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ABSTRACT

Two studies were conducted to determine whether language as well as appearance cues would influence children's performance on a sex constancy task. In the first study, preschoolers and second graders participated in a sex constancy task in which different labels were used to refer to a picture of a boy or girl. The results showed that older children scored higher on sex constancy than the preschoolers, but that children of both ages were more likely to respond correctly when proper names were used in the task than when pronouns or sex-neutral labels were used. In a second study, preschoolers, second graders, and fourth graders were asked whether a change in proper name would change a person's sex. The question was asked both with and without an accompanying change in the appearance of pictured persons. The results showed that preschoolers and second graders thought that sex would be changed by a change in proper name but that fourth graders knew that both proper name changes and appearance changes were irrelevant to sexual identity. The results suggest that children attend to both language cues and information about appearance when determining the sex of another person. (Author/RH)

Development of sex constancy: The role of language

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Abstract

Two studies were conducted to determine whether language as well as appearance cues would influence children's performance on a sex constancy task. In the first study, preschoolers and second graders participated in a sex constancy task in which different labels were used to refer to a picture of a boy or girl. The results showed that older children scored higher on sex constancy than the preschoolers, but that children of both ages were more likely to respond correctly when proper names ("John/Jane") were used in the task than when pronouns ("he/she") or sex-neutral labels ("this child") were used. In a second study, preschoolers, second graders and fourth graders were asked whether a change in proper name (e.g., from "John" to "Jane") would change a person's sex, both alone and with an accompanying appearance change. The results showed that preschoolers and second graders thought that sex would be changed by a change in proper name but that fourth graders knew that both proper name changes and appearance changes were irrelevant. The results suggest that children attend to both language cues and information about appearance when determining the sex of another person.

Development of sex constancy: The role of language

An important acquisition in middle childhood is sex constancy: the knowledge that one's sex is a permanent attribute that cannot be changed by superficial changes in one's external appearance (Emmerich, 1981; Kohlberg, 1966). Thompson and Bentler (1971) have shown that young children decide if someone is male or female on the basis of clothing and hairstyle cues, even when genital and other physical information about the person's true sex is available. Thus, young children believe that if an individual's external appearance is changed, his or her sex will be changed as well. Sex constancy has been shown to be the final component acquired in a sequence of gender knowledge, including the ability to label the self and others as male or female, and the knowledge that one's gender is stable over time (Eaton & Von Bargen, 1981). Children's acquisition of sex constancy has also been related to their interest in observing same-sex others and their level of reasoning on concrete operational tasks (Marcus & Overton, 1978; Ruble, Balaban, & Cooper, 1981; Slaby & Frey, 1975).

The task most often used to assess sex constancy resembles a Piagetian conservation task, in that children are asked to reason logically when confronted with a compelling perceptual transformation (Emmerich, 1981). In the task, the subject is first shown a picture of a boy or girl and is asked to identify the child's sex. As the subject watches, the picture's appearance is gradually transformed to look like a child of the opposite sex. The subject is credited with an understanding of sex constancy if he or she reports that the child in the picture is still the same sex, despite the apparent transformation to the opposite sex.

Although the acquisition of sex constancy appears to depend in part on general cognitive development, the results of several studies indicate that children's performance on the sex constancy task is also affected by how the task is presented.

For example, Marcus and Overton (1978) found that children were more likely to maintain constancy when asked about a pictured child than when they were asked about the sex of a live classmate who was dressed as the opposite sex. Gouze and Nadelman (1980) compared children's understanding of sex constancy for themselves and for other children, and found that children performed better when asked about their own sex rather than the sex of another person. Emmerich, Goldman, Kirsch, and Sharabany (1977) found that when clear justifications for correct responses were required, children did not consistently show sex constancy until they were about nine years old.

