THE INFLUENCE OF INFANT FOOD ADVERTISING ON INFANT FEEDING PRACTICES IN ST. VINCENT

Ted Greiner and Michael C. Latham

A survey designed to examine the extent to which infant food advertising could be shown measurably to influence infant feeding practices was carried out in St. Vincent in the eastern Caribbean. A questionnaire was administered to mothers of about 200 children one to two years old, nearly a complete sample in each of two towns. Infant food advertising was found to be uncommon. The typical infant feeding pattern, largely a combination of both breast and bottle feeding, had existed for decades. Despite the fact that this was not a very appropriate setting for such a study, and that there were a number of methodological constraints, the results of two multiple regression analyses suggested that the more a mother was influenced by infant food advertising, the sooner she began to bottle feed and the sooner she stopped breastfeeding. The cessation of all promotion of commercial infant foods, to the public as well as to health professionals, is called for.

The possible role of the promotion of commercial infant foods¹ as a factor leading to the decline in breastfeeding both in developing and industrialized countries has received increasing attention during the past decade. A wide range of actions have resulted from this concern, varying from lawsuits against some of the companies involved to national legislation regulating trade in commercial infant foods (1).

Two sets of assumptions appear to underlie these actions: (a) Bottle feeding is inferior to breastfeeding. In situations where either poverty, unsanitary environmental conditions, or illiteracy are prevalent, problems with improper dilution of milk powder or unhygienic preparation of feeds often lead to higher levels of morbidity and mortality among bottle-fed than among breast-fed infants. (b) Activities associated with the marketing of commercial infant food products, particularly promotional efforts by manufacturers and their local agents or distributors, contribute to conditions leading to an increase in bottle feeding.

This article is based on a Master of Science thesis by Ted Greiner, "Infant Food Advertising and Malnutrition in St. Vincent," submitted to Cornell University in 1977. The research was funded by the Center for International Studies, Cornell University.

¹The term "infant food" is used here to encompass all products commercially produced and marketed for infant feeding. In most developed countries this would include infant formulas (milk, soy, or meat-based preparations designed to meet all the nutritional needs of an infant), strained baby foods, and infant cereals. In many developing countries, however, other products are commonly promoted for use in bottle feeding, e.g. evaporated milk, sweetened condensed milk, full cream powdered milk, various fortified or "tonic" beverages, and glucose.

Much of the scientific evidence on which these assumptions are based has been reviewed elsewhere (2-8). The present paper reports on research designed to examine the extent to which infant food advertising can be shown measurably to influence infant feeding practices. The study was of necessity an exploratory effort. New methodology had to be developed for some aspects of the research.

There are a number of schools of thought on how the persuasion process takes place and on how its effectiveness should be measured. One, referred to by Robertson (9) as the information-processing approach, is summarized in Figure 1. It suggests that a message designed to influence consumer behavior must succeed in being presented to the consumer, who then must attend to it, comprehend it in the intended manner, yield to it, retain it, and act accordingly. Market researchers have developed a number of effectiveness tests for each step along this process. As suggested by the figure, the present study included variables which to some degree measured effectiveness of infant food advertising at three stages. MEDIAINDEX, a measure of the mothers' usage of radio and newspapers, only gave some indication of whether or not the mother was likely to be exposed to infant food advertising. At the other end of the spectrum was a measure of actual behavior. This variable, ADFOODS, measured the mothers' selective awareness and purchase of advertised over unadvertised brand names of infant foods. Another variable, ADSHEARD, the number of brand names the mother had heard or seen advertised, was a form of brand name recall. This is generally used to measure comprehension to some degree, and of course measures attention at the same time. Though it is among the less sophisticated approaches used by modern market researchers, it is more straightforward to administer and interpret than most, and perhaps among the most suitable types of marketing research for use in developing countries (10). Detailed descriptions of these variables are given below.

Figure 1. Tests of advertising effectiveness related to steps in the persuasion process. Source, adapted from T. S. Robertson, *Consumer Behavior*, Scott Foreman & Co., Glenview, Ill., 1970.

THE RESEARCH SETTING

The study took place in St. Vincent, an English-speaking country in the eastern Caribbean. St. Vincent was chosen as the research setting because it appeared to have the highest levels of protein-energy malnutrition and infant and young child mortality in the English-speaking Caribbean, and because earlier studies had shown bottle feeding to be very widespread.

The population of a little over 100,000 live mainly in the coastal areas, especially in the south, where the capital, Kingstown, is located. The vast majority of the population are descendants of African slaves brought to the island by the British in the 18th and early 19th centuries.

The economy is based largely on agriculture, with bananas and arrowroot as the major export products. Most of the food is imported, the top three imports being wheat flour, automobiles, and milk powder (11). The annual per capita gross national product in the early 1970s was slightly above US \$200, the lowest in the Caribbean, except for Haiti (12). Literacy is high, and only 8 percent of the population over 15 years of age has never attended school.

Health in St. Vincent is generally good. There are few problems with major epidemic or tropical diseases (13). However, the health of infants and young children is poor, due largely to high levels of gastroenteritis and malnutrition. From 1970-1973, gastroenteritis and nutritional deficiency diseases were responsible for 44 and 25 percent respectively of all post-neonatal infant mortality (death of infants 28 days to one year old). Infant mortality rates are high (70 per 1000 live births in 1970-1974) (14).

METHODS

The research was carried out in 1975 with the cooperation of the Caribbean Food and Nutrition Institute and the permission of the Ministry of Health of St. Vincent. It began with an investigation of the marketing and promotion of commercial infant foods in St. Vincent and Barbados (where television and many radio broadcasts received in St. Vincent originate). In Barbados informal interviews were held with representatives of advertising agencies, advertising managers from broadcast media, and a supervisor and a "commercial milk nurse" from an infant formula company subsidiary. In St. Vincent interviews were held with import agents for infant food companies and with owners of stores which sold infant foods. A survey was taken of the availability, costs, and shelf space occupied by infant foods in 25 supermarkets and shops in Kingstown. The history of infant food advertising in St. Vincent was studied by talking with senior health professionals and examining back issues of local newspapers.

This was followed by a survey of mothers of children between one and two years of age (a 13-month age range was used to achieve the desired sample size of 200) in two towns, Layou (population 5200) and Georgetown (population 6300). These towns were chosen because they were sites for a local Community Health Action Programme (CHAP).

In each town, five local female secondary school graduates had been given several months' training as paraprofessional "health aides," and worked in cooperation with

local government-operated maternal and child health clinics. During the early months of 1975, the CHAP health aides had surveyed nearly all households with children under five years of age in the two towns. Most of the socioeconomic and family composition data used in the present study were derived from records of their survey.

