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ABSTRACT

Developmental differences in categorization in a communication situation were investigated among 16 adult women and 16 nine-year-old children who instructed 7-year-old children in either the organization of groceries in a mock kitchen (home task) or the sorting of photographs of common objects into compartments (school task). In both tasks, the 18 items were separated into six groups and the subjects studied their locations on shelves or in compartments before instructing the 7-year-olds. Two students unaware of the purpose of the study coded each subject's references to the 18 items according to a system elaborated from Olver and Hornsby (1966). The statements were coded in terms of superordinate, functional, and nominal categories. Each of the coders rated 20 tapes, including 8 reliability tapes, which were interspersed throughout the coding phase. Results suggest that when categorization is the means to the goal of teaching children, functional categories assume great importance for adults. Category use also seems to vary according to whether communication is in an everyday context as opposed to a school or laboratory setting. (Author/RH)

Categorization by Children and Adults in Communication Contexts

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Abstract

An important difference between laboratory and real life categorization is that in everyday use, categorization generally serves as the means to an end (e.g., arranging the kitchen to be able to find things efficiently), rather than the end itself. Laboratory classification studies have found increases with development in the use of superordinate categories, and in the use of nominal rather than functional categories. The present study examines developmental differences in categorization in a communication situation. Adult women and 9-year-old children instructed 7-year-old children in the organization of either groceries in a mock kitchen ("home" task) or photographs of common objects into compartments ("school" task).

In contrast with the usual laboratory findings, adults provided significantly more functional than nominal category references, while children used only slightly more functional than nominal cateogry references. Adults used relatively more superordinate category references than children, but this was produced largely by the school task. In the school task, adults gave more superordinate category references than references to item names, while in the home task, adults gave slightly fewer references to superordinate category than to item name, as did the children in both tasks. The results suggest that when categorization is the means to the goal of teaching children, functional categories assume great importance for adults. Category use also seems to vary according to whether communication is in an everyday context as opposed to a school or laboratory task.

Categorization by Children and Adults in Communication Contexts

Traditional laboratory studies of the development of categorization have noted that the use of "sophisticated" categorization strategies increases with age. Older children and adults use more superordinate category labels, and classify more on the basis of nominal (e.g., an apple and a pear are both fruit) than functional categories (e.g., a knife and scissors both cut) (Denney & Moulton, 1976; Olver & Hornsby, 1966; Ragain, 1980). However, recent cognitive theory and research suggest that the cognitive skills and strategies demonstrated in the laboratory may not closely resemble those found in everyday use. As Flavell (1970) warned, there is "no convincing reason to suppose that an individual's behavior on a sorting task is a really faithful reflection of the spontaneous categorization he makes in everyday situations" (pp. 997-998).

One important difference between laboratory classification tasks and classification in everyday life is that in everyday situations the classification is generally a means to an end (e.g., arranging the kitchen to be able to find things efficiently), whereas in the laboratory, classification is an exercise which is the end or goal of the problem situation. Young children may have particular difficulty with tasks which do not seem to have a meaningful goal, and may not demonstrate cognitive skills which they spontaneously use when trying to reach meaningful practical goals (Brown, 1975; Hull, 1920; Istomina, 1977).

Even for adults, however, classification of items in the context of reaching practical goals (e.g., for the purpose of organizing a kitchen)

may differ from categorization observed in laboratory tasks (Super, Harkness, & Baldwin, 1977). In practical situations, classification may be primarily according to function (e.g., Chinese dinner ingredients together), though when multiple exemplars of similar items must be organized, classification may be by nominal category (e.g., fruits and vegetables separated; saucers stacked separately from salad plates). The usual findings of heavy use of nominal categorization by adults and older children may be a function of schooling, and may only appear on laboratory tasks resembling the school tasks on which nominal classification is taught (Markman, 1981; Rogoff, 1981).

The present study examines categorization by adults and children as they use it as the means to another goal; communicating the organization of a set of objects to a child whose learning will later be tested. The classification element of the task was not made explicit, nor was it required to complete the instructional goal. The two versions of the task simulate putting groceries away in a kitchen and sorting photographs of objects in a homework problem. Since the groupings of items were determined by the experimenters, the subject's task is not to determine an appropriate organization of items, but to communicate an existing classification system.

Method

Subjects

The subjects were 16 9-year-old children ($\bar{X}$ = 9.0, range = 8.0 to 9.8 years) and 16 women, each of whom taught a 7-year-old child. Equal numbers of male and female children participated.

Procedure

Each subject participated in one of two teaching activities, instructing 7-year-olds in either the organization of grocery items on shelves in

a mock kitchen ("home" task) or in the organization of color photographs into compartments ("school" task). Both tasks took place in a room arranged to look like an actual kitchen with cupboards, appliances, and kitchen accessories. The subjects were encouraged to teach the way they do at home putting groceries away or helping with homework. In both tasks, 18 items were separated into 6 groups whose locations on shelves or in compartments the subject studied before the instruction session. In addition, the subjects were provided with a pictorial cue sheet to use if necessary during the instruction. The category structure of the items was not pointed out to the subjects; they were simply told to teach the learner how the items were arranged so that the learner could independently place some identical and some new items. The interaction was videotaped, and then the learner was tested on the organization of the objects.

