

# Cultural transmission of social essentialism

Marjorie Rhodes<sup>a,1</sup>, Sarah-Jane Leslie<sup>b</sup>, and Christina M. Tworek<sup>a</sup>

<sup>a</sup>Department of Psychology, New York University, New York, NY 10003; and <sup>b</sup>Department of Philosophy, Princeton University, Princeton, NJ 08544

Edited\* by Douglas L. Medin, Northwestern University, Evanston, IL, and approved July 2, 2012 (received for review May 25, 2012)

**Social essentialism entails the belief that certain social categories (e.g., gender, race) mark fundamentally distinct kinds of people. Essentialist beliefs have pernicious consequences, supporting social stereotyping and contributing to prejudice. How does social essentialism develop? In the studies reported here, we tested the hypothesis that generic language facilitates the cultural transmission of social essentialism. Two studies found that hearing generic language about a novel social category diverse for race, ethnicity, age, and sex led 4-y-olds and adults to develop essentialist beliefs about that social category. A third study documented that experimentally inducing parents to hold essentialist beliefs about a novel social category led them to produce more generic language when discussing the category with their children. Thus, generic language facilitates the transmission of essentialist beliefs about social categories from parents to children.**

cognitive development | generic language | social cognition | social categorization | conceptual development

In his seminal work on the psychological foundations of social prejudice, Gordon Allport noted that "... a belief in essence develops. There is an inherent 'Jewishness' in every Jew. The 'soul of the Oriental,' 'Negro blood,' ... 'the passionate Latin' – all represent a belief in essence. A mysterious mana (for good or ill) resides in a group, all of its members partaking thereof" (1, p 174). Psychological essentialism is a pervasive cognitive bias that leads people to view members of a category as sharing a deep, underlying, inherent nature (a category "essence"), which causes them to be fundamentally similar to one another in both obvious and nonobvious ways (2, 3). Numerous previous studies have documented essentialist beliefs about social categories (e.g., gender, race) from the preschool years through adulthood (4–8); however, to date no research has examined the processes underlying the development of these beliefs. The question of how "a belief in essence" develops was the focus of our present studies.

As a pervasive cognitive bias, psychological essentialism shapes how people think about many types of categories. Psychological essentialist beliefs have been studied most often in the context of biological categories (e.g., tigers) (2, 9–11) rather than social categories, such as those described by Allport. For biological categories, psychological essentialism facilitates learning and knowledge acquisition. For example, viewing category members as fundamentally alike allows a child to infer that if one tiger is ferocious, then other tigers will be too, even if the individual tigers look different from each other (e.g., orange and white tigers) (12). Similarly, viewing category-linked properties as arising from an underlying nature allows children to infer that a baby tiger will inevitably grow up to be ferocious, even if it does not appear ferocious at birth (9, 10). When applied to social categories, psychological essentialism can have pernicious consequences, however. As suggested by Allport's observations, essentialist beliefs about social categories (hereinafter referred to as "social essentialism") facilitate social stereotyping and prejudice (13–18). For example, social essentialism facilitates the belief that because one girl is bad at math, girls in general will be bad at math, or that because one member of a racial group commits a criminal act, the group must share a criminal nature (13, 16).

Two aspects of when social essentialism arises provide insight into the processes possibly underlying its development. First,

essentialist beliefs about both biological and social categories have been found early in development (by age 4 y) in every cultural context studied to date, including in both rural and urban communities within the United States (4, 5, 7, 19), among Jewish and Arab children in Israel (8, 20–22), in a small fishing community in Madagascar (6), and among children in Brazil (23). However, whereas young children show essentialist beliefs about all basic animal categories (e.g., tigers, robins, lizards), they hold essentialist beliefs about only a small subset of the social categories with which they are familiar. For example, European American 5-y-olds from several cultural communities within the United States have been found to have essentialist beliefs about gender categories, but not racial categories (19). Thus, psychological essentialism emerges early in development, but young children view only a small subset of social categories in an essentialist manner (24).

Second, across development, substantial cultural variation emerges in which social categories invoke essentialist beliefs. For example, by age 7–10 y, children growing up in more politically conservative communities in the United States have more essentialist beliefs about race compared with children growing up in more politically liberal communities (19). In India, adults from upper social classes view class-based groups in essentialist terms, but adults from lower classes do not (25, 26). Also, within Israel, essentialist beliefs about ethnicity are more common among older children in religious communities than among older children in secular communities (21).

