

# Brand Logo Recognition by Children Aged 3 to 6 Years

## Mickey Mouse and Old Joe the Camel

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**Objective.**—Little is known about the influence of advertising on very young children. We, therefore, measured product logo recognition by subjects aged 3 to 6 years.

**Design.**—Children were instructed to match logos with one of 12 products pictured on a game board. Twenty-two logos were tested, including those representing children's products, adult products, and those for two popular cigarette brands (Camel and Marlboro).

**Setting.**—Preschools in Augusta and Atlanta, Ga.

**Participants.**—A convenience sample of 229 children attending preschool.

**Results.**—The children demonstrated high rates of logo recognition. When analyzed by product category, the level of recognition of cigarette logos was intermediate between children's and adult products. The recognition rates of The Disney Channel logo and Old Joe (the cartoon character promoting Camel cigarettes) were highest in their respective product categories. Recognition rates increased with age. Approximately 30% of 3-year-old children correctly matched Old Joe with a picture of a cigarette compared with 91.3% of 6-year-old children.

**Conclusion.**—Very young children see, understand, and remember advertising. Given the serious health consequences of smoking, the exposure of children to environmental tobacco advertising may represent an important health risk and should be studied further.

(*JAMA*. 1991;266:3145-3148)

SEVERAL types of research have been used in the past decade to examine the association between cigarette advertising and rates of underage smoking. These studies have included econometric modeling,<sup>1,2</sup> the measurement of advertisement recognition,<sup>3,4</sup> and experimental studies of adolescents' reactions to advertisement imagery.<sup>5-7</sup> In one re-

cent study of teenagers, the self-perceived influence of cigarette advertising had the strongest and most consistent effect on the initiation of smoking among a group of variables that included parental smoking, sibling smoking, peer influence, and intention to smoke.<sup>8</sup> Collectively, these studies provide compelling evidence that cigarette advertisements are seen by adolescents and that they respond to the advertisements' intent. Some health experts, therefore, now believe that cigarette advertising is causally linked to smoking behavior.<sup>9-11</sup>

In contrast, the tobacco industry argues that cigarette advertising is not

targeted to adolescents and that advertising does not increase the use of tobacco products. These companies claim that advertising and promotion are designed instead to produce brand switching by adults who already smoke.<sup>12</sup> In 1988, the tobacco industry spent \$3.27 billion on cigarette advertising and promotions, making cigarettes the second most heavily advertised product in the United States.<sup>11</sup> This level of advertising cannot be justified on the basis of brand switching alone, since only 10% of current smokers change brands within a given year.<sup>13</sup>

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See also pp 3149, 3154, and 3185.

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There has been considerable speculation but little published research on the impact of advertising on very young children. Typical survey methods are generally unreliable when conducting research involving this age group since children have limited verbal skills and, therefore, cannot articulate concepts that they may understand. There is, however, some evidence that very young children understand advertising. Donohue et al<sup>14</sup> used nonverbal measures (ie, picture games) to study young children's knowledge of television commercials. They concluded that by 3 years of age, children understand both the intent of television commercials and the sophisticated concept of audience segmentation (ie, that advertisements are targeted to specific groups).

We studied the recognition level of 22 brand logos by children aged 3 to 6 years. Included were logos from two of the

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most heavily advertised cigarette brands: Camel and Marlboro.

## METHODS

The study design was based on the well-accepted market research concept of advertisement recognition.<sup>15</sup> Recognition of an advertisement indicates that it has been both seen and remembered.

Twenty-two brand logos were collected from a variety of printed sources including advertisements and product packaging. These included the logos of 10 products that are, in part, targeted to children, five logos representing two cigarette brands, and seven logos of products primarily targeted to adults (Table). No logos had specific image or word clues that might indicate what kind of product the brand represented (eg, the "Marlboro man" was not smoking). One of the current Surgeon General's warnings ("Quitting Smoking Now Greatly Reduces Serious Risks to Your Health") as it appears on printed advertisements was also included as a test item.

Recognition was measured by having the subjects match 22 logo cards to one of 12 products pictured on a game board (Table). Product position on the board was made by random assignment and was not varied between subjects.

Subjects were recruited from 10 pre-schools in Augusta and Atlanta, Ga. The schools were selected in an attempt to balance the sample for race and socioeconomic variables. Each subject's parent signed a parental consent form and completed a short questionnaire about the child's age, gender, race, number of hours of television watched each day, frequency with which the child requested specific brands, number of years of parental education, and the use of cigarettes in the subject's home.

