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The Child's Conception of Food: Differentiation of Categories of Rejected Substances in the 16 Months to 5 Year Age Range

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Children ($N = 54$) ranging in age from one year four months to five years were offered over 30 items to eat. The items included normal adult foods and exemplars of different adult rejection categories: disgust (e.g. grasshopper, hair), danger (liquid dish soap), inappropriate (e.g. paper, leaf) and unacceptable combinations (e.g. ketchup and cookie). We report a high to moderate level of acceptance (item put into mouth) of substances from all of these categories in the youngest children. Acceptance of disgusting and dangerous substances decreases with increasing age, while acceptance of inappropriate substances remains at moderate levels across the age range studied. Although the youngest children accepted more disgust items, the majority rejected most of the disgust choices. Almost all children at all ages tested accept combinations of foods which, although individually accepted by adults, are rejected in combination. No significant differences were observed between 'normal' children and those with a history of toxin ingestion, although there was a tendency of ingesters to accept more inedible items. In general, the results suggest that a major feature of the development of food selection is learning what not to eat.

The human infant has a few genetically programmed responses to foods, such as a preference for sweets and an aversion to bitter tastes (Cowart, 1981; Desor, Maller & Greene, 1977; Peiper, 1963; Steiner, 1977; Rosenstein & Oster, Note 1). Except for this modest endowment, the human infant enters the world without information about what is edible and what is not. Along with the young of other omnivorous species, it faces the task of sorting the world on this vital dimension. And, with the aid of parents and a wide range of cultural forces, over a period of six to ten years, the child comes to adopt a more or less adult attitude to foods (Rozin & Fallon, 1981; Fallon, Rozin & Pliner, 1984). Anecdotal evidence supports the idea that infants have a very broad acceptance of items as potential foods, in the sense that they are reported to mouth all sorts of things. This mouthing is, in part, exploratory, but is often followed by ingestion. These behaviors suggest that a major part of the learning that occurs in development may be learning what *not* to eat.

We (Rozin & Fallon, 1980, 1981; Fallon & Rozin, 1983) have developed a psychological taxonomy to describe the way American adults categorize the world of potential edibles. The categorization is based on three types of motivations for

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acceptance or rejection: sensory affective (liking the taste, smell or other sensory properties), anticipated consequences, and ideational (culturally transmitted knowledge about the nature, origin or history of the item). Thus, on the negative side, some items are rejected primarily because they taste bad (negative sensory affective properties, or distastes), some because they are harmful (dangers: anticipated harmful consequences) and others because of negative information about their nature or origin. The latter category can be split into items that are rejected because the culture considers them non-foods (inappropriate, e.g paper) and items the culture considers offensive (disgust, e.g. feces, cockroaches). Our prior work (Fallon *et al.*, 1984) indicates that by four to five years of age, exemplars of each of these four negative categories are rejected by children. However, we found that these children accounted for all of their rejections in terms of anticipated harmful consequences or bad taste. This suggested that adult inappropriate and disgust items, when rejected by young children, were treated as distasteful or dangerous.

This study extends our prior work into a younger age group. While our prior work used pictures of foods as stimuli, in this study we test responses to foods directly, by examining responses to actual foods or inedible substances (belonging to various psychological categories). This analysis allows us to map out, for the first time, the major lines of development in response to different types of potential edibles. We also evaluate the general hypothesis that a basic feature of development is acquisition of more elaborated motivations for rejection, and hence a decrease in per cent of possible edibles that are actually consumed. We include in this study a group of children with a history of ingestion of a toxic substance. There are suggestions in the literature, based on reports of parents, that there are somewhat greater 'oral' tendencies in such children, and that they are more likely to put non-food items in their mouths (Craig, 1955; Sibert & Newcombe, 1977). Our study allows for a direct measurement of this tendency, which should appear as less discrimination and greater acceptance of disgusting, dangerous, distasteful and inappropriate items.

METHOD

Subjects were 54 children (age range 16 to 60 months, mean age, 36·1 months) of both sexes, who were outpatients in the Children's Hospital of Philadelphia. All but two were black, and 18 had a history of at least one incident of ingestion of a toxic substance (paint, cleaning fluid, etc.). All children were healthy at the time of the study, and none of the 'ingesters' had had any serious consequences from their ingestion.

