these were the most intuitive to interpret.

Table 1
Participant information by age group and condition in Experiments 1 and 2.

	n	M_{age}	Range	Generic	Non-Generic	Ambiguous
Experiment 1						
Younger						
Pretend	23	3;9	3;0–4;4	54	8	6
Non-Generic Language	21	3;9	3;0–4;5	40	21	11
Older						
Pretend	20	5;2	4;6–5;10	58	14	6
Non-Generic Language	21	5;2	4;6–5;11	29	27	12
Experiment 2						
Younger						
Pretend	26	3;8	3;0–4;5	35	16	2
Non-Generic Language	28	3;9	3;2–4;5	48	17	2
Older						
Pretend	27	5;2	4;7–5;11	45	26	2
Non-Generic Language	26	5;3	4;6–5;11	16	38	1

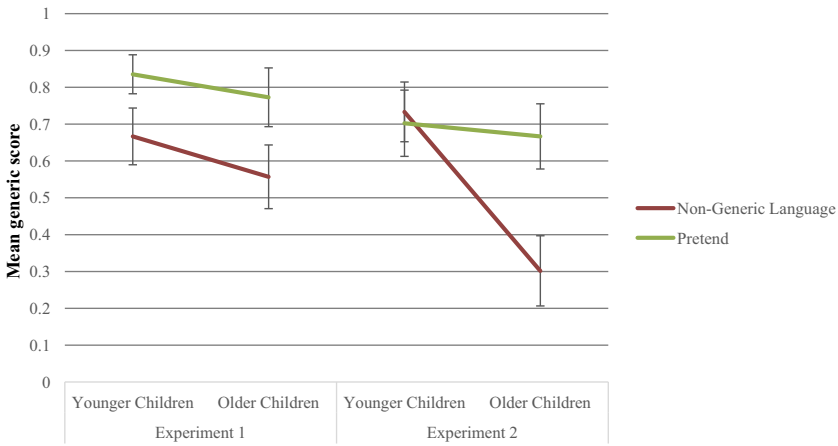

Fig. 2. Mean scores in Experiments 1 and 2.

applicable beyond the individual exemplars; children generalize information about pretend individuals to kinds.

We also looked at three additional variables that could have influenced differences in children's scores between the two conditions. We examined whether the conditions differed in whether children remained silent, produced irrelevant answers, and were asked follow-up questions; see the supplementary material for a table listing the number of times each occurred. None of these variables differed by condition (Mann–Whitney tests, all *ps* > .20). We conclude, then, that our results were not driven by these factors but rather were driven by children's differential interpretation of the pretense and non-generic language in the scenarios.

In this experiment, we used realistic pictures of animals to present information to children. Although pretend play can use realistic props, it often makes use of less iconic materials. Likewise, non-generic language can be directed at materials that are not highly iconic. For this reason, we used less iconic materials in the next experiment. In the Pretend condition, we used felt puppets to represent the target animals and used other objects to represent the target objects (e.g., large beads were used to represent toy cars). We did not use these materials in the Non-Generic Language condition to avoid the possibility of children interpreting it as involving pretense. Instead, children in the

Non-Generic Language condition were shown clip-art pictures of the animals on a laptop computer. These pictures are less iconic than photographs but are typical of the kinds of pictures that might appear on a website or in a book directed at children. It should also be noted that using these different materials across the conditions was conservative; when children and parents converse about physical objects (and particularly objects that are manipulable), they typically talk about the properties of those particular objects, suggesting that manipulable objects (e.g., puppets) might afford a non-generic interpretation (Gelman, Chesnick, & Waxman, 2005; Gelman, Waxman, & Kleinberg, 2008). In contrast, children's talk about pictures typically concerns kinds, suggesting that our clip-art pictures might afford a generic interpretation.

Experiment 2

Method

Participants

A total of 107 children (M_{age} = 4;6 [years;months], range = 3;0–5;11, 56 girls) were tested in a quiet area at their schools and day-care facilities. Children were randomly assigned to either the Pretend condition or the Non-Generic Language condition, as in Experiment 1. An additional 15 children were tested but could not be included in the final sample due to audio equipment errors (n = 10), failing to provide any type of answer on all trials (n = 4), or not speaking any English (n = 1). Most participants were Caucasian and from middle-class families, although demographic information was not formally collected.

