CHILD DEVELOPMENT

Child Development, March/April 2011, Volume 82, Number 2, Pages 471–492

The Generic/Nongeneric Distinction Influences How Children Interpret New Information About Social Others

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These studies investigate how the distinction between *generic* sentences (e.g., ''Boys are good at math'') and *nongeneric* sentences (e.g., ''Johnny is good at math'') shapes children's social cognition. These sentence types are hypothesized to have different implications about the *source* and *nature* of the properties conveyed. Specifically, generics may be more likely to imply that the referred-to properties emerge naturally from an internal source, which may cause these properties to become essentialized. Four experiments (N = 269 four-year-olds and undergraduates) confirmed this hypothesis but also suggested that participants only essentialize the information provided in generic form when this construal is consistent with their prior theoretical knowledge. These studies further current understanding of language as a means of learning about others.

Although children are keen observers of those around them, much of what they know about people undoubtedly also stems from what they *are told* (e.g., Gelman, 2009; Harris & Koenig, 2006). By attending to what others say, children can gain information about the people and events they are observing, as well as about things that are displaced in space and time and would likely be inaccessible without language. Although most of the information acquired through language is carried by the literal meaning of the utterances children hear, often the linguistic message also contains subtle, but important, implications that supplement this primary level of meaning. In this article, we focus on the subtle implications of *generic language* (Carlson, 1977; Carlson & Pelletier, 1995; Gelman, 2004; Leslie, 2008; Prasada, 2000). On the surface, a category-referring generic sentence (e.g., ''*Boys* are good at math'') and a nongeneric sentence (e.g., ''*This boy* is good at math,'' ''*Some boys* are good at math'') differ in the size of their referent sets—a generic sentence is typically about more individuals than its nongeneric counterpart, a fact that even preschoolers are sensitive to (Chambers, Graham, & Turner, 2008; Gelman, Star, & Flukes, 2002; see also Cimpian, Gelman, & Brandone, 2010; Leslie, 2008). Our main claim here is that the meaning differences go deeper: Aside from its broader scope, a generic sentence is also more likely to imply that the information it conveys is *essential* (Bloom, 2004; Gelman, 2003; Medin & Ortony, 1989) or *central* to the identity of its referents than an equivalent nongeneric sentence. For example, generic sentences such as ''Girls are really good at a game called 'gorp''' or ''Boys have something called 'thromboxane' in their brains'' may convey—in addition to the fact that there are many boys and girls who display these novel features—that being good at gorp and having thromboxane in one's brain are *deep, inherent facts* about being a girl or a boy, respectively. In contrast, hearing nongeneric sentences such as ''There's a girl who is really good at a game called 'gorp''' or ''There's a boy who has something called 'thromboxane' in his brain'' may lead one to think that these features are more superficial or temporary—perhaps the products of externally driven

This research is based, in part, on a doctoral dissertation submitted to Stanford University by Cimpian. Generous financial support was provided to Cimpian by the University of Illinois and by an Elizabeth Munsterberg Koppitz Child Psychology Graduate Fellowship from the American Psychological Foundation. Portions of this research were presented at the 2009 biennial meeting of the Society for Research in Child Development in Denver, CO. We would like to thank Lera Boroditsky, Herb Clark, Carol Dweck, Cindy Fisher, Vikram Jaswal, Yuyan Luo, Meredith Meyer, and Joe Robinson for their helpful comments on this research and on the manuscript; Adrienne Sussman, Ben Boldt, and the Cognitive Development Lab team at the University of Illinois for their able assistance in data collection and coding; and the children, parents, and teachers at Bing Nursery School, where much of this research was conducted.

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 0009-3920/2011/8202-0004
DOI: 10.1111/j.1467-8624.2010.01525.x

causal processes such as teaching or contamination, respectively. The four experiments reported in this article provide evidence for this hypothesis but also refine it to show how the influence of the generic/nongeneric distinction is modulated by factors such as the nature of the social category and the nature of the property referred to. First, however, we provide some background on generic language.

Generic Language: Semantic Properties, Frequency, Comprehension

In the social domain, generic sentences are a common vehicle for *stereotypes* (as in ''Boys are good at math''). What's more, generics are a particularly powerful means of transmitting stereotypes because they are often accepted on the basis of scant evidence (e.g., Abelson & Kanouse, 1966; Gelman & Bloom, 2007), and, once accepted, they are resistant to counterevidence (e.g., Chambers et al., 2008; Gelman, 2004; Prasada, 2000).

Lax Truth Conditions

The evidential threshold for accepting a generic can be quite low. In their pioneering research on generic assertions as ''persuasive appeals in political and ideological controversy,'' Robert Abelson et al. (e.g., Abelson & Kanouse, 1966; Gilson & Abelson, 1965) found that adults were often willing to accept a generalization such as ''Gleeps have gadgets'' even though only *one third* of gleeps had gadgets. Thus, they concluded that ''a persuasive communicator can sway his audience'' by establishing ''the apparent validity of a generic assertion on the basis of fragmentary evidence'' (Abelson & Kanouse, 1966, p. 172). Although the bar for accepting a generic is set rather low for adults, it may be even lower for children. In fact, children may accept what adults tell them on the basis of no evidence other than their inherent ''trust in testimony'' (e.g., Gelman & Markman, 1986; Harris & Koenig, 2006). It is only under special circumstances (e.g., when an adult commits gross errors such as consistently mislabeling common household objects) that children are likely to question the information they receive from adults (e.g., Jaswal & Neely, 2006; Koenig, Clement, & Harris, 2004).

Resistance to Counterevidence

Once accepted, a generic statement is difficult to disprove. Unlike universally quantified sentences (e.g., ''*All boys* are good at math'')—which are another means of conveying broad-scope information—generics remain true even in the face of exceptions, almost to the point of being unfalsifiable. For example, encountering boys who are not good at math falsifies ''All boys are good at math'' but not its generic analog, ''Boys are good at math.'' Chambers et al. (2008) demonstrated that even 4-year-olds ignore counterexamples to the facts learned from generic sentences.

Frequency in Child-Directed Speech

Not only do generics have powerful semantic properties, but they are also quite frequent in speech directed to young children. In a study of parent–child conversations in everyday contexts, Gelman, Goetz, Sarnecka, and Flukes (2008) found that generics made up 3%–4% of the total number of utterances children (aged 2–4) and parents exchanged (see also Gelman & Tardif, 1998). This amount of generic input is substantial, especially considering adults' tendency to focus on the decidedly specific aspects of the ''here and now'' in speech to young children (e.g., Harris, Jones, & Grant, 1983). The frequency of generics appears to be even higher in the context of reading picture books (Gelman, Chesnick, & Waxman, 2005; Gelman, Coley, Rosengren, Hartman, & Pappas, 1998; Gelman, Taylor, & Nguyen, 2004).

Comprehension

The task of distinguishing between generic and nongeneric statements is complicated by the fact that there is no straightforward, one-to-one mapping between surface linguistic cues and generic meaning (e.g., Cimpian & Markman, 2008; Gelman & Raman, 2003). Given the lack of an unambiguous grammatical marker for genericity, a listener must use a variety of other, often extralinguistic, sources of information in order to discern whether a sentence was meant as generic or nongeneric. Although this may seem a significant obstacle for young children, they are in fact up to the challenge. Recent research has shown that, by the time they are in preschool, children are able to tell apart generic and nongeneric sentences on the basis of a variety of lexical (Chambers et al., 2008; Gelman et al., 2002; Hollander, Gelman, & Star, 2002), morphosyntactic (Gelman & Raman, 2003), contextual-pragmatic (Cimpian & Markman, 2008; Gelman & Raman, 2003), and world-knowledge (Cimpian & Markman, 2008) cues.

The Argument: Generics Imply That the Information They Convey Is Essential

The research reviewed in the previous section suggests that generic assertions are (a) often accepted on the basis of little to no evidence despite their very broad scope, (b) difficult to disconfirm, (c) frequent in child-directed speech, and (d) understood appropriately by preschool-age children. Even when considering just these features, it is clear that generic language has the potential to shape what children know about social others. Rather than being a neutral vehicle for this type of information, however, generic language might also imply that what is being conveyed are *deep, essential facts* about its referents. Explicitly, a generic sentence such as ''Girls are good at 'gorp''' establishes a mapping between a property (being good at ''gorp'') and the members of a category (girls). We hypothesize that, implicitly, such a sentence may also be informative about the *origin* and *nature* of the property it refers to. Specifically, the generic may imply that being good at ''gorp'' is a natural consequence of membership in the *girl* category. As such, this generically conveyed property might also be expected to originate from within the individuals themselves (rather than from some external influence), to emerge naturally and effortlessly (rather than as a result of some intervention), and to be relatively stable and enduring (rather than have specific starting and ending points). We will refer to properties whose construal matches this pattern as *essential* or *essentialized*.

