How Does Generic Language Elicit Essentialist Beliefs?

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Abstract

Generic language (e.g., "tigers have stripes," "girls hate math") is a powerful vehicle for communicating essentialist beliefs. One way generic language likely communicates these beliefs is by leading children to generate kind-based explanations about particular properties; e.g., if a child hears "girls hate math," he may infer that there must be an inherent causal basis for the generalization, which in turn supports essentialist beliefs. However, it is also possible that simply hearing a category described with generics elicits the belief that the category is an appropriate kind to generalize about. On this account, even if the generic is negated ("girls don't hate math"), the generic language might nonetheless lead children to essentialize the category. The current study supports the latter possibility, suggesting that even hearing negated generics ("girls don't hate math") may still foster social essentialism.

Keywords: generic language; essentialism; conceptual development

Introduction

The ability to organize entities into categories is a key element of human cognition. Focusing on the similarities that unite category members allows even young children to use information about one member of a category to make inferences about other members (e.g., if one dog is friendly then other dogs are probably friendly too; Gelman & Markman, 1987). People tend to believe that certain categories, such as animal species, mark objective divisions in nature, and that members of these categories share a deep, underlying essence which gives rise to both observable and unobservable properties. These beliefs, referred to as psychological essentialism (Medin & Ortony, 1989), reflect pervasive cognitive biases that appear early in development (Gelman, 2003; Hirshfield, 1996). Psychological essentialism is an important element of conceptual development, helping to scaffold knowledge acquisition by guiding children to focus on similarities between category members (Gelman & Coley, 1990).

Children hold essentialist beliefs about only a fraction of the categories with which they are familiar. For instance, children and adults generally view animal categories in more essentialist terms than artifact categories (Diesendruck, 2003; Gelman, 2003; Gelman & Coley, 1990; Rhodes & Gelman, 2009; Rhodes, Gelman, & Karuza, 2014). Likewise, children develop essentialist beliefs about certain social categories but not others; the extent to which children view a particular social category in essentialist terms depends on the cultural input they receive throughout development (Diesendruck & Haber, 2009; Mahalingham & Rodriguez, 2006; Rhodes & Gelman, 2009). For example, European American 7- to 10-year-old children growing up in more politically conservative communities hold more essentialist beliefs about racial categories than those in more politically liberal communities (Rhodes & Gelman, 2009). For this reason, social categories provide an excellent window into how cultural input shapes essentialist beliefs.

An important form of cultural input that guides conceptual development is language. For instance, labeling objects with words leads preverbal infants to focus on similarities and facilitates categorization (Fulkerson & Waxman, 2007). Generic language – which characterizes kinds rather than individuals, e.g., "tigers have stripes," "birds lay eggs" – is a particularly powerful linguistic tool in guiding children's category reasoning. Children understand generics by preschool age (Cimpian & Markman, 2008; Cimpian, Meltzer, & Markman, 2011; Gelman & Raman, 2003) and they are common in child-directed speech (Gelman, Taylor, & Nguyen, 2004; Gelman, Waxman, & Kleinberg, 2008), particularly in pedagogical contexts (Gelman, Ware, Manczak, Graham, 2013).

Generic language is importantly related to psychological essentialism. For example, parents produce more generics for animal categories than for categories like artifacts, which are not generally viewed in essentialist terms (e.g., Brandone & Gelman, 2009). Further, limited exposure to generics leads to increased essentialist beliefs about novel animal (Gelman, Ware, & Kleinberg, 2010) and social (Rhodes, Leslie, & Tworek, 2012) categories. For instance, Rhodes, Leslie, and Tworek (2012) had children and adults read a storybook about a novel social category called "Zarpies," consisting of either generic statements (e.g., "Zarpies sleep in tall trees"), or matched specific statements about one member of the category (e.g., "This Zarpie sleeps in tall trees"). Subjects who heard generic statements came to view the category in more essentialist terms than those who heard specific statements. In addition, inducing essentialist beliefs about Zarpies led parents to *produce* more generic language about the kind.

