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Specific social influences on the acceptance of novel foods in 2–5-year-old children

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ABSTRACT

Social influences have been shown to be very important to overcome food neophobia in young children. However, there is no experimental evidence about whether social influences on food acceptance are specific, that is if models eating the same food as the child are more effective in promoting food acceptance than models eating a different food. We assessed children's behavior towards novel foods when an adult model (a) was not eating (*Presence* condition), (b) was eating a food of a Different color (*Different color* condition), and (c) was eating a food of the Same color (*Same color* condition). We tested 27 children (ages 2- to 5-years-old) recruited from The Pennsylvania State University day-care facilities. Results show that children accepted and ate their novel food more in the *Same color* condition than in the *Different color* and in the *Presence* conditions. Therefore, in young children food acceptance is promoted by specific social influences. These data indicate that children are more likely to eat new food if others are eating the same type of food than when others are merely present or eating another kind of food.

INTRODUCTION

Food neophobia, defined as the hesitancy to eat novel foods (Barnett, 1963), can be considered an efficient behavioral strategy to cope with the ‘omnivore's dilemma’ (Rozin, 1977): omnivores should explore, sample, and eventually include novel foods in the diet, but they should also be very cautious toward them, in order to avoid the risk of ingesting poisonous substances (see also [Freeland and Janzen, 1974] , [Glander, 1982] and [Milton, 1993]). Food neophobia is widespread among omnivorous species, including humans (e.g. warblers, Dendroica castanea and D. pensylvanica: Greenberg, 1990; rats, Rattus norvegicus, [Barnett, 1958] and [Galef, 1970] ; ruminants: Provenza, 1995; capuchin monkeys, Cebus apella, [Visalberghi and Fragaszy, 1995] and [Visalberghi et al., 2003] ; rhesus macaques, Macaca mulatta: [Johnson, 2000] , [Johnson, 1997] and [Weiskrantz and Cowey, 1963] ; chimpanzees, Visalberghi et al., 2002; humans, Rozin, 1976).

In children, although the available studies on food neophobia have utilized rather different approaches, there is evidence that neophobia is minimal in infancy, rises rapidly at around the age of two, and gradually decreases thereafter. Children aged 2–5 years old are more neophobic than infants (4–7 months old). It has been argued that neophobia is not a functional response during infancy, when food is provided by parents, whereas it becomes more important by early childhood, when children have begun to explore the environment and eat by themselves ([Birch et al., 1998] and [Cashdan, 1994] ; see also Cooke, Wardle, & Gibson, 2003). Moreover, in 2–6-year-old children higher levels of neophobia are associated with lower consumption of vegetables, fruit, and meat, which are the most potentially dangerous foods given the possible presence of plant toxins and food poisoning bacteria (Cooke et al., 2003, see also Cashdan, 1998). These findings are consistent with the hypothesis that children's food preferences are shaped by evolutionary adaptations that are no longer appropriate in the current Western food environment ([Cooke et al., 2003] and [Rozin, 1990]).

However, although children's neophobic response towards novel foods is a common cause of parental concern and frustration, neophobia is not a permanent dislike for a particular novel food (Birch, 1983). In fact, neophobia attenuates over time possibly because dietary variety is important for survival in omnivorous species (Raynor & Epstein, 2001). The two more important factors promoting the acceptance of a novel food are the social context in which the food is encountered and the repeated experiences with that food and the consequences of its ingestion.

In adult humans and in other omnivorous species (gerbils, Meriones unguiculatus, Forkman, 1991; rats, Galef, 1993; marmosets, Callithrix jacchus, Vitale & Queyras, 1997; chacma baboons, Papio ursinus, Cambefort, 1981; tufted capuchin monkeys, Visalberghi & Addessi, 2003; adult humans, [de Castro and Brewer, 1992] and [de Castro, 1990]), the social context affects food consumption; in particular, when an individual eats in the presence of others eating, his/her eating behavior is socially facilitated (sensuClayton, 1978), i.e. he/she eats more than alone. According to Clayton (1978), social facilitation is an increase in the frequency of a familiar behaviour pattern in the presence of others displaying the same behaviour pattern at the same

time. When an individual is faced with a novel food, social facilitation of eating leads to a faster acceptance of the novel food (Visalberghi & Addessi, 2000).