This research explored the hypothesis that, in addition to the factors described above, children's ability to reason correctly on the sex constancy task might be influenced by the kinds of verbal descriptions that are used to refer to the picture. Support for this possibility is suggested by a recent study by Gelman, Collman and Maccoby (1986). These researchers found that when a child's appearance was ambiguous with regard to gender, labeling the child as a "boy/girl" helped preschool children make inferences about sex-linked properties that the child in the picture might possess. For example, when children saw an ambiguous child and were told it was a "boy," they inferred that he would have "andro" in his blood like other boys, even though he did not look much like other boys. The results suggested that children categorized the ambiguous child on the basis of the label "boy" or "girl," even though there were no useful appearance cues to indicate the child's sex.

The results of the Gelman et al. (1986) study suggest that when appearance cues are unavailable, children will attend to the linguistic description of an individual and will use this information to reason about sex-linked properties. Such information might also be used by children even when appearance information is available, as in the sex constancy task. The sex-typed terms generally used to describe the child in the picture

("John/Jane, he/she") could help children to reason that the individual continues to belong to the male or female category even when his or her appearance is changed. On the other hand, given young children's general tendency to make judgments on perceptual grounds, it is not necessarily obvious that, when observing a dramatic appearance change, they would also be influenced by the particular terms used to refer to the picture.

Given this uncertainty about the possible interaction of linguistic and appearance cues in the sex constancy task, one goal of the present studies was to determine whether or not children's reasoning about sex constancy would be influenced by how the picture was described. Previous research does not answer this question because different terms have been used in different studies. For example, Emmerich et al. (1977) described the picture with a sex-typed proper name ("John/Jane"). In contrast, Marcus and Overton (1978) referred to the picture with pronouns ("this boy/girl"). The overall pattern of results was similar in both studies, in that kindergarten children were less likely to demonstrate sex constancy than second graders. However, there has been no direct comparison of the relative effects of different types of labels on children's constancy judgments, within the same procedure and subject population.

The results of the Gelman et al. (1986) study suggested that sex-typed descriptions might assist children in reasoning about sex constancy. In addition to learning whether different descriptions might help children maintain their original categorization of a picture as a boy or girl, we were also interested in the opposite possibility: that children might recategorize the picture to the opposite sex when only its label was changed and its appearance remained the same. This possibility was suggested by research on the word-referent distinction (Piaget, 1965). Studies by Osherson and Markman (1975) and Markman (1976) have shown that children believe that when an object's name is changed, properties of the object may be changed as well. For example, Osherson

and Markman (1975) found that children would agree that a cat could be called a "dog," if everyone in the world agreed to make the change. However, the children then reported that the re-named cat would bark instead of meow. Similarly, children might reason that if an individual's name is changed to one of the opposite sex, other properties, such as being a boy or a girl, might also be changed as well, even if his or her appearance remains the same.

To summarize: the current studies were designed to assess whether different types of labels would influence children's reasoning about sex constancy, and how label changes might interact with appearance changes. In the first study, children participated in a traditional sex constancy task in one of three conditions, which varied according to how the picture was described. In one condition, the picture was referred to with a sex-typed proper name ("John/Jane"), while in the second condition it was described with a pronoun ("he/she), and in the third, a neutral phrase ("this child") was used. The goal of the second study was to learn whether children would reason that the picture's sex could be changed by a label change alone, even when its appearance remained the same.

Study 1

Method

Subjects. Thirty-five preschool children (M = 4 years 6 months) and 47 second graders (M = 8 years 2 months) participated in the study. Children were randomly assigned to one of the three constancy conditions. Sex distribution was approximately equal for each age group and within conditions. Children attended a preschool and elementary school in a middle to lower-middle class rural community.

Materials. The sex constancy task involved paper doll figures of a boy and a girl, each with appropriate sex-typed clothing, hairstyle, and toys. Tabs were used to dress each paper doll in the clothes of the opposite sex, and to provide it with new toys and a

different hairstyle.