Thus, rudimentary social essentialist beliefs emerge early in development in every cultural context studied to date, yet there is substantial cultural variation in which social categories are viewed in this manner. This pattern suggests that the development of social essentialism results from an interplay between early emerging cognitive biases and cultural input—in particular, that cultural input guides how children map general essentialist biases onto particular categories in their environment. Such a process would explain why some form of social essentialism emerges early in development, but also why children hold essentialist beliefs about only some of the social categories with which they are familiar (those categories for which they receive the requisite form of input), why there is cultural variation in these categories (because input is given about different categories in different communities), and why there is often a lengthy developmental trajectory for social essentialist beliefs (if it takes time to receive a sufficient amount of the input). In these studies, we examined the nature of the cultural input that shapes the development of social essentialism.

We tested the role of a particular form of cultural input, namely, generic language (e.g., "boys play with trucks," "a girl wears pink") (27). Generic statements describe a kind or category in general, rather than some particular members. For example, "boys play with trucks" (a bare plural generic sentence)

Author contributions: M.R. and S.J.L. designed research; C.M.T. performed research; M.R. analyzed data; and M.R. and S.J.L. wrote the paper.

The authors declare no conflict of interest.

\*This Direct Submission article had a prearranged editor.

<sup>1</sup>To whom correspondence should be addressed. E-mail: marjorie.rhodes@nyu.edu.

This article contains supporting information online at [www.pnas.org/lookup/suppl/doi:10.1073/pnas.1208951109/-DCSupplemental](http://www.pnas.org/lookup/suppl/doi:10.1073/pnas.1208951109/-DCSupplemental).

does not refer to a particular boy and need not be true of all boys, but instead reflects a belief about the category in general (14). Similarly, “a girl wears pink” (an indefinite singular generic) does not refer to any particular girl, but rather expresses something about girls in general. These statements can be contrasted with nongeneric sentences, such as “some boys play with trucks” or “this girl wears pink,” which refer to a subset and an individual, respectively.

Previous research has suggested a causal link between hearing generic language and forming essentialist beliefs about animal categories (28, 29). However, children rapidly develop essentialist beliefs about animal categories even in the absence of generic language (2, 30); thus, generic language may have only a weak facilitative effect on the development of essentialism. In contrast, social essentialism develops more slowly, more selectively, and with cultural variation, suggesting that cultural input plays a much more important role. We tested whether generic language plays a powerful role in shaping the development of social essentialism by guiding children to develop essentialist beliefs about social categories that they would not otherwise view in an essentialist manner.

Why might generic language elicit social essentialism? Generic language is usually understood as communicating nonaccidental generalizations. Thus, when children hear generic language describing a new property of a familiar category, they assume that there is a kind-based, causal explanation of why the members have the property. For example, on hearing that “butterflies have dust on their wings,” children offer kind-based explanations (e.g., “butterflies need the dust so they can fly”) (31, 32). Alternately, on hearing the nongeneric description “this butterfly has dust on her wings,” children assume that the cause is incidental (e.g., “she flew through a dusty room”).

We hypothesized that hearing generic language about a novel category would lead children to infer that it is the sort of cohesive, natural kind that supports such explanations. Accordingly, we tested whether hearing generic language about a novel social category leads children to develop essentialist beliefs about the category. For generic language to facilitate the cultural transmission of social essentialism, children also must hear more generic language for categories for which adults in their communities hold essentialist beliefs. Indeed, we further hypothesized that parents would be more likely to produce generic language to describe categories that they themselves view as supporting the kind of category-based explanations described above (33). Thus, we also tested whether holding essentialist beliefs about a social category leads parents to produce more generic language describing the category when talking to their children. Indeed, parents do produce generic language for at least some social categories (gender) (34); yet whether this language causes children to develop essentialist beliefs as they learn about those categories remains unknown. Further, whether parents selectively produce generic language for categories for which they themselves hold essentialist beliefs has not yet been examined. [There is evidence suggesting that parents and children produce more generic language for animals than for artifacts (33, 43, 44), which could be due to domain differences in essentialism. However, because there are many differences in the structure of animal and artifact categories, these studies cannot provide definitive evidence of the role of essentialism in the production of generics. Furthermore, they do not speak to the role of essentialism in the production of generics for social kinds.]