Generic language is a powerful means of communicating essentialist beliefs, yet how generics accomplish this has not

been explained. One likely mechanism through which generic statements increase essentialism is by eliciting kind-based explanations as to why the particular property is generally shared among category members. Prior work has found that children are more likely to expect properties predicated in generic statements to arise from deep, kind-based causal structures, whereas they expect the same properties predicated in specific statements to arise from more idiosyncratic causes (Cimpian & Erickson 2012; Cimpian & Markman, 2009; 2011). For example, when children heard a novel ability attributed to a gender category using generic language (e.g., "boys are really good at *leeming*") they were more likely to explain the ability in essentialist terms, attributing it to inherent traits of the category (e.g., "because boys are tougher than girls"). In contrast, when the same novel property was introduced with a non-generic statement (e.g., "this boy is good at *leeming*") they offered explanations based on individual effort (e.g., "because he got teached;" Cimpian & Markman, 2011; Cimpian & Erickson, 2012). Thus, perhaps explaining properties as arising from kind-based causal mechanisms may lead children to develop a belief in a place-holder "essence" or common causal mechanism for the category members' shared properties. For instance, if children hear "Zarpies buzz when they are sad," they might reason that this property is due to an inherent shared nature, e.g., because Zarpies are not able to cry. Such reasoning may lead them to intuit that Zarpies generally share a common underlying nature that could potentially give rise to other shared properties as well.

An alternative (or perhaps additional) mechanism through which generic statements could elicit essentialism, however, is by more generally signaling that a particular category is appropriate to make generalizations about. By uttering a generic statement, a speaker could simply be communicating the belief that it is appropriate to generalize about the category in question. As children depend on cultural cues to determine which categories support rich inductive generalizations (Diesendruck & Haber, 2009; Mahalingham & Rodriguez, 2006; Rhodes & Gelman, 2009), generics may serve this function by signaling to a child that a given category provides a strong basis for generalizing. Notably, on this hypothesis, the specific nature of the properties being generalized is not the primary factor in explaining essentialist beliefs. What matters is that the kind is being flagged as an appropriate locus of generalization; the specific link between the kind and the predicated property does not play an important role.

Crucially, these two processes need not be mutually exclusive. It is quite possible that essentialist beliefs about a category might be fostered in tandem both by cues that the category is appropriate to generalize about and through causal reasoning about particular properties. Importantly, however, the relative weights of these two processes in eliciting essentialist beliefs imply different recommendations for how a parent or educator might most effectively correct the generic statements that children hear in their daily lives (e.g., "girls hate math") in order to lessen their effects on children's essentialist beliefs. For instance, if generics elicit increased essentialism primarily by leading children to construct a kind-based causal framework for particular properties, then negating the properties would be sufficient to lessen the generic statement's effect (e.g., "No, girls don't hate math). Such a correction clarifies that the property is not generally associated with the kind, presumably halting the need to generate a kind-based causal explanation for the generalization. If, however, generics elicit essentialism primarily by signaling that a particular kind is appropriate to generalize about, then such corrections may not be effective in reducing the tendency to essentialize. That is, as the statement "girls don't hate math" is still itself a generic, such a correction may still leave intact the implication that *girls* constitutes a rich, inductive basis for generalizing. If this hypothesis were supported, then correcting these statements to apply to a particular individual would be a more effective strategy (e.g., "No, only this one girl hates math").

The current study tests whether negating generic statements, and thereby hindering the causal reasoning process, nonetheless elicits essentialist beliefs about a novel social category. Is it necessary for children to believe that a set of positive properties is associated with a novel category in order to develop essentialist beliefs? Or is simply hearing the kind treated as an appropriate locus of a generic generalization sufficient? If the input does not present clear properties about which to construct a kind-based explanatory framework, do children nonetheless develop essentialist beliefs when hearing generic language? The present study focuses on social categories, as they are particularly sensitive to cultural input. Children heard generic statements about a novel social category called "Zarpies," based on materials used by Rhodes et al. (2012). Children heard generic statements (e.g., "Zarpies have striped hair") uttered by one puppet, which were immediately denied by a second puppet. Puppet 2's corrections were of three different types, depending on condition. For a third of participants, these corrections were in the form of direct negations (Generic Negation condition, e.g., "No, no, no! Zarpies don't have striped hair.") Another third of participants heard Puppet 2 offer an alternative property (Generic Replacement condition, e.g., "No, no, no! Zarpies have spotted hair.") The remaining subjects heard Puppet 2 correct only Puppet 1's generalization to the kind (Specific condition, e.g., "No, no, no! *This* Zarpie has striped hair.")

If generics communicate essentialist beliefs mainly by signaling that a kind is appropriate to generalize about, then both generic conditions (Generic Negation and Generic Replacement) should elicit increased essentialism compared with the Specific condition. In both generic conditions, Puppet 2 does not challenge the implication that it is appropriate to generalize across the category, only that the particular property given by Puppet 1 is a correct generalization. In contrast, in the Specific condition, Puppet

2 challenges the generalization's scope directly (by saying that the property applies to just this particular Zarpie).