Subjects were recruited from lists of people with outpatient appointments for those days on which we ran experiments. Parents (mothers) were contacted a few days before the appointments, and their cooperation was solicited for a study lasting less than one hour, which would be carried out just before or after their medical appointment, and in a neighboring room. Parents agreeing to participate were asked to avoid giving their child a meal in the period of two hours preceding the test, and an appropriate time was selected. Parents were explicitly informed of the range of substances that would be offered. We kept no records of refusals, but estimate that approximately 20 per cent of the parents contacted refused to participate and that approximately 40 per cent of those who agreed to participate failed to show up for their medical appointment and our study. Therefore, it is conceivable that those who served as subjects were a somewhat biased sample of the hospital outpatients. Of 61 children who began the study, we eliminated seven from our analysis because they either refused to accept any of the

highly acceptable foods we used at the beginning of the experiment ($N = 4$), or became uncooperative during the study ($N = 3$).

The study was carried out by two experimenters in a small examining room. The child was seated near one end, in a small chair or baby seat, in front of a table. The mother sat behind the child, and was instructed to remain silent during the study. All mothers complied. One experimenter, sitting across the table from the child, offered the child a series of foods. The other experimenter operated video equipment.

Each potential food was offered on a paper plate prepared ahead of time. Only the item in question was visible to the child on any trial. The experimenter presented a plate of each 'food' and simultaneously said: 'Here's some (name of item). Would you like some?' If the child made no response, the experimenter said after ten seconds: 'Don't you want to taste some?' and if no response, said about ten seconds later, 'Would you like to taste some?' The trial was terminated if the child either failed to respond to all three probes at 30 seconds (unless the child was actively moving towards a more intimate level of contact, in which case a few more seconds were allowed), or the child ingested the food before 30 seconds had elapsed. Substances were presented once a minute. The highest level of contact of the child with the food was noted, using the following scale: 1 = no contact, 2 = touch, 3 = smell, 4 = brought to mouth, 5 = in mouth and out, and 6 = eat.

Each child was offered 32–37 items. The number varied because of occasional unavailability of a few of the items, and the fact that two items were used only in special cases (combination, see below). One item, Hawaiian punch, was presented five times, spread throughout the series, to assure that satiety or some other factor did not greatly change the likelihood of ingestion during the session. Hawaiian punch was the only item that appeared more than once, so that there were actually 33 different items. The 37 items were presented in the same order to all children. In order to establish that children would accept some items in this situation, the first two choices for all children were a small amount (about 4 ml) of Hawaiian punch and a few pieces of 'Sugar Pops' breakfast cereal. To establish rejection, and therefore the realization that no negative social consequences would follow from it, four items typically rejected by adults were included among the first ten items. We list the food items below by the adult psychological category to which they belong (not in the order presented), with a brief description of the item. The items were usually described to the child with the same word(s) that we use to describe them in this list. When we used a different description, it is indicated in parentheses and in quotes following the item name. The number in parentheses after each item indicates its original position in the presentation sequence.

Normal, Acceptable Adult 'Snack' Foods: (Nine Different Items)

Hawaiian punch (1, 11, 23, 27, 35), about 4 ml (red) in a 4 oz. transparent plastic cup; Sugar Pops (2) ('cereal'), three or four yellow pieces (dry); sugar (7), about one tablespoon of white granulated sugar; banana (8), a whole banana peeled halfway, with a one inch piece cut off, lying next to the rest of the banana; lemon juice (9), reconstituted unsweetened lemon juice in a 4 oz. transparent plastic cup; potato chip (17), a few potato chip flakes; chocolate candy (19), one piece of Hershey snack-size candy bar; ketchup (29), about one tablespoon on the plate, next to the bottle; flavored potato chip (36) ('a different kind of potato chip'), a few flakes of Herr's sour cream and onion potato chips.

Normal, Acceptable Adult 'Meal' Foods

American cheese (5), one slice of American cheese (Kraft); hot dog (13), one whole hot dog, with a bite sized piece cut off and placed next to it; Spinach (16), about one tablespoon of thawed spinach from a frozen food package; beets (24), a few beet slices from a can of beets.