Procedure. Each child was tested individually in a quiet room at his or her school in a 10-15 minute session. The sessions were tape-recorded as a supplement to the experimenter's notes and to check that the different versions of the questions were presented correctly in each condition.

The child subject was shown a paper-doll figure (4.5 x 1 inch) of a child who was the same sex as the subject. The picture showed the child dressed in appropriate sex-typed clothing. The subject was first asked to identify the sex of the child shown in the picture. The subject was then asked if the depicted child could change sex if he or she really wanted to (the "motive" question). Then, the subject observed four transformations (activities/toys, hairstyle, clothing, and clothing plus hairstyle) to the picture and was asked whether the pictured child's sex had changed after each transformation.

The exact form of the questions varied for the three conditions. In the *proper name* condition the experimenter referred to the picture with the same sex-typed name throughout the procedure. In the *pronoun* condition, the experimenter referred to the picture as "he" or "she." In the *neutral* condition the experimenter referred to the picture as "this child." For example, for the clothing question the proper name version was, "If Jane (John) puts on boys' (girls') clothes like this, what would Jane (John) be? Would Jane (John) be a boy or a girl?" The pronoun version was, "If she (he) puts on boys' (girls') clothes like this, what would she (he) be? Would she (he) be a girl or a boy?" The corresponding neutral phrase question was, "If this child puts on boys' (girls') clothes like this, what would this child be? Would this child be a boy or a girl?"

Results and Discussion

Correct responses on the five constancy questions were summed for each child,

producing a score of 0 to 5. The constancy scores were then analyzed in a 2 (Grade) x 3 (Label Condition) x 2 (Sex) analysis of variance with unequal cell sizes. Mean scores are shown in Table 1. There was a main effect of Grade, $F(1,70) = 5.07$, $p < .05$. The mean score for preschoolers was 2.17, while the mean score for second graders was 3.00. There was also a main effect of Label Condition, $F(2, 70) = 6.71$, $p < .01$. There were no interactions, and no effect of sex of subject. A Newman-Keuls post-hoc test ($a < .05$) on the marginal condition means (collapsed across grade, since there were no interactions) showed that scores in the Proper name condition were significantly higher than those in the Pronoun and Neutral conditions, which did not differ significantly from each other. Justifications provided by the children, particularly the preschoolers, were generally brief or uninformative and were not systematically analyzed.

The results of Study 1 suggest that children attend to both label and appearance cues in making decisions about the sex of a pictured individual. In the neutral condition, where the pictured child appeared to be the opposite sex and the verbal description provided no information to the contrary, even second graders (seven year olds) did not consistently exhibit sex constancy. While pronouns were not particularly helpful, sex-typed proper names were an important source of support for children's reasoning in the task. There is some evidence that proper names are particularly significant to children as labels that signify particular individuals with unique attributes. Proper names are acquired very early in language development, since there is a simple and unique mapping between the name and the associated individual (MacNamara, 1982). In contrast, pronouns are used to refer to members of the class of males or females, but are not permanently associated with specific individuals. Research by Piaget (1965) and Scarlett and Press (1975) also suggests that young children see proper names as central to their own identity, and "experience themselves as fused with their names" (Scarlett & Press, 1975, p. 127). If children consider proper names to be central to an

individual's identity, the continued use of a sex-typed proper name may imply that other important personal attributes of the individual, such as his or her sex, will also remain the same. Some of the second graders mentioned explicitly the name as the reason they thought the picture remained the same sex. For example, after seeing the paper doll transformed from a boy to a girl, a second grade boy said, "Well, his *name* is John. It would be weird for a girl to be named John!" In contrast, children never mentioned the pronoun as a reason for their correct constancy responses.