The CHAP survey included exactly 200 children between one and two years of age. This appeared to be a complete sample in Layou, but in Georgetown the residents of a wealthier section of town did not participate. Hospital records showed that an additional 16 children of this age would have been in the sample if this section of the town had been included.

Mothers, or in a few cases other guardians of these children, were interviewed in their homes by the first author, always accompanied by a local aide. Eight mothers did not consent to this re-interview and data from three others were not used because respondents were relatives of health aides. The final sample for computer analyses thus consisted of 82 children from Layou and 107 from Georgetown.

Heights and weights were measured by the first author. Ages were verified with baptismal certificates and hospital records when possible.

A number of steps were taken to help insure the validity of the data. Webb *et al.* (15) describe many of the common threats to the valid interpretation of survey data and divide them into three categories: error that may be traced to the respondents being interviewed, error that comes from the investigator, and error associated with sample imperfections.

Our attempts to minimize one source of respondent-related error, awareness of being studied, included reorganization and rewording of questions and avoiding all questions that caused any visible tension or embarrassment to the mothers. This was facilitated by avoiding all questions related to socioeconomic status, relying instead on data obtained earlier by the CHAP aides. (The aides in turn had tried not to arouse tension, avoiding probing, and as a result many socioeconomic questions suffered from a great many missing values, especially those relating to income.)

When respondents' "role selection" was extreme, e.g. if a respondent exaggerated her poverty, the aides were invaluable in pointing this out, and responses affected by this were not recorded.

Questions were worded in such a way as to avoid "response sets." For example, no question was phrased in such a way that a simple yes or no answer would suffice.

The combination of a foreign male interviewer (often perceived by the mothers as a doctor, though introduced by the aides as a nutrition student) and a well-known local female appeared to improve the validity of the data. In numerous instances the aides reported to the first author that mothers had revealed information during this interview that they had concealed previously. On the other hand, in many other instances the aides warned the author either during or after an interview that a mother was attempting to "pull the wool over his eyes."

Although the questionnaire was designed with extensive input from local and regional health professionals, time was too short to permit adequate pretesting. Thus the questionnaire was changed during the first five to ten interviews. Several questions were dropped and a few were added. Although this resulted in a slightly smaller sample size for these added questions, we have no indication that this introduced any bias, since the first mothers interviewed were selected on a haphazard basis.

We minimized sampling error by the largely successful attempt to include the entire eligible population in the two towns, as explained above. We repeated visits to eligible homes as many times as was necessary to find the mother or other major caretaker at home. Population mobility in the areas sampled was very low.

The major areas of inquiry on the questionnaire were infant feeding practices, exposure to mass media, recall of infant food advertising, attitudes about breastfeeding and commercial infant foods, and the mother's familiarity with and extent of purchase of locally available commercial infant foods (assessed by showing them photographs of 45 of these products). The Appendix presents the questions asked, reflecting both the wording most commonly used and their order of presentation.

Data were coded, punched, and verified. Computer analysis was carried out using the Statistical Package for the Social Sciences (16) and the Statistical Analysis System (17).

At the time of the interview, 25 children were still breastfeeding. Each of their ages at the time of the interview was recorded as their age of sevrage for regression analysis. (We use the French word "sevrage" to indicate the complete cessation of breastfeeding. The word "wean" is often used in this sense, but can lead to confusion, since it actually refers to the entire process of replacing breast milk with solid foods.)

While most of the variables reported on here are self-explanatory, three require further explanation. Two, MEDIAINDEX and LIVINGLEVEL, were simple linear summated composite indices, while the third, ADFOODS, was formed by subtracting one such index from another. The method used in constructing linear summated composite indices of this kind is described by Greiner (18) and more in detail by Brooks (19).

The first index, MEDIAINDEX, was created by adding together each respondent's score on three questions: frequency of radio listening, frequency of newspaper reading, and number and "cosmopolitanness" of newspapers read. Respondents who listened to the radio or read a newspaper more often and who read a greater variety of newspapers received higher scores on the index. We assessed the reliability of this index using an "internal consistency" method based on the intercorrelation of the three variables. A "reliability coefficient" which can vary between 0 and 1, depending on how highly intercorrelated the variables in the index are, was calculated according to an equation given in Nunnally (20, p. 223). (In calculating the average correlation, we excluded each variable's correlation with itself, obviously a value of one. This was a conservative measure, taken because of the small number of items in the index.) The value of the reliability coefficient for MEDIAINDEX, 0.61, was somewhat low, though not for a three-item index.

We directed a great deal of attention into creating a valid and reliable index measuring socioeconomic status. Three separate indices were created and tested. The one finally chosen included variables on the family's type of housing construction, number of rooms in the house, type of cooking facilities, source of water, toilet facilities, and radio ownership. It had a reliability coefficient of 0.73. The other two indices tested included many more variables, including marital status, occupation, and weekly household expenditures. They were rejected because they performed about the same way as the chosen index in various analyses, but included fewer cases. Analyses using these indices would have been based on a subsample of the population which probably

was biased. The chosen index was considered to be a measure of "level of living" rather than socioeconomic status, due to the limited nature of the variables it included. Tests of "criterion related" validity and an "item analysis" (21) suggested that LIVINGLEVEL was valid.

A third variable reported on, ADFOODS, was formed from two other indices. Mothers were given a score for each of 42 commercial infant food products. The scores were 0, 1, or 2, respectively, according to whether the mother had never heard of it, had heard of it, or had bought it. A correlation matrix of scores on these products revealed that several of these known to have been advertised locally were highly intercorrelated, as were several of those not known to have been advertised locally. Indices of both advertised and unadvertised products were created from the combinations of variables that maximized the reliability coefficients obtained, 0.67 and 0.53 respectively. Each contained four brand name infant foods. Finally, mothers' scores on the index of unadvertised products were subtracted from their scores on the index of advertised products. This yielded a score which measured the mothers' awareness and purchase of advertised foods, while controlling for (i.e. reducing the score of) those who simply tried a great number of products, whether they were advertised or not. Thus, ADFOODS can be said to measure a mother's orientation toward advertised over unadvertised brands of infant foods.²

The major statistical technique used in the explanatory analysis was standard linear multiple regression. This analysis sought to develop multiple regression equations that included only independent variables with statistically significant regression coefficients. The criterion for inclusion was that the regression coefficient was greater than its standard error, that is, the T statistic was greater than one for the null hypothesis that the regression coefficient was equal to zero.