According to the psychological essentialism view (see Bloom, 2004; Gelman, 2003; Medin & Ortony, 1989), conceptual representations consist of dense clusters of correlated features (e.g., birds build nests in trees, have wings, fly, etc.) that are connected to one another by causal–explanatory links (e.g., having wings enables flight). Moreover, the direction of these causal links establishes a hierarchy in the cluster, with features that cause or generate others being represented as deeper, more central, or more important (e.g., Ahn, Kim, Lassaline, & Dennis, 2000; Medin & Ortony, 1989). On this view, people also believe that categories have ''essences''—for example, that there is *something* (deep, internal, hidden) that makes a bird what it is. Although the essence is often described as a *single* feature (see Gelman, 2003), in practice most research on psychological essentialism has investigated a broader set of ''essential'' properties, where ''essential'' is roughly synonymous to ''central,'' ''deep,'' or ''important.'' For example, Gelman and Wellman (1991) frame their classic studies as testing ''whether children consider [nonobvious properties, such as insides] essential in the sense of specially important'' (p. 240). They also argue that ''internal, inborn, and intrinsic features can all be . . . in some sense 'essential''' (p. 240), or at least ''relatively more essential than outer surfaces'' (p. 223). That children are able to distinguish between more versus less essential features of a category is a core prediction of psychological essentialism. Here, we capitalize on this prediction and test whether generic language is one mechanism through which novel features can come to be represented as relatively essential (in this broader usage of the term). Note, however, that our studies were not designed to test whether children believe in the existence of a single category essence, nor are we arguing that the properties learned from generics are thought to be the essence per se. Instead, we are arguing that novel properties introduced via generics are more likely to be construed as *central, deep, stable, inherent*—in a word, essential—than properties introduced via nongenerics.

It is important to point out that, in principle, generic language can be used to convey both deep and superficial properties (Prasada & Dillingham, 2006). In fact, there are many familiar generics that refer to properties that have a statistical, rather than causally deep, link to the relevant categories (e.g., ''Fire trucks are red''). Thus, if children derive essentialist implications from the generic form of the novel properties, this interpretation cannot be a trivial consequence of the linguistic construction per se. That is, since generics are not exclusively dedicated to expressing essential properties, it will be all the more remarkable if we find that children who hear novel properties in a generic frame construe them to be stable, deep, and inherent. (Children's construal might vary, though, depending on the categories and properties involved. This issue is discussed later.)

Previous Evidence

Although versions of the hypothesis that generic sentences have essentialist implications have been proposed before (Dahl, 1975; Gelman, 2004; Prasada, 2000), to date there is little empirical evidence for it. Perhaps the strongest case in its favor was made by Hollander, Gelman, and Raman (2009), who demonstrated that a property provided generically becomes a more valid cue to category membership than the same property provided nongenerically. Preschoolers were first shown a novel animal (e.g., ''This is a bant'') and told something about it using either a generic (e.g., ''Bants have stripes'') or a nongeneric (e.g., ''This bant has stripes'') sentence. When the children were subsequently asked which of two test items was also a ''bant,'' their categorization/naming decisions showed more reliance on the highlighted feature (e.g., stripes) if it had been presented in generic form than in nongeneric form. It is unclear, however, to what extent this result actually supports the hypothesis that children *essentialize* the facts learned from generics. An alternative explanation may be that generically conveyed facts are understood, by virtue of generics' literal meaning, to be *more prevalent*. For example, if ''Bants have stripes'' is taken to mean roughly that most bants have stripes, then a child could reasonably assume that any animals without this property are relatively unlikely to be bants. Hollander et al. themselves acknowledge that their results leave open the question of ''whether children think that the property [heard in generic form] is relatively central to the category (i.e., that it has a principled or essential link), or instead whether they think that the property is statistically prevalent in the category'' (p. 501). Our goal in this article is to provide a direct and unambiguous test of generics' essentialist implications in the context of social categories.

The Strategy: Use Children's Open-Ended Explanations

To determine whether children essentialize socially relevant facts learned from generic sentences more than analogous facts learned from nongeneric sentences, we asked them to explain these facts (e.g., ''Why are girls good at 'gorp'?''). Open-ended explanations, a measure also used in other studies of essentialism (e.g., Taylor, Rhodes, & Gelman, 2009), are well suited to our purpose in this article because they reveal the nature of the causal links children forged to make sense of the new information. By analyzing children's explanations, then, we may be able to infer the new features' status as more versus less essential. For example, a child who answers the question ''Why are girls good at 'gorp'?'' by saying ''because girls are really smart'' seems to have a more essentialized conception of this property than a child who responds with ''because they practiced a lot.'' The first answer implies that ''gorp'' ability is a direct consequence of girls' inherent intelligence, not something they learned or put effort into, whereas effort is precisely what the second answer highlights.

Cimpian and Markman (2009) recently used this type of evidence to argue that in the context of biological natural kinds, preschoolers are indeed more likely to essentialize information they learn from generics (see also Cimpian & Cadena, 2010). They identified systematic patterns of variation in children's explanations for generic and nongeneric formulations of the same novel properties (e.g., ''Snakes have holes in their teeth'' vs. ''This snake has holes in his teeth''). Specifically, children generated significantly more functional explanations (e.g., ''so they can swallow things'') for the generic versions of these facts, while the nongeneric versions were predominantly explained in terms of prior, often accidental, causes (e.g., ''maybe because a bug came in its room, and it bited his teeth''). In light of Ahn and her colleagues' argument that features that *cause* others are more central or essential than features that are *effects* of others (e.g., Ahn, Gelman, Amsterlaw, Hohenstein, & Kalish, 2000; Ahn, Kim, et al., 2000), Cimpian and Markman interpreted their findings as indicating that children understood features provided in generic frames as more essential than features in nongeneric frames. Building on this conclusion, the current series of studies tested whether the subtle connotations of generic language shape how children interpret information about other people.

Overview of Studies

The hypothesis laid out above was tested in Experiment 1. Experiment 2 provided further evidence for this hypothesis by replicating one of the findings from Experiment 1 with a different measure. Experiments 3 and 4 were designed to refine our argument: Do generics invariably lead to an essentialized conception of the facts they convey, or are there factors that moderate the strength of their essentialist implications? In other words, do children automatically essentialize *anything* in generic form, or are they in fact able to resist this interpretation under certain circumstances? Experiment 3 tested whether children are able to modulate their interpretation of new facts learned from generics based on the nature of the *category* referred to in these sentences. Finally, in Experiment 4 we investigated whether the nature of the *properties* referred to in generic sentences also influences the strength of their implications.

Experiment 1

To test for generics' essentialist implications, we provided participants with a novel fact that was said to be true either of boys/girls in general (generic) or of just one boy/girl (nongeneric). We then asked participants to explain this fact so we could determine how they represented it. In light of our argument, we predicted they would generate more essentialized explanations (e.g., in terms of traits or other inherent facts) and fewer nonessentialized explanations (e.g., in terms of externally driven causal processes) when the new properties were phrased generically than when they were phrased nongenerically.

We used gender because (a) it is familiar and of great interest to young children (e.g., Gelman et al., 2004; Martin, Eisenbud, & Rose, 1995; Rhodes & Brickman, 2008) and (b) we were confident that children are able to think about it in essentialist terms (e.g., Gelman, Collman, & Maccoby, 1986; Taylor, 1996; Taylor et al., 2009). Note, however, that our argument is not specific to gender-based categories—rather, it is meant to extend to generic language about other social categories (e.g., race/ethnicity) as well, provided that the listener is familiar with the relevant category distinction. In terms of the properties used, we focused on abilities and physical/biological properties, both due to their prevalence in stereotypes (e.g., ''Boys are good at math,'' ''Boys are strong'') and because of the potential detrimental effect of essentializing this information on children's well-being and academic achievement. Finally, although our main focus is on children's responses, we also included an adult comparison group so we can determine whether there are any developmental changes in the strength of the essentialist implications of generic language.

Method

Participants

Forty-eight 4- and 5-year-old children (24 girls; mean age = 4 years 10 months; range = 4 years to 5 years 4 months) from a university-affiliated preschool participated in this study. Eight additional children were tested but not included in the final sample because they did not complete the task. Children came from predominantly middle- and upper-middle-class families. Forty-one undergraduates (20 females) participated as well.

Materials and Design

We used eight novel properties: four abilities and four biological properties. The four ability items referred to a game called ''gorp,'' a sport called ''leeming,'' a dance called ''quibbing,'' and a puzzle called ''zool'' (e.g., ''Girls are really good at a game called 'gorp'''). Novel words were used as names for the made-up activities featured in these items. For the biological items, we chose to refer to real substances and biological structures that occur in the human body but that adults and children might be unfamiliar with. The four biological items referred to thromboxane in the brain, osteoclasts in bones, fibrinogen in the blood, and sarcomeres in muscles (e.g., ''There's a boy who has something called 'thromboxane' in his brain''). The ability and biological items were presented as separate blocks (four trials per block), and the order of these blocks was counterbalanced across subjects. The order of the properties within a block was counterbalanced as well. In addition, half of the trials referred to properties of boys (or one boy) and half referred to properties of girls (or one girl). The boy and girl trials were presented in alternation, and the gender of the first trial was counterbalanced across subjects. Each of the properties was predicated of boys (or one boy) for half of the participants and girls (or one girl) for the other half. The generic/nongeneric format of the properties was manipulated between subjects—that is, each participant heard either eight generic or eight nongeneric sentences. Participants were randomly assigned to the generic condition (adults: $n = 21$, children: $n = 24$) or the nongeneric condition (adults: $n = 20$; children: $n = 24$).

Procedure

Children were tested individually by an experimenter who was acquainted with them. The experimenter first introduced a stuffed animal to the children and told them that the toy was ''trying to figure some things out'' and that they should try to help it. On each trial, the property was introduced with, ''I wanna tell you something interesting *about boys/girls*'' (generic) or ''I wanna tell you something interesting *about a boy/girl*'' (nongeneric). The relevant property was then provided twice: For example, ''*Boys* have something called 'thromboxane' in their brains. *They* have something called 'thromboxane' in their brains'' (generic) or ''*There's a boy* who has something called 'thromboxane' in his brain. *He* has something called 'thromboxane' in his brain'' (nongeneric). Children were then asked, e.g., ''Why do you think that is? Why do *boys* have thromboxane in their brains?'' (generic) or ''Why do you think that is? Why does *this boy* have thromboxane in his brain?'' (nongeneric). If the children said they did not know how to answer a question, the experimenter asked them to make a guess to help the stuffed animal and reassured them that there is no wrong answer and that any guess would be fine. If the children still said they did not know, the experimenter went on to the next item but came back to the unanswered one at the end of the session. If the child did not provide an answer at this point, the answer was recorded as ''don't know.''

