

## Research Article

### CARROT-EATERS AND CREATURE-BELIEVERS: The Effects of Lexicalization on Children's Inferences About Social Categories

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**Abstract**—This article examines how language affects children's inferences about novel social categories. We hypothesized that lexicalization (using a noun label to refer to someone who possesses a certain property) would influence children's inferences about other people. Specifically, we hypothesized that when a property is lexicalized, it is thought to be more stable over time and over contexts. One hundred fifteen children (5- and 7-year-olds) learned about a characteristic of a hypothetical person (e.g., "Rose eats a lot of carrots"). Half the children were told a noun label for each character (e.g., "She is a carrot-eater"), whereas half heard a verbal predicate (e.g., "She eats carrots whenever she can"). The children judged characteristics as significantly more stable over time and over contexts when the characteristics were referred to by a noun than when they were referred to by a verbal predicate. Lexicalization (in the form of a noun) provides important information to children regarding the stability of personal characteristics.

People can be classified in a rich variety of ways, along dimensions that include gender, age, appearance, occupation, and traits. One important challenge to young children is to decide which of these groupings are most central. Which properties can be assumed to be a relatively stable aspect of a person and enduring over time, and which are instead transient or superficial? One potential cue for children may come from language, specifically, from category labeling. Category labels (e.g., "tattletale," "nerd") seem intuitively to tell what a person is, not just what a person is like (Markman, 1989). Many properties that could be construed as temporary states (e.g., "Sally didn't clean up her room today") may seem more enduring and fundamental when expressed in the form of a category label (e.g., "Sally is a slob").

There is widespread interest in the effects of labeling on social categorization. Researchers have theorized that labels lead to changed expectations, and as such can have either positive or negative effects. One benefit of labeling is that it can allow more complex interpretations of behavior that might otherwise be evaluated negatively (Wood & Valdez-Menchaca, 1996). For example, behaviors that would otherwise be considered disruptive are reassessed as creative when a child displaying the behaviors is labeled as "gifted" (Murphy, 1990). Labeling can also have the practical benefit of easing access to social services (Rosenfield, 1997). However, there is also an ample literature demonstrating that labeling can foster stereotypes and lead to negative expectations (e.g., Darley & Fazio, 1980; Fiske & Neuberg, 1990; Hamilton, Sherman, & Ruvolo, 1990; Miller & Turnbull, 1986).

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Labeling effects are found in children as well as adults (Milich, McAninch, & Harris, 1992).

However, what is not completely understood is why labeling has negative effects. Certainly one cause of negative evaluations is the information literally conveyed in a label. For example, describing someone as a criminal provides information about that person's past behavior, and increases the probability that one can make inferences about the person's trustworthiness. As Jussim, Nelson, Manis, and Soffin (1995) discussed, a label carries with it information about category base rates. This information can lead to negative appraisals, which in turn can affect how a person is treated (e.g., Rosenthal & Jacobson, 1968). Moreover, labeling may activate a stigma associated with that particular category.

Word meanings can additionally include quite subtle, nonobvious social implications. A number of studies have found that the type of word selected (e.g., action verb vs. mental state; descriptive action verb vs. adjective) implicitly conveys information relevant to a social appraisal. For example, Brown and Fish (1983) found that adults draw different causal inferences depending on whether a verb describes an action or a mental state. When hearing behavioral or action verbs (e.g., "helps"), people give greater causal weight to the subject (e.g., Ted helps Paul because Ted is helpful, not because Paul is helpable). In contrast, with mental or state verbs (e.g., "likes"), people give greater causal weight to the object (e.g., Ted likes Paul because Paul is likable, not because Ted is likeful). This effect is quite systematic across a wide range of behavioral-action versus mental-state verbs. There are also systematic differences in interpretation due to whether an event is described with a verb (e.g., "Paul is lying") or an adjective (e.g., "Paul is dishonest"): A description using an adjective is viewed as more informative, and as reflecting a more enduring quality of the subject (Fiedler, Semin, & Bolten, 1989; Semin & Fiedler, 1988).