Thus, whether generic language transmits selective, social essentialist beliefs across generations remains an open question. The present studies tested whether two complementary processes underlie the cultural transmission of social essentialism: (i) that parents produce more generic language when they hold essentialist beliefs about a social category, and (ii) that hearing

more generic language leads children to develop essentialist beliefs about the category.

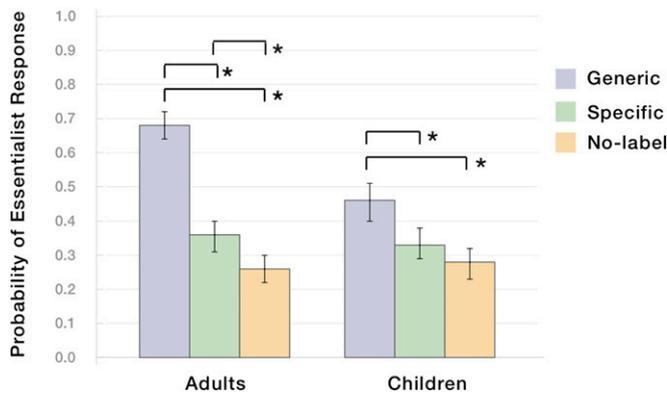
We examined these questions over the course of three studies. The first two studies tested the effects of generic language on the formation of social essentialist beliefs, and the third study tested the effects of essentialist beliefs on parents’ production of generic language in parent–child conversation. The first two studies examined both adult and 4-y-old participants. The 4-y-olds were selected because this is the age at which social essentialism begins to emerge and thus the age at which it is most crucial to examine the processes underlying its formation. Adults were included to test for a developmental “window”—whether sensitivity to generic language is found only in young children or continues into adulthood. Given that learning about the social world continues over a lifetime—and new social categories may be encountered for the first time in adulthood—we predicted that adults would also be sensitive to generic language. The third study examined parent–child pairs, focusing on the parents of preschool-age children. Together, these three studies provide a strong test of whether generic language can serve as a mechanism by which social essentialist beliefs are culturally transmitted.

## Results

**Study 1.** To test whether hearing generic language induces social essentialism, we introduced children and adults to a novel category of people—“Zarpies”—via an illustrated storybook, as in previous work on animal categories (28). Each page presented a picture of a single person displaying a unique physical or behavioral property. The characters were diverse with respect to sex, race, and age; thus, the novel category cut across groupings for which people might already have essentialist beliefs. For example, if all of the “Zarpies” were Asian, subjects might apply essentialist beliefs to the group because they generally have essentialist beliefs about race. Because the novel group is so diverse, it would initially appear arbitrary (35); thus, levels of essentialism in the absence of generic language should be low (as confirmed by comparison conditions).

A single line of text describing the depicted property accompanied each page using the language specified by the participant’s condition: *generic* (e.g., “Look at this Zarpie! Zarpies are scared of ladybugs”) or one of two comparison conditions (*specific*, e.g., “Look at this Zarpie! This Zarpie is scared of ladybugs!” or *no label*, e.g., “Look at this one! This one is scared of ladybugs”). Participants were randomly assigned to one of these three conditions. In study 1a, adult participants read the storybook twice before completing the test questions. In study 1b, a trained experimenter read 4-y-old participants the storybook four times over the course of two research sessions approximately 3 d apart. Children completed the test questions in a third research session approximately 3 d later. The test questions comprised multiple measures of essentialist beliefs, which assessed the extent to which participants (i) expect properties associated with the new category to be innate and inevitable (*inheritance* items), (ii) expect properties attributed to a single category member to extend to other category members (*induction* items), and (iii) view category membership as causing/explaining the development of typical properties (*explanation* items).

In study 1a, adults gave more essentialist responses in the generic condition compared with the specific and no-label conditions ( $P < 0.001$ ), and more essentialist responses in the specific condition compared with the no-label condition ( $P = 0.001$ ) [main effect condition; Wald  $\chi^2(2) = 169.90, P < 0.001$ ] (Fig. 1). The generic condition increased the odds of an essentialist response by 6.07 [Wald 95% confidence interval (CI) = 4.56, 8.08] relative to the no-label condition. In study 1b, children gave more essentialist responses in the generic condition than in the specific condition ( $P = 0.002$ ) or no-label condition ( $P < 0.001$ ), but responses to the specific and no-label conditions did not



**Fig. 1.** Probabilities of essentialist responses by condition for study 1a (adults) and study 1b (children). Error bars represent Wald 95% CIs.

differ [condition, Wald  $\chi^2(2) = 25.69, P < 0.001$ ] (Fig. 1). The generic condition increased the odds of an essentialist response by 2.21 (95% CI = 1.62, 3.03) relative to the no-label condition. Thus, study 1 demonstrates that hearing generic language about a novel, diverse social category led to the formation of essentialist beliefs about that category among both 4-y-olds and adults.