Design and procedure

The procedure was identical to that of Experiment 1 but with two changes. First, the materials were changed from foam cutouts to puppets and clip-art photos. Second, the procedure was shortened in the interest of keeping the task concise. One trial was removed, leaving three trials, and the task framing was modified. Instead of using the moose toy, the experimenter simply told children "I'm going to [show/tell] you some things [with/about] these animals" while gesturing to all of the puppets or a picture of all the clip-art animals to introduce the task. The test questions were then asked by the experimenter instead of by the moose toy. See Fig. 1 and the supplementary material for materials.

Coding

All coding procedures were the same as in Experiment 1 except that there were two independent coders (i.e., rather than one independent coder and an author). No trials needed to be excluded for audio or experimenter errors. Kappa statistics were again excellent: final response, κ = .95; irrelevant, κ = .95; follow-up, κ = .94 (all ps < .001).

Results and discussion

As in Experiment 1, we divided children into Younger and Older age groups using a median split; Table 1 shows the mean ages and age ranges for Younger and Older children in each condition. We then used a generalized linear model (ordinal logistic) to test whether scores were influenced by age (Younger or Older), condition (Pretend or Non-Generic Language), or their interaction. This analysis revealed that scores were predicted by age (Younger > Older), Wald χ^2 = 5.34, df = 1, p = .021, and the interaction between age and condition, Wald χ^2 = 4.49, df = 1, p = .034, but not by condition (p = .098).

As can be seen in Fig. 2, older children gave more generic responses after viewing the fact in pretense (M = 0.67) than after hearing the fact in non-generic language (M = 0.30), Mann–Whitney U = 173, z = 2.52, p = .012. In contrast, younger children did not differ in the amount of generic language used between the Pretend (M = 0.70) and Non-Generic Language (M = 0.73) conditions, Mann–Whitney U = 249, z = 0.34, p = .734.

We again performed follow-up analyses examining if the conditions differed in whether children responded, produced irrelevant answers, and required follow-up questions; see the supplementary material for a table listing the number of times each occurred. Only older children in our sample differed by condition, so we limited our analyses to this group. Older children did not produce irrelevant answers or fail to respond differently between conditions (Mann–Whitney U, $ps > .05$), although they did have a greater need for follow-up questions in the Non-Generic Language condition ($M = 1.46$ of a possible 3) than in the Pretend condition ($M = 0.59$), Mann–Whitney $U = 208$, $z = 2.70$, $p = .007$. To ensure that our findings were not due to the difference in the occurrence of these questions, we reanalyzed the data for older children without the trials in which follow-up questions occurred (40 of 78 trials). As in the main analysis, older children gave more generic responses in the Pretend condition (Non-Generic Language $M = 0.28$; Pretend $M = 0.66$), Mann–Whitney $U = 142$, $z = 2.68$, $p = .007$. Because these results show the same pattern with increased significance, we hold that our results are not due to the occurrence of follow-up questions in the Non-Generic Language condition.

General discussion

In two experiments, 3- to 5-year-old children watched pretend-play scenarios in which animals reacted to objects. When children were asked *who* reacts to objects in this way, children often gave generic responses. For instance, after seeing pretend play in which two dogs were afraid of raccoons, they often asserted that "dogs" are afraid of raccoons. In contrast, when children heard statements about the particular animals, they were less likely to give generic responses and instead often referred to the particular animals described by the statement (e.g., "The dogs are afraid of raccoons"). This difference occurred at all ages in our first experiment but only in older children in our second experiment. In the second experiment, both pretend play and non-generic language led younger children to give generic responses at high rates. These high rates of generic responses show that the age difference resulted from changes in children's interpretation of non-generic language and not from changes in their interpretation of pretense.