Children show a consistent tendency to sample an unfamiliar food more readily when an adult is eating it than when the food is merely offered (Harper & Sanders, 1975) and an enthusiastic teacher modeling acceptance of a novel food is effective to encourage novel food acceptance in preschool children (Hendy & Raudenbush, 2000; see also Highberger & Carothers, 1977). Moreover, watching peer models who have different preferences modifies food preferences in preschoolers: exposing target children to peer models who are selecting and eating the target children's non-preferred food increases the number of choices for the initially non-preferred food by the target children, even in the presence of an initially highly preferred food ([Birch, 1980] and [Duncker, 1938] , for similar findings see also Hendy, 2002).

There is some evidence for age differences in the extent to which children's preferences are affected by the behavior of a model. In Birch (1980) study, food preferences of younger children (3-year-olds) are more affected by peer modeling than those of older children (4-year-olds). In contrast, Harper and Sanders (1975) do not find any differences between toddlers (14 to 20-month-olds) and older children (42 to 48-month-olds) in their response to adult models of novel food acceptance. An inconsistency in the results is also evident for gender differences: whereas some studies show girls to be more influenced than boys by peer models of novel food acceptance (Hendy & Raudenbush, 2000), other studies do not find any gender differences in the responsiveness to adult or peer models ([Birch, 1980] and [Harper and Sanders, 1975]).

Children's food preferences are also shaped by the frequency of encounters with a novel food ([Birch and Marlin, 1982] and [Sullivan and Birch, 1994]) and children learn about the negative and positive physiological consequences of ingesting it. In fact, if an initially rejected food is repeatedly presented simply requiring that the child takes a very small bite, 2- to 5-year-old children will eventually accept the food after several encounters (experimenter-led exposure in the laboratory: [Birch and Marlin, 1982] and [Sullivan and Birch, 1990] ; parent-led exposure at home: Wardle et al., 2003). In contrast, if a child merely smells or looks at the food, the child's food acceptance will not be as positive (Birch, McPhee, Shoba, Pirok, & Steinberg, 1987). It is possible that either repeated experiences with a food determine an increase in liking for its taste, or that the absence of post-ingestive nausea and gastrointestinal discomfort gradually lead to the acceptance of a novel food (‘learned safety’ hypothesis, Kalat & Rozin, 1973). On the contrary, if the ingestion of a novel food is followed by the above negative internal consequences, an individual will associate them with its consumption and that food will not be eaten anymore (food aversion learning, [Garcia et al., 1955] and [Garcia and Koelling, 1966]).

Furthermore, it has been shown that early experiences with the flavor of a food have a powerful influence on their subsequent acceptance of that food. Children who are breastfed are exposed to a variety of flavors, and there is evidence that babies prefer flavors they have previously experienced prenatally through the amniotic fluid and postnatally through breast milk (Mennella, Jagnow, & Beauchamp, 2001). There is also evidence that breastfed children are more likely to accept pureed vegetables when first introduced to solids than formula fed babies (Sullivan &

Birch, 1994) and the positive influence of breastfeeding on the reduction of picky eating is evident in children as old as 7 years of age (Galloway, Lee, & Birch, 2003).

The aim of the present study was to examine to what extent social influences affect the acceptance and consumption of novel foods in children (ages 2:5–5:2 years). In particular, we aimed to assess whether observing a familiar adult eating a novel food differentially influenced children's behavior towards that food when (a) the adult model was present and eating a different food (Different color condition), (b) the adult model was present and eating the same food (Same color condition), or when (c) the adult model was present, but not eating (Presence condition). We lack experimental evidence on the extent to which in children social influences are selectively oriented towards specific food, i.e. if social influences affect the acceptance of a novel food only when the child and the model are eating the same foods, and not when they are eating different foods. Already (Clayton (1978), p. 384) pressed for ‘a comparison between occasions where socially facilitated feeding among individuals of a group occurs and occasions where the group is feeding on different types of food’. It should be noted that to learn about a safe diet, an individual should pay attention to what others are eating, and should eat more of a novel food only if its own food matches the food that group members are eating. In fact, eating if others are eating may result in a very different output than eating exactly what the others are eating and specific and non-specific social influences have different consequences. If social influences are specific, i.e. oriented towards the same food the others are eating, the individual ends up eating a food, which is likely to be palatable. Vice versa, if social influences are non-specific, i.e. directed to food in general, the individual does not match the appearance of its own food with the appearance of others' food, and merely learns to accept the food more readily than it would have done alone. In this latter case, showing a socially facilitated eating response might be risky ([Visalberghi and Addessi, 2000] and [Visalberghi and Addessi, 2001]).