RESULTS

Infant Feeding Practices and Attitudes

We have described the infant feeding practices of the sample mothers in detail elsewhere (22). The milk feeding pattern is illustrated in Figure 2. It shows that, while breastfeeding was initiated by nearly all mothers (93 percent), other milk was introduced from an early age. The median age of introduction of non-breast milk was two weeks, and the mean was 4.2 weeks (standard deviation (SD) = 5.7). Only 1 percent of the infants had not received other milk. The first milk given was nearly always infant formula fed by bottle, though within a few months most mothers switched to the cheaper full cream powdered milk. Weaning occurred at a median age of seven months. Depending on how long breastfeeding continued among the 13 percent of the mothers still breastfeeding at the time of the survey, the mean age of weaning would probably lie between eight and nine months. By far the major reason given for weaning, by 37 percent of the mothers, was that "the baby weaned himself." Solid foods, mainly commercial infant cereals, "custard" (a commercial product

²This was a measure of mothers' awareness of (yielding a score of 1) and purchase of (yielding a score of 2) certain brand names of commercial infant food, irrespective of whether or not the mother reported having heard any of them advertised.

Figure 2. Milk feeding history of sample children (N = 194).

made from finely ground corn meal), and arrowroot flour, were either added to the bottle, or fed by spoon to 73 percent of the sample by the age of four months. If these data are compared to those reported by Antrobus (23) and Beaudry-Darisme *et al.* (24), it appears that there may have been a decline in the age of sevrage and in the age of introduction of milk and solids in St. Vincent during the first half of the 1970s (22).

The mothers' attitudes and opinions about various aspects of infant feeding are summarized in Table 1. Breast milk usually was not named as the best food item for a young baby, but when asked if the product they named was as good as or better than breast milk, most mothers responded that it was not. A majority of the mothers felt that exclusive breastfeeding for four months would be good for a baby (though almost none practiced this). Less than half of the mothers perceived infant formula as being merely a food. The others attributed "tonic" or medicinal properties to it in addition.

We have described the nutritional status of the children in the sample, based on weight and height, elsewhere (25). Mild and moderate protein-energy malnutrition

Table 1

Attitudes of Vincentian mothers toward selected aspects of infant feeding		
	Frequency	Percent
<i>A. The best feed for a young baby</i>		
Breast milk	43	27
A non-commercial infant food	76	47
Brand name commercial infant food	42	26
Total	161	100
<i>B. What would happen to a baby exclusively breast-fed for 4 months?</i>		
Would be healthy	112	69
Would be healthy if mother well fed	9	6
Would need more food to be healthy	25	15
Would not be healthy	17	10
Total	163	100
<i>C. Category in which mother places her favorite brand of formula^a</i>		
Medicine	11	7
Tonic	74	47
Food	72	46
Total	157	100

^aMultiple answers were recorded only in the uppermost category to which they applied. Thus, the reply "food and medicine" was recorded only as "medicine."

were relatively widespread, and 3 percent of the sample children fell below 60 percent of the Boston Standard weight for age. The mean was 85 percent of the standard.

Availability and Promotion of Commercial Infant Foods

As in many developing countries, an extensive array of packaged products was sold, promoted, and used as infant food. The brand names of these products are listed by product category in Table 2. Most were sold in two or three sizes. A survey of 22 stores in Kingstown revealed that these products occupied an average of 29 percent of the shelf space devoted to non-alcoholic food and beverages.

Infant food advertising has a long history in the English-speaking Caribbean. The oldest Vincentian newspapers that we could locate, dating from the 1930s, contained advertisements for infant foods. The peak period for newspaper advertising of infant foods appeared to have occurred in the 1950s. In *The Vincentian*, the major newspaper, 52 infant food advertisements appeared in 1954, 39 in 1969, but only 3 during the first half of 1975. Other mass media in the Eastern Caribbean had carried infant food advertising, but advertising agencies in Barbados (where most television and radio

Table 2

Brand names of commercial infant foods available in St. Vincent

Type of Product	Brand Name	Type of Product	Brand Name
Strained baby food	Heinz	Evaporated milk	Restora
	Gerber		Pet
	Beech-Nut		Libby
Infant formula	Olac		Rose
	Cow & Gate		Ideal
	Ostermilk		Carnation
	Lactogen		Farm
	SMA		Cow & Gate
	Baker	Infant cereal	Robinson Patent
Full cream powdered milk	Farm		Barley
	Dano		Gerber Cereal
	Milex		Cerelac
	Millac		Heinz Cereal
	Kanny		Beech-Nut Cereal
	Arinco		Farex
	Lita		Robinson Cereal
	Nomad		Pablum
	Dancow		Cow & Gate
	Anchor		Cereal
	Fernleaf		Nestum
	Klim	Glucose	Ayrton's
	Greenland		Glucodin
Sweetened condensed milk	Castle		Superdex
	Nestle		Cow & Gate
	Blue Cross	"Tonic food" beverage powders	Milo
			Horlick's
			Bournvita

received in St. Vincent originate) said that this had dropped off after about 1971-1972. Part of the reason, they said, was the initiation of price controls which cut down on advertising budgets by placing ceilings on profits. But also, companies had found promotion to the health professions and the hiring of nurses to be more effective in increasing sales. In Barbados the supervisor of milk nurses for one firm stated that their nurses had been in operation since 1962 and now were "in" with the local pediatricians—only "one doctor or so" in the various hospitals would object to their activities there.

In St. Vincent there appeared to be no one employed solely to promote infant foods to either health professionals or to the public. However, other forms of promotion to and through health professionals were more salient than that directed to the public. Health professionals received free samples of infant formula for distribution to mothers. (However, perhaps because it was a small, isolated market, these were supplied intermittently.) Calendars and posters from milk companies were seen on the walls of clinics, the malnutrition ward of the hospital, and a day care center. Infant care and feeding booklets, published by infant food companies, were given to pregnant

mothers at the antenatal clinics. We found that some mothers saved them for years and passed them along to friends. Nineteen percent of the mothers named these "baby books" as their source of information on how to bottle feed.

Perception of Infant Food Advertising

Various aspects of the mothers' recall of infant food advertising are shown in Table 3. Sixty-two percent of the mothers had seen or heard infant food advertisements (Table 3A). Of these, 68 percent (i.e. 42 percent of the entire sample) said that the ads made them feel like they would want to try the product with their own babies (Table 3D).

Altogether the mothers recalled 19 brand names of advertised products. The brand names most often recalled were three infant formulas, Nestle's Lactogen (27 mothers), Glaxo's Ostermilk (20 mothers), and Unigate's Cow & Gate (17 mothers), as well as an infant cereal, Heinz Baby Rice (17 mothers).

Only two brands of infant food, Heinz Baby Rice and Lactogen, were known to have been advertised in St. Vincent during the months prior to the interviews. They accounted for 34 percent of the mothers' responses. Most of the infant food advertising which had occurred in St. Vincent, and certainly most of that which could have had an influence on the infant feeding practices we observed, had taken place anywhere from a year to over a decade before the study. Therefore, to a large extent the brand name recall variable, ADSHEARD, must be a measure of retention. In this connection it is interesting to note that older mothers tended to have a higher score on ADSHEARD than younger mothers, though this did not achieve statistical significance ($r = 0.11, P = .08$).