However, if constructing kind-based causal explanations for particular properties is necessary for generics to elicit essentialist beliefs, then only the Generic Replacement condition should elicit increased essentialism relative to the Specific condition. In the Generic Replacement condition, children receive a set of properties to reason about (i.e., the properties described by Puppet 2), whereas in the Generic Negation condition, they do not know what particular properties are held by Zarpies (as Puppet 2 negates all of the generics stated by Puppet 1).

Method

Participants

Participants included 51 four- and five-year-old children (25 male, M_{age} = 4.91 years, range = 3.99-5.89 years; approximately 41% European American, 9% African American, 5% Asian American, 13% Hispanic, 14% Multiethnic, and 18% unreported). Participants were recruited from and tested at the Children's Museum of Manhattan. Written parental consent was obtained for all participants; children provided oral assent. All study procedures were approved by the Institutional Review Board of New York University.

Procedure

The procedure was divided into three phases. In the first phase, children were introduced to a novel social category, called "Zarpies." The experimenter showed participants an illustration of four Zarpies, who varied by race and gender, and said, "Here is a picture of some Zarpies." The experimenter then pointed to each Zarpie one at a time and said, "This is a Zarpie." Children were asked to repeat the category name to ensure they had understood the introduction before moving on to the experimental phase.

The second phase of the study contained the manipulation by condition in the form of a short puppet show. Subjects were first randomly assigned to one of three conditions. They then watched a puppet show with two animal puppets operated by the experimenter. The experimenter introduced the two puppets as "Sally" (Puppet 1) and "Jenny" (Puppet 2) and told participants that they would be playing a game with Puppet 1 where she looked inside a special box and told the child what she saw. However, they were told, Puppet 1 could not see very well and had forgotten her glasses, so Puppet 2 was going to help her by telling her if she got it wrong. To ensure children understood the procedure, they completed a warm-up round in which Puppet 1 mistakenly said a small blue bear toy in the box was a yellow ball and was corrected by Puppet 2.

After the warm-up, children were presented with a series of 16 generic statements about Zarpies from Puppet 1 and corrections from Puppet 2. The statements were modified from those used by Rhodes et al. (2012), and each expressed a unique physical or behavioral property of Zarpies. Children were first told that there were pictures of Zarpies in the box and that Puppet 1 was going to look at them one at a time and tell them what she saw. Puppet 1 then looked inside the box and uttered a generic statement about Zarpies (e.g. "Zarpies have striped hair"). Puppet 2 then also looked inside the box and disagreed with Puppet 1 in one of three ways, depending on condition. In the Generic Negation condition, Puppet 2 corrected Puppet 1 by simply negating the statement (e.g., "No, no, no! Zarpies don't have striped hair"). In the Generic Replacement condition, Puppet 2 instead provided an alternative property (e.g., "No, no, no! Zarpies have spotted hair"). In the Specific condition, Puppet 2 corrected the statement as that it only applied to the depicted individual (e.g., "No, no, no! *This* Zarpie has striped hair"). After each correction, the experimenter moved on to the next statement by Puppet 1, followed by another correction by Puppet 2, and so on. Subjects heard all 16 items in a row.

The third phase, following the puppet show, consisted of questions that probed the child's essentialist beliefs about the novel social category Zarpies. Test items included two measures of essentialist beliefs, modeled on those used in Rhodes et al., (2012): three explanation questions, and three inheritance questions (using a switched at birth task). For the explanation items, children were asked to explain a property that they had not heard about during the puppet show (e.g., "Why is this Zarpie chasing a shadow?") Explanation content and scope were coded according to a schema used in previous research (Cimpian & Erickson, 2012; Cimpian & Markman, 2009; Gelman et al., 2010; Rhodes et al., 2012). Explanation content was coded with intrinsic causes ("he loves to chase shadows") as 1, and with incidental causes ("he wants to catch it") as 0. Explanation scope was coded with category-based explanations ("because Zarpies like to…") as 1, and with individual explanations ("because he likes to…") as 0.