Items Rejected by Adults as Inappropriate

Crayon (7), a commercial, non-toxic crayon; paper (12), a crumpled piece of paper towel; Play Doh (22), a ball (about 2 cm in diameter) of Play Doh; leaf (25), one green leaf from a plant; sponge (32), a rectangular piece of kitchen sponge with a small, bite size piece detached from it.

Items Rejected by Adults as Disgusting

Doggie doo (6) (parent asked for appropriate word for her child before the session). An extruded mixture of peanut butter, limburger cheese and blue cheese extract that was remarkably similar in appearance, texture and odor to the real thing; hair (10), a 'lock' of (sterilized) human hair, about 1 cm in diameter and about 2 to 3 cm long; grasshopper (18), a large (about 6 cm long) dead, green (sterilized) grasshopper; fish (34), a whole, dried (oriental) fish, about 7 cm long.

Item Rejected by Adults as Dangerous

Dish soap (37), a green liquid (actually 'flat' tonic water with green coloring) poured into a clear transparent plastic glass from a bottle of commercial dish soap.

Combinations Rejected by Adults

Hot dog and chocolate (14), immediately following the hot dog trial, chocolate syrup was poured on the hot dog. (If the child refused the combination, he was offered plain chocolate (15) syrup to be sure that both components were desirable); ketchup and cookie (30), immediately following the ketchup trial, the ketchup was put on a chocolate chip cookie. (If the child refused the combination, he was offered a cookie (31) to be sure that both components were desirable).

Unclassified Adult Rejection (Inappropriate or Disgust)

Dog biscuit (26), a commercial, medium sized dog biscuit, in a 'bone' shape.

Difficult to Classify Food Items

Tree ears (3) ('vegetable'), Chinese tree ear fungus, a chewy and thin brown fungus, served after soaking in water; fish eggs (20) ('fish eggs'), black caviar; beer (21), freshly poured room temperature beer, in a transparent plastic glass; smelly cheese (33), ripe blue cheese; baby food (28), a spoonful from a jar of banana baby food.

These 31 items, plus four additional trials on Hawaiian punch, and the two second items for combinations (chocolate and cookie, offered only when the combination was refused) constitute the 37 trials.

At the end of the session, mothers were briefly interviewed. Stage of toilet training (not yet begun, in training, or complete) was determined, as well as information about feeding problems.

RESULTS

In the absence of any significant differences between toxin ingesters and non-ingesters (see end of results section), we present the combined data for all children.

Most interactions with the 32 to 37 substances resulted in what we call acceptance (68·8% of all scores were 5 [in mouth and out] or 6 [eat or drink]). (By our estimate of adult's judgments of edibility, we would expect 39–50% acceptance responses from adults in natural situations. We cannot estimate how adults would behave under 'demand' characteristics equivalent to those in this study.) Most of the remaining contacts involved minimal interaction (29·1% of contacts were 1 [no contact] or 2 [touch]). Only 2·5% of interactions terminated at the stages of sniffing (score of 3) or brought to mouth (4).

Hawaiian punch appeared five times in the sequence to serve as a reliability and stability check. None of the 54 subjects failed to drink it (score of less than 6) on more than one of the five exposures. Since only three children rejected Hawaiian punch on the last trial, it is unlikely that satiety or uncooperativeness became an important factor in the course of the study. Furthermore, the next to last item, which was a flavored potato chip, was consumed (score of 6) in 94% (51 out of 54) cases. All subjects refused (maximum score of no contact or touch) at least one item; seven of the younger children touched all items. The highest level of acceptance (score of 5 or 6) was 97%: one 19-month-old child rejected only hair, and one 22-month-old child rejected only paper. The lowest rates of acceptance were 30% for a 52-month-old child, and 37% for a 38-month-old.

Since the critical issue is whether a child will put an item in his or her mouth, we use this as our basic, dichotomous measures. Scores of 5 or 6 count as acceptance, while scores less than 5 (brought to mouth, sniff, touch, or no contact) count as rejection. This measure discards some of the information in the 6 point rating scale, but there were very few intermediate responses (scores of 3 or 4).