As an indirect measure of the difficulty of this task, we tallied all instances in which the experimenter had to return to an item at the end of the session. Overall, only 5.9% of the trials required such a return. The frequency of returns did not seem to be influenced by the generic/nongeneric format of the properties ($M_{\text{generic}} = 5.2\%$ vs. $M_{\text{nongeneric}} = 6.5\%$ returns) or by their content ($M_{\text{abilities}} = 4.8\%$ vs. $M_{\text{biological}} = 6.9\%$ returns). On the whole, these data suggest that children required relatively little prompting to come up with explanations for our items.

At the end of the session, children in the generic condition received a short debriefing in which they were told that ''in real life'' boys and girls are both good at the same things and have pretty much the same things inside their bodies. The experimenter wrote down children's responses during testing, but the session was videotaped as well. Video recordings of the experimental sessions are available for 47 of the 48 children in this study.

The undergraduates were tested individually or in small groups. They were handed a booklet that contained the eight generic or nongeneric items and instructed to provide their explanations in writing. At the end of the session, the undergraduates were thanked for their participation and handed a debriefing sheet that provided more information about the experiment.

Coding

Based on a review of the literature on essentialism, as well as our inspection of the responses, we identified six main types of explanations. Three of these explanation types revealed a more essentialized construal of the novel properties, while the other three were assumed to indicate a less or nonessentialized construal (see below and Table 1 for examples of these categories). Two additional coding categories consisted of ''don't know'' (or equivalent) responses and explanations that did not fit into any of the main six categories (the ''other'' category). These two categories did not show condition differences, so they will not be discussed further.

Essentialized explanations. (1) Inherent explanations. Explanations stating or implying that the property occurs naturally or is a normal consequence of development were coded in this category (e.g., girls have thromboxane in their brains because ''maybe that's how they're made''). Features explained in this way are unlikely to have been imposed from the outside and are therefore revealing of one's true nature (see Bastian & Haslam, 2006; Levy, Stroessner, & Dweck, 1998).

(2) Trait explanations. Explanations stating or implying that the property is the result of a trait or preference were coded in this category (e.g., boys are good at ''leeming'' because ''they are tougher than girls''). These explanations are essentialized because they attribute the feature (e.g., being good at ''leeming'') to something stable and internal to the person or group (e.g., being tough) rather than to external or situational factors (e.g., having good coaches; see Abelson, Dasgupta, Park, & Banaji, 1998; Jones & Harris, 1967; Yzerbyt, Rogier, & Fiske, 1998).

(3) Functional explanations. Explanations stating or implying that the property serves a function or need were coded in this category (e.g., girls have sarcomeres in their muscles ''to make them strong''). Properties explained functionally are construed as causing or enabling other properties (e.g., sarcomeres enable strength) and are thus more conceptually central than properties that are construed as effects of other properties or events (Ahn, Kim, et al., 2000; Cimpian & Markman, 2009; see also Ahn, Gelman, et al., 2000).

Nonessentialized explanations. (4) ''Problem'' explanations. Explanations stating or implying that the property was, or was caused by, a problem, an accident, an injury, or a disease were coded in this category (e.g., a girl has fibrinogen in her blood because ''maybe the bunny bite her''). These explanations reveal a nonessentialized construal of the property because (a) they imply that it constitutes a (perhaps temporary) deviation from normal and (b) they often place its origin in some external cause (e.g., an accident, a pathogenic agent) rather than in some essential fact about the person.

(5) ''Practice'' explanations. Explanations stating or implying that the property was acquired as a result of practice, learning, exercise, or being taught were coded in this category (e.g., a boy is good at ''leeming'' because ''he learned from his mommy so much that maybe he can do it''). These explanations were considered nonessentialized because

Table 1
Examples From the Six Explanation Categories Used in Experiments 1 and 3

Child sample explanations [*item*]	Adult sample explanations [*item*]
Inherent	Inherent
''Maybe that's how people usually get born.'' [*bones**]	''I think it's a hormone that boys have because it is transcribed from male DNA.'' [*blood*]
''Because it's part of their body.'' [*brain*]	''Perhaps thromboxane is a common chemical present in brain tissue.'' [*brain*]
''Maybe God made him that way.'' [*blood*]	
Trait	Trait
''Maybe because they are tougher than girls.'' [*sport*]	''He is smart, therefore he is good at 'zool'.'' [*puzzle*]
''Because they're smart.'' [*brain*]	''A pretend game. Boys have good imagination.'' [*game*]
''Because I think her eyes are good. Then she can see the puzzle pieces.'' [*puzzle**]	''Boys are generally stronger than girls, and quibbing sounds like it requires some strength.'' [*dance*]
Functional	Functional
''To help them think.'' [*brain*]	''Boys have fibrinogen in their blood to help carry oxygen.'' [*blood*]
''To make them healthy.'' [*blood*]	''She has thromboxane in her brain in order to help her understand and process her thoughts.'' [*brain*]
''I think because it makes his bones very strong.'' [*bones*]	
Problem	Problem
''Maybe she bumped something.'' [*brain*]	''She could have a blood disease or caught something from food she eats.'' [*blood*]
''Maybe because she falled.'' [*blood**]	''The sarcomeres are actually not supposed to be there. They eat away at healthy muscle and weaken the body.'' [*muscles*]
''Maybe something's wrong. Or maybe her tummy's hurting. Or maybe she was holding her peepee.'' [*muscles*]	
Practice	Practice
''Because they got teached.'' [*sport**]	''A style of dance that the boy has practiced and is good at.'' [*dance*]
''Because her mom showed how she did it.'' [*puzzle**]	''This is because her school has a good leeming coach.'' [*sport**]
''Because she took ballet class and then she practiced a lot, so then she got really good at it.'' [*dance*]	''Because she's been taught how to solve the puzzle and has practiced enough to where now she's good at solving it.'' [*puzzle*]
External	External
''Well, because he drinked that and it went down into his bones.'' [*bones*]	''It might be a chemical that she encountered in her environment.'' [*brain**]
''Because they ate lots of things.'' [*blood**]	''She goes to school in a farm or in a farm house.'' [*puzzle**]
''Because her has ballet shoes.'' [*dance**]	''The trees have fibrinogen in them that the girls breathe in and goes into their blood.'' [*blood**]

Note. The explanations marked with an asterisk (*) are from Experiment 3. The rest are from Experiment 1.

they rely on a general mechanistic process to explain the occurrence of the properties rather than calling up some special facts about their possessors. For example, if being really good at ''leeming'' is a result of practice, then anyone can become good at it, and there may not be anything particularly deep about the individual or the category that explains why they display this property.

(6) External explanations. Explanations that referenced an external or environmental cause for the property in question were coded in this category (e.g., a boy has osteoclasts in his bones because ''maybe one of his friends has those and he plays a lot with that friend so now he has those''). These explanations were similar to the other nonessentialized explanations insofar as they placed the origin of the property in something about the situation or in an external agent; however, unlike problem and practice explanations, external explanations did not imply that the property is somehow linked to a health issue, nor did they refer to a pedagogical process.

Because our main argument concerns the overall level of essentializing of items provided in generic versus nongeneric format, we derived two composite explanation categories: one that aggregates over the inherent, functional, and trait explanations (the *essentialized* explanation aggregate) and one that aggregates over the problem, practice, and external explanations (the *nonessentialized* explanation aggregate). These aggregates were coded using a present/absent method: For instance, the essentialized aggregate was assigned a 1 on a particular trial if any one (or more) of the inherent, functional, or trait categories was present, and a 0 otherwise.

In this and subsequent experiments, the coders were kept blind to wording condition by removing from the transcript the experimenter's generic/nongeneric prompt. A second judge, who was also blind to the hypotheses of the study, coded 79 of the 89 transcripts in order to assess interrater reliability. For the essentialized aggregate, the agreement was 97.9% (Cohen's $\kappa = .93$) for adults' responses and 88.7% (Cohen's $\kappa = .77$) for children's responses. For the nonessentialized aggregate, the agreement was 97.9% ($\kappa = .94$) for adults' responses and 94.2% ($\kappa = .87$) for children's responses. Disagreements were resolved through discussion.

Results and Discussion

Data Analysis Strategy

Our analyses focused on the essentialized and nonessentialized explanation aggregates. Note that the two aggregates are not redundant because (a) participants could provide neither or both of these responses on any single trial and (b) there were two other categories (''don't know'' and ''other'') in our coding scheme.

Participants' responses on the aggregate measures were summed up within the ability and biological property blocks; thus, the possible range for each aggregate was 0–4 within a block and 0–8 over the entire session. These variables were not normally distributed, and they also violated the homogeneity of variance assumption required for parametric tests. Thus, instead of analyses of variance (ANOVAs) we used repeated-measures ordinal logistic regressions (RM-OLRs); logistic regression models require neither normality nor homoscedasticity in the dependent variable (e.g., Howell, 2009). The RM-OLRs were computed through the Generalized Estimating Equations procedure in SPSS 16.0, which outputs ANOVA-style tests of main effects and interactions. Nonparametric tests such as the Mann–Whitney *U* and the Wilcoxon signed-ranks test were used to follow up on the results of the RM-OLRs. This analytic strategy was used in all subsequent experiments as well.