**Study 2.** Study 2 tested another form of generic language, indefinite singular generic sentences (e.g., “A Zarpie sleeps in tall trees”). Like bare plural generic sentences (the form of generic language used in study 1), indefinite singulars are about kinds and categories, not individuals; for example, “a cow says ‘moo’” asserts something about cows in general, not about one specific cow (27, 36). However, unlike bare plural noun phrases, indefinite singular noun phrases are grammatically singular. In the two comparison conditions of study 1 (specific and no-label), the subjects of the sentences were singular noun phrases, whereas in the generic condition, they were plural noun phrases. Thus, based on the findings of study 1, it is possible that it is not generic language per se, but simply the use of plural noun phrases, that leads to essentialism. Testing indefinite singulars allows us to control for singularity/plurality across the conditions, to provide a more stringent test of whether it is generic language per se that induces essentialism. This important issue has not been addressed in any previous work on the role of generic language in the development of essentialism, including work on the case of animal categories.

In study 2a, adults were randomly assigned to either the generic condition (indefinite singular; e.g., “A Zarpie sleeps in tall trees”) or the specific condition (e.g., “This Zarpie sleeps in tall trees”). For study 2b, children—like adults—completed the entire study in a single research session. An experimenter read the assigned condition two times and then immediately asked the test questions. Because of this procedural change, we also included a bare plural generic condition, to replicate the findings from study 1b. In this way, study 2b also allowed us to assess whether children need extended generic input (multiple sessions over the course of a week) to essentialize, or whether these effects emerge more rapidly. Thus, children were randomly assigned to one of three conditions: generic bare plural (e.g., “Zarpies sleep in tall trees”), generic indefinite singular (e.g., “A Zarpie sleeps in tall trees”) or specific (e.g., “This Zarpie sleeps in tall trees”).

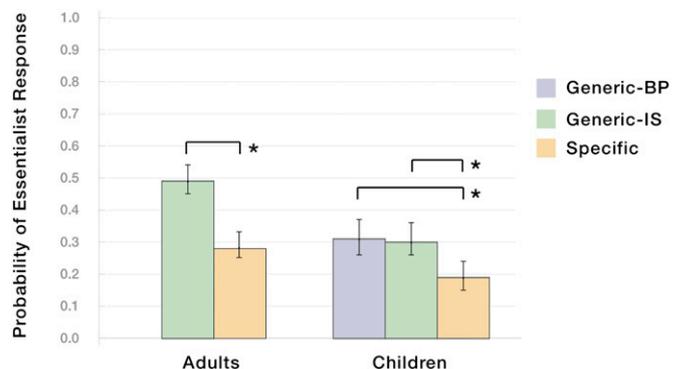
Adults in study 2a gave more essentialist responses in the generic indefinite singular condition than in the specific condition [Wald  $\chi^2(1) = 41.17, P < 0.01$ ] (Fig. 2). The generic condition increased the odds of an essentialist response by 2.45 (95% CI = 1.86, 3.26). Children in study 2b gave more essentialist responses in both of the generic conditions than in the specific condition ( $P < 0.001$ ), whereas the two generic

conditions did not differ from one another [condition, Wald  $\chi^2(2) = 15.55, P < 0.001$ ] (Fig. 2). The generic bare plural condition increased the odds of an essentialist response by 1.94 (95% CI = 1.35, 2.79) relative to the specific condition; the generic indefinite singular condition increased the odds of an essentialist response by 1.85 (95% CI = 1.29, 2.65). Thus, study 2 confirms that it is generic language per se—not simply the use of plural noun phrases—that underlies the formation of essentialist beliefs. Further, whereas study 1 provided children with extended exposure to generic language over time, study 2 confirms that hearing generic language leads to the rapid formation of essentialist beliefs among 4-y-olds.