For individual items, subjects receive a score of 100 for acceptance (5 or 6), and zero for rejection (less than 5). We grouped the items according to our own criteria for adult categories (see method and Table 1), and obtained the mean of the scores of individual items in such categories for each subject. The data for these composite measures (see Table 1) directly indicate the per cent of items in the category that entered the mouth. We explore relations between age and acceptance with two measures. One is the Spearman rho between age of child (in months) and acceptance score for individual items (100 or 0) or categories. A second is based on a division of the subjects into three age groups, approximately equal in size. The youngest group ($n = 20$) includes children in the age range 16–29 months (less than 2·5 years old) and the oldest group ($n = 17$) includes children 43–60 months old (more than 3·5 years old). To obtain a clear age contrast from a continuous age distribution for statistical analysis, we compare these extreme groups, leaving aside the 17 subjects in the third (middle) group, between 30 and 42 months of age.

Acceptance scores (mean per cent of items in each category given 5 to 6 ratings for all children in all three age-groups) for adult food categories (composite measures) are displayed in Figure 1. Table 1 presents the data from the two extreme age groups, along with Spearman rhos across all ages. There is a high level of acceptance of adult accepted substances (meal and snack foods combined) in all age groups, and no evidence of age differences (Table 1, Fig. 1). However, among adult rejected substances, there are significant decreases with age in acceptance of items from the disgust and danger

TABLE 1

Response of children to different items and adult categories

	N	% Accept	rho[a]	% Acceptance[b] 16–29 months	% Acceptance[b] 43–60 months
Adult accepted[c,d]	54	87	07	89	86
Hawaiian punch[e]	52	96	09	95	100
Sugar pops	54	94	−12	95	88
American cheese	54	93	−10	95	88
Sugar	54	74	32*	60	88
Banana	50	90	01	85	86
Lemon juice	52	94	06	95	100
Hot dog	51	94	−04	95	93
Spinach	51	65	17	56	70
Potato chip	54	98	04	100	100
Chocolate candy	54	94	01	95	94
Beets	54	59	−41**	85	35***
Ketchup	53	85	−17	100	82
Flavored potato chip	54	94	02	95	94
Inappropriate[c,f]	52	52	−13	62	49
Crayon	54	63	−20	75	53
Paper	53	42	34*	25	61**
Play Doh	54	65	−48***	95	41***
Leaf	40	38	02	40	42
Sponge	51	49	−20	68	35*
Disgust[c,f]	50	21	−42**	35	12
Doggie doo	54	28	−49***	55	12**
Hair	54	13	−00	15	18
Grasshopper	54	17	−21	30	12
Fish	50	26	−41**	42	6*
Danger					
Dish soap	53	43	−60***	79	12***
Combination[c,g]	52	93	05	95	91
Hot dog + chocolate	45	93	02	94	93
Cookie + ketchup	41	93	−12	94	92
Miscellaneous					
Tree ears	53	64	17	58	56
Fish eggs	52	42	−28*	60	25*
Beer	50	74	−15	82	65
Baby food	52	64	−20	79	41*
Smelly cheese	54	65	−10	75	59
Dog biscuit	53	51	−23	68	41

[a] Age vs. acceptance (score of 5 to 6) or rejection (dichotomy, for individual substances) or mean percent acceptance of all members of each category. Significance levels based on t tests for rho.

[b] Young group (16–29 months) contains 20 subjects, while old group (43–60 months) contains 17 subjects. Significance levels are based on a chi-square statistic for individual substances, and a Mann–Whitney U test for the composite measures.

[c] Composite measures represent, for each subject, the mean of the items listed below the composite.

[d] Subjects not included if data for more than 3 of the 13 accepted substances was missing.

[e] Refers to the third of the five spaced presentations of Hawaiian punch.

[f] Subjects not included if data for more than one of the four or five substances was missing.

[g] Combination data includes all acceptances, but only those rejections in which the subject accepted both items in the combination when presented individually. Combination (composite score) involves data from both examples, unless one does not qualify. In such cases, the subject contributes data from only one of the two combinations.