On the following day, each child was individually tested in a quiet, separate area of his or her classroom. It was explained to the child that he or she would play a game matching cards with products. Each of the 12 products on the game board was then named. A demonstration of matching was done with a sample logo card. The child was then given a test card to match. After the child placed the card on the board (whether correct or incorrect), the child was told, "That's good." No other feedback or encouragement was given. Following each match, that card was removed from the board and the child was presented with the next card. The cards were randomized for each subject to prevent bias due to the order of presentation.

Responses were graded as either correct (grade of 1) or incorrect (grade of 0), and a score was derived by summing the binary values assigned to each logo.

Table 1.—Logos Tested,\* Correct Product Response, and Recognition Rates for 229 Subjects Aged 3 to 6 Years

| Product Category          | Logo             | Correct Product Response | Recognition Rate, % |      |
|---------------------------|------------------|--------------------------|---------------------|------|
| Children's brands         | Disney Channel   | Mickey Mouse             | 91.7                |      |
|                           | "McDonald's"     | Hamburger                | 81.7                |      |
|                           | "Burger King"    | Hamburger                | 79.9                |      |
|                           | "Domino's Pizza" | Pizza                    | 78.2                |      |
|                           | "Coca Cola"      | Glass of cola            | 76.0                |      |
|                           | "Pepsi"          | Glass of cola            | 68.6                |      |
|                           | "Nike"           | Athletic shoe            | 56.8                |      |
|                           | "Walt Disney"    | Mickey Mouse             | 48.9                |      |
|                           | "Kellogg's"      | Bowl of cereal           | 38.0                |      |
|                           | "Cheerios"       | Bowl of cereal           | 25.3                |      |
|                           | Cigarette brands | Old Joe                  | Cigarette           | 51.1 |
|                           |                  | "Marlboro" and red roof  | Cigarette           | 32.8 |
|                           |                  | Marlboro man             | Cigarette           | 27.9 |
| Camel and pyramids        |                  | Cigarette                | 27.1                |      |
| "Camel"                   |                  | Cigarette                | 18.0                |      |
| Adult brands              | "Chevrolet"      | Automobile               | 54.1                |      |
|                           | "Ford"           | Automobile               | 52.8                |      |
|                           | Apple            | Computer                 | 29.3                |      |
|                           | "CBS"            | Television               | 23.1                |      |
|                           | "NBC"            | Television               | 21.0                |      |
|                           | "Kodak"          | Camera                   | 17.9                |      |
|                           | "IBM"            | Computer                 | 16.2                |      |
| Surgeon General's warning | Cigarette        | 10.0                     |                     |      |

\*Quotation marks on the logo indicate that the brand name is part of the test item.

Subscores were calculated for each product type (ie, children's brands, cigarette brands, or adult brands), which were then transformed into a recognition rate score based on the percentage of correct matches for that type of product and for the products overall. These were then compared with data from the parental questionnaire. Analyses using the  $\chi^2$  test were used to test for independence between categorical variables. The McNemar Test was used to test for the significance of change in correct responses between two logos (The Disney Channel and Old Joe).<sup>16</sup> A correlation analysis was used to test for association of recognition rates by age. A multifactor analysis of variance was used to test the significance of the survey variables and the recognition of logos.

## RESULTS

Two hundred twenty-nine children were recruited. Subjects ranged in age from 3 to 6 years. Seventy-nine were 3 years of age (34.5%), 67 were 4 years of age (29.3%), 60 were 5 years of age (26.2%), and 23 were 6 years of age (10.0%). One hundred twenty-three (53.7%) were boys. One hundred sixty-six (72.5%) were white and 63 (27.5%) were black. Of the subjects' parents, 67 (29.3%) had less than 12 years of education, 123 (53.7%) had 12 to 16 years of education, and 39 (17.0%) had more than 16 years of education. Many subjects (34.1%) came from homes where at least one person smoked.

Each subject's parent was asked to report the number of hours of television watched per day by his or her child. One hundred eight (47.2%) of the subjects watched up to 2 hours per day, 100

(43.7%) watched 2 to 4 hours, and 21 (9.2%) watched 4 or more hours per day.

The parents were also asked to rate how often their child requested specific product brands, measured with a four-item Likert scale. Thirty-seven parents (16.2%) reported almost always, 106 (46.3%) reported often, 79 (34.5%) reported infrequently, and seven (3.1%) reported never. Unexpectedly,  $\chi^2$  analysis revealed no association of more frequent brand requests among older children. Fifty-two percent of 3-year-old children, 73% of 4-year-old children, 63% of 5-year-old children, and 65% of 6-year-old children often or almost always requested specific brands ( $P = .10$ ).