All items were pretested for familiarity to the subject population. The categories and items (actual groceries) used in the home task were condiments (ketchup, pickles, olives); snacks (Doritos, crackers, cookies); sandwich spreads (margarine, honey, peanut butter); fruits (pineapples, peaches, applesauce); baking goods (cake mix, muffin mix, flour); and dry goods (macaroni mix, rice, taco shells). The categories and items (8½ cm by 6½ cm color photographs) used in the school task were machines (popcorn popper, hair dryer, typewriter); cutting tools (scissors, paring knife, lawn mower); table settings (table knife, bowl, cup); hygiene articles (toothbrush, razor, curlers); baking utensils (wooden spoon , mixer, measuring cup); and cleaning tools (broom, bucket, rubber gloves). The categories were designed to be somewhat overlapping rather than obviously

mutually exclusive, in keeping with the everyday emphasis of the tasks.

Coding system

Two students unaware of the hypotheses coded the subjects' verbal references to the 18 items according to a coding system elaborated from Olver and Hornsby (1966). The statements fell into the following modes of reference:

Superordinate categories. Providing the rationale for a group by means of a label or explanation applicable to all members of the group. This included both functional and nominal categories:

Functional category: Stating the use or function of a group of items, usually using a verb (e.g., these things you make a sandwich out of; scissors and knife cut things; things you plug in).

Nominal category: identifying a group by means of a superordinate label, usually a noun or noun phrase (e.g., sandwich stuff; sharp things; machines).

Other verbal references to groups or items

Perceptible grouping: specifying perceptual qualities such as color, shape, or material which are applied to a group of items (e.g., both of these are boxes). This is not included in the superordinate category, especially since perceptible groupings did not accurately fit all three items of a group with the items and categories of our tasks. For example, the photographs could not be successfully sorted on the basis of color and there were no grocery categories consisting of all bottles, all boxes, or all cans.

Basis of grouping not specified: stating that two or more items belong

together or are alike, without elaborating on the basis of the association or the nature of the similarity (e.g., the peaches go with the pineapples; ketchup is like pickles).

Item name: stating the name of the target item being placed (e.g., ketchup). This is coded to provide a measure of the amount of references to single items whether or not their organization is specified.

The coders each rated 20 tapes, including 8 reliability tapes which were interspersed throughout the coding phase. Reliabilities for the various types of reference were high, ranging from correlation coefficients of .88 to 1.0.

Results and Discussion

The results are presented as percentages of the total amount of verbal references coded, since the adults provided a greater total amount of verbal references than the children, t (30) = 4.56, $p < .001$. Three of the 16 children did not provide any references to item name or the various kinds of grouping. The percentages for the children are thus based on the data provided by the 13 children who did make references to items or categories.

In contrast with the usual laboratory findings, adults in this study provided significantly more functional than nominal category references (averaging 35% and 18% respectively, t (15) = 2.63, $p < .02$). Children were also more likely to describe the use of the group of items than to name it, although the difference was not significant (10% vs. 6%). Use of

perceptible and unspecified groupings was infrequent (ranging from 2% to 7%) for both children and adults.

These percentages also indicate that the adults used relatively more superordinate category references than the children, consistent with the usual findings. Adults provided significantly more of both functional and nominal category references than did children (respectively, 35% vs. 10%, t (30) = 4.44, $p < .001$; 18% vs. 6%, t (30) = 3.08, $p < .005$). This contrasts with the children's more frequent reference to item name compared to adults (74% vs. 38%, t (30) = 2.10, $p < .05$).

However, this effect was produced largely by one of the teaching contexts. It was only in the school task that adults gave a greater percent of superordinate (nominal and functional) category references than references to item names (66% vs. 26%, t (7) = 7.87, $p < .001$). The adults in the home task gave slightly fewer references to superordinate category than to item names (40% vs. 50%, not significant). In both the school and home tasks, the children gave fewer references to superordinate category than to item name (home task: 8% vs. 71%, t (7) = 3.78, $p < .01$; school task: 18% vs. 48%, t (7) = 2.22, $p = .06$). Figure 1 illustrates the comparison between the home and school task for reference to item names vs. superordinate categories. Both adults and children adjusted their communication of category information according to the task context.

Insert Figure 1 about here

The results demonstrate that when classification is embedded in the

goal of teaching a child, functional categories assume at least as great an importance, relative to nominal categories, for adults as for children. The relation of task context (home vs. school) to use of superordinate categories supports our view that category use varies according to whether communication is in an everyday context as opposed to a school or laboratory task.

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Figure Caption

Figure 1. References to item name vs. superordinate category in home and school tasks.