We performed two such RM-OLRs, one on the essentialized explanation aggregate and the other on the nonessentialized aggregate. For each, the predictors were (a) wording condition (generic vs. nongeneric; between subjects), (b) property type (ability vs. biological; within subject), and (c) age group (children vs. adults; between subjects). We will refer to these analyses as ''three-factor RM-OLRs.'' We also performed two-factor RM-OLRs for each age group separately (with just wording condition and property type as predictors) and will use these results throughout as needed to clarify or supplement the results of the more general, three-factor RM-OLRs.

We should also note that it was not possible to test for the effects of participant gender and block order (ability first vs. biological first) by simply adding them to the above-mentioned three-factor RM-OLRs: Including any additional variables in these models resulted in computational errors due to the high number of parameters relative to the size of our data set—there are 31 main effects and interactions in a factorial model with five predictors. We tentatively explored the effects of these variables using five-predictor ANOVAs, which can be computed even with limited sample sizes. (Keep in mind, though, that our data violate the normality and homogeneity of variance assumptions, so the output of parametric analyses may be less than reliable.) These ANOVAs revealed a number of significant two- and four-way interactions involving gender and block order. However, since these interactions were neither predicted nor easily interpretable, we do not list them here.

Essentialized Explanations

Confirming our main hypothesis, participants provided overall more essentialized explanations in the generic condition ($M = 6.55$ on eight trials) than in the nongeneric condition ($M = 4.12$), Wald $\chi^2 = 28.25$, $df = 1$, $p < .001$. Importantly, the effect of generic language did not differ across the two age groups, as indicated by a nonsignificant Wording Condition × Age Group interaction (see Figure 1), Wald $\chi^2 = 0.13$, $df = 1$, $p = .719$. Two-factor RM-OLRs confirmed that both children and adults, considered separately, were significantly more likely to essentialize properties phrased generically (children: $M_{generic} = 5.70$ vs. $M_{nongeneric} = 2.92$ on eight trials, Wald $\chi^2 = 13.65$, $df = 1$, $p < .001$; adults: $M_{generic} = 7.52$ vs. $M_{nongeneric} = 5.55$ on eight trials, Wald $\chi^2 = 16.40$, $df = 1$, $p < .001$). For example, when participants explained why boys or girls are good at a certain puzzle, game, etc., they frequently called on a feature or a trait in their explanations (e.g., '''cause boys are really smart,'' '''cause girls have long hair'')—more so than when they explained why a single boy or girl is good at that very same puzzle, game, etc.

The main effect of property type was also significant, Wald $\chi^2 = 8.46$, $df = 1$, $p = .004$, suggesting that participants produced more essentialized explanations for biological properties ($M = 2.90$ on four trials) than for abilities ($M = 2.45$). Not only

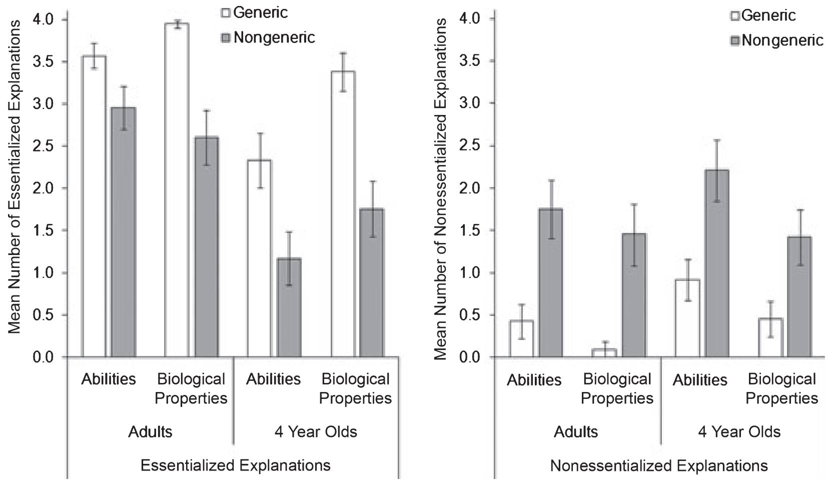

Figure 1. The mean number of essentialized and nonessentialized explanations in Experiment 1.
Note. The error bars represent the standard error of the mean.

did biological properties draw more essentialized explanations overall, but the effect of the generic/nongeneric manipulation was larger for them as well, as shown by a significant Wording Condition × Property Type interaction, Wald $\chi^2 = 5.32$, $df = 1$, $p = .021$: Although there were significantly more essentialized explanations for generics than for nongenerics for both types of items, the magnitude of this difference was larger for biological properties ($M_{\text{generic}} = 3.64$ vs. $M_{\text{nongeneric}} = 2.14$ on four trials, Mann–Whitney $U = 431.0$, $z = 5.08$, $p < .001$) than for abilities ($M_{\text{generic}} = 2.91$ vs. $M_{\text{nongeneric}} = 1.98$ on four trials, Mann–Whitney $U = 661.0$, $z = 2.81$, $p = .005$).

Finally, the three-factor RM-OLR on the essentialized aggregate also revealed a main effect of age group, Wald $\chi^2 = 20.66$, $df = 1$, $p < .001$, indicating that the adults ($M = 6.56$ on eight trials) were overall more likely than the children ($M = 4.31$) to produce essentialized explanations.

Nonessentialized Explanations

The three-factor RM-OLR on the nonessentialized responses revealed that, in line with our hypothesis, participants provided significantly fewer nonessentialized explanations in the generic condition ($M = 0.98$ on eight trials) than in the nongeneric condition ($M = 3.43$), Wald $\chi^2 = 27.98$, $df = 1$, $p < .001$. For example, they were more likely to explain an ability in terms of learning and practice when they heard that an individual possesses it (e.g., ''because she's learning it, and when you learn things, you get better at it'') than when they heard that an entire category possesses it. The interaction between wording condition and age group was again not significant (see Figure 1), Wald $\chi^2 = 2.04$, $df = 1$, $p = .154$, which suggests that children and adults were equally sensitive to the generic/nongeneric distinction on this measure as well. Two-factor RM-OLRs confirmed that, in fact, participants of both ages produced significantly fewer nonessentialized explanations in the generic condition (children: $M_{\text{generic}} = 1.38$ vs. $M_{\text{nongeneric}} = 3.63$ on eight trials, Wald $\chi^2 = 10.21$, $df = 1$, $p = .001$; adults: $M_{\text{generic}} = 0.53$ vs. $M_{\text{nongeneric}} = 3.20$ on eight trials, Wald $\chi^2 = 17.70$, $df = 1$, $p < .001$).

Participants also provided significantly fewer nonessentialized explanations for the biological items ($M = 0.85$ on four trials) than for abilities ($M = 1.34$), Wald $\chi^2 = 7.74$, $df = 1$, $p = .005$, consistent with the analogous main effect for the essentialized explanations.

The only other significant result was a main effect of age group, Wald $\chi^2 = 4.32$, $df = 1$, $p = .038$, suggesting that children ($M = 2.50$ on eight trials) produced more nonessentialized explanations than the adults ($M = 1.83$). This difference, combined with the fact that adults produced significantly more essentialized explanations than children, suggests that the tendency to essentialize becomes stronger with age—at least in the context of the particular social category and property types used in this experiment. This conclusion is somewhat at odds with findings that younger children are more rigidly essentialist about gender than older children and adults (e.g., Taylor et al., 2009). To speculate, one reason for this discrepancy may be that the studies of gender essentialism asked children to make predictions about *familiar* stereotypical traits or behaviors. For example, would a baby girl raised only by men grow up to play with a toy truck or with a tea set? In contrast, all of the properties we asked children to explain were *novel*. It may be that young children are staunch essentialists about features they already know to be associated with one gender or the other, but that this stance is somewhat weaker when they have to reason about novel properties.

Beyond the Aggregates

Although our main focus here is on the aggregate measures, an examination of the results for the six separate coding categories revealed several facts worthy of mention. First, the generic/nongeneric differences in the aggregates were carried by certain explanation categories for the ability items and by others for the biological items. For instance, the generic/nongeneric difference in the nonessentialized aggregate was due to *practice* explanations for the ability items but mostly to *problem* and *external* explanations for the biological items. Thus, both children and adults (appropriately) manifested their nonessentialized understanding of our properties in different ways across domains. Second, collapsing across the generic/nongeneric dimension, many of the six explanation categories occurred significantly more often for one type of item than for the other. For instance, children produced more inherent, functional, and problem explanations for biological properties than for abilities and more practice explanations for abilities than for biological properties (Wilcoxon ps < .05). Although this selectivity may not be too surprising in adults' responses, it is worth highlighting in the case of children because it suggests that they were able to tailor their explanations to the nature of the property to be explained.

Conclusion

Both age groups provided more essentialized explanations and fewer nonessentialized explanations when they heard novel properties in generic format than when they heard the same novel properties in nongeneric format. This result supports our argument that properties expressed in generic statements come to be understood as deeper and more essential than equivalent properties conveyed in nongeneric statements.