The issue we address in the present research is whether lexicalization per se—that is, characterizing someone with a classificatory label—carries implications beyond the literal information conveyed. Specifically, the linguistic form in which a social category is expressed may have important effects on other people's response. That is, labeling may imply that the information provided is particularly stable and immutable. Giving a label may reify a category in a way that other ways of referring to the same information do not. We find intuitive support for this hypothesis in noting that labels can be separated from the behaviors they describe (e.g., "He's not a criminal; he just made an error in judgment"; "I believe in equal rights for women, but I'm not a feminist"). In these cases, the label conveys that someone is a member of a category (with implied stability and centrality to identity), whereas the behavioral description conveys that someone has a particular attribute (with implied temporary status and distance from central identity).

Labels can include common nouns (e.g., "slob"), adjectives (e.g., "messy"), or diagnostic possessive phrases (e.g., "has attention deficit

disorder"). There may be important differences among these forms in what they imply about social categories, but that is beyond the scope of this article. In the present context, we focus on the contrast between common nouns and behavior descriptions.

There is now growing evidence that nouns may carry implications beyond those carried by other linguistic expressions (see Gentner, 1982). Markman (1989) discussed this distinction when contrasting nouns and adjectives. She hypothesized that referring to a category with a noun, rather than an adjective, conveys that the category supports more inferences, provides more essential information, is central to the identity of an object, is relatively enduring and permanent, is organized into taxonomies, and is unique and nonoverlapping with other categories. In contrast, referring to a category with an adjective implies that it supports fewer inferences, provides less essential information, is less central to an object's identity, and so on.

Markman and Smith (cited in Markman, 1989) tested these ideas directly in a series of studies with adults. On one task, participants were asked to list properties of a series of categories. Depending on the condition, categories were either nouns (e.g., "an intellectual") or adjectives (e.g., "intellectual"), matched for semantic content. Subjects listed more properties of the nouns than of the content-matched adjectives (*M*s of 4.0 vs. 3.1 per item, respectively). On another task, subjects were given a direct contrast between statements including nouns and statements including adjectives, presented in pairs (e.g., "John is a liberal" vs. "John is liberal"). They were asked which member of each pair seemed to be stronger and why. These adults judged nouns as conveying more powerful information than adjectives, and often explained their choices by suggesting that the nouns were more enduring and central to category identity.

What about development? It is plausible that children attend to lexicalization. A number of studies comparing conditions in which labels were and were not provided have shown that category labels are important sources of information for both children and adults (Balaban & Waxman, 1997; Baldwin & Markman, 1989; Gelman & Markman, 1987; Markman & Hutchinson, 1984; Waxman & Hall, 1993; Waxman & Markow, 1995). Furthermore, children are sensitive to linguistic form class (e.g., nouns vs. adjectives) as early as 2 years of age or even earlier (Brown, 1957; Hall, 1994; Hall, Waxman, & Hurwitz, 1993; Katz, Baker, & Macnamara, 1974). For example, children appropriately assume that a novel noun refers to a class of like objects, whereas a novel adjective refers to a single property.

However, we know of only a few studies that have contrasted nouns with other parts of speech in terms of the inferences that children draw. One study used familiar nouns and familiar adjectives, and found that nouns (not adjectives) were used by children to draw novel inferences (Gelman & Coley, 1990). Children 2 to 3 years of age inferred that two animals with the same noun label (e.g., "bird") shared the same properties (diet, habitat, etc.), even when they were perceptually dissimilar. This was not found when the animals were labeled with familiar change-of-state adjectives (e.g., "sleepy"). Another study (Gelman, Collman, & Maccoby, 1986) found that gender nouns ("boy," "girl") imply richer inferences than gender-linked properties (e.g., "will grow up to be a daddy," "will grow up to be a mommy"). This finding is notable because the properties were central to category identity. Yamauchi and Markman (1998) have also found that, for adults, category labels lead to different inferences than category features.