*$p<0.05$ (two tailed). **$p<0.01$. ***$p<0.001$.

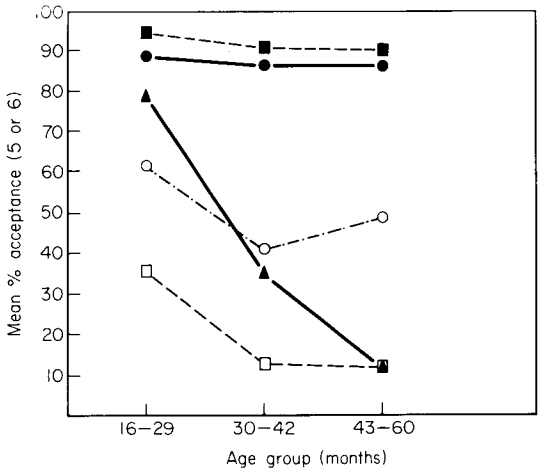

FIGURE 1. Mean per cent acceptance for five different categories of foods, across three age groups. For each subject and each category, a per cent acceptance score is obtained by determining the per cent of items in that category that get into the mouth (scores of 5 or 6). The figure presents mean values of these scores for subjects within each of three age groups. 'Adult accepted' items are acceptable meal or snack foods in American culture. Unlike the other categories, danger is represented by only one item (dish soap). Combination refers to two combinations of foods individually acceptable to adults, but that are generally unacceptable to adults in combination (hot dog and chocolate, cookie and ketchup). ■---■, Combination; ●—●, adult accepted; ○---○, inappropriate; ▲—▲, danger; □---□, disgust.

categories (Table 1, Fig. 1). Inappropriate items showed moderately high levels of acceptance (more than 50%, overall) across the age range. Almost all children in all groups accepted what were unacceptable food combinations to adults. We scored a rejection only when the subject accepted both components of the combination, but rejected the combination. Using this criterion, 93% of the combinations unacceptable to adults were put in the mouth.

Analyses by individual substances (Table 1) reveal significant drops (judged by Spearman rhos and the extreme group comparisons) for two of the four disgust substances (doggie doo and fish). Grasshopper showed a non-significant effect in the same direction (which was significant using the full 1–6 rating scale), and there was no increase in rejection for hair. Notably, the two most widely rejected substances across all age groups were hair (accepted [scores of 5 or 6] by 13% of subjects) and grasshopper (17%). Among the inappropriate substances, the only significant effects (depending on the measure used) were drops in acceptability of Play Doh and sponge, and an increase in acceptability of paper (acceptance by 25% of the youngest children and 65% of the oldest). Of a series of items that did not clearly fit into one of the adult 'categories' (dog biscuits, tree ears, fish eggs, baby food, beer and smelly cheese), none showed a significant increased acceptance with age, and only fish eggs and baby food showed weakly significant declines (Table 1). Two surprising findings were decreased acceptability of beets with age (rho = −0·42) and a marginally significant increase in acceptability of sugar.

Up to this point, we have combined full acceptance (score of 6) with acceptance (entering mouth) followed by rejection (score of 5). (Note that a score of 6 means either that the items was swallowed or remained in the mouth when the 30 second trial period expired. For items that cannot easily be swallowed or pulverized, such as sponge, we asked

the child to eject the item after the measurement period was over.) Oral cues (taste, flavor, temperature and texture), normally thought to be major determinants of acceptance, could only operate once the food had entered the mouth. In this study, distal factors (primarily knowledge about the items and their appearance) account for many more rejections than oral factors. Of 1307 cases of initial acceptance (scores of 5 or 6), only 160 (12·2%) were rejected (score of 5) before 30 seconds had elapsed. The level of oral rejection was slightly higher in young (16–29 month) group (15·8% of items that entered the mouth) than in the oldest group (43–60 months; 9·8% rejected). However, this difference derives primarily from the fact that the younger children were much more likely to put items difficult to process (e.g. sponge) in the mouth in their mouths in the first place.