The results of Study 1 show that when the picture's appearance was transformed, children's ability to maintain constancy was influenced by the language used in the task. When sex typed names were used, children were more likely to respond correctly in the task. We became interested in the alternative possibility: that the use of proper names might also hinder children's performance on the task. Studies of the word-referent distinction suggest that children might make unwarranted inferences about new object properties on the basis of label changes alone, without an accompanying transformation of appearance. Thus, the goal of the second study was to learn how children would categorize an individual when only the label was changed. This procedure is somewhat analogous to that used by Osherson and Markman (1975), who asked children whether a cat called a "dog" would bark or meow. However, in their tasks no pictures were shown to the children. In contrast, in Study 2 children viewed a picture of a boy or girl and were asked if its sex would be changed by a name change.

Study 2

Method

Subjects. Fifteen preschoolers (M = 4 years 8 months), 14 second graders (M = 7 years 6 months, and 14 fourth graders (M = 10 years 1 month) participated. The children attended a preschool and elementary school in the same school district as the

children in Study 1.

Materials. The paper dolls and doll clothes used in Study 1 were also used in this study.

Procedure. Children were tested individually in their schools in sessions that lasted approximately 10 minutes. Children were first shown the picture of the boy or girl. Girls saw the picture of the girl, while boys saw the picture of the boy. The child was first asked to identify the sex of the depicted child. All children did so correctly. The child was then asked 6 questions about the picture. The first question was the name-change question. The experimenter pointed to the picture and asked, "If this child's name was changed to John/Jane, would this child be a boy or a girl?" The picture's appearance was *not* changed for this first question. For the five remaining questions the picture's appearance was gradually transformed. In the second question, pictures of toys associated with the opposite sex were placed next to the picture and the child was asked, "If this child played with cars and trucks and did boys' things (dolls, girls' things) would this child be a girl, or a boy?" The third, fourth and fifth questions involved transformations of hairstyle, clothing, and hairstyle along with clothing. For the sixth question, the experimenter pointed to the now-transformed picture and asked, "If this child's name was changed to John/Jane, would this child be a boy or a girl?"

Results and Discussion

Each child's correct responses on the six constancy questions were summed to form a constancy score. These scores were analyzed in a one-way analysis of variance, with Grade as the independent variable. The results showed an effect of Grade, $F(2,39) = 11.72$, $p < .001$. Preschoolers answered an average of 1.20 out of six questions correctly, while second graders responded correctly on an average of 1.69 questions. The fourth graders scored significantly higher (4.42) than the two younger age groups, which were not significantly different from each other.

Many preschoolers and second graders responded incorrectly to the first question, which asked if the pictured child's sex would be changed by a name change alone: 75% of the preschoolers and 76% of the second graders reported that when the child's name was changed (e.g., from "Jane" to "John") the child would be the opposite sex, even though the child still looked like a prototypical boy or girl. This result suggests that under some conditions young children's general tendency to be most influenced by perceptual appearances can be overcome by verbal cues. It was not until fourth grade that children clearly indicated that a name change was irrelevant to the picture's sex. Only 14% of the fourth graders erred on the first question. When explaining why a name change would not affect one's sex, several fourth graders mentioned friends who had names that were not strongly sex-typed, such as "Leslie."

It is possible that after answering the name-change question (which was always presented first, before the appearance transformation) children might have been less motivated to provide constancy responses on the subsequent questions about hairstyle, clothing, clothing-plus-hairstyle, and toys/activities. Preschool and second grade children's responses to these four questions were analyzed separately and compared to children's responses to the same questions in the neutral phrase condition of Study 1. A two-way analysis of variance, with Grade (preschool vs. second grade) and Study (1 vs. 2) as grouping factors, showed no difference in performance on these four questions, $F(1,52) = 2.93$, N.S. Thus, being first asked about a name-change did not in itself seem to make children less likely to exhibit sex constancy on the other questions. However, responses to the sixth question, when both the pictured child's appearance and name had been changed to the opposite sex, showed that almost all of the younger children, and about one-fourth of the older children, failed to show constancy. 93% of the preschoolers, 84% of the second graders, and 28.5% of the fourth graders said that the renamed and perceptually

transformed child was the opposite sex.