In non-human primates, it has often been assumed that naïve individuals gain information about food by observing what conspecifics do. However, when tufted capuchin monkeys, South-American primates whose feeding behavior share remarkable similarities with humans (Addessi, Galloway, Birch, & Visalberghi, 2004), were tested by using a similar paradigm to that used in the present study, social influences worked a-specifically: capuchins accepted and ate more of a novel food also when their group members were eating a food of a Different color ([Addessi and Visalberghi, 2001] and [Visalberghi and Addessi, 2000]). Moreover, when observing their group members eating a food of the Same color as their own food, observer capuchins did not eat significantly more novel food than when observing group members eating a food of a Different color (Visalberghi & Addessi, 2001; for a review, see [3] and [Visalberghi and Addessi, 2003]).

Compared to non-human primates, children have more sophisticated behavior-matching capabilities, which may represent an important requirement for social influences affecting their behavior only when the food eaten by the model corresponds to the novel food they are faced with. At around 12 months of age, human infants begin to tune their attention on the behavior of adults and spontaneously do what others are doing (Tomasello, 1999). Imitation of goal-directed actions by preverbal infants is a selective, interpretative process, that involves evaluation of the means in relation to the constraints of the situation, rather than a simple re-enactment of the

means used by a demonstrator (Gergely, Bekkering, & Király, 2002). In contrast, non-human primates do not learn by imitation (defined as learning a novel behavior by observing it performed by a demonstrator) how to achieve a goal, although social influences on motor actions already in their repertoire (such as social facilitation, sensuClayton, 1978) are indeed present ([Visalberghi, 2000] , [Visalberghi and Fragaszy, 2002] and [Whiten and Ham, 1992]). Given this, we expect children's acceptance of novel foods to be affected by social influences only when the child's and the model's food have the Same color. Children should accept and eat more novel food in the Same color than in the Presence conditions, and should not show any behavioral difference between the Presence and the Different color conditions.

METHODS

Participants

Twenty-seven children, seven boys and 20 girls, belonging to three classrooms (BFL, RTG, and SOW, Child Development Laboratory, The Pennsylvania State University), participated to the study. At the beginning of the study, children ranged in age from 2:5 to 5:2 years, with a median age of 3:9. For purposes of analysis, the children were divided at the median into younger (<45 months of age) and older children (≧45 months of age). All children were from middle-class families. Eight children were Asian, one was African American and the remainder were Caucasian. For each child, we retrieved information from parents using a questionnaire about early feeding practices (breastfeeding, i.e. children were exclusively breastfed for at least 4 months; partial breastfeeding, i.e. children received supplements such as milk, formula, or solids daily before the 4th month of life, but breastfeeding continued for at least or more than 4 months; or formula feeding, i.e. children were never breastfed).

Foods

We used three foods never previously tasted by the children. Foods were three different versions of semolina. Semolina was cooked with water (20 g of semolina for 100 ml of water). Right before the end of cooking, it was colored yellow, green, or red with food colorings (Sauer's®, 0.4 ml/100 g) and flavored with cumin (0.5 g/100 g), caper paste (1.6 g/100 g), or anchovy paste (1.1 g/100 g). Therefore, we obtained three types of semolina: yellow cumin semolina, green caper paste semolina and red anchovy paste semolina. The food for the adult model was sweetened semolina, cooked and colored according to the same procedure as the children's food, but flavored with sugar (13 g/100 g). In the *Different color* condition, the food for the adult model was not colored, whereas in the *Same color* condition the food for the adult model was colored yellow, green, or red with food colorings (Sauer's®, 0.4 ml/100 g).

We chose cumin, caper paste and anchovy paste as flavorings because they were (1) very unlikely to be familiar to the children, and (2) not particularly attractive to the children. We gave to the adult models semolina with sugar so that that they would eat it enthusiastically. The semolina presented to the children and to the models had the Same color and texture.

Procedure

Children were tested individually, in a familiar school environment, with an adult model. The adult models were three intern students (two females and one male, one for each classroom), which were very familiar with the children. The child sat at a table and the adult model sat in front of the child. Both the child and the adult model received 100 g of semolina, served warm in a transparent cup with a spoon.