For inheritance items, children were told that a baby was born to a Zarpie mother but raised by a non-Zarpie mother. They were asked to predict whether the baby would display three novel properties of the Zarpie mother, or alternative properties of the adoptive mother, when it grew up. For instance, children were told that the Zarpie mother loves to eat flowers, but the other mother loves to eat crackers, and were asked whether the baby would love to eat flowers or crackers. Inheritance items were also scored for essentialism using a schema from prior work, with properties of the Zarpie mother coded as 1 and those of the adoptive mother coded as 0 (Gelman et al., 2010; Rhodes et al., 2012; Springer & Keil, 1989; Waxman, Medin, & Ross, 2007). After each property, children were asked whether their judgments were flexible, i.e., if the baby might also display the unselected property. Inflexible "no" responses were coded as 1, and flexible "yes" responses were coded as 0 (Rhodes et al., 2012; Taylor, Rhodes, & Gelman, 2009).

Participants' responses were recorded on an answer form by the experimenter, and an independent coder who was blind to the study design coded explanation responses.

Sessions were also videotaped, and a secondary coder transcribed participants' responses verbatim from video and coded all videos for children's responses. Initial agreement between the coders was 87%, with disagreements resolved by the first author.

A set of memory questions was included at the end of the study. The questions differed across conditions and were included in order to check that subjects remembered the corrections from Puppet 2 rather than the original generic statements uttered by Puppet 1. Participant responses were scored such that higher scores in each condition represented endorsement of the properties expressed by Puppet 2.

Results

Experimental Results

Responses consisted of a series of binary responses in which the dependent variables were the number of times participants gave essentialist responses. Data were analyzed with binomial generalized regression models using the Generalized Linear Model (GLM) procedure in SPSS 2.0. Our primary analysis consisted of a total essentialism score -- the total number of essentialist responses given across the explanation items and the inheritance questions, presented as probabilities of essentialist responses across items.

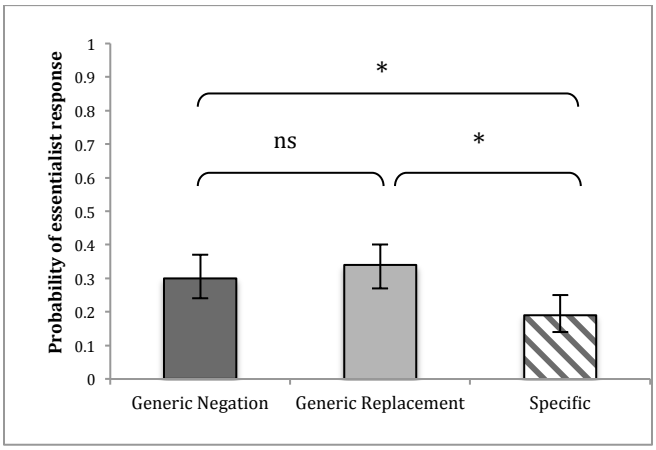

Figure 1: Probabilities of giving an essentialist response by condition: Generic Negation = "Zarpies don't have striped hair;" Generic Replacement = "Zarpies have spotted hair;" Specific = "This Zarpie has striped hair;" (* $p < 0.05$).

Children's essentialist responses varied by condition (Wald X^2 (2) = 12.72, $p < .01$). Children gave more essentialist responses in the Generic Negation condition (e.g., "Zarpies don't have striped hair," $M = .30$, $CI = .24$-$.37$) and the Generic Replacement condition (e.g., "Zarpies have spotted hair," $M = .34$, $CI = .27$-$.40$) than in the Specific condition (e.g., "This Zarpie has striped hair," $M = .19$, $CI = .14$-$.25$; $ps < .05$), and responses in the two Generic conditions did not differ from one another. Relative to the Specific condition, the Generic Negation condition increased the odds of essentialist responses by 1.81, CI = 1.14-2.86, and the Generic Replacement condition increased the odds of essentialist responses by 2.13, CI = 1.35-3.36.

Memory Check Results

Performance on memory check questions showed that memory for corrections from Puppet 2 overall was very good, and exceeded chance overall ($M = .86$, $CI = .81$-$.92$) and within each condition (all $ps < .01$). Memory performance was not correlated with essentialist responses (r (51) = .15, $p = .31$).

Discussion

Hearing generic statements about a novel social category led children to develop the same degree of essentialist beliefs, regardless of whether the generics predicated positive properties of the kind or were simply negative, denying that a given property is shared among the members of the kind. These results are a preliminary indication that generic statements instill essentialist beliefs by signaling that a given category is an appropriate basis for generalizing.