**Study 3.** Studies 1 and 2 show that hearing generic language elicits social essentialism. For generic language to serve as a mechanism by which communities transmit essentialist beliefs, then people must also selectively produce generic language when they have essentialist beliefs about a social category. Study 3 tested this prediction with an experimental study of parent–child interactions. First, parents were introduced to the category “Zarpies” via a paragraph that led them to hold essentialist beliefs about Zarpies (by describing Zarpies as a distinct kind of people with many biological and cultural differences from other social groups) or nonessentialist beliefs about Zarpies (by describing Zarpies as a nondistinct kind of people, with many biological and cultural similarities to other populations). A pilot study with a separate sample of adult participants ( $n = 20$ ) confirmed that the essentialist paragraph (mean = 0.76, 95% CI = 0.68, 0.82) elicited more essentialist beliefs about Zarpies (as indicated by scores on the inheritance and induction items used in studies 1 and 2) than the nonessentialist paragraph [mean = 0.57, 95% CI = 0.49, 0.65, Wald  $\chi^2(1) = 10.30, P = 0.001$ ].

After reading the introductory paragraph, parents received a picture book containing the illustrations used in studies 1 and 2, with no accompanying text. They were asked to talk through the picture book with their child and describe the people and events depicted, just as they would a picture book at home. No other instructions were provided. The entire parent–child conversation was videotaped and transcribed. References to the characters in the story were coded as generics (e.g., “Zarpies are scared of ladybugs!”), Zarpie category labels (e.g., “This Zarpie is scared of the ladybug!”), pronouns (e.g., “She is scared of the ladybug!”), social category labels other than Zarpie (e.g., “This woman is scared of the ladybug!”), or as universally quantified (e.g., “All Zarpies are scared of ladybugs!”).

The total number of parent utterances did not differ by condition [essentialist, mean =  $117.67 \pm 68.42$ ; nonessentialist, mean =  $119.30 \pm 37.91$ ;  $t(17) = -0.06, P = \text{not significant}$ ], and neither did the number of utterances referencing the characters



**Fig. 2.** Probabilities of essentialist responses by condition for study 2a (adults) and study 2b (children). Error bars represent Wald 95% CIs.

**Table 1. Percentage of character references fitting each code by condition, study 3**

	Essentialist	Nonessentialist
Generic	14.32 (2.56)	6.04 (1.78)*
Label	10.93 (3.97)	8.56 (4.70)
Pronoun	61.99 (5.14)	68.99 (5.72)
Other category	10.93 (1.91)	15.30 (4.16)
Quantified	1.84 (0.89)	1.11 (0.62)

Numbers in parentheses are means  $\pm$  SE.

\*Different from essentialist condition,  $P < 0.05$ .

in the pictures [essentialist, mean  $67.67 \pm 30.97$ ; nonessentialist, mean =  $66.80 \pm 22.32$ ;  $t(17) = 0.07$ ,  $P =$  not significant]. However, a higher percentage of the character references were generic in the essentialist condition compared with the nonessentialist condition [ $t(17) = 2.15$ ,  $P < 0.05$ ] (Table 1). No other type of character reference differed by condition. Thus, as predicted, parents produced more generic language when they were induced to hold essentialist beliefs. We also coded the content of the conversation for evaluative comments (i.e., statements that a character was doing something positive, e.g., “they’re cool, right?” or negative, e.g., “that’s yucky”). Parents produced more negative evaluations in the essentialist condition than in the nonessentialist condition [mean,  $2.55 \pm 0.67$  vs.  $0.70 \pm 0.34$ ;  $t(17) = 2.56$ ,  $P = 0.02$ ]. Positive evaluations did not differ by condition (essentialist, mean =  $0.22 \pm 0.15$ ; nonessentialist, mean =  $0.10 \pm 0.10$ ).

## Discussion

These three studies provide strong evidence that generic language is a mechanism by which social essentialist beliefs can be transmitted from parents to children. As shown in studies 1 and 2, hearing generic language about a novel social category led both preschool-age children and adults in our samples to develop essentialist beliefs about the category. The effect of generic language was not simply a function of the plurality of the subject noun phrase, because both bare plural generics (e.g., “Zarpies are scared of ladybugs”) and indefinite singular generics (e.g., “A Zarpie is scared of ladybugs”) induced essentialism. Furthermore, in the children, we found both immediate effects (when the input and testing occurred within a single session in study 2) and effects that persisted over time (when children were exposed to generic input over the course of several days and tested 3 d later in study 1). Thus, the effects of generic language appear to be powerful and robust.