Effects of Advertising on Infant Feeding Practices

We had obtained adequate data from eleven brand name products to determine both whether the mother had heard or seen the product advertised and whether she had bought it. We combined the data from these products and the average values are in Table 4. Although there appears to be a trend such that mothers were more likely to have purchased products they had heard advertised, it failed to reach statistical significance ($\chi^2 = 0.39$).

We further explored the role of infant food advertising in influencing infant feeding practices using standard linear multiple regression analyses. We report here results from analyses on two dependent variables, the age of introduction of non-breast milk (AGEMILK) and the age of sevrage (SEVRAGE). Table 5 displays data on the five independent variables found to be significantly associated with AGEMILK. Those found not to be significant were town of residence, whether or not the mother worked, mother's opinions about breast and bottle feeding (responses to questions recorded in Tables 1A and 1C), mother's age, the media index, spacing of the previous and subsequent children, sex of the child, mother's marital status, and the number of living and dead siblings. The final equation explains 11 percent of the variance in AGEMILK.

Table 3

Vincentian mothers' recall of infant food advertising

	Frequency	Percent
<i>A. Extent of recall</i>		
Mother heard no ads	70	38
Heard ads but could recall no details	33	18
Recalled what was said but not brand names	4	2
Recalled brand names but not what was said	35	19
Recalled both brand names and what was said	43	23
Total	185	100
<i>B. Ad content or slogans recalled</i>		
Heard no ads	70	37
Could not remember content	68	36
Product good for babies	18	10
Makes babies healthy	10	5
Builds big or fat babies	4	2
Nearest to mother's milk	4	2
Milk has special qualities	4	2
Especially good for young babies	3	2
Miscellaneous	7	4
Total	188 ^a	100
<i>C. Number of advertised brands recalled</i>		
Heard no ads	70	38
Could not recall advertised brand names	37	20
1 brand	47	25
2 brands	14	8
3 brands	7	4
4 brands	1	1
5 brands or more	10	5
Total	186	101 ^b
<i>D. Did advertising make mother want to try product?</i>		
Heard no ads	70	38
Yes	70	38
Yes, but could not afford	8	4
Maybe	2	1
No	32	17
Do not know	2	1
Total	184	99 ^b

^a Double answers were recorded for five mothers.^b Deviations from 100% caused by rounding off of all percentages.

Table 4

Purchasing patterns for 11 commercial infant foods in St. Vincent,
according to whether mothers had heard the products advertised

	Ave. no. of mothers who had heard product advertised	Ave. no. of mothers who had not heard product advertised	Average total
Ave. no. of mothers who had purchased product	5.5	75.8	81.3
Ave. no. of mothers who had not pur- chased product	2.8	102.5	105.3
Average total	8.3	178.3	186.6

Table 5

Significance and magnitude of effects of variables associated with age
of introduction of milk (AGEMILK) in St. Vincent^a

Independent Variable ^b (1)	Level of Significance ^c (2)	Mean Value ^d (3)	Regression Coefficient (4)	Average Magnitude of Its Effect ^e (5)
WHEREBORN (hospital)	.02	(0.84)	+2.5	+2.1
ADFOODS	.02	3.4	-0.48	-1.6
LIVINGLEVEL	.05	12	-0.24	-2.9
ADSHEARD	.06	0.81	-0.51	-0.4
HOMEFATHER (at home)	.14	(0.41)	+1.3	+0.53

^aThe mean age of introduction of milk for the entire sample of 183 children was 4.2 weeks (SD = 5.7). There were 6 cases with missing values. The mean for the subsample of 164 children included in this multiple regression equation was 3.9 weeks (SD = 5.5). The r^2 for this equation was 0.11, and the adjusted r^2 was 0.08.

^bSee text for definitions of the variable names.

^c $P \leq$ the value given, using Student's T-Test for the null hypothesis, $\beta = 0$. One-tailed tests were used for all variables except HOMEFATHER, for which a two-tailed test was used since the direction of association had not been hypothesized in advance for this variable only.

^dFor variables with only two categories, this represents the proportion of the sample involved and is placed in parentheses. Values are for the entire sample rather than the regression subsample.

^eArrived at by multiplying column 3 by column 4. If the mean values had been calculated from the regression subsample, the figures in column 5, when added to the intercept (5.1 weeks), would equal the mean value of the dependent variable (3.9 weeks).

In Table 6 we present data on the eight independent variables found to be significantly associated with SEVRAGE. Those found not to be significant were town of residence, whether or not the mother worked, number of dead siblings, whether the child had been born at home or in the hospital, mother's marital status, the media index, the mother's orientation toward advertised over unadvertised brands of infant food (ADFOODS), the mother's opinions about breast and bottle feeding (responses to questions recorded in Tables 1A and 1C), and whether or not the mother was a family planning acceptor. The final equation explains 22 percent of the variance in SEVRAGE.

Table 6

Significance and magnitude of effects of variables associated with age of termination of breastfeeding (SEVRAGE) in St. Vincent^a

Independent Variable ^b (1)	Level of Significance ^c (2)	Mean Value ^d (3)	Regression Coefficient (4)	Average Magnitude of Its Effect ^e (5)
YOUNGERSIB	.0005	0.26	-4.0	-1.0
AGEMILK	.02	4.2	+0.57	+2.4
ADSHEARD	.02	0.81	-0.63	-0.51
LIVINGLEVEL	.03	12	-0.26	-3.1
AGEMOTHER	.03	26	+0.10	+2.6
HOMEFATHER (at home)	.07	(0.41)	-1.2	-0.50
FREEMILK (received it)	.07	(0.14)	-1.7	-0.24
SEX (male)	.28	(0.56)	+0.86	+0.48

^aThe mean age of sevrage for the entire sample ($n = 189$) was 7.8 months ($SD = 5.2$), and that for the subsample included in this multiple regression equation ($n = 161$) was also 7.8 months ($SD = 5.1$). For those children who were still breastfeeding at the time of the study (13% of the sample), their age at the time of the interview was used as the age of sevrage. The r^2 for this equation was 0.22, and the adjusted r^2 was 0.17.

^bSee text for definitions of the variable names.

^c $P \leq$ the value given, using Student's T-Test for the null hypothesis, $\beta = 0$. One-tailed tests were used for all variables except SEX, for which a two-tailed test was used, since the direction of association had not been hypothesized in advance for this variable only.

^dFor variables with only two categories, this represents the proportion of the sample involved and is placed in parentheses. Values are for the entire sample rather than the regression subsample.