Hall and Moore (1997) directly contrasted adjectives and nouns, and found that preschool children and adults distinguish adjectives and

nouns on the basis of form class alone. In these studies, children heard familiar color terms, in either adjective or noun form, applied to a set of novel creatures. For example, in one experiment, the distinction between nouns and adjectives was supplied morphosyntactically (e.g., "This is a blue one" in the adjective condition vs. "This is a blue" in the noun condition). In further experiments, the distinction was supplied phonologically (e.g., "This is a blue bird" in the adjective condition vs. "This is a bluebird" in the noun condition). Children in the adjective condition were then asked to judge which of two pictures was also "a blue one" or "a blue bird"; children in the noun condition were asked which was "a blue" or "a bluebird." Participants chose between pictures depicting an object-kind match (the same creature or bird, but covered with a red substance) and a property match (a different creature or bird that was blue in color). Results indicated that both 4-year-olds and adults used lexical category (noun or adjective) as the basis of their judgments. In the adjective condition, participants typically selected the property match, whereas in the noun condition, participants typically selected the object-kind match. One way of interpreting these results is to say that nouns led to judgments of greater stability; that is, object identity was preserved with nouns, but not adjectives.

To date, all studies of lexicalization effects have focused on familiar labels, making it difficult to tease apart effects of the information conveyed in the label versus effects of the label form itself. In the present work, we investigated whether the linguistic form itself is sufficiently powerful to produce inferences of stability. We tested this possibility by using novel nominalized phrases, to remove the possibility of contaminating effects of familiar labels that may cause listeners to retrieve predetermined meanings. During the experimental sessions, each of four child characters was described as having an idiosyncratic characteristic (e.g., loves to eat carrots). Then, each was further described with either a novel noun (e.g., "She is a carrot-eater"; *label* condition) or a descriptive phrase (e.g., "She eats carrots whenever she can"; *verbal-predicate* condition). Each characteristic was chosen as one that could be construed as either temporary or stable. We hypothesized that labels would imply greater stability of the characteristics. Children were then asked a series of questions designed to assess their judgments of the stability of the characteristics, over time and across contexts.

## METHOD

### Participants

Participants were fifty-eight 5-year-olds and fifty-seven 7-year-olds. Children were randomly assigned to one of two conditions: the label condition (5-year-olds:  $n = 30$ ,  $M = 5.5$  years; 7-year-olds:  $n = 30$ ,  $M = 7.7$  years) and the verbal-predicate condition (5-year-olds:  $n = 28$ ,  $M = 5.6$  years; 7-year-olds:  $n = 27$ ,  $M = 7.7$  years).

### Items

Each participant received four item sets. For each item set, participants heard a three-sentence description, followed by a set of four test questions. The three-sentence description included the character's name and age, a distinctive behavior that the character characteristically engages in, and either a noun label (*label* condition) or a description in the form of a verbal predicate (*verbal-predicate* condition). For example, for one story, the description was as follows: "Rose is 8 years

old. Rose eats a lot of carrots. She is a carrot-eater<sup>1</sup> [label condition]/She eats carrots whenever she can [verbal-predicate condition].” The verbal predicates were designed to restate the information in the previous statement, in a slightly different form. The labels were designed to refer to the same information, using a single compound noun phrase.

Aside from the carrot-eater item, the other items concerned a boy who thinks creatures live on other planets (“a creature-believer”), a boy who wakes up early (“an early-waker”), and a girl who really loves guinea pigs (“a guinea-pig-lover”). The four item sets were provided in a separate random order for each participant.

The four test questions for each item set concerned the stability of the key property (e.g., eating carrots). They asked about (a) past behavior (“Did Rose eat a lot of carrots when she was 4 years old?”), (b) future behavior (“Will Rose eat a lot of carrots when she is grown up?”), (c) behavior with no family support (“Would Rose eat a lot of carrots if she grew up in a family where no one liked carrots?”), and (d) behavior with family opposition (“Would Rose stop eating a lot of carrots if her family tried to stop her from eating carrots?”). The four properties were always questioned in this order.

**Procedure**

Children were tested individually. Each child received all four item sets and was asked all four test questions for each item set. No feedback was provided.

**RESULTS**

Responses indicating stability of the property (“yes” to the questions regarding prior behavior, future behavior, and no family support; “no” to the question regarding family opposition) received a score of 1. A score of 0 was given for each response indicating nonstability (“no” to the questions regarding prior behavior, future behavior, and no family support; “yes” to the question regarding family opposition). Each “don’t know” response received a score of 0.5. Preliminary analyses revealed no significant effects of gender, so gender was excluded from subsequent analyses.