There were six items for which at least ten of the 54 subjects scored 5, and there were seven items for which more subjects scored 5 than 6. The nine items meeting one or the other of these criteria are, in order of decreasing number of '5' scores: sponge, tree ears, Play Doh, crayon, paper, dog biscuit, grasshopper, leaf and hair. Virtually all are characterizable as hard to pulverize or process in the mouth. We conclude from this that the major cause of rejection after initial acceptance was texture. There were four items for which one might have predicted acceptance followed by rejection on the basis of taste cues. These were fish eggs (salty), beer (bitter), 'dish soap' (bitter) and lemon juice (sour). Surprisingly, of 136 cases of initial acceptance of these items, only nine (6·6%) were followed by rejection (5 scores). Perhaps the liquid form of most of these items discouraged the children from spitting them out.

In order to determine whether children with a history of toxin ingestion differed in responses to foods, we matched each of the 18 ingesters with a child of the same age in the sample. The mean age for ingesters was 35·56 months, and for controls, 35·61 months. *t*-Tests on the differences in mean acceptance scores for each category between the pairs results in no significant effects ($p < 0{\cdot}05$ or better). However, for all categories, acceptance was higher among ingesters (adult accepted: 90% ingester vs. 85% non-ingester mean acceptance; inappropriates: 61% vs. 38% [$t = 2{\cdot}03$, $p < 0{\cdot}10$]; disgust: 27% vs. 17%; danger: 56% vs. 33%; combination: 83% vs. 81%; miscellaneous: 57% vs. 47%). Rejection can, of course, occur after an item has entered the mouth (score of 5 as opposed to 6). Comparison of the two groups on the extent of rejection of items already placed in the mouth reveals no difference between the groups: ingesters consumed 88·7% and non-ingesters 89·4% of the items that entered their mouths.

Discussion

The major finding of this study is the confirmation of the belief that young children will put a wide range of items into their mouths. In particular, items regarded by adults as dangerous, disgusting, or inappropriate, and combinations of individually liked foods that are unacceptable to adults were readily accepted by many of the younger children in our sample. However, a few adult-rejected items, particularly hair, were also rejected by most of the youngest children in our sample. Within the 16 month to five year age range studied, there is a clear developmental trend towards rejection of items that adults consider disgusting or dangerous, though we do not know whether the older children reject these items on the same grounds as adults do. As prior research has suggested (Moncrieff, 1966; Petó, 1936; Stein, Ottenberg & Roulet, 1958), young children do not seen repelled by decay odor: the strong and smelly cheese was taken into the mouth by a majority of children at all ages. The relatively high (in comparison

to adult) acceptance of inappropriate and combination items extends across this age range, confirming our prior report that these types of adult rejections do not appear until after five years of age (Fallon *et al.*, 1984).

Our results fail to confirm earlier reports (Craig, 1955; Sibert & Newcombe, 1977) of increased mouthing of non-food items by toxin ingesters. However, although our results were not significant, there was a tendency in the predicted direction.

This study is a first attempt to map out the domain of acceptable and unacceptable food items for young children. As might be expected from a first attempt, there are multiple interpretations of the basic pattern of rejection over age that we have reported. We consider here some alternative formulations, caveats and limitations of this study.

The situation in which a potential food is presented surely influences the general level of acceptance. This study was carried out in a room in a hospital, with the mother present in the background, and with two friendly experimenters interacting with the child. The experimenters presented the items in a food context, and repeatedly invited the children to try the items. These features of the experiment may well have raised the general level of acceptance. However, we note that all children rejected at least one item, and as a result of *early* rejections (in all but one child) the children discovered that there were no negative consequences of such rejections.

A second and related problem is that younger children may be particularly compliant. Indeed, Engen & Corbit (1970) suggested that the positive response to decay odor and other adult-rejected odors reported in their study might be accounted for in terms of demand characteristics. However, so far as we know, two year olds are not generally more compliant than older children; in fact, younger children may be less subject to the demand characteristics of the social setting (Saarni, 1984). It is virtually impossible to construct a single social situation that would exert equal social 'force' on children of ages as different as two and five years. For this same reason, we did not run adult 'controls' in this situation. We are aware that for items of moderate unacceptability (eg. paper, sponge), we could probably produce acceptance or rejection as a function of the structuring of the social situation. But note that our main concern is with the categories of rejected substances, and differences among and within age groups for different types of substances, as opposed to the absolute level of rejection of all substances. Therefore, the criticisms in this and the previous paragraph have less force.