^eArrived at by multiplying column 3 times column 4. If the mean values had been calculated from the regression subsample, the figures in column 5, when added to the intercept (9.3 months),

DISCUSSION

This study, an attempt to determine if infant food advertising and promotion had a measurable effect on infant feeding practices in St. Vincent, suffered from a number of methodological constraints. First, it was a retrospective survey based on interviews. Cause and effect could be much more clearly discerned through a longitudinal design, if possible including more in-depth approaches such as participant observation.

Second, infant food advertising at the research setting, St. Vincent, had declined in the years prior to the study. Milk nurses did not exist and free sampling was sporadic, in both cases probably because it was a small, isolated market. Measuring the impact of low levels of advertising, or of the much higher levels of the past, is a difficult task, given the many other factors known to influence breastfeeding [see, for example, the list in Greiner (3)].

Third, we could find no way to measure directly the impact of the promotional activities that appeared to have the most influence, those involving local health professionals. Finally, bottle feeding was so well-established in St. Vincent by the time of our study that current infant food advertising would no longer be expected to rank among the major influences. Historically, many factors, especially various aspects of the slavery system, had a negative impact on breastfeeding in St. Vincent (22) as well as other parts of the Caribbean (26). Vincentian women were reported to be practicing early supplementation, mainly with arrowroot, but also with cow and goat milk, in 1938-1939 (27). A doctor who had begun working in the Kingstown Hospital in the late 1940s reported to the first author that bottle feeding was widespread by that time. Ideally, a study of the impact of infant food advertising should be carried out in a locality where bottle feeding has just begun to increase in prevalence.

Our analysis failed to show a statistically significant association between brand names of advertisements recalled and brand names purchased, though the trend appeared to be in the expected direction (Table 4). Part of the reason may have been the small number of women who had heard or seen each product advertised. Furthermore, such a relationship should not be expected to be strong in a culture where brand name awareness, brand loyalty, and other sophisticated consumer attitudes are not well established. It is likely that infant food advertising in such a culture sells bottle feeding *per se* rather than specific brands. In our current research in the Yemen Arab Republic, we have found that mothers do not even attempt to pronounce the strange foreign brand names of infant formulas, but have evolved local names for them, often based on a picture or symbol on the label.

An examination of the results of the multiple regression equations in Tables 5 and 6 must view them from two different perspectives. First, what do they reveal about the impact of infant food advertising on the entire sample, that is, at the community level? Second, what do they reveal about the impact of infant food advertising on an individual mother who has been exposed to it?

In each table, the fourth column, the regression coefficient, gives a measure of the impact of each independent variable at the individual level and the fifth column gives a measure of its impact on the entire sample. For example, in Table 5, a baby born in the hospital was supplemented with milk 2.5 weeks later than one born at home. (Mothers reported that breastfeeding was strongly promoted on the maternity wards.)

Since 84 percent of the babies were born in the hospital, the average magnitude of its effect was 2.1.

In considering the impact of infant food advertising, let us begin with the AGE-MILK equation (Table 5) at the level of the individual mother. The regression coefficient for ADFOODS suggests that a mother slightly oriented toward advertised over unadvertised brands of infant food (with a score of 1 on ADFOODS) would introduce non-breast milk one half week earlier than a mother with no orientation either way. Similarly, a mother who attended sufficiently to infant food advertising so that she recalled one brand name she had heard advertised (ADSHEARD) would introduce non-breast milk about one half week sooner than a mother who could not recall hearing any brand advertised.

However, at the level of the entire sample, the average magnitude of the effect of ADFOODS was much greater than that of ADSHEARD. Whereas the average mother was considerably more oriented toward advertised than unadvertised products in her awareness and purchase patterns (the average score for ADFOODS being 3.4), the average number of brands mothers recalled having heard advertised was only 0.8. Thus, the magnitude of the effect of ADFOODS on the entire sample was higher, in fact, four times as great as that of ADSHEARD.

Looking at the SEVRAGE equation (Table 6), the impact of ADSHEARD on an individual mother was equal to 0.63 months less breastfeeding per brand name recalled. Again, this relatively large impact on such mothers translated to a relatively small impact on the entire sample.

Three other independent variables deserve discussion in the present context. The FREEMILK data suggest that a mother who received free dried skim milk (from a local Canadian Save the Children program) breast-fed 1.7 months less than a mother who did not. This, too, had little overall impact, since such a small proportion of the sample received the free milk.

Second, the AGEMILK data suggest that for every week a mother delayed the initiation of bottle feeding, breastfeeding would be prolonged by two weeks. The impact of this variable on the entire sample was rather large. This effect is in spite of the fact that there was usually a long period, averaging six months, during which breast and bottle feeding were practiced simultaneously. (This can be seen in Figure 2 by scanning along the 50th percentile.) Rarely was there an abrupt shift from breast to bottle. But it is likely that in many cases the initiation of bottle feeding gradually led to sevrage. Since "the baby weaned himself" was the most common reason given for sevrage, one might speculate that once bottle feeding started, with the invariably sweet fluid (and often an enlarged hole in the nipple), the infant showed a growing preference for it over the breast.

Both the age of introduction of non-breast milk and the age of sevrage were earlier among mothers at a higher economic level of living. This may reflect an increased ability to purchase artificial infant food, or perhaps a feeling that breastfeeding is for the poor and that bottle feeding is fashionable and something practiced by the affluent.

Referring back to the original model of steps in the persuasion process (Fig. 1), we now can summarize the extent to which this study was able to show a relationship between infant food advertising and infant feeding practices. The variable which

measured exposure to the mass media did not have a significant effect on either the AGEMILK or the SEVRAGE equation. In fact, while it may have been a reasonable measure of mass media exposure at the time of the survey, it did not measure previous exposure during times when advertising was more common. Older mothers, who were more likely to have been childbearing during the days of more active infant food advertising, had a lower score on MEDIAINDEX ($r = 0.15, P < .04$).

ADFOODS, a measure of both awareness and purchase behavior oriented toward advertised brands, had a strong association with AGEMILK but none with SEVRAGE.

ADSHEARD, a measure of mothers' recall of advertised brand names, may have been more a measure of retention, as shown in Figure 1, than simply comprehension. Only 34 percent of the brand name recalls were for brands known to have been advertised in the months preceding the survey. ADSHEARD had a moderate association with both dependent variables at the level of the individual mothers. The fact that the magnitude of its effect on the entire sample was small in both cases is to be expected, given the relatively small amount of infant food advertising that had been done in St. Vincent during the two or three years preceding the survey.

The meaning of ADSHEARD is perhaps somewhat less straightforward than most of the other variables considered here. Although advertisers generally assume that brand name recall measures advertising effectiveness in some sense, in the present circumstance three alternative interpretations deserve to be examined:

1. Mothers who vaguely recalled hearing infant food advertisements may have simply named the products they recalled seeing on store shelves. An examination of each brand name product according to its local advertising history, availability in local stores, and extent of advertising recall suggested that this was not the case. The best example was Heinz Baby Rice. It was the only product known to have been advertised on local radio close to the time of the survey. Though it was a new product, available in only two of the stores surveyed, it was among the most often recalled brand names.