There were three experimental conditions: (1) *Presence*: the child received one of the three flavored semolina, while the adult model did not have any food; (2) *Different color*: the child received another flavored semolina, while the adult model ate sweetened semolina of a Different color than the child's; (3) *Same color*: the child received the third flavored semolina, while the adult model ate sweetened semolina of the Same color as the child's. In the *Different* and *Same color* conditions, the adult model ate his/her semolina in front of the child during the entire trial. The model was instructed to eat continuously and enthusiastically, and to talk with the child about anything but food-related topics. At the end of the trial, the model still had some food left.

Each trial took place right before lunch (between 1100 and 1130 h) and lasted 5 min. The children were told that they were going to receive an appetizer before lunch and right before the beginning of the trial the adult model gave them the following instruction: ‘Here is your snack to try, you can have as much as you want’. We tested one child a day from each classroom; during the 5-min trial the children could not see each other.

Children were assigned to three experimental groups (N=9 each). The three experimental groups differed in terms of the way in which each of the three foods was assigned to one of the three conditions (e.g. Experimental group 1 received the yellow semolina in the *Presence* condition, the red semolina in the *Different color* condition and the green semolina in the *Same color* condition; Experimental group 2 received the red semolina in the *Presence* condition, the green semolina in the *Different color* condition and the yellow semolina in the *Same color* condition; finally Experimental group 3 received the green semolina in the *Presence* condition, the yellow semolina in the *Different color* condition and the red semolina in the *Same color* condition). Each experimental group was balanced for age, sex, early feeding practice, classroom (BFL, RTG, and SOW), and order of presentation of the three experimental conditions (*Presence*, *Different color*, and *Same color*).

We tested every child in each of the three conditions once; presentations occurred on different test days and the minimum interval between trials was seven days (15.6 days, on average). In addition, the three types of trials were presented to each child separated one from the other by a washout period of at least 1 week, to minimize the influence among the three conditions. We carried out the experiment between March and April 2004.

Behaviors scored

We videotaped children's behavior (except for one child, whose parents did not give the consent for videotaping). From videotapes, we scored latency to ingestion (seconds) and eating

behavior, defined as ‘putting food in mouth and chewing it’ or ‘chewing food already in mouth’. We measured eating behavior by instantaneous sampling every 10 s. According to Martin and Bateson (1993), we divided the 5-min trial into 30 sample intervals lasting 10 s each and we recorded whether or not eating behavior was occurring on the instant of each sample point (i.e. on the ‘beep’ of the stopwatch). Therefore, on the ‘beep’ we recorded whether the child was either putting food into his/her mouth or chewing food already in his/her mouth. Moreover, at the end of each trial, we weighted the leftover food with a digital scale (Mettler Toledo PG5001-S scale) and we calculated the amount of food eaten (g).

Statistical analyses

Since the assumptions of parametric statistics were not met, we used non-parametric statistics. For each dependent variable, we carried out a non-parametric ANOVA (Friedman ANOVA) in order to compare children's behavior in the three experimental conditions. For post-hoc comparisons, we used the Wilcoxon Signed-ranks Test (one-tailed). The power of the Wilcoxon Signed-ranks Test (one-tailed) is 0.84 with N=27, α=0.05, H1: Probability (Sample >0)=0.67, and H1: Probability (Sample + Sample'>0)=0.80. Similarly, we used Friedman ANOVA to compare children's behavior in the three different trials and with the three Different colored foods, respectively. Post-hoc comparisons were carried out by Wilcoxon Signed-ranks Test (two-tailed). Moreover, we used the Mann Whitney U Test (two-tailed) in order to assess whether age and sex affected children's behavior towards novel foods. Kruskal–Wallis ANOVA was used in order to assess whether early feeding practices (breastfeeding, partial breastfeeding, or formula feeding) or classrooms (BFL, RTG, and SOW) affected children's behavior towards novel foods.