The mean logo recognition rates for all subjects are shown in the Table. As would be expected, children had high recognition of the children's brand logos ranging from 91.7% for The Disney Channel to 25.3% for Cheerios. Random guessing alone would produce a recognition rate of 8.3% (ie, one of 12 items).

Old Joe, the cartoon character promoting Camel cigarettes, had the highest recognition rate among the tested cigarette logos. More than half of the subjects correctly matched this figure with a picture of a cigarette. The other cigarette logos were correctly recognized at rates of 18.0% to 32.8%. The logos for adult products were recognized by 16.2% to 54.1% of subjects, with automobile brand logos having the highest recognition rates.

Logo recognition was highly associated with the subject's age. Figure 1 shows mean recognition rates by age for each of the three product categories. This association of increased recognition with older age was significant for

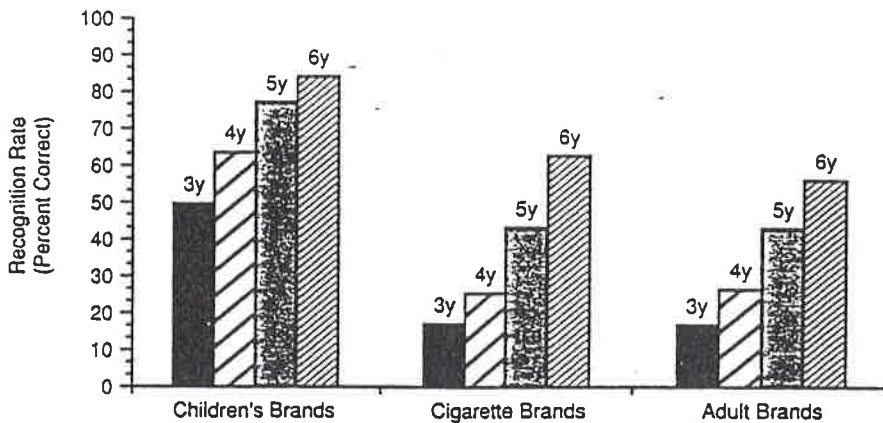


Fig 1.—Logo recognition rates by years of age for children's brands, cigarette brands, and adult brands.

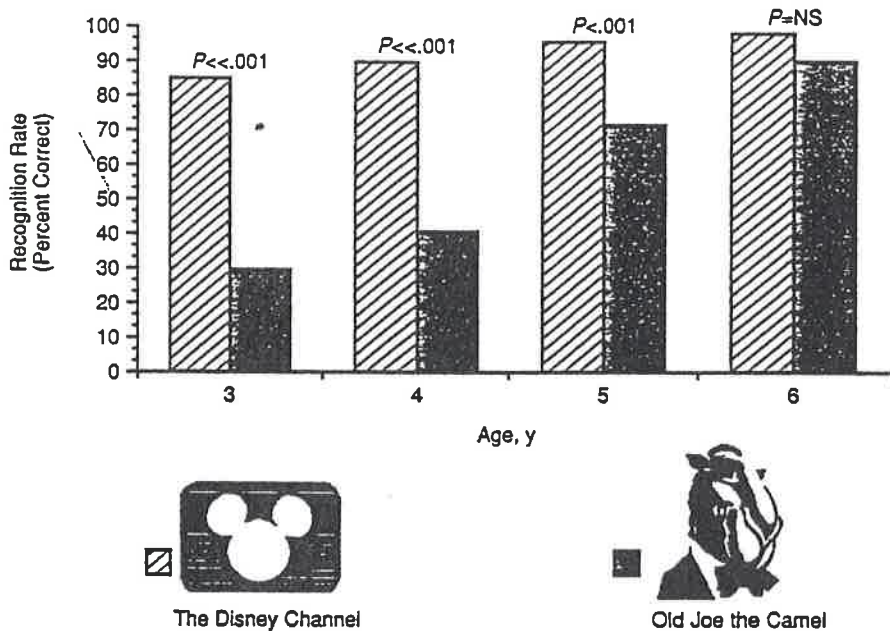


Fig 2.—Logo recognition rates for The Disney Channel and Old Joe by subject age.

children's products ( $r = .51$ ;  $P < .0001$ ), cigarette brands ( $r = .52$ ;  $P < .0001$ ), and adult brands ( $r = .50$ ;  $P < .0001$ ).

Cigarette logo recognition rates ranged from 11.4% (Camel) to 30.4% (Old Joe) for 3-year-old subjects. This rate increased to between 43.5% (Camel) and 91.3% (Old Joe) for children 6 years of age.