Experiment 2

This study follows up on a finding from Experiment 1. Children often explained the abilities phrased generically in terms of *traits* (e.g., being smart, being strong), but when the same abilities were provided in nongeneric form, children talked about the *practice* and *effort* that went into developing these abilities. In fact, out of the six explanation categories, it was these two that showed the largest generic/nongeneric differences on the ability items: There were significantly more trait explanations in the generic condition than in the nongeneric condition ($M_{\text{generic}} = 1.75$ vs. $M_{\text{nongeneric}} = 0.92$ on four trials, Mann–Whitney $U = 195.0$, $z = 2.03$, $p = .043$) but more practice explanations in the nongeneric condition ($M_{\text{generic}} = 0.67$ vs. $M_{\text{nongeneric}} = 2.13$ on four trials, Mann–Whitney $U = 154.0$, $z = 2.94$, $p = .003$). Thus, hearing generic language about abilities may lead young children to assume that having an ability is simply a function of membership in a certain category (e.g., being a girl) and possession of the traits associated with that category. Nongeneric language, in contrast, appears to allow more room for thinking about the effort that is in fact necessary to establish any type of expertise. This difference in how children conceptualize the abilities they learn about may be a consequential one. It is well established that trait-focused and effort-focused thinking have divergent effects on children's achievement motivation (e.g., Cimpian, 2010; Cimpian, Arce, Markman, & Dweck, 2007; Dweck, 1999, 2006), with effort-focused mindsets leading to a more adaptive pattern of response to challenges (e.g., maintenance of positive affect, persistence in completing the task). Given its potential connection to children's motivation, we wanted to highlight this Experiment 1 result and establish its reliability. Thus, the goal of Experiment 2 was to replicate it by using a set of questions that assessed the extent to which children's thinking about novel abilities in generic and nongeneric format emphasizes practice.

Method

Participants

Thirty-four 4- and 5-year-old children (17 girls; mean age = 5 years 1 month; range = 4 years 3 months to 5 years 7 months) from a university-affiliated preschool participated in this study. Three additional children were tested but not included in the final sample because they did not complete the task ($n = 2$) or because of experimenter error

($n = 1$). All of these children had been previously tested in Experiment 1. An average of 3.3 months (range = 2.7–4.0) separated the two experiments. Given this lengthy delay, it is unlikely that children's memory for the first study influenced their responses in this task.

Materials, Design, and Procedure

We used the four ability items from Experiment 1. However, instead of eliciting open-ended explanations, we asked children three targeted questions for each item: First, we asked whether the possessors of the ability had to practice or whether they were ''just good'' at the task (e.g., ''Does this boy have to practice this game, or is he just good at it?''). We alternated which option (practice vs. just good) was mentioned first across the four items in a session. Second, we asked to what extent ''working at it'' played a role in acquiring the relevant ability (e.g., ''Does this boy have to work at it to be really good at this game?''). If children said ''no,'' the experimenter went on to the next question. If the answer was ''yes,'' children were asked a 3-point scale question as a follow-up (e.g., ''Does he have to work at it *a little bit*, *some more*, or *a whole lot* for him to be really good at this game?''). This follow-up was accompanied by a drawing of three circles of increasing size, which the experimenter pointed to while asking the question. Third, we asked how detrimental the absence of practice would be to the relevant ability (e.g., ''What if this boy couldn't practice for some time? Would he still be good at this game or would he not be good at it anymore?''). Both positive and negative answers were followed up with a 3-point scale question (e.g., ''Would he be *sort of good*, *good*, or *really good* at this game after not practicing for some time?''), accompanied by three schematic faces with smiles or frowns of increasing intensity.

These three questions were always presented in the order above. Children were reminded of the content of the item before they were asked the second and the third questions. The order of the items was counterbalanced across children, as was the gender of the first trial. The gender of the items alternated across trials for each child. The generic/nongeneric format of the items was manipulated between subjects.

To minimize interference from Experiment 1, we tested children in the same wording condition they had been tested in before. Also, to determine the extent to which children's responses in this experiment may have been influenced by their participation in the first, we calculated the correlation between their responses in the two studies. The resulting correlation coefficients were small and nonsignificant, suggesting there is little reason to suspect such influence.

Children's responses were recorded during the session by the experimenter but also videotaped. To ensure accuracy, a second researcher recorded the responses off the videotapes. The two researchers agreed on 99.3% of the answers.

Results and Discussion

Children's answers to the three questions were coded numerically such that higher values signified more emphasis on practice. However, as all three questions measured the extent to which children thought about the novel abilities in terms of practice, we derived a single composite measure of ''practice focus,'' which we also used in our statistical analyses. This measure was generated by (a) finding the mean for each of the three questions for each child by averaging across the four items; (b) standardizing these means across the sample of children, which resulted in three separate z scores per child (one for each question); and (c) averaging across the three questions' z scores within each child (see Cimpian et al., 2007, for a similar analysis). The resulting number provides an overall indication of children's tendency to think of effort and practice as the originators of the abilities they heard about; higher values on this measure indicate more focus on practice.

As expected, an OLR with wording condition (generic vs. nongeneric) and participant gender (boys vs. girls) as between-subjects predictors revealed that children in the nongeneric condition ($M = 0.26$) had significantly higher values on the ''practice focus'' composite than children in the generic condition ($M = -0.29$), Wald $\chi^2 = 6.56$, $df = 1$, $p = .011$. The nongeneric advantage held up for all three individual questions, although it only reached statistical significance for the ''work at it'' question, Mann–Whitney $U = 74.0$, $z = 2.45$, $p = .014$. No other effects were significant in this analysis.

To conclude, this study successfully replicated the result we obtained with open-ended explanations in Experiment 1. When children learn about a novel ability from a generic sentence, they are likely to essentialize it by discounting the possibility that it is the result of effort and thinking about it more in terms of internal, stable factors.

Experiment 3

In this experiment, we tested whether the nature of the category referred to in a generic sentence moderates the extent to which the accompanying property is essentialized. Hearing that, say, ''boys have thromboxane in their brains'' may lead a child to essentialize this physical property in part because gender is a category that is represented as being underlain by deep, nonobvious features. A generic sentence predicating the same property of a category that is less richly structured and more context-based may be much weaker in its essentialist implications. We used *boys/girls at a school* as our categories in this study, both because the school context is familiar even to young children, which makes it more likely that they will distinguish these categories from the broader gender categories, and because of prior evidence that adults represent categories of this type (e.g., students at a university) as ''loose associations,'' not very coherent or ''entitative'' (Lickel et al., 2000).

Method

Participants

Forty-eight 4- and 5-year-old children (24 girls; mean age = 4 years 8 months; range = 4 years to 5 years 4 months) from a university-affiliated preschool participated in this study. Six additional children were tested but not included in the final sample because they did not complete the task ($n = 5$) or because of experimenter error ($n = 1$). Children came from predominantly middle- and upper-middle-class families. None of them had participated in the previous experiments. Forty undergraduates (21 females) participated as well. One additional adult participant was tested but not included in the analyses because she responded with ''I don't know'' (or equivalent) for all questions.

Materials, Design, and Procedure

Participants were randomly assigned to the generic condition (children: $n = 24$; adults: $n = 21$) or the nongeneric condition (children: $n = 24$; adults: $n = 19$). The task and the properties were very similar to those in Experiment 1. In the generic condition, children heard, for example, ''I wanna tell you something interesting about *boys at a different school*. And here's a picture of that school. [The experimenter pulled out and pointed to a picture of a school building.] *Boys at this school* have something called 'thromboxane' in their brains. *They* have something called 'thromboxane' in their brains.'' In the nongeneric condition, children heard, for example, ''I wanna tell you something interesting about *a girl at a different school*. And here's a picture of that school. *There's a girl at this school* who has something called 'thromboxane' in her brain. *She* has something called 'thromboxane' in her brain.'' We used eight pictures of eight different school buildings, randomly assigned to the eight trials of the task for each participant. The experimental sessions were videotaped for all 48 children. The adults completed a pen-and-paper version of this task.

As in Experiment 1, it was only infrequently (6.5% of all trials) that the experimenter had to return to an item at the end of children's sessions because they did not provide an answer the first time around. Children appeared to have an easier time explaining abilities (only 1.6% returns) than biological properties (11.5%), which is perhaps not surprising because the school context provides a ready explanation for any ability a child might display. The frequency of returns was comparable for the items in generic and nongeneric format ($M_{\text{generic}} = 7.3\%$ vs. $M_{\text{nongeneric}} = 5.7\%$).

The coding scheme was identical to that used in Experiment 1. A second judge, who was blind to the hypotheses of the study, coded 78 of the 88 transcripts in order to assess interrater reliability. For the essentialized aggregate, the agreement was 97.1% ($\kappa = .93$) for adults' responses and 90.1% ($\kappa = .79$) for children's responses. For the nonessentialized aggregate, the agreement was 97.5% ($\kappa = .94$) for adults' responses and 93.6% ($\kappa = .87$) for children's responses. Disagreements were resolved through discussion.

Results and Discussion

Essentialized Explanations

In contrast to Experiment 1 (boys/girls), the three-factor RM-OLR on the essentialized explanation aggregate revealed no hint of a generic ($M = 2.82$ on eight trials) versus nongeneric ($M = 2.75$) main effect, Wald $\chi^2 = 0.00$, $df = 1$, $p = .985$. Since the Wording Condition × Age Group interaction was also not significant, Wald $\chi^2 = 0.89$, $df = 1$, $p = .346$, it appears that neither the children nor the adults showed a generic/nongeneric difference. Indeed, separate two-factor RM-OLRs confirmed the absence of a generic/nongeneric main effect in both age groups (children: Wald $\chi^2 = 0.39$, $df = 1$, $p = .530$; adults: Wald $\chi^2 = 0.45$, $df = 1$, $p = .502$).