2. Mothers may have simply responded with those brand names most widely discussed in their social circles. This need not mean that advertising has no influence, but that it can operate through a group as well as at the individual level. Thus, the members of a social group may be jointly influenced by promotional practices. Infant food advertising, like newspaper editorials at election time (28), may not directly mold opinion so much as it "sets the agenda" for discussions among groups of mothers. A member of such a group may in turn be more sensitized to hearing and attending to infant food advertising.

3. ADSHEARD may be an effect rather than a cause. This, as all retrospective studies, is susceptible to the presence of a "self-selection" factor. Mothers already predisposed to bottle feeding may simply have attended more to infant food advertising. A similar reversal of cause and effect would seem to occur when attitude change follows rather than precedes behavior (29). Thus, a mother who buys an expensive brand of infant formula may selectively attend to advertising for that brand. In the latter case, such a mother might score rather low on ADSHEARD, since she would tend to avoid "dissonance-inducing information—for example, failing to perceive information or ads about the rejected alternatives." (9) But more importantly, for both cases, if ADSHEARD is an effect, it is also a cause further along in a chain of

cause and effect. Infant food advertising, in the early stages of the innovation-adoption process for bottle feeding, may increase awareness of the product, may persuade the mother of its value, or may precipitate a decision to try it. But in the long run, if a "discontinuance" (30) is to be avoided, it must reconfirm her decision. Thus, a mother who is sensitized to listen selectively for or attend to advertising for infant foods in general or for a brand of milk she purchased would feel assuaged (her cognitive dissonance over its high price or over her decision not to breastfeed would be reduced) by the status conferred upon the product by the advertising. In such a case, although ADSHEARD would be measuring an effect at an earlier stage of the adoption process, it would be measuring a cause at the crucial "confirmation" stage, which the mother would have to reach if ADSHEARD were to be causally associated with SEVRAGE.

These multiple regression equations, especially the SEVRAGE equation, explain a relatively large percent of the variance in their dependent variables for data gathered under these kinds of field conditions. Nevertheless, they leave the bulk of the variance unexplained. This is probably partly because of the great amount of "noise" inherent in this kind of study, and partly because other important variables were not measured.

The body of literature with which to compare these findings is surprisingly small. Popkin (31) attempted to use multiple regression analyses to study the effects of the promotion of commercial infant foods on breastfeeding practices in the Philippines. He used only one relevant independent variable, whether or not the family had been visited by a milk company representative. Out of a subsample of 140 mothers with infants, only 9 percent had been visited by a representative. These visits were found to have no association with "breastfeeding participation" and a positive association ($P = .05$) with the duration of breastfeeding. Popkin mentions that it is possible that these representatives intentionally selected active breastfeeding households. It is also important to keep in mind that he measured only exposure to promotion, rather than any form of response to it. This is analogous to an advertising agency measuring the effectiveness of an advertisement by counting how many times it appeared in the newspapers a customer read or on the television shows he or she watched.

Bergevin *et al.* (32) conducted a randomized controlled trial to determine whether the provision of infant formula sample packets had an adverse effect on duration of breastfeeding. They found that it did, particularly among ill and less-educated mothers.

Most other investigators have studied the role of infant food advertising in the introduction of bottle feeding rather than in weaning from the breast. Thus, Grantham-McGregor and Back (33), in a sample of 300 Jamaican infants, found that 14 percent were started on the bottle because of advertising. This included "all those mothers who said that a nurse employed by a commercial milk firm had either told her to start the bottle or given her a free milk sample at a time when the child was being satisfactorily breast fed." Ransome-Kuti *et al.* (34) found that, in a sample of Nigerian infants, "283 (58%) got artificial milk because the mother got the idea from milk advertisements on the radio, or believed it was good for the baby because she had seen some well-to-do mothers feed their babies artificially." Social Policy Research, Limited (35) found that among 364 out of 500 Nigerian mothers who combined

breast and bottle feeding, 95 percent "believed they had been advised to do so by medical personnel, mainly midwives or nurses. Milk company representatives who give talks on feeding appear to be identified as hospital and clinic staff."

The present study attempted to determine whether infant food advertising had a measurable impact on infant feeding practices by developing measures of advertising effectiveness based not merely on exposure to advertising, but also on its comprehension and retention, and a behavioral response to it. The results suggest that this method was indeed successful in demonstrating a measurable impact of infant food advertising on infant feeding practices.

Somehow it is difficult for the Western mind to believe that advertising can have an effect on such crucial and complex decisions as whether and when to introduce bottle feeding to a baby or when to terminate breastfeeding. Perhaps this is in part due to our own sophisticated ability to deal with the daily onslaught of advertising, especially in the United States. Levitt (36) quotes Galbraith as saying, "... because modern man is exposed to a large volume of information of varying degrees of unreliability ... he establishes a system of discounts which he applies to various sources almost without thought. ... The discount becomes nearly total for all forms of advertising. The merest child watching television dismisses the health and status-giving claims of a breakfast cereal as 'a commercial'." It is reasonable to assume that this system of discounts has not developed among people who are not exposed to a large volume of information of varying degrees of unreliability, or who are not aware that the mass media can be vehicles for untruth. Pierce (37) found that foreign students were more favorably disposed to American advertising, the lower the stage of economic development of their home country.

Whereas infant food promotion seldom, if ever, is the sole factor influencing a mother in her decisions about infant feeding, its task is in fact much simpler than this. If a mother can be convinced that the contents of a formula can (and she probably does not appreciate that it is simply fortified, altered cow's milk) are "closest to mother's milk" or "humanized," then the switch from breast to bottle may become a rather facile decision. The least problem with breastfeeding, even when breast milk is perceived as best, may lead to a decision to bottle feed if infant formula is perceived as almost as good as or almost the same as breast milk.

Also, traditional beliefs about various factors that "spoil" breast milk, or about the inferiority of female products and activities in general, could facilitate the switch to a product which presents itself as the modern or "logical alternative." (38)

It must be stressed that this study attempted to measure the effects of infant food advertising, but not of other aspects of the promotion of commercial infant foods. We suspect that the long-term impact of advertising, though possibly substantial, is far less than that of free sampling, the activities of so-called "milk nurses," and the heavy promotional efforts of many kinds directed toward health professionals (3, 4, 6, 7), particularly the use of detail men or medical sales representatives (39).