Figure 2 compares the recognition rates for The Disney Channel and Old Joe by subject age. These two were the most highly recognized logos in their respective product categories. While The Disney Channel's logo recognition was higher for subjects aged 3, 4, and 5 years, this difference in recognition was

not significant in subjects aged 6 years. In that age group, both the silhouette of Mickey Mouse and the face of Old Joe were nearly equally well recognized and correctly matched by almost all children.

Neither race nor gender was associated with the recognition scores of any of the three product categories. A multifactor analysis of variance that included each of the other survey variables showed that the hours of television watched were positively associated with the recognition of children's product logos ( $F_{(2,198)} = 10.1$ ;  $P < .0001$ ) and adult logos ( $F_{(2,198)} = 4.41$ ;  $P = .01$ ), but not with cigarette logos. Parental education

was positively associated with the recognition of adult product logos ( $F_{(2,198)} = 6.14$ ;  $P = .002$ ), but not with children's products or cigarettes. The recognition of cigarette logos was independent of the use of cigarettes in the subjects' homes.

Only 23 (10.0%) of the subjects matched the Surgeon General's warning with the picture of a cigarette. The recognition rate for the warning in subjects aged 3, 4, and 5 years was only 8.4%, a rate nearly equal to that expected for random guessing.

#### COMMENT

Children are referred to by marketing researchers as "consumers in training." As stated by McNeal,<sup>17</sup> "All of the skills, knowledge, and behavior patterns that together we call consumer behavior are purposely taught to our children right along with toilet training, toddling and talking."

Research has identified three distinct children's markets. First are the markets directly under the control of children. Children aged 5 to 12 years spend \$4.2 billion of their own money each year.<sup>17</sup> By age 6 years, half of all children regularly go shopping by themselves.<sup>17</sup>

The second market is for products in which children influence household purchasing decisions. Children influence the spending of \$131 billion each year, including \$82 billion for food and beverages, \$17 billion for leisure activities and products, and \$13 billion for apparel (*Business Week*, September 9, 1991:94).

The third market is for products that children will consume when they become adolescents and adults. Market researchers believe that brand awareness created in childhood can be the basis for product preference later in life.<sup>17</sup> It has been shown that children prefer the brands that they see advertised.<sup>18</sup> This effect has been shown to even influence their preference of products that they are too young to use, such as lipstick and diet soft drinks.<sup>19</sup> This potential influence has raised concern about the exposure of children to cigarette advertising. For instance, it has been suggested that children receive positive messages about smoking when they view cigarette advertisements and that this may influence later decisions to smoke.<sup>20</sup>

The children in this study demonstrated high recognition rates of brand logos for products that are targeted to both children and adults. It is no surprise that most children can properly match the McDonald's arches to a hamburger. It is also not surprising that there is high recognition of the Chevrolet and Ford logos. Automobiles are heavily advertised on television, and

many children are exposed to these brands through personal family use. In contrast, the high recognition rate of cigarette logos may be counterintuitive. After all, cigarette advertising no longer appears on television and very young children cannot read. Yet by the age of 6 years, Old Joe is as well recognized as Mickey Mouse.

Children's knowledge of cigarette brand logos is most likely the result of their exposure to "environmental tobacco advertising." Camel and Marlboro brand advertising is ubiquitous, appearing in movies, on billboards, promotional displays at youth-oriented events, on television during sporting events, and on "line extenders," such as T-shirts, posters, and caps.<sup>21,22</sup> In addition to this paid advertising, Camel and Marlboro brand logos appear on video arcade games, children's toys, and candy products (*Washington Post*. March 13, 1990;sectA:8).

There are several limitations to the cur-

rent study. First, the subjects were a convenience sample and, therefore, did not include children cared for at home. While the sample does represent children from families with a range of ethnic and socioeconomic backgrounds, it is unknown how the sampling method might have influenced the study results. The study design relied on the ability of children to match cards picturing brand logos to products on a game board. This is a novel design that has face validity, but which would be difficult to validate in any other way. Finally, there is some obvious arbitrariness to the selection of specific logos as test items. The choice of children's products was based on published data describing children's markets.<sup>17</sup> Heavily advertised cigarette brands were tested. Adult brands were chosen from among those products that are primarily targeted to consumers who are older than the study subjects. Of all the brands tested, only the manufacturers of cigarettes specifically claim not to advertise to children.

It is obviously impossible to predict how the exposure of children to environmental tobacco advertising might influence their later smoking behavior. While cigarette companies claim that they do not intend to market to children, their intentions are irrelevant if advertising affects what children know. R J Reynolds Tobacco Company is as effective as The Disney Channel in reaching 6-year-old children. Given this fact and the known health consequences of smoking, cigarette advertising may be an important health risk for children.

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