This analysis also revealed a two-way interaction between wording condition and property type, Wald $\chi^2 = 3.87$, $df = 1$, $p = .049$, which was subsumed under a three-way interaction between wording condition, property type, and age group, Wald $\chi^2 = 12.86$, $df = 1$, $p < .001$. To explore this three-way interaction, we analyzed the age groups separately. The Wording Condition × Property Type interaction was not present in children's responses, Wald $\chi^2 = 1.59$, $df = 1$, $p = .207$. Thus, regardless of item type, children did not essentialize the properties presented in the context of boys/girls at a school any more than they did the properties presented in the context of one boy/girl at a school. The RM-OLR on the adults' responses, on the other hand, did reveal this two-way Wording Condition × Property Type interaction, Wald $\chi^2 = 15.26$, $df = 1$, $p < .001$, which was the result of two opposing trends (see Figure 2): For the biological properties, adults responded as in the boys/girls experiment, providing more essentialized explanations in the generic condition ($M = 1.95$ on four trials) than in the nongeneric condition ($M = 0.95$), Mann–Whitney $U = 136.5$, $z = 1.77$, $p = .077$. Surprisingly, the reverse pattern held for the ability items: The adults were actually more likely to essentialize information provided *non*generically ($M = 1.53$ on four trials) than information provided generically ($M = 0.38$), Mann–Whitney $U = 101.0$, $z = 2.90$, $p = .004$. That is, adults used more trait explanations for abilities provided about an individual (e.g., ''he is simply a natural at it,'' ''she is good at it because she is intelligent''). We will provide a speculative explanation for this surprising result in the General Discussion.

Finally, participants also provided more essentialized explanations for biological properties ($M = 1.77$ on four trials) than for abilities ($M = 1.01$), Wald $\chi^2 = 15.93$, $df = 1$, $p < .001$, replicating the analogous finding from the boys/girls experiment. This result suggests that switching to context-based categories affected participants' responses selectively—although it influenced their use of the generic/nongeneric information, other aspects of their behavior remained unchanged.

Nonessentialized Explanations

A three-factor RM-OLR performed on participants' nonessentialized explanations bolstered the conclusions above. The main effect of generic/nongeneric condition was again not significant ($M_{generic} = 4.36$ vs. $M_{nongeneric} = 5.00$ on eight trials), Wald $\chi^2 = 0.69$, $df = 1$, $p = .406$, and neither was the Wording Condition × Age Group interaction, Wald $\chi^2 = 0.65$, $df = 1$, $p = .421$. Two-factor RM-OLRs confirmed that neither the children, Wald $\chi^2 = 1.29$, $df = 1$, $p = .256$, nor the adults, Wald $\chi^2 = 0.01$, $df = 1$, $p = .930$, distinguished between the generic and nongeneric sentences in the number of nonessentialized explanations they produced (see Figure 2).

The three-way interaction between condition, property type, and age group was significant in this analysis as well, albeit only at the $\alpha = .10$ level, Wald $\chi^2 = 3.38$, $df = 1$, $p = .066$: While the adults

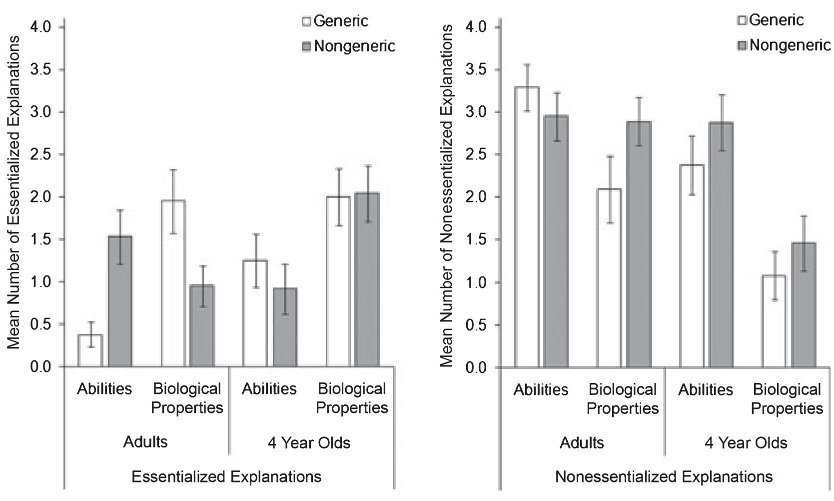

Figure 2. The mean number of essentialized and nonessentialized explanations in Experiment 3.
Note. The error bars represent the standard error of the mean.

showed a crossover interaction between wording condition and property type, Wald $\chi^2 = 5.98$, $df = 1$, $p = .014$, the children did not, Wald $\chi^2 = 0.93$, $df = 1$, $p = .760$.

There was also a main effect of property type, with abilities ($M = 2.85$ on four trials) drawing significantly more nonessentialized explanations than biological properties ($M = 1.82$), Wald $\chi^2 = 26.50$, $df = 1$, $p < .001$. A significant interaction between property type and age, Wald $\chi^2 = 4.31$, $df = 1$, $p = .038$, also suggested that this difference was somewhat larger for the children ($M_{\text{abilities}} = 2.62$ vs. $M_{\text{biological}} = 1.27$ on four trials) than for the adults ($M_{\text{abilities}} = 3.12$ vs. $M_{\text{biological}} = 2.48$ on four trials).

Finally, the three-factor RM-OLR on the nonessentialized aggregate revealed a significant main effect of age, with adults ($M = 5.59$ on eight trials) producing more nonessentialized explanations than children ($M = 3.89$), Wald $\chi^2 = 8.24$, $df = 1$, $p = .004$. This is a reversal with respect to Experiment 1 (boys/girls), where it was the children who provided more nonessentialized explanations. One interpretation of this result would be that adults drew sharper distinctions between these two types of categories—relative to children, they both over-essentialized the natural kind-like category (boys/girls) and under-essentialized the context-based category (boys/girls at a school).

Effect of Block Order

As in Experiment 1, block order and participant gender could not be added to the three-factor RM-OLRs without causing computational errors. ANOVAs that included them as predictors replicated the results discussed earlier but also revealed a significant main effect of block order on the frequency of essentialized explanations, $F(1, 72) = 6.93$, $p = .010$. Participants were overall more likely to generate essentialized explanations when they received the biological properties first ($M = 3.44$ on eight trials) than when they received the abilities first ($M = 2.09$). Such order effects are not uncommon in the essentialism literature. For example, Heyman and Gelman (2000) found that children were more nativist about the origin of physical and psychological traits when they were asked about physical traits (e.g., foot size) first than when they were asked about psychological traits (e.g., shyness) first.

Conclusion

This experiment suggests that the structure of the social category referred to in a generic sentence influences the strength of its essentialist implications. When participants learned novel properties from generic sentences about boys/girls at a school—a category that is shallower and more contextual than boys/girls (Experiment 1)—their explanations no longer revealed any consistent tendency to essentialize these properties relative to those learned from nongeneric sentences. Thus, even preschool children's construal of new information does not blindly follow the generic versus nongeneric form of an utterance. Children do not essentialize *any* new fact just because it is learned from a generic sentence but rather are quite adept at integrating multiple sources of information into their interpretation.

Experiment 4

Is the effect of generic language modulated by *property type* as well? That is, does the nature of the novel property influence whether it becomes construed as essential? Experiment 1 already provided some evidence on this question, as the effect of generic language was more pronounced for biological properties than for abilities (see Figure 1); however, the generic/nongeneric difference was in fact significant for both of these item types. Are there properties that block generics' essentialist implications? One class of such properties may be those that simply do not lend themselves to an essentialist construal, perhaps because they are not typically thought to originate from a stable, internal factor. For example, Benenson and Dweck (1986; see also Rholes & Ruble, 1984) found evidence that, up through fourth grade, children seldom think of negative academic outcomes as the result of negative traits (e.g., not being smart enough), attributing these outcomes to unproductive actions (e.g., not doing homework) instead. This default construal may be strong enough to counter the essentializing effect of generic language, such that presenting these properties in generic frames (e.g., "Girls aren't very good at a kind of puzzle called 'zool'") might in fact *not* be sufficient to make children think of them as stemming from some deep internal fact about their possessors. In contrast, adults may be more easily swayed by the generic phrasing.

Method

Participants

Forty-four 3- to 5-year-old children (24 girls; mean age = 4 years 9 months; range = 3 years

10 months to 5 years 7 months) from a university-affiliated preschool participated in this study. Ten additional children were tested but not included in the final sample because they did not complete the task. Children came from predominantly middle- and upper-middle-class families. None of them had participated in the previous experiments. Forty-eight undergraduates (24 females) participated as well.

Materials, Design, and Procedure

We used eight lack-of-ability items. Four of these were constructed by negating the ability items from Experiment 1 (e.g., ''Boys *aren't* really good at a kind of game called 'gorp'''); the other four were identical except for the name of the made-up activity (e.g., ''Girls *aren't* really good at a kind of game called 'hep'''). These two sets of four items were presented as separate blocks whose order was counterbalanced across children. Each activity was paired with one gender in one block and the other gender in the other block. All other aspects of the procedure and design were identical to those of Experiment 1. Participants were randomly assigned to the generic condition (children: $n = 22$; adults: $n = 24$) or the nongeneric condition (children: $n = 22$; adults: $n = 24$). The experimental sessions were videotaped for all 48 children. The adults completed a pen-and-paper version of this task.

The experimenter had to return to an item at the end of children's sessions only on 2.6% of trials. The frequency of returns was comparable for the items in generic (2.3%) and nongeneric (2.8%) format.

Coding

The coding scheme for this study consisted of three categories. As in Experiments 1 and 3, we coded for trait explanations (e.g., girls are not good at ''leeming'' ''because they like playing fairies and mermaids''). This was the only essentialized explanation category included in this study, as it was the only one that occurred consistently in participants' responses.