These findings are particularly striking because the novel category was diverse with respect to race, ethnicity, age, and sex; did not map onto any preexisting social category for which people might already hold essentialist beliefs (24); and thus initially appeared arbitrary. Furthermore, the properties used in the test questions were very unusual ones that people are not normally expected to possess (e.g., disliking ice cream, eating flowers). However, essentialist responses involved projecting these properties. For example, the inheritance items asked participants to consider a baby born to a Zarpie mom who likes to eat flowers but raised by a non-Zarpie mom who likes to eat crackers. To evidence essentialist beliefs on this question, participants had to overcome the general expectation that people prefer to eat crackers rather than flowers.

As would be expected, then, given both the diversity of the category and the unusualness of the properties, baseline levels of essentialism (as shown in the comparison conditions of studies 1 and 2) were very low. However, fairly minimal exposure to generic language (several readings of a storybook) approximately doubled the essentialist responses among children, and had even larger effects in adults. Thus, accumulating exposure to generic

language over time, as children learn about familiar social categories in their everyday environment (34), could perhaps lead to even more dramatic increases in social essentialism. Indeed, the effect of generic language appeared to be stronger among children in study 1 (where children received more input across several sessions) than in study 2 (where children received less input in a single session), suggesting that the effects of generic language may increase over time with increasing input.

In study 3, the parents were more likely to produce generic language when speaking with their children about a social category for which they themselves held essentialist beliefs. To experimentally test the causal influence of essentialism on the production of generics, we induced parents’ essentialist beliefs by describing Zarpies as having different biological and cultural properties from other social groups; nothing was said about whether Zarpies were similar to one another. Furthermore, parents were never shown Zarpies sharing any properties; like the participants in studies 1 and 2, they saw only one Zarpie at a time in the picture book, each of which displayed a unique property (e.g., one Zarpie was shown flipping in the air, the next sleeping in a tree, and so on). However, despite the fact that no within-category similarities were described in the essentialist prime or shown in the picture book, inducing essentialism led parents to produce generic sentences when talking about Zarpies with their children (e.g., generating such sentences as “Zarpies sleep in tall trees”).

These data do not show that generic language *creates* essentialist thought. Essentialist beliefs (e.g., that categories are innate, coherent, and causally powerful) go far beyond any content that is explicitly communicated by generic language, and essentialism can emerge in the absence of generic language, such as in the case of animal kinds (30). Rather, social essentialism appears to result from the interplay of cognitive biases and cultural input; children’s cognitive biases lead them to assume that some or other social categories reflect essential kinds, and generic language signals to them to which categories they should apply these beliefs.

These studies indicate that generic language can facilitate the transmission of social essentialism from one generation to another. To determine whether this mechanism accounts for cross-cultural variation in social essentialism, future work will need to test whether the effects obtained in the populations studied here (which consisted primarily of educated middle-class families in a diverse, urban environment) extend to other cultural communities. Certainly other cultural factors—for example, the degree to which a category serves as the basis of segregation or differential treatment (20, 22, 37)—could also play roles in shaping the development of social essentialism.

Given the pernicious consequences of social essentialism, elucidating the processes underlying its development is a critical goal. Indeed, in study 3, parents who were induced to hold essentialist beliefs about Zarpies were more likely to produce negative evaluative statements about them. Thus, these data suggest that inducing essentialism may contribute to negative social attitudes (13, 16, 38–40). Understanding the mechanisms that underlie the development of social essentialism could provide guidance on how to disrupt these processes, and thus perhaps on how to



Fig. 3. Sample Illustrations.

reduce stereotyping and prejudice. As a society, we often change the way we speak about a given social group (e.g., when a label comes “politically incorrect”); grounding these changes in mechanisms that have been empirically shown to influence the formation of essentialist beliefs could lead to more effective efforts to reduce societal prejudice.

## Materials and Methods

**Participants.** Adults in study 1a (53 females, 8 males) and study 2a (22 females, 18 males) were undergraduate students at New York University who volunteered to participate. Children in study 1b (24 males, 22 females; median age, 4.70 y; age range, 4.0–5.5 y) were recruited from private preschools across New York City. Children in study 2b (21 males, 21 females; mean age, 4.81 y; age range, 4.50–5.36 y) and families in study 3 (19 parents, 9 males and 10 females; 19 preschool-age children, 7 males and 12 females; mean age, 4.2 y; age range, 3.0–5.44 y) were recruited from the Children’s Museum of Manhattan. The sample was ~64% European American, 9% African American, 21% Asian American, and 6% Hispanic. All participants spoke English as their first language. All study procedures were approved by the Institutional Review Board of New York University. Written informed consent was obtained from adult participants and parents of participating children; children provided oral assent.