The findings from our pretend-play conditions show that children infer that certain facts demonstrated in pretend play extend to kinds and do not pertain only to individuals in the pretense. This is consistent with previous studies showing that children learn general knowledge from pretend play (Hopkins et al., 2015; Sutherland & Friedman, 2012, 2013) and is also broadly consistent with findings showing that children acquire such knowledge from other kinds of fiction (Ganea et al., 2014; Walker et al., 2015). Together, these findings contrast with views of pretense that emphasize how children keep representations of pretense separate from their representations of reality (e.g., Leslie, 1987, 1994; Nichols & Stich, 2000). Our findings are also striking given that our pretend conditions featured manipulable objects because outside the context of pretense such objects often prompt non-generic talk about the properties of particular objects (see especially Gelman et al., 2005). We next consider three ways in which our findings extend understanding of children's learning from pretend play, and we then consider questions raised by the findings.

Pretend play and non-generic language

Our findings show that pretense has an advantage over non-generic language in conveying general information, at least for older children. This is striking because pretense and non-generic language are both ways of conveying information about individuals (e.g., the characters and objects represented in pretense, those described in a statement).

One reason why children may generalize from pretend play is that it allows information to be conveyed without using non-generic language. As in previous studies (e.g., Chambers et al., 2008; Cimpian & Markman, 2008; Graham et al., 2011; Stock et al., 2009), children resisted inferring that non-generic language expresses general knowledge, although in our second experiment this occurred only in older children. However, pretend play does not require the use of non-generic language, and this may be why children in our experiments interpreted this information as informative about kinds. This possibility is broadly consistent with claims that children have a default tendency to interpret information

as pertaining to kinds (e.g., Leslie, 2007; also see Gelman, Leslie, Was, & Koch, 2015; Khemlani, Leslie, & Glucksberg, 2012; Leslie & Gelman, 2012).[3]

Future studies could more directly test whether the absence of non-generic language is critical for children to treat information in pretense as general. For instance, children could be shown pretend-play enactments accompanied by non-generic narration (e.g., "This dog is running away from the raccoon"). If children do not generalize information from these scenarios, it would suggest that learning from pretense benefits from the fact that it can convey information without non-generic language. Alternatively, if children continued to interpret pretend-play enactments as conveying general information, even when they included non-generic language, this would suggest that other features of pretend play may support the transmission of general knowledge (e.g., exaggerated motions and facial expressions; see Sutherland & Friedman, 2012).

Learning about familiar kinds

Our findings also show that children use pretense to learn about familiar kinds. All of our pretend scenarios featured animals that were familiar (i.e., dogs, cats, birds, and fish), and even the entities and objects to which these animals reacted were also familiar. This finding extends knowledge of how children learn from pretense because past work on children's learning from pretense, and also from storybooks, has focused exclusively on novel kinds (Ganea et al., 2014; Hopkins et al., 2015; Sutherland & Friedman, 2012, 2013; Walker et al., 2015). As such, the current findings are the first to show that fiction (i.e., in the form of pretend play) supports learning about familiar kinds.

This ability to learn about familiar kinds reveals that children's learning from pretense is not restricted to instances where they have little or no other information or experience (i.e., as occurs when they learn about unfamiliar kinds). When considering familiar kinds, children could instead base judgments on their existing knowledge and experiences and could easily discount information as limited to pretense. The fact that children typically gave generic answers after watching pretense about familiar kinds suggests that it can serve as a robust source of knowledge and not just a last resort.

Learning without prompts to consider kinds

Finally, our findings show that children generalize information from pretense without being prompted to think about kinds. In previous studies suggesting that children acquire general knowledge from pretend play, children were asked questions that explicitly prompted them to think about kinds (Hopkins et al., 2015; Sutherland & Friedman, 2012, 2013); similar questions were also asked in previous studies suggesting that children learn general knowledge from storybooks. These kind-based questions may have invited children to generalize the information and to see it as relating to kinds. By asking open-ended questions, we were able to assess whether or not children generalized without prompting them to think about kinds. The finding that children gave generic answers in response to the pretense scenarios shows that they see information from pretense as relevant to kinds without being prompted to make this connection. As such, the findings suggest that pretend play could serve as a robust source of general knowledge for young children.