This interpretation does not preclude a role for kind-based explanations in the development of essentialist beliefs. Hearing particular properties expressed in generic language may lead children to view those *properties* in essentialist terms, even if it is not the primary means through which generics increase essentialist beliefs about the kind in general. For example, hearing a novel ability, e.g., *leeming*, associated with a gender category may lead children to expect that *leeming* ability is due to stable, fixed causes linked to category membership. To take a real-world example, hearing athletic ability associated with a racial category might lead people to expect that an individual's athletic ability can be explained and predicted by his race. Thus, generating kind-based explanations may play an important role in the development of children's (and adult's) essentialist beliefs that particular properties are linked to categories (e.g., that athletic ability is linked to race), even if generating such explanations is not critical to the development of essentialist beliefs about kinds more generally (e.g., that race is an essential kind).

One limitation of the current study is that children could be interpreting the negated statements in the Generic Negation condition (e.g., "Zarpies don't have striped hair") as generic statements about negative properties (i.e., the property of not having striped hair.) Future research is investigating this possibility by more fully disassociating properties from the category. In an ongoing follow-up study, Puppet 2 completely rejects Puppet 1's utterance: "No, no, no! That's not what this picture shows. That's not right about Zarpies!" If children are in fact interpreting the negated generic statements in the current study as expressing alternative (negative) properties, then children should not develop increased essentialist beliefs about Zarpies in this new condition. In contrast, if simply hearing a generalization about the category is sufficient to elicit increased essentialism, as the results of the present study

indicate, then children should still develop increased essentialist beliefs in this new condition.

These results also do not provide an exhaustive account of how generic language communicates essentialist beliefs. For instance, it remains unknown how much generic input children need to develop these beliefs, and whether the effects are cumulative across time. The generic input children heard about the novel social category Zarpies in the current design is very limited; children most likely hear significantly more input about the actual categories they come to view in essentialist terms in their daily lives. Future research might investigate if and how these factors modulate the effect of generic language on essentialism.

One interesting question left open by the current findings is the extent to which a listener's existing conceptual structure interacts with the minimal category information offered in the current study. For instance, Gelman et al. (2010) found that hearing a series of generic statements about a novel animal category lead to increased essentialist beliefs about the category in both children and adults. Children and adults generally hold high levels of essentialist beliefs about animal kinds and these beliefs are less dependent on cultural input than social categories (Rhodes & Gelman, 2009). Would minimally informative generics like those used in the current study be even more powerful in eliciting essentialist beliefs about these categories given children's existing essentialist expectations?

In a similar vein, would adults – who hold more established conceptual structure – be equally sensitive to the minimal generics used in the current study? Prior research has shown adults to be susceptible to generic language in developing essentialist beliefs about novel categories, both biological (Gelman et al., 2010) and social (Rhodes et al., 2012). Future research might investigate whether adults, like children, develop these beliefs even if the specific properties expressed in the generic statements are negated. Rhodes et al. (2012) found that adults gave more essentialist responses than children after hearing generic language about Zarpies. Thus, it is possible that adults require even less input than children to develop essentialist beliefs, perhaps due to a more robust expectation that the social world consists of essential kinds.

A more detailed understanding of the ways in which subtle linguistic cues foster the development of essentialist beliefs is of great social importance. Though psychological essentialism can be a powerful tool for learning about regularities in one's environment, viewing certain types of categories, like race and gender, in essentialist terms can have pernicious consequences. Essentialist beliefs about social categories can facilitate social stereotyping and prejudice (Gelman, Heyman, & Legare, 2007; Haslam, Rothschild, & Ernst, 2002; Hirschfield, 1996; Keller, 2005; Leslie, 2008, 2013; Prentice & Miller, 2007). For example, children who hold essentialist beliefs about gender might believe that if one girl is bad at math, then girls in general are probably bad at math (Haslam et al., 2002; Leslie, 2013). Understanding how corrections to generic statements lessen their effect on essentialism implies possible strategies for counteracting stereotyping and prejudice. Based on the current findings, simply negating a generic statement may not be very effective, while correcting the scope of the statement from generic to specific may be more potent.

One reason generic language may have such a powerful effect on the development of stereotypes is that simply negating them is not sufficient to undermine their influence. Thus, hearing a negated generic statement ("girls don't hate math") can nonetheless lead children to conceptualize gender in more essentialist terms. By uttering even a negated generic statement about girls a speaker is communicating the view that gender is a valid category for generalizations. The present results indicate that this alone is sufficient to elicit increased essentialist beliefs.

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