RESULTS

Children's latency to ingestion, eating behavior, and food eaten significantly differed among the three experimental conditions (Friedman ANOVA: *Latency to ingestion*: X_2^2=11.13, N=27; P<0.01; *Eating behavior*: X_2^2=8.71, N=27; P<0.05; *Food eaten*: X_2^2=10.05, N=27; P<0.01, respectively). In particular, children accepted and ate more of their novel food in the *Same color* condition than in the *Presence* condition (Wilcoxon Signed-ranks Test: *Latency to ingestion*: Z=−3.26, N=27; P<0.01; *Eating behavior*: Z=−2.62, N=27; P<0.01; *Food eaten*: Z=−2.2, N=27; P< 0.05, respectively; see Fig. 1a–c) and in the *Different color* condition (Wilcoxon Signed-ranks Test: *Latency to ingestion*: Z=−2.35, N=27; P<0.05; *Eating behavior*: Z=−1.91, N=27; P<0.05; *Food eaten*: Z=−1.93, N=27; P< 0.05, respectively; see Fig. 1a–c). There was no significant difference between the *Presence* condition and the *Different color* condition (Wilcoxon Signed-ranks Test: *Latency to ingestion*: Z=−0.45, N=27; NS; *Eating behavior*: Z=−0.31, N=27; NS; *Food eaten*: Z=−0.78, N=27; NS, respectively).

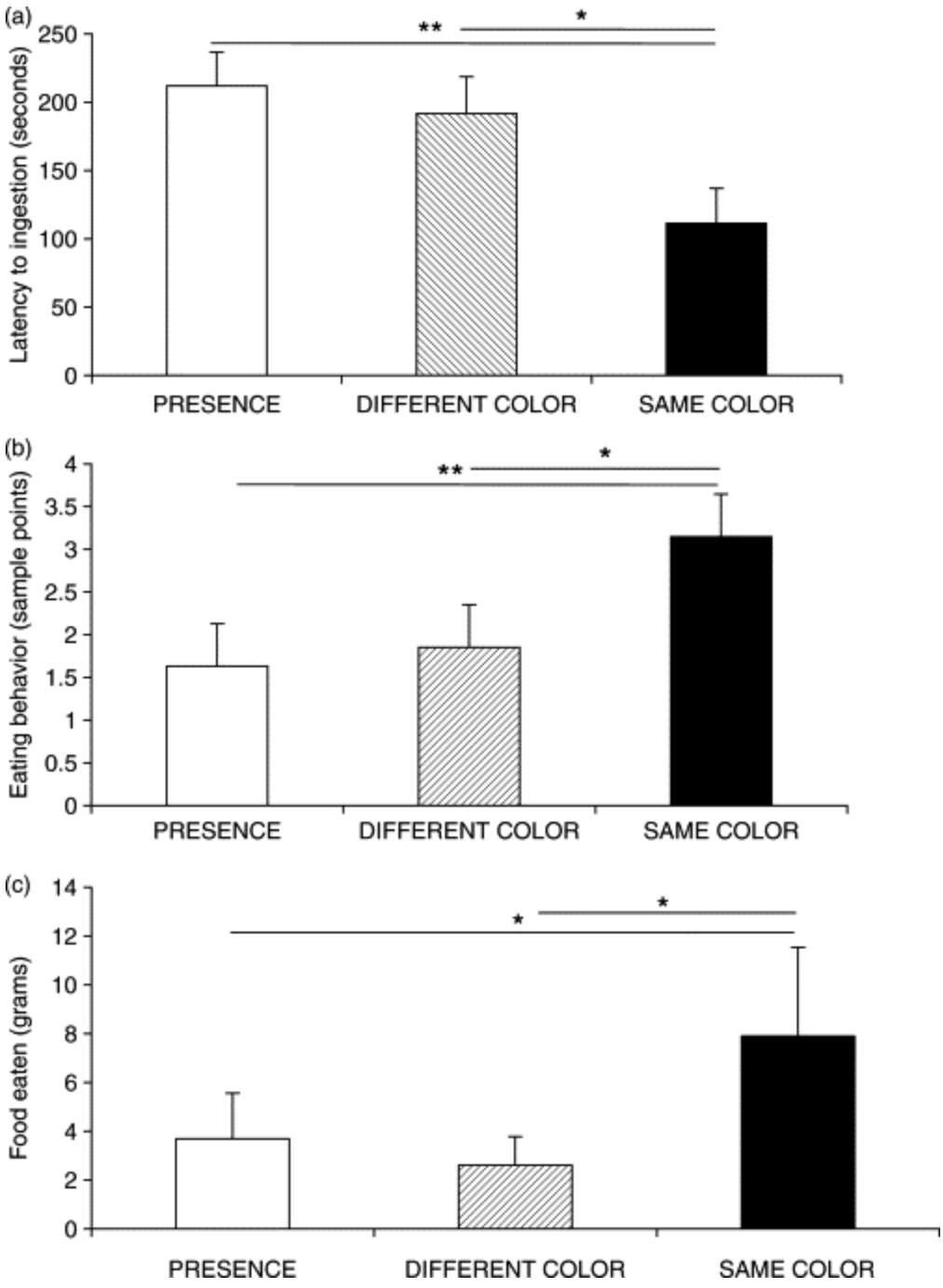

Fig. 1.