**Materials.** The picture book consisted of 16 illustrated pages (identical across conditions and studies; Fig. 3 presents sample items). Each page presented a picture of a single person displaying a unique physical or behavioral property (e.g., “This Zarpie...chases shadows, loves to eat flowers, has striped hair, sleeps in tall trees”). The characters were diverse with respect to sex (half male, half female), race/ethnicity (four white, four black, four Latino, and four Asian), and age (four young children, four older children, four adults, and four older adults). To allow for a visual identifier of category membership, the characters had a category-typical clothing style, but no single clothing feature was a necessary or defining feature of category membership. In studies 1 and 2, a statement describing the character’s action, using the form of language specified by the condition, accompanied each illustration (Tables S1 and S2). In study 3, no text accompanied the illustrations. For study 3, materials also included introductory paragraphs to induce essentialist or nonessentialist beliefs about Zarpies (SI Text).

**Procedure.** In studies 1a and 2a, adults were given a printed copy of the picture book and asked to read it twice. They were then given a booklet containing all of the test questions (with accompanying illustrations) and asked to complete the test items on their own. The test items included three

measures of essentialist beliefs (SI Text), all modeled on previous work (28): explanations (four items) (28, 31, 32), inheritance (three items) (4, 5, 9, 10, 41), and induction (six items) (12). Identical materials were used in studies 1b and 2b, but the stories and test questions were presented verbally to children in individual research sessions. The experimenter recorded the children’s responses on an answer form. Child sessions were also videotaped. A secondary coder coded all videos for children’s responses. The percent agreement between the live coder and video coder was 95%, with disagreements resolved by the first author. In studies 1a and 1b, after the test items, participants completed an assessment of their memory for the stories; analyses of these data confirmed that memory could not account for the obtained pattern of condition differences in essentialism (SI Text). For study 3, sessions were videotaped, and parent–child conversations were transcribed verbatim. The first and second authors, blinded to condition, coded each utterance according to the scheme provided in Table S3. Initial interrater reliability was 94%, with differences resolved by discussion.

**Analyses** For studies 1 and 2, data were composed of a series of binary responses. Data were analyzed with binomial regression models, testing for an effect of condition separately for each age group, followed by post hoc contrasts with sequential Bonferroni corrections. The dependent variables were entered as the number of times that participants gave essentialist responses out of the total test items. These analyses yielded Wald  $\chi^2$  values as indicators of significant effects. For ease of interpretation, data are presented as probabilities of essentialist responses, accompanied by Wald 95% CIs. Our main analyses examined a composite measure summing all essentialist responses across the three measures (Cronbach’s  $\alpha = 0.85$ ). Similar patterns were found across each measure of essentialism examined separately; descriptive statistics for each measure of essentialism are available in Tables S4 and S5. For study 3, the percentage of category references fitting each code was compared across condition via a series of independent-samples *t* tests, as were the number of negative and positive evaluations.

**ACKNOWLEDGMENTS.** We thank Dr. Susan Gelman for providing the materials from previous work on which the present materials were modeled; Kelli Grobe and Greg Kirschen for assistance with data collection; the staff and families at Temple Emanu-El Nursery School, Park Avenue Christian Church Day School, and the Children’s Museum of Manhattan for participating in this research; Karl Edwards for study illustrations; and Dr. Todd Gureckis for assistance with figure preparation. Funding was provided by a seed grant from the New York University Institute for Human Development and Social Change (to M.R. and S.J.L.) and by National Science Foundation grant BCS-1147543 (to M.R.).