We also identified two categories of nonessentialized explanations, specific to the lack-of-ability items. First, ''insufficient practice or knowledge'' explanations stated or implied that the lack of ability is due to insufficient learning, practice, or instruction in the relevant activity, or to insufficient knowledge about how to perform it. Examples from children's responses include the following: ''he needs to learn,'' ''because he never saw anyone taught him that,'' ''he just bought it [the puzzle],'' ''maybe they forgot it,'' and ''maybe because he doesn't know where the ball goes.'' These explanations are nonessentialized because they imply that the lack of ability is caused by a (temporary, reversible) lack of access to relevant information about the activity rather than by something deep about the individuals. The second nonessentialized explanation category consisted of ''difficult target'' explanations, which stated or implied that the lack of ability is due to the excessive difficulty of the target activity. Examples from children's responses include the following: ''because it [the puzzle] has way too much pieces,'' ''maybe it's so tricky and so hard to learn,'' ''because it's too hard,'' and ''maybe if it's a game board, maybe it's a very, very hard one.'' These explanations are nonessentialized because they imply that the ability is absent due to certain features of the activity (i.e., an external cause) rather than because the individuals themselves are deficient in some way. The last two explanation categories were combined into a nonessentialized explanation aggregate using the same present/absent method described in Experiment 1. As before, the coding scheme also included an ''other'' category and a ''don't know'' category.

A second judge, who was blind to the hypotheses of the study, coded 77 of the 92 transcripts in order to establish interrater reliability. For trait explanations, the agreement was 93.9% ($\kappa = .84$) for adults' responses and 88.5% ($\kappa = .70$) for children's responses. For the nonessentialized aggregate, the agreement was 94.9% ($\kappa = .87$) for adults' responses and 96.1% ($\kappa = .91$) for children's responses. Disagreements were resolved by a third coder.

Results and Discussion

Our analyses focused on the trait explanations and on the nonessentialized aggregate. Responses on these measures were summed up over the eight experimental trials; thus, the possible range for each measure was 0–8. In light of the argument above, we predicted that the generic/nongeneric manipulation would have a stronger effect on the adults than on the children.

Trait Explanations

An OLR with the number of trait explanations as a dependent variable and wording condition (generic vs. nongeneric), age group (preschoolers vs. adults), and participant gender (males vs. females)

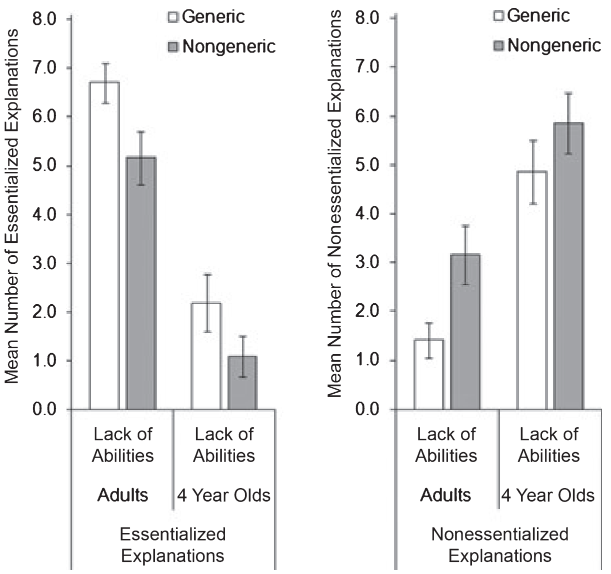

Figure 3. The mean number of essentialized (trait) and nonessentialized explanations in Experiment 4.
Note. The error bars represent the standard error of the mean.

as between-subjects factors revealed that the predicted interaction between wording condition and age group was in fact not significant, Wald $\chi^2 = 0.04$, $df = 1$, $p = .836$. Instead, the OLR uncovered just a main effect of wording condition, with trait explanations being overall more prevalent in the generic condition ($M = 4.54$ on eight trials) than in the nongeneric condition ($M = 3.22$), Wald $\chi^2 = 7.79$, $df = 1$, $p = .005$.

Despite the nonsignificant interaction, we nevertheless examined the magnitude of the generic/nongeneric difference within each age group (see Figure 3). In line with our hypothesis, it was *only* the adults who essentialized these lack-of-ability items significantly more when they were presented in generic rather than nongeneric sentences, $M_{\text{generic}} = 6.71$ versus $M_{\text{nongeneric}} = 5.17$ on eight trials, Mann–Whitney $U = 185.0$, $z = 2.21$, $p = .027$. For example, the adults explained why boys or girls are not good at something by saying that ''their thinking skills are not as advanced as others,'' ''boys don't have rhythm,'' ''you need to be tall and very strong,'' and so on. (A significant three-way interaction between wording condition, age group, and gender in the OLR suggested that this pattern was strongest for the female undergraduates, Wald $\chi^2 = 4.94$, $df = 1$, $p = .026$.) Although children's trait explanations showed a similar trend ($M_{\text{generic}} = 2.18$ vs. $M_{\text{nongeneric}} = 1.09$ on eight trials), the generic/nongeneric difference did not reach significance for them, Mann–Whitney $U = 176.5$, $z = 1.68$, $p = .092$.

The OLR also revealed that adults ($M = 5.94$ on eight trials) were overall much more likely to produce trait explanations than children were ($M = 1.64$), Wald $\chi^2 = 39.85$, $df = 1$, $p < .001$. This result provides convergent evidence for an age-related shift in the default construal of these properties, as suggested by Benenson and Dweck (1986).

Nonessentialized Explanations

A similarly structured OLR performed on participants' nonessentialized explanations revealed that there were significantly more of these explanations in the nongeneric condition ($M = 4.46$ on eight trials) than in the generic condition ($M = 3.07$), Wald $\chi^2 = 5.89$, $df = 1$, $p = .015$. Despite a nonsignificant Wording Condition × Age Group interaction, Wald $\chi^2 = 0.04$, $df = 1$, $p = .844$, analyzing children's and adults' responses separately revealed the predicted asymmetry in the influence of generic language. Adults produced significantly more nonessentialized explanations (e.g., ''maybe she is not familiar with that dance,'' ''the puzzle is really hard'') in the nongeneric condition ($M = 3.17$ on eight trials) than in the generic condition ($M = 1.42$), Mann–Whitney $U = 188.5$, $z = 2.11$, $p = .035$ (see Figure 3). Children, on the other hand, were not influenced by the generic/nongeneric manipulation, producing many of these nonessentialized explanations regardless of wording ($M_{\text{nongeneric}} = 5.86$ vs. $M_{\text{generic}} = 4.86$ on eight trials, Mann–Whitney $U = 186.5$, $z = 1.34$, $p = .181$).

Consistent with Benenson and Dweck's (1986) findings, the OLR also revealed that nonessentialized explanations were on the whole much more prevalent in children's responses ($M = 5.36$ on eight trials) than in adults' ($M = 2.29$), Wald $\chi^2 = 21.14$, $df = 1$, $p < .001$.

Conclusion

This study asked whether the strength of generics' essentialist implications is modulated by the type of property they refer to. Specifically, we hypothesized that children may not construe statements about the *lack* of an ability in essentialized terms even when they are provided in generic frames. This hypothesis was motivated by previous evidence suggesting that children's thinking about negative outcomes in the academic domain is strongly antiessentialist (Benenson & Dweck, 1986). (For other examples of the effects of valence on children's social reasoning see, among others, Heyman & Giles, 2004; Lockhart, Chang, & Story, 2002; Rholes & Ruble, 1984.) As predicted, children who heard that girls or boys are not good at a certain novel activity tended to construe this information in terms of nonessential factors such as the difficulty of the activity or the lack of relevant instruction and only rarely invoked stable traits of the individuals in their explanations. Their answers to the generic and nongeneric phrasings of these lack-of-ability items were thus quite similar. The adults, however, did essentialize the properties provided generically more than the ones provided nongenerically, just as they had done in Experiment 1 (where they were given positive statements of ability).

General Discussion

Generic sentences such as ''Boys are good at math'' convey broad generalizations about entire categories of people. Given their prevalence in speech to children and their robust semantic properties (e.g., their resistance to counterexamples), generics constitute an important means of learning about others. What children learn from a generic sentence, however, may not be limited to a simple mapping between a property (e.g., being good at math) and a broad referent set (e.g., boys). Our hypothesis in these studies was that generic language also conveys, more covertly, a certain perspective on *how this mapping came to be*, inducing children to think of the relevant property as emerging naturally from an internal source.

Summary and Additional Discussion of the Experiments

Experiment 1 provided strong evidence for this hypothesis. Both preschool-age children and adults generated more essentialized explanations (in terms of traits, functions, or inherent causes) and fewer nonessentialized explanations (in terms of disease/injury, learning, or external causes) for novel properties provided in generic sentences than for the same properties provided in nongeneric sentences. This effect held up both for biological properties (e.g., having thromboxane in one's brain) and for abilities (e.g., being good at a game called ''gorp'') but was somewhat stronger for the biological properties.

In future work, it may be useful to also compare children's construal of properties introduced via generics versus via sentences quantified with ''most'' (e.g., ''*Most girls* are really good at a game called 'gorp'''). In contrast to the nongeneric sentences used in these studies, both generic and ''most''quantified sentences apply to a multitude of category members; however, only generics refer to the category as an abstract whole. Thus, such a comparison would allow us to determine the extent to which the category-reference aspect of generics' meaning contributed to the effects documented here.

Experiment 2 provided converging evidence for the essentializing effect of generic language on children's conceptions of novel abilities. Children who heard the nongeneric version of a certain ability thought that (a) practice, (b) ''working at it,'' and (c) uninterrupted effort were more important to its acquisition and maintenance than did children who heard the generic version of it. This difference replicated a result obtained with open-ended explanations in Experiment 1, where children provided significantly more practice explanations and fewer trait explanations for novel abilities phrased nongenerically. Considering the extensive work on the motivational consequences of people's implicit ''theories'' of ability (see Dweck, 1999, 2006), it is possible that these language-induced differences in how children *think* about abilities would actually translate into meaningful differences in how children *behave* in achievement-related contexts (see Cimpian, 2010)—especially if the generic versus nongeneric language children hear is about abilities that are important to their success in school (e.g., ''Boys are good at math and science'').