Mean and standard error for latency to ingestion (seconds, a), eating behavior (frequency, expressed as sample points, b), and food eaten (grams, c) in the three experimental conditions (Presence, *Different color*, and *Same color*). Medians, first and third quartile for the three experimental conditions are: *Latency to ingestion*: *Presence* condition: 300 (70–300); *Different color* condition: 300 (19–300); *Same color* condition: 22 (7.5–300); *Eating behavior*: *Presence* condition: 0 (0–1); *Different color* condition: 0 (0–0.5); *Same color* condition: 1 (0–2); *Food*

eaten: *Presence* condition: 0 (0–1.7); *Different color* condition: 0 (0–0.7); *Same color* condition: 0.3 (0–3.5)

As shown in Fig. 2, repeated experiences of the procedure affected consumption of novel foods as well. In fact, children ingested significantly less food in the first trial than in the second and in the third trial (Friedman ANOVA: X_2^2=7.01, N=27; P<0.05; Wilcoxon Signed-ranks Test: first trial vs. second trial: Z=−2.44, N=27; P<0.05; first trial vs. third trial: Z=−2.22, N=27; P<0.05). For latency to ingestion and eating behavior, the difference between the three trials was not significant (Friedman ANOVA: *Latency to ingestion*: X_2^2=1.65, N=27; NS; *Eating behavior*: X_2^2=3.96, N=27; NS, respectively).

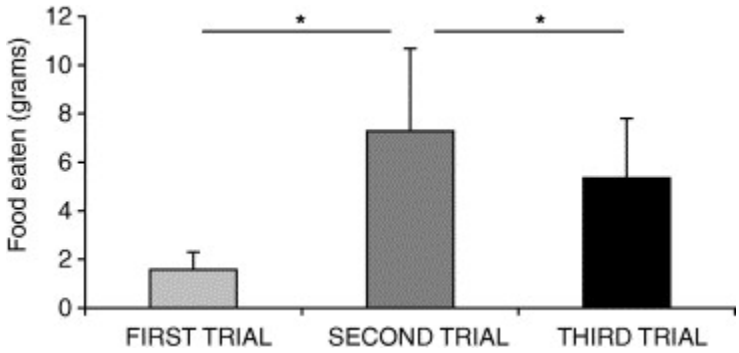

Fig. 2.

Mean and standard error for food eaten (grams) in the three trials of the experiment. Medians, first and third quartile for the three trials are: Food eaten: Presence condition: 0 (0–0.4); Different color condition: 0.3 (0–2.9); Same color condition: 0.2 (0–2).

Children did not show a significant preference for any of the three colors used. Moreover, age (<45 months or ≧45 months), early feeding practice (breast- or formula feeding) or classroom membership (BFL, RTG, or SOW) did not significantly affect their food acceptance and consumption.

DISCUSSION

The results of the present study confirm that 2-to-5-year-old children are reluctant to eat novel foods and provide evidence that food neophobia can be overcome by social influences and repeated experiences with novelty ([Birch, 1980] , [Birch, 1983] , [Birch, 1998] , [Birch and Marlin, 1982] , [Harper and Sanders, 1975] and [Sullivan and Birch, 1994]). Our findings extend the available literature, because we showed that in children social influences are selectively oriented towards specific food targets, in that their behavior is socially facilitated (sensuClayton,

1978) only when the child's and the model's food have the Same color but not when the child's and model's foods have Different colors. As expected, children took into account what food the demonstrator was eating and behaved accordingly: they accepted and ate more novel food in the Same color condition (when their own food matched in color the food eaten by the demonstrator), than in the Different color and in the Presence conditions, whereas their behavior did not differ significantly between the Presence and the Different color conditions.