Table 1 presents the results. Scores were summed over the four trials per property (one trial for each of the four item sets) and entered into a 2 (age: 5 years vs. 7 years) × 2 (condition: label vs. verbal predicate) × 4 (property type: past vs. future vs. no family support vs. family opposition) analysis of variance. As predicted, there was a significant main effect of condition,  $F(1, 111) = 7.58, p < .01$ , indicating that children predicted greater stability in the label condition than in the verbal-predicate condition. There was also a main effect for property type,  $F(3, 333) = 5.07, p < .005$ . Newman-Keuls post hoc tests indicated that the question regarding no family support yielded fewer predictions of stability than any of the other three properties, all  $ps < .05$ . There were no other significant effects.

Although there was no significant Condition × Property Type interaction, we conducted a series of planned comparisons to determine

1. Use of this construction (“carrot-eater”) requires that children understand three things: that “eater” is the head noun, that “carrot” modifies “eater,” and that “eater” is an agentive noun meaning “one who eats.” Children understand all three of these principles before age 5 years, the youngest age in our study (Clark, Gelman, & Lane, 1985; Clark & Hecht, 1982).

**Table 1.** Mean number of predictions that the characteristic would be stable (out of 4 possible) as a function of age, condition, and property type

Property type	Condition	
	Label	Verbal predicate
5-year-olds		
Past	2.82 (1.46) **	2.50 (1.62)
Future	3.28 (0.98) ***	2.52 (1.47)
No family support	2.78 (1.44) **	2.18 (1.56)
Family opposition	3.15 (1.03) ***	2.86 (1.27) **
7-year-olds		
Past	2.92 (1.54) **	2.83 (1.26) **
Future	3.08 (1.00) ***	2.59 (0.90) **
No family support	2.65 (1.37) *	1.93 (1.45)
Family opposition	3.03 (1.38) ***	2.63 (1.42) *

*Note.* Standard deviations are in parentheses. Each mean was submitted to a *t* test to determine whether it deviated from chance performance.  
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

which properties individually carried the effect of condition. These analyses revealed that the questions regarding future behavior and behavior with no family support each received more stable (“yes”) responses in the label condition than in the verbal-predicate condition, both  $ps < .02$ . Questions regarding past behavior and behavior with family opposition also showed condition differences in the predicted direction, although they were nonsignificant.

To see whether these effects held for each of the four item sets, we examined responses for each item set separately. In every case, the label condition had a significantly higher score for stability than the verbal-predicate condition.

**DISCUSSION**

By 5 years of age, children judge personal characteristics as more stable when they are referred to by a noun (e.g., “She is a carrot-eater”) than by a verbal predicate (e.g., “She eats carrots whenever she can”). Children in the label condition predicted that characteristics would be more stable over time (e.g., more likely to be retained in the future) and more stable over adverse environmental conditions (e.g., more likely to be retained even when there is no family support). This finding is consistent with a range of other findings showing that people possess strong stereotypes of social categories encoded in labels (e.g., Darley & Fazio, 1980), and that nouns are particularly important for implying that a category is richly structured (Hall & Moore, 1997; Markman, 1989). The present finding also extends beyond previous work in showing that labels make a difference even when a label condition is compared with a condition in which the same information is provided in no-label format. Moreover, the present findings are noteworthy in that all the characteristics were relatively novel (e.g., carrot-eater, creature-believer). This novelty implies that children were not retrieving rote meanings, but rather made use of a general rule that they applied to these novel noun phrases. We thus conclude that lexicalization (in the form of a noun) provides important information to children regarding property stability.

The distinction between “carrot-eaters” and “those who eat carrots” can be understood in terms of a well-known social psychological phenomenon, the fundamental attribution error (Jones, 1976; Nisbett & Ross, 1980). Specifically, the fundamental attribution error is the tendency of people to emphasize the role of dispositional factors, and downplay the role of situational factors, in explaining people’s behavior. The present results suggest that noun labels encourage and promote this reasoning error in children as young as 5 years of age. Whereas “those who eat carrots” are interpreted as eating carrots for situationally determined reasons, “carrot-eaters” are interpreted as eating carrots for reasons that are rooted within the individuals’ dispositions.