CONCLUSION

The promotion of commercial infant foods has been widely condemned during the past decade by health professionals and international health agencies. The strongest

statement so far has come from the WHO/UNICEF Meeting on Infant and Young Child Feeding (40) and the resulting International Code of Marketing of Breastmilk Substitutes which recommended that no sales promotion to the public be permitted, either through mass media or health service channels. The long-term response of the infant food industry to this international code of ethics remains to be seen. Industry response to previous recommendations of this kind consisted largely of minor shifts in promotional strategies in developing countries coupled with sophisticated public relations campaigns in industrialized countries. Funds for mass media advertising have been shifted largely toward promotion through the health professions. The color of uniforms for milk nurses has been changed. Free sample containers have been reduced in size.

These minimal responses have been justified by the industry in part by pointing out that research on the negative effects of the promotion of infant foods is inadequate. This argument might be irrelevant if the standards for overseas marketing practices were comparable to those in effect in the United States, where courts have long held companies responsible even for "foreseeable misuse" of their products (41).

While the present study does not answer all the questions, it does, using a multivariate analytic approach, show measurable effects of commercial infant food advertising. As in any field of scientific endeavor, cause and effect relationships will emerge more clearly with further research. However, the findings of this study make even more compelling the arguments for ending all promotion of commercial infant foods in developing countries. Much infant illness, suffering, and mortality may result from its continuation, and little serious harm could conceivably result from its immediate cessation.

Acknowledgments—The authors are grateful to the Caribbean Food and Nutrition Institute, the Ministry of Health of St. Vincent, Dr. A.C.K. Antrobus, Ms. Belle Allen, and Dr. Frank Ramsey for facilitating this research. Dr. Mark Brooks provided crucial assistance with the data analysis, and Ms. Stina Almroth helped with numerous aspects of the research. Ms. Doreen Doty kindly typed the various drafts of this manuscript.

REFERENCES

1. Hewson, B. Influencing multinational corporations: The infant formula marketing controversy. *New York University International Law and Politics* 10(1): 1-28, 1978.
2. Berg, A. *The Nutrition Factor*. The Brookings Institution, Washington, D.C., 1973.
3. Greiner, T. The promotion of bottle feeding by multinational corporations: How advertising and the health professions have contributed. *Cornell International Nutrition Monograph* No. 2, 1975.
4. Greiner, T. Regulation and education: Strategies for solving the bottle feeding problem. *Cornell International Nutrition Monograph* No. 4, 1977.
5. Wray, J. Maternal nutrition, breast-feeding and infant survival. In *Nutrition and Human Reproduction*, edited by W. H. Mosley, pp. 197-229, Plenum Press, New York, 1978.
6. Chetley, A. *The Baby Killer Scandal*. War on Want, London, 1979.
7. Jelliffe, D. B., and Jelliffe, E. F. P. *Human Milk in the Modern World*. Oxford University Press, New York, 1979.
8. Jelliffe, D. B., and Jelliffe, E. F. P. Feeding in early infancy and primary health care (a post Alma Ata comment). *Ecol. Food and Nutr.* 9: 189-194, 1980.
9. Robertson, T. S. *Consumer Behavior*. Scott, Foreman & Co., Glenview, Ill., 1970.

10. Kracmar, J. Z. *Marketing Research in the Developing Countries: A Handbook*, Praeger, New York, 1971.
11. St. Vincent Statistical Unit. *Digest of Statistics for the Year 1974*, No. 24, 1975.
12. Smith, L. L., and Doughty, M. *Agricultural Statistics of the Caribbean Countries*. Office for the Caribbean, ECLA/POS, 74/11, August 12, 1974.
13. Ashcroft, M. T., and Antrobus, A. C. K. Heights and weights of school children in St. Vincent. *J. Biosoc. Sci.* 2: 317-328, 1970.
14. Health Statistics Unit. *Vital Statistics 1974*. Ministry of Health, Kingstown, St. Vincent, 1975.
15. Webb, E. J., et al. *Unobtrusive Measures: Nonrestrictive Research in the Social Sciences*. Rand-McNally & Co., Chicago, 1966.
16. Nie, N. H., et al. *Statistical Package for the Social Sciences*. McGraw-Hill Book Co., New York, 1975.
17. Barr, A. J. *A User's Guide to SAS76*. SAS Institute, Inc., Raleigh, N.C., 1976.
18. Greiner, T. H. *Infant Food Advertising and Malnutrition in St. Vincent*. Master of Science Thesis, Cornell University, Ithaca, N.Y., 1977.
19. Brooks, R. M. *Iron Deficiency Anemia in Malaysian Women and Its Relationship to Contraception*. Master of Science Thesis, Cornell University, Ithaca, N.Y., 1980.
20. Nunnally, J. C. *Psychometric Theory*. McGraw-Hill Book Co., New York, 1967.
21. Bohrnstedt, G. W. A quick method for determining the reliability and validity of multiple-item scales. *Amer. Soc. Rev.* 34: 542-548, 1969.
22. Greiner, T., and Latham, M. C. Infant feeding practices in St. Vincent and factors which affect them. *West Indian Med. J.* 30: 8-16, 1981.
23. Antrobus, A. C. K. Child growth and related factors in a rural community in St. Vincent. *J. Trop. Ped.* 17: 187-209, 1971.
24. Beaudry-Darisme, M. N., Hayes-Blend, L. C., and Van Veen, A. G. The application of sociological research methods to food and nutrition problems on a Caribbean island. *Ecol. Food and Nutr.* 1: 103-119, 1972.
25. Greiner, T., and Latham, M. C. Factors associated with nutritional status among young children in St. Vincent. *Ecol. Food and Nutr.* 10: 135-141, 1981.
26. Marchione, T. J. A history of breast-feeding practices in the English-speaking Caribbean in the twentieth century. *Food and Nutr. Bull. (U.N.U.)* 2(2): 9-18, 1980.
27. Murray, W. C. G. Infant feeding and nutrition in St. Vincent. *Caribbean Med. J.* 4(3): 92-96, 1942.
28. McCombs, M. E. Mass communication in political campaigns: Information, gratification and persuasion. In *Current Perspectives in Mass Communication Research*, edited by F. G. Kline and P. J. Tichenor, pp. 169-194, Sage Publications, Beverly Hills, Ca., 1972.
29. Festinger, L. *A Theory of Cognitive Dissonance*. Stanford University Press, Stanford, Ca., 1957.
30. Tannon, C. P., and Rogers, E. M. Diffusion research methodology: Focus on health care organizations. In *The Diffusion of Medical Technology*, edited by G. Gordan and G. L. Fisher, Ballinger, Cambridge, Mass., 1975.
31. Popkin, B. M. Economic determinants of breast-feeding behavior: The case of rural households in Laguna, Philippines. In *Nutrition and Human Reproduction*, edited by W. H. Mosley, pp. 461-497, Plenum Press, New York, 1978.
32. Bergevin, V., Kramer, M., and Dougherty, C. Do Infant Formula Samples Affect the Duration of Breastfeeding? A Randomized Controlled Trial. Paper presented at the Annual Meeting of the Ambulatory Pediatric Association, San Francisco, April 30-May 1, 1981.
33. Grantham-McGregor, S. M., and Back, E. H. Breastfeeding in Kingston, Jamaica. *Arch. Dis. Child.* 45: 404-409, 1970.
34. Ransome-Kuti, O., Gbajumo, W. O., and Olaniyan, M. O. Some socioeconomic conditions predisposing to malnutrition in Lagos. *Nigerian Med. J.* 2(3): 111-118, 1972.
35. *Infant Feeding and Health in Ibadan*. Social Policy Research, Ltd., London, 1973. (Summarized in S. Orwell and J. Murray. Infant feeding and health in Ibadan. *J. Trop. Ped.* 20: 206-219, 1974.)
36. Levitt, T. The morality (?) of advertising. *The International Advertiser* 11(4): 5-13, 1970.
37. Pierce, F. N. How foreign students see advertising. *J. Advertising Res.* 11(6): 26-29, 1971.
38. Pelto, G. H. Infant feeding practices in the Third World: Beliefs and motivations. In *Infant and Child Feeding*, edited by J. Bond et al., Academic Press, New York, 1981.
39. Almroth, S. The Marketing of Breast Milk Substitutes in the Yemen Arab Republic. Unpublished manuscript, 1980 (See letter to editor, *Salubritas* 4(2): 6, 1980.)