This contrasts with what monkeys do in the same situation. In fact, although it has often been assumed that non-human primates learn from conspecifics which foods to eat and which to avoid, social influences on capuchins' acceptance of novel foods were non-specific in that they accepted and ate more of a novel food whatever their group members were eating ([Addessi and Visalberghi, 2001] , [Visalberghi and Addessi, 2000] and [Visalberghi and Addessi, 2001] ; for a review, see Visalberghi & Addessi, 2003). The lack of correspondence between children's and capuchins' behavior can be explained on the basis of the cognitive differences between the two species. Young children are capable of matching the behavior of others as well as their goals (Tomasello, 1999); in contrast monkeys do not learn by imitation how to achieve a goal, although social influences on motor actions already in their repertoire are indeed present ([Visalberghi, 2000] , [Visalberghi and Fragaszy, 2002] and [Whiten and Ham, 1992]).

In addition to social influences, repeated experiences with the novel procedure also affected children's behavior. In fact, regardless of the experimental condition, children ate more food in the second and in the third trial than in the first trial. Whereas it has been previously shown that children usually require several encounters before accepting a novel food ([Birch and Marlin, 1982] , [Sullivan and Birch, 1990] and [Wardle et al., 2003]), in our study children increased the amount of food eaten already in the second trial, possibly because of the simultaneous effect of social influences. Therefore, it can be argued that the influence of the social context was the primarily responsible factor for the increased acceptance of novel foods.

The behavioral response to the novel foods was similar for the children belonging to the three different classrooms of the day care. Therefore, the modeling behavior provided by the three models was equally effective in enhancing children's acceptance of novel foods. This finding is in agreement with the Social Cognitive Theory (Bandura, 1997), for which teacher modeling should be one of the most effective methods to encourage young children to accept foods, especially in a novel situation, and with previous results obtained in preschool children (Hendy & Raudenbush, 2000; see also Highberger & Carothers, 1977).

Although it has been shown that age can affect children's responses to novel food and the extent to which children's food preferences are affected by watching the behavior of a model ([Birch, 1980] , [Birch et al., 1998] and [Cashdan, 1994] ; see also Cooke et al., 2003), we did not find any significant difference between the behavior of younger (<45 months of age) and older children (≧45 months of age). Our findings are in agreement with those by Harper and Sanders (1975), who did not find age differences between toddlers and older children in their response to adults modeling eating behavior. It might be hypothesized that when modeling behavior is provided by adults instead than by peers, younger and older children are equally sensitive to it. However, peers have been shown to be more effective models than teachers: in presence of a

peer modeling for a food different than the one modeled by the teacher, the effect of teacher modeling is reduced or surpassed (Hendy & Raudenbush, 2000). Therefore, it would be interesting to investigate the role of peer-modeling on children's acceptance of novel foods by using our same paradigm.

Early feeding practices (breastfeeding, partial breastfeeding, or formula feeding) did not affect children's response to novel foods. This finding is in contrast with experimental evidence showing that children's early experiences with the flavor of a food have a significant influence on their subsequent acceptance of that food ([Galloway et al., 2003] , [Gerrish and Mennella, 2001] , [Mennella et al., 2001] and [Sullivan and Birch, 1994]). However, it is likely that differences due to the children's early feeding practices require time to emerge. The findings of the only study in which the first acceptance of vegetables was compared between breastfed and formula fed infants are in agreement with ours: Sullivan and Birch (1994) found that breastfed and formula fed infants did not differ during their first encounters with vegetables, but only after a 10-day exposure period infants fed breast milk showed a greater increase in intake of the vegetables than formula fed infants.

In conclusion, social influences—together with repeated experiences with novelty—are a powerful instrument to promote the acceptance of novel foods in young children. Our findings suggest that the set of foods that children would learn to accept might be enlarged if teachers ate routinely with children. Unfortunately, this latter practice does not seem very common: preliminary observations of 42 preschool lunches showed that teachers typically eat less than 25% of the foods offered to children (Hendy, 2002). However, given our small sample size, before considering our experimental evidence conclusive, it would be necessary to replicate our study in a larger and diverse sample. Moreover, it might be of interest to undertake cross-cultural research on this aspect of children's eating behavior and to investigate whether specific social influences on children's neophobia may relate to the occurrence of active teaching by adults. In fact, although active teaching, intervention and prevention by mothers in food-related activities are typical of the Western culture (Visalberghi & Fragaszy, 1996), this is not an universal approach and there is evidence that individuals may reach same levels of expertise in cultures where active teaching is not pursued (Gosso, Otta, de Lima Salum e Morais, Leite Ribeiro, & Raad Bussab, 2005).

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