One important question that remains for future research concerns the scope of children’s reasoning. We have argued that the children had formed a generalization, and had not simply learned rote meanings for the labels used in this experiment. What remains unclear is the nature of the generalization they had formed. For example, do linguistic cues narrowly affect children’s judgments of characteristic stability, or do such cues have broader implications for how children view certain social descriptions?

We suggest that use of a label may have a broader effect, by serving as one factor that helps children to construe certain social categories as natural kinds. Natural kinds are categories that are assumed to have a particularly rich structure, with nonobvious similarities (including an underlying “essence”) and rich inductive potential. Most studies of natural kinds have focused on basic-level animal categories. For example, upon learning that an atypical exemplar is a member of a category (e.g., that a penguin is a bird), children and adults draw novel inferences from typical instances to the atypical member (Gelman & Markman, 1986). By age 4, children judge nonvisible internal parts to be especially crucial to the identity and functioning of an item. Children also treat category membership as stable and unchanging over transformations such as costumes, growth, or metamorphosis (Gelman, Coley, & Gottfried, 1994; Keil, 1989). Finally, children treat species-characteristic properties as being innately determined at birth, and unlikely to change over changing environmental conditions (such as adoption; Gelman & Wellman, 1991).

Some social characteristics appear to be treated as natural kinds, despite the lack of strong factual basis for this judgment (Rothbart & Taylor, 1992). In Rothbart and Taylor’s words, “whereas social categories are in reality more like human artifacts than natural kinds, they are often perceived as more like natural kinds than human artifacts” (p. 12). Our work suggests that language may be one factor that changes where social characteristics are perceived to fall on this continuum. In other words, referring to a category with a noun label may foster an essentialist perspective on a category.

There are other predictions of essentialist thinking, and it would be interesting to discover if lexicalization promotes these as well. For example, essentialism implies relative emphasis on within-group similarity and between-group differences. It also implies that a category has high inductive potential (i.e., promotes many inferences), that it has a nonobvious basis, that it is real (discovered) rather than invented, that it is biological in origin rather than social, and that it is inherent in an individual rather than the product of social interaction. Overall, language may help turn an arbitrary characteristic into a trait and may provide clues about how to carve up the social world.

In future research, it would also be important to discover what forms of language have the effects demonstrated here. We have focused on noun labels; however, it is possible that other parts of

speech (such as adjectives) may similarly convey essentialist implications—especially for social categories, which often are expressed with adjectives (e.g., “smart,” “athletic,” “shy”). Another open question concerns what kinds of entities are susceptible to language effects. Lexicalization effects may be found across domains. Alternatively, it may be that language is especially powerful for affecting social categories, because social categories are so variable in structure.

A final question posed by this research is how children know that labels carry essentialist implications. One plausible account is that children have formed a generalization based on their experience with English. As Markman (1989) has demonstrated, in English familiar nouns tend to capture more properties than familiar adjectives. Children may come to discover a mapping between linguistic form class and conceptual structure (see also Waxman & Markow, 1995), and form expectations about novel words on this basis. Although this account would suggest that children need specific experiences with nouns and adjectives in order to acquire the formal distinction between the two kinds of words, we would not expect this finding to be restricted to English, given that the distinction between nouns and verbal predicates appears to be universal (Gentner, 1982), albeit with some cross-linguistic variations (Tardif, 1996). Thus, we would predict that a lexicalization effect might be found quite broadly across languages.

In closing, we suggest that the present results may have broader implications for children’s self-concept. The results of this experiment imply that how parents talk about a child may affect how that child thinks about his or her own characteristics. For example, when a parent says, “You’re a dawdler” (vs. “You dawdle a lot”), the label itself may convey information that the characteristic is a fundamental part of the child’s identity. Although the linguistic distinction is subtle, it may convey to the child important implications regarding trait malleability. Wylie (1990) argued that the majority of mothers’ attributions about their young children, expressed to the children themselves, are implicit. Similarly, the character descriptions used in our study can be thought of as conveying implicit messages that even young children are sensitive to.

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