Experiments 3 and 4 identified two factors that moderate the strength of generics' essentialist implications. Experiment 3 demonstrated the moderating effect of the *category* referred to in a generic sentence. When the novel properties were framed in terms of a context-based category such as *boys/girls at a school*, participants no longer explained them in terms of functions or deep underlying causes, arguably because this category does not support essentialist inferences (e.g., Haslam, Rothschild, & Ernst, 2000; Lickel et al., 2000; Prentice & Miller, 2007). Although the null effect of the generic/nongeneric manipulation held for both age groups, the adults only showed this overall null effect because of a crossover interaction with item type: For biological properties, adults were more likely to essentialize the items in generic format (just as in Experiment 1), while for abilities they did the opposite, giving more essentialist responses for the items provided in *nongeneric* format. For example, they used trait explanations more often when an ability was true of a single boy/girl at a school (e.g., ''she is good at this because of her problem-solving and reasoning abilities'') than when the same ability was true of boys/girls at that school.

Although at first surprising, this last finding is predicted by a classic account of causal attribution. Kelley's (1973) ''ANOVA'' model was formulated to explain how people determine the causes of their own and others' behavior—and, in particular, whether these causes are internal to the person or external. One factor in Kelley's model is *consensus*—that is, whether the same behavior or outcome occurs consistently across people. The higher the consensus, the more likely it is that an external cause was responsible for the observed outcome. Imagine a student who gets an excellent grade on her final. Was it something about her (e.g., high ability) that enabled her to get a good grade, or was it something about the class (e.g., easy final)? With just this one data point, the two possibilities are about evenly matched. However, if we knew that many other students in the class did very well on the final (high consensus), then it may be that something about the course was responsible for her excellent grade. This attributional process might explain the higher number of trait explanations in the nongeneric condition: An internal cause is plausible when it is a single boy or girl who is good at something. When it is all the boys or girls at a school who are good, though, their ability may be better accounted for by external factors (e.g., the school's curriculum) rather than by their traits.

Two questions remain, however. First, why was consensus information not used in Experiment 1 (boys/girls), where participants in the generic (i.e., high-consensus) condition favored internal, essential attributions instead of external ones? This discrepancy seems to be explained by the structure of the social categories that instantiate the consensus information. For instance, Yzerbyt et al. (1998) suggested that the ''impact of consensus is limited to those settings in which the observed people are considered to be individual members of an *aggregate* and not when they are perceived to be members of . . . a meaningful and coherent social category'' such as boys/girls (p. 1098, emphasis added). Thus, the fact that the gender categories used in Experiment 1 are ''meaningful and coherent'' rather than mere ''aggregates'' may have promoted explanations in terms of essential factors. The second remaining question is related to the first: Why did adults in Experiment 3 not use consensus information when explaining *biological properties* that were true of boys/girls at a school? Recall that the generic versions of the biological properties were essentialized more than the nongeneric versions—the opposite of the pattern obtained for abilities. To speculate, it could be that hearing biological properties applied to boys/girls at a school reifies these categories for adults, making them more like coherent natural kinds (e.g., ''boys with high IQs,'' ''girls who are gifted in math,'' ''people who are high class''). Thus, adults may have been likely to appeal to essential factors in their explanations because the biological properties ''naturalized'' the categories. Alternatively, the biological nature of the properties may have led adults to assume that these are features shared by the entire gender or by all humans (e.g., ''it's possible that everyone has it in their brain . . .''), which would also account for the higher number of essentialized explanations.

A final point regarding Experiment 3: The question may arise whether participants in fact interpreted the noun phrase ''boys/girls at a different school'' as referring to a *generic category*, which would include past and future instances (as in, e.g., ''the kind of boy/girl who typically goes to this school''), or whether they interpreted it as referring to a *specific group* instead (as in ''the set of boys/girls who are currently attending this school''). Although we do not have conclusive evidence that the generic category interpretation was preferred, some of our participants' responses suggested they did have a *type* of boy/girl in mind rather than a specific *group*. For example, they sometimes talked about children at this school as being ''gifted'' or ''mentally disabled,'' or as having certain ''special needs,'' ''learning impairments,'' or ''genetic predispositions.'' They also often referred to characteristics of the school in their explanations (e.g., ''isolated and remote school,'' ''at an incredibly high elevation,'' ''looks like a nice Montessori-type school''), which may imply that they were explaining why *anyone* attending that school—in the past, present, or future—might acquire the features in question.

Experiment 4 focused on the moderating effect of the *property*. Since, in fact, not all facts expressed in generic sentences are central to the relevant concepts (e.g., ''Dogs wear collars''; see Prasada & Dillingham, 2006, 2009), we asked if children can use the semantics of the properties talked about to modulate the extent to which they essentialize them. Specifically, we tested whether the essentialist implications of generic language would be blocked by properties that are seldom construed in terms of stable internal factors. Following Benenson and Dweck (1986), we assumed that 4- and 5-year-old children would have an effort-based default construal of properties such as not being good at a puzzle or a game. This nonessentialist ''baseline'' may be strong enough to cancel out the effect of generic language. Adults, however, are more flexible in how they think about these properties, so they might be more susceptible to a generic/nongeneric manipulation. Our predictions were confirmed: It was only the adults who distinguished between the generic and nongeneric phrasings of the lack-of-ability items, producing significantly more trait explanations and fewer nonessentialized explanations (e.g., in terms of insufficient practice or the difficulty of the task) in the generic condition. Although children showed a similar pattern, for them the generic/nongeneric differences were weaker and did not reach statistical significance. Instead, children demonstrated the expected bias toward a nonessentialized construal of these properties, producing only about a third as many trait explanations as the adults and more than twice as many nonessentialized explanations.

Taken together, the results described here provide a compelling account of how, and under what circumstances, the generic/nongeneric distinction shapes young children's thinking about others. Our studies thus fit into a long tradition of research into the effects of implicit linguistic meanings on social cognition.

Language Cues to Essentialism

Starting with Markman and Smith (cited in Markman, 1989), several studies have demonstrated that *nouns*—when used as person descriptions—also have powerful essentialist implications (Gelman & Heyman, 1999; Reynaert & Gelman, 2007; Walton & Banaji, 2004). For example, adults judge a sentence such as ''John is *an intellectual*'' to make a stronger statement about John than the nearly identical adjective description ''John is *intellectual*'' (Markman, 1989). Similarly, the noun description has more inferential depth—when asked to list ''what else might be commonly believed about the person,'' adults generated significantly more attributes for ''John is an intellectual'' than for ''John is intellectual'' (Markman, 1989, p. 125). Nouns' implications extend to novel disease descriptions (e.g., ''He is a baxtermic'' vs. ''He is baxtermic''; Reynaert & Gelman, 2007) and even self-descriptions (e.g., ''I am a chocolate-lover'' vs. ''I eat chocolate a lot''; Walton & Banaji, 2004), and are picked up by children as young as 5 (Gelman & Heyman, 1999).

Recently, Cimpian et al. (2007) demonstrated that minor changes in the wording of praise can have a dramatic impact on children's achievement motivation, likely by changing the extent to which they essentialize their good performance (see also Cimpian, 2010; Kamins & Dweck, 1999; Mueller & Dweck, 1998). The linguistic distinction Cimpian et al. tested was that between individual-referring generic sentences (e.g., ''You are a good drawer''), which generalize across time and situations, and their nongeneric counterparts (e.g., ''You did a good job drawing''), which refer to a specific event. The children who heard the generic sentence above as praise for succeeding on a drawing task reacted much more negatively when they subsequently made mistakes than the children who were praised nongenerically. Being told they were ''good drawers'' arguably led children to essentialize their success by inferring that it was due to a stable quality or talent, which was then threatened by the mistakes, resulting in increased negative affect and decreased task persistence.

Semin and Fiedler's (1988, 1991) linguistic category model provides another example of the subtle ways in which linguistic forms affect social cognition (see also Heyman & Diesendruck, 2002). Semin and Fiedler argued that (a) any interpersonal event (e.g., A and B are fighting) can be described, with equal validity, at different levels of abstractness and (b) the abstractness of the description has important implications for how the event is represented, with more abstract descriptions leading to more essentialist construals. Moving from the concrete to the abstract end of this scale, to describe an event one could use a ''descriptive action verb'' (e.g., ''A is *pushing* B''), or an ''interpretive action verb'' (e.g., ''A is *hurting* B''), or a ''state verb'' (e.g., ''A *hates* B''), or an adjective (e.g., ''A is *aggressive*''). Adults (e.g., Semin & Fiedler, 1988), as well as young elementary-school children (Werkman, Wigboldus, & Semin, 1999, Study 2), interpret the more abstract descriptions to be more informative about the person (e.g., A)—that is, more essentialized—and less informative about the situation.

Conclusion

The findings described in the present studies add to this rich literature by suggesting that the semantic distinction between generic and nongeneric sentences carries more meaning than one might at first suspect. In addition to the *scope* of the properties conveyed, generic and nongeneric sentences differ in their implications about the *source* of these properties and therefore in their implications about the *kind of properties they are*—essential, stable features of their referents that emerge effortlessly from an internal source versus superficial, temporary features that emerge as a result of external intervention or sustained effort. However, our studies also show that children will not automatically essentialize any piece of information that is conveyed in generic form. Rather, they actively integrate this linguistic cue with their theoretical knowledge about the relevant categories and properties, and are thus likely to arrive at a rich, nuanced interpretation of the facts they learn.

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