However, it should be acknowledged that the very act of questioning children may have prompted them to consider the scope of the information in pretense when they would not have otherwise, potentially increasing the likelihood of them treating pretense as a source of general information. As such, we cannot claim that our findings show that children's generalizing from pretense was completely spontaneous. Perhaps future research could investigate whether children rely on pretense as a source of general knowledge using tasks where children are not questioned in any way or at least in tasks where they are questioned after a considerable delay.

[3] However, this claim might not fit with findings showing that in the absence of non-generic language, children do not always generalize (e.g., Butler & Markman, 2012; Cimpian & Markman, 2008, baseline condition). Given these findings, it is even more striking that children in our pretense conditions generalized.

Further questions

Although our findings are informative about how children learn general knowledge from pretend play, they also raise new questions. One question concerns why younger children gave non-generic responses in the Non-Generic Language condition of the first experiment but gave generic responses in that condition in the second experiment.[4] The most important difference between the experiments was in the materials used in that condition. Whereas realistic photos were used in the first experiment, clip-art drawings were used in the second experiment. It is possible that children were more inclined to interpret the photographs as depicting particular individuals than to interpret drawings in this way. This is plausible because whereas a drawing of a person might not indicate any particular individual, a photograph necessarily indicates the individual who was photographed. Broadly consistent with this, children and adults often talk about kinds when conversing about objects in drawings (i.e., instead of talking about the particular object shown; Gelman et al., 2005, 2008). In addition, they see causal connections between photographs and the objects they depict, and sometimes they respond as if these are linked even after the photograph has been taken (e.g., Donnelly, Gjersoe, & Hood, 2013; Zaitchik, 1990). To explain the findings, however, this account requires that younger and older children differed in whether they were more sensitive to the materials or to the use of non-generic language. Further research will be needed to test whether this account can explain the difference in performance we observed between the two experiments.

A broader question raised by the current experiments is whether our findings would extend to other forms of fiction. This question is most relevant to the observed differences between children's responses to pretense and non-generic language. Whereas pretense readily allows information about particular agents or objects to be conveyed without language, many other forms of fiction rely on language to a much larger extent. For example, a storybook will normally use non-generic language to indicate that two dogs are afraid of raccoons. Here we might expect that children would not treat this information as pertaining to kinds given that children do not typically treat non-generic language as conveying information about kinds.

However, it should be remembered that even to the extent that storybooks use non-generic language, use of such language is not limited to baldly *telling* facts about particular individuals (e.g., "These two dogs are afraid of raccoons"). Non-generic language can also be used to convey facts in much the same way as they are conveyed in pretense enactments; such language can be used to *show* facts (e.g., "The two dogs see the raccoons. And look! The dogs run away as fast as they can."). Guides for aspiring writers commonly advise them to "show not tell" (e.g., Hendrickson & Tankard, 1997; Noble, 1991). Perhaps children acquire general facts when non-generic language conveys facts via showing rather than telling.

A related factor that might affect whether various forms of fiction can be used to convey general knowledge is the degree of detail. Our pretense conditions featured very simple scenarios with no character names or descriptions of the setting. This simplicity may have encouraged children to interpret the information as extending to kinds; when characters are not given individuating details, they may be viewed as typical of their kinds. In contrast, when more unique details are provided (e.g., "This dog is named Frank, and he lives in a townhouse in Minneapolis"), children may be less likely to infer that information about any character will extend to its kind. Hence, future research could compare whether children are more likely to interpret information in various types of fiction as extending to kinds depending on the degree to which it includes specific details about the characters and setting.

Summary

Our findings are informative about how children learn from pretend play. Children are more likely to generalize information as pertaining to kinds if it is conveyed using pretense than if it is conveyed using non-generic language. In addition, we see that children use pretense to learn about familiar

[4] We discuss this difference because the two experiments did yield different results for the younger children. However, the conclusion that younger children's responses differed by experiment should be taken with caution. We conducted an analysis comparing younger children's responses across the two experiments and did not observe any significant differences (all *ps* > .13).

kinds and gain general knowledge from pretense even when they are not explicitly prompted to think about kinds. Together, these findings suggest that pretend play can serve as a robust source of general knowledge for young children.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jecp.2016.05.004.

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