A third possible limitation of the study is that it was carried out on a lower class, ethnically homogeneous (almost entirely Black) sample. Furthermore, one-third of the children had a toxin ingestion history. There is also a sampling bias, since about 20 per cent of contacted parents refused to participate, about 40 per cent of those who agreed to participate failed to show up for our study or their medical appointment, and 12 per cent were dropped because of failure to consume any of the offered foods. It is reasonable to assume that our actual testing of less than 50 per cent of initially contacted people affected our estimates of overall item acceptance levels for the clinic population. However, it is unlikely that this bias operated differentially across age groups. We believe that our data on developmental changes are not seriously affected by these biases.

It would certainly be desirable to extend our results to other racial and socio-economic groups. However, the pattern that we report for the five year olds in this study matches reasonably well with the performance of upper middle class white five year olds that formed the youngest groups in our more indirect study of the development of food rejections (Fallon *et al.*, 1984) and categorization (Rozin, Fallon & Augustoni-Ziskind, 1985).

A few of our findings strike us as anomalous. One is the minimal effect of strong tastes in inducing rejection after oral acceptance. It may be that the social situation discouraged children from spitting out food (particularly liquids), although 45 of the 54 children did spit out on at least one occasion. Another finding that we cannot explain is the increased acceptance of paper or sugar with age.

One explanation of the pattern of results we report, and in particular the delayed onset of disgust and danger rejection, is that the child is just ignorant of the particular properties of the items offered. Since disgust is based on the idea of what the substance is, ignorance of this could preclude disgust. Thus the younger children might not know what a grasshopper or doggie doo is (though we used the word for doggie doo that the mother suggested). It is less likely that the whole fish would be unfamiliar. Hair, the most familiar disgust, was rejected by most of the young children, supporting the 'ignorance' explanation. At this time, we cannot discriminate this explanation from the 'deeper' claim that the whole category in question does not exist in the head of the younger children.

Our measure in this study was degree of acceptance. By itself, this does not have the 'richness' to convey differences among items in the reasons for rejection. Our study of older children (Fallon *et al.*, 1984) suggests that although children in the five to seven year range reject some of the same items that adults reject, their reasons for doing so may be different, and that adult categories may not yet be clearly differentiated. Distaste and danger are confounded, so that it is commonly believed that if something tastes bad, it is dangerous. Disgust is not detectable as a differentiated category until after seven or more years of age. Without the possibility of meaningful verbal interchange with the youngest children, the appropriate differentiations would be hard to make. We believe that facial expressions may provide a more sensitive method to make these distinctions, and analyses of the facial responses of children in this study are now underway.

It has been suggested (Rozin & Fallon, 1981) that toilet training may be the experience that initiates the category of disgust. Unfortunately, our data cannot speak to this issue, because almost all of our subjects were either toilet-trained or in the process of toilet-training. However, our data do indicate (along with studies of children's reactions to decay odors [Pető, 1936; Stein *et al.*, 1958]), that putrid items are acceptable to children after toilet training. If toilet training is of particular potency in the generation of disgust, at least some of the effects must be delayed.

Our results support a conception of the development of food choice that moves from broad to narrow. It is likely, given this trend, that children younger than our youngest subjects (less than 18 months old) would show even broader acceptance, and perhaps literally put everything possible into their mouths.

Our findings leave us with many problems, including the explanation of the frequently reported rejection of almost all types of foods by American children in the two to four year age range. Our results give no indication of how young children acquire the adult categorization: do they initially learn to categorize foods based on their sensory properties or effects, or do they simply learn to respond to foods in the same way that their parents do?

The basic line of development we have sketched fits well with the ecology of the infant. The flow of food to the child is under the control of the mother for the first few years of life, so that an elaborated rejection scheme would be superfluous. In the years from two to seven, the child becomes a much more independent feeder, and the development and differentiation of rejections takes place during this period.

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