General Discussion

The results of these studies suggest that how the pictured child is described can be an important influence on children's reasoning about sex constancy. Sex constancy is often described as being acquired at about seven years (see Huston, 1983). However, when both appearance and language cues were removed (by transforming the picture's appearance, and using a sex-neutral description or a name typical of the opposite sex), most seven year olds in these studies failed to show constancy. Research on concrete operational tasks in the last decade has often emphasized the basic competence of younger children's reasoning when potentially confusing language is eliminated or clarified (e.g., Gelman, 1972). In contrast, the results of these studies suggest that older children's reasoning about sex constancy has often been facilitated by the use of sex-typed descriptions in the traditional procedure, and that without such supports seven year olds do not always show constancy. This conclusion is supported by recent findings of "pseudoconstancy" in seven year olds, who often could not adequately explain their reasons for correct answers on the sex constancy task (Emmerich et al., 1977; Wehren & De Lisi, 1983). Children may not acquire a solid understanding of the concept until they are about nine years old. Gelman et al. (1986) and Carey (in press) suggest one reason for the relatively extended development in the domain of gender knowledge: In contrast to other conservation tasks, knowledge about sex as a permanent category relies on the acquisition of specific biological knowledge, which most children in the early grades have not had the opportunity to acquire. Thus, in the absence of this technical knowledge, children are likely to depend on other information. including both appearance and language clues, when deciding whether someone is male or female.

The results also have implications for the relationship between language and categorical knowledge. Previous work has shown that the terms used to refer to an

individual can signify whether the person should be categorized as male or female, and can support inferences about sex-linked properties that the person is likely to have (Gelman et al., 1986). In addition, the responses of children in these studies suggest that one specific kind of label -- sex-typed proper names -- can influence children's readiness to recategorize an individual into a new class (the opposite sex) even when his or her appearance remains the same. Children were less willing to recategorize the person when a proper name was used than other terms, and they were willing to recategorize the person when he or she was given a new proper name. Although we cannot claim to know exactly why the use of proper names helped children maintain constancy in Study 1 and hindered it in Study 2, it seems clear that proper names, in addition to appearance, are an important cue to gender identity.

The results of these studies also support recent conclusions that no single measure of sex constancy should be used to infer what children know about this important concept, since their performance can be significantly affected by how the task is presented. One limitation of these studies is that children were only asked questions about a picture showing a child of their own sex. Gouse and Nadelman (1980) found that children acquire sex constancy first for their own sex, and then for the opposite sex. However, Gelman et al. (1986) found that their preschool subjects performed the same when asked about children of the same and the opposite sex. Although previous results are inconsistent, it is certainly possible that the preschoolers and second graders in these studies would have performed at an even lower average level if they had been questioned about the opposite sex as well as their own.

In the process of sex role socialization, children's interest in observing and learning from same-sex peers and models seems to depend on their understanding that they are permanently male or female (Ruble et al., 1981; Slaby & Frey, 1975). Thus, it is critical to understand the factors that can influence children's reasoning about this

important concept. While previous research has focused on how changes in the target referent (e.g., self vs. other, live vs. pictured target) affect children's performance, the studies reported here focused on a comparison of the effects of different labels that have been used in previous work. It was discovered that relatively simple label changes can have a significant impact on children's ability to reason that superficial changes in one's appearance do not alter one's biological sex. Specifically, proper names seem to assist children when they are observing an appearance transformation. Proper names may be effective because they encourage children to reason about a specific individual and about the pattern of enduring attributes, including sex, that define his or her identity.

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Table 1

	Condition:		
Grade:	Neutral	Pronoun	Proper Name
Preschool	1.81	1.30	3.42
Second	2.15	3.20	3.67

Table 1: Mean scores on sex constancy task. (Maximum score is 5.)