- Allport GW (1954) *The Nature of Prejudice* (Addison-Wesley, Oxford), p 174.
- Gelman SA (2003) *The Essential Child: Origins of Essentialism in Everyday Thought* (Oxford Univ Press, New York).
- Medin DL, Ortony A (1989) *Similarity and Analogical Reasoning*, eds Vosniadou S, Ortony A (Cambridge Univ Press, New York), pp 179–195.
- Hirschfeld LA (1995) Do children have a theory of race? *Cognition* 54:209–252.
- Taylor MG, Rhodes M, Gelman SA (2009) Boys will be boys; cows will be cows: Children’s essentialist reasoning about gender categories and animal species. *Child Dev* 80:461–481.
- Astuti R, Solomon GEA, Carey S (2004) Constraints on conceptual development: A case study of the acquisition of folkbiological and folksociological knowledge in Madagascar. *Monogr Soc Res Child Dev* 69:1–135, vii–viii, discussion 136–161.
- Waxman SR (2010) Names will never hurt me? Naming and the development of racial and gender categories in preschool-aged children. *Eur J Soc Psychol* 40:593–610.
- Diesendruck G, HaLevi H (2006) The role of language, appearance, and culture in children’s social category-based induction. *Child Dev* 77:539–553.
- Waxman S, Medin D, Ross N (2007) Folkbiological reasoning from a cross-cultural developmental perspective: Early essentialist notions are shaped by cultural beliefs. *Dev Psychol* 43:294–308.
- Gelman SA, Wellman HM (1991) Insides and essences: Early understandings of the non-obvious. *Cognition* 38:213–244.
- Medin DL, Atran S (2004) The native mind: Biological categorization and reasoning in development and across cultures. *Psychol Rev* 111:960–983.
- Gelman SA, Markman EM (1987) Young children’s inductions from natural kinds: The role of categories and appearances. *Child Dev* 58:1532–1541.
- Leslie SJ The original sin of cognition: Fear, prejudice, and generalization. *J Philos*, in press.
- Leslie SJ (2008) Generics: Cognition and acquisition. *Philos Rev* 117:1–47.
- Prentice DA, Miller DT (2007) Psychological essentialism of human categories. *Curr Dir Psychol Sci* 16:202–206.
- Haslam N, Rothschild L, Ernst D (2002) Are essentialist beliefs associated with prejudice? *Br J Soc Psychol* 41:87–100.
- Hirschfeld LA (1996) *Race in the Making: Cognition, Culture, and the Child’s Construction of Human Kinds* (MIT Press, Cambridge, MA).
- Keller J (2005) In genes we trust: The biological component of psychological essentialism and its relationship to mechanisms of motivated social cognition. *J Pers Soc Psychol* 88:686–702.
- Rhodes M, Gelman SA (2009) A developmental examination of the conceptual structure of animal, artifact, and human social categories across two cultural contexts. *Cognit Psychol* 59:244–274.
- Deeb I, Segall G, Birnbaum D, Ben-Eliyahu A, Diesendruck G (2011) Seeing isn’t believing: The effect of intergroup exposure on children’s essentialist beliefs about ethnic categories. *J Pers Soc Psychol* 101:1139–1156.
- Diesendruck G, Haber L (2009) God’s categories: The effect of religiosity on children’s teleological and essentialist beliefs about categories. *Cognition* 110:100–114.
- Birnbaum D, Deeb I, Segall G, Ben-Eliyahu A, Diesendruck G (2010) The development of social essentialism: The case of Israeli children’s inferences about Jews and Arabs. *Child Dev* 81:757–777.
- Sousa P, Atran S, Medin D (2002) Essentialism and folkbiology: Evidence from Brazil. *J Cogn Cult* 2:195–223.
- Haslam N, Rothschild L, Ernst D (2000) Essentialist beliefs about social categories. *Br J Soc Psychol* 39:113–127.
- Mahalingam R (2007) Essentialism, power, and the representation of social categories: A folk sociology perspective. *Hum Dev* 50:300–319.
- Mahalingam R, Rodriguez J (2006) Culture, brain transplants and implicit theories of identity. *J Cogn Cult* 6:453–462.
- Carlson GN, Pelletier FJ (1995) *The Generic Book* (Chicago Univ Press, Chicago).
- Gelman SA, Ware EA, Kleinberg F (2010) Effects of generic language on category content and structure. *Cognit Psychol* 61:273–301.
- Waxman SR, Lynch EB, Casey KL, Baer L (1997) Setters and Samoyeds: The emergence of subordinate level categories as a basis for inductive inference in preschool-age children. *Dev Psychol* 33:1074–1090.
- Diesendruck G (2003) Categories for names or names for categories? The interplay between domain-specific conceptual structure and language. *Lang Cogn Process* 18: 759–787.