40. WHO/UNICEF Meeting on infant and young child feeding. *Who Chronicle* 33: 435-443, 1979.
41. Trombetta, W. L., and Wilson, T. L. Foreseeability of misuse and abnormal use of products by the consumer. *J. of Marketing* 39: 48-55, 1975.

APPENDIX

Questions Asked of St. Vincent Mothers

1. What was the first kind of milk you gave your baby (except for breast milk)?
2. How old was he the first time he ever got it?
3. How soon after he was born did he get breast milk—the first day, second day, third day, or what?
4. Did he start to suck on the dry breast before that?
5. What did he get to drink before the breast milk came? (If answer was "hot water": Did it have sugar or glucose in it?)
6. Did you give him the breast whenever he wanted it?
7. Both breasts each time or only one at a time?
8. Would he suck at the breast for a short time like five minutes or a long time like 15 minutes?
9. Did you have any difficulties or problems with breastfeeding? If so, what?
10. Did anyone advise you about breastfeeding your babies?
11. How long did you feed (Target child's name)?
12. Why did you stop then?
13. How many babies did you have before (Target baby)?
14. Did any of them die?
15. If so: How old was it? What was wrong with it? What year was it born in?
16. About how long did you breast feed the others?
17. Why did you stop them?
18. Did you ever give cow milk to (Target)? How about dried skim milk? Sweetened condensed milk? Evaporated?
19. How long did you keep using ——— (first brand of milk introduced)?
20. Then what did you use? Any other kinds of tin milk?
21. Why did you start with ———?
22. And then why did you change to ———?
23. What kind of milk is Target using now?
24. Does Target drink milk from a nursing bottle? If a cup: Is it a feeding cup or a regular cup? What age did you switch him from bottle to cup?
25. Have you ever heard about tin milk or baby food on the radio? If so: Which kinds did you hear about? What did they say about those milks? When you heard that, did it make you feel like you wanted to try it with your baby?
26. When (Target) was getting milk from both breast and bottle, how many times a day did he get the bottle? How many times the breast? How many times at night?
27. During those first ——— months (length of time Target got breast milk), would you say he got more breast milk or more bottle milk?
28. What size tin did you buy?
29. Was Target the only one using milk from those tins?
30. How long would each tin last?
31. When Target was only two or three months old, how many ounces of milk would he take from the nursing bottle?

32. Did you make up each bottle separately or several bottles' worth at one time? If several: How did you store it? If separate: When you used to make up a bottle with ——— ounces in it, how much dried milk would you put in? Was it the spoon from that same tin? Did you leave it heaping or scrape it level? How much sugar would you put in?
33. When Target was older, say about a year (or now if Target was still on a bottle), how many ounces would he take? How much powder, etc.?
34. Where did you get the water you would add to the milk? Did you boil it? And add it to a flask?
35. Did you have one bottle you would use with him?
36. Was it/were they glass or plastic?
37. How did you wash it? Did you always use soap? How did you get down inside it?
38. How did you take care of the nipple? If "scald it off": Where did you get the boiling hot water?
39. Did you ever put the bottle and the nipple in a pan over the fire to boil? If so: About how many times a week?
40. How did you learn about taking care of the bottle and washing it?
41. If the baby left some milk in the bottle what would you do with it?
42. When did Target first begin to eat food from the family pot—the same food you would fix for the rest of the family?
43. What kind of food did he get before then? Was porridge started before then? Which kind? If arrowroot "starch": Did you give the starch thick or thin? From a spoon or a bottle? About how many times a day? How many ounces would he take? What age did he stop getting starch?
44. Did you give him eggs before then? How about bread or biscuits? Did you start bananas young? How about fruit juice—orange and lime? (In each case the age of introduction was elicited.)
45. Did you give him glucose when he was young? Up to what age did you keep giving it regularly? Did you give it in his milk or in water? If in water: How many times a day? How many ounces would he get? Did you buy the small 8-ounce box or the big 1-pound size? How long would it last?
46. (If a mother had trouble recalling the time of introduction of foods:) So were most other foods like meat and vegetables and beans started about the time he began eating from the family pot?
47. How many times a day does he get milk now? How much each time?
48. Do you ever flavor the milk with Milo, Ovaltine, or chocolate? About how often?
49. Does he still get fruit juice? How often? How much?
50. Does he get plain water with sugar in it? How many times a day? How much?
51. Now I'm going to ask you how many times a week you give him different foods. I know that some weeks he gets them more and some weeks less, but just give me a number that's in the middle. About how many times a week does he get meat or chicken? How about fish? Eggs? Fruits like mangoes or oranges? Bananas? Breadfruit? How about vegetables like greens, cucumber, cabbage, and so on? How about beans or peas? Ground provisions (i.e. root crops)? Rice? Macaroni? Bread or biscuit—how many times a day? Does he still get porridge? What kind and how often?
52. Did you ever give him cod liver oil or tonic? If cod liver oil: What age did you start it? Does he still get it now? How often? A teaspoon each time? Did anyone advise you to use it?
53. Does he get bush tea? How often? Which kind? Since he was born? Why do you use that one?

54. When's the last time he had a cold? How long does it usually stay on him? How often does he get it—would you say once a month, once every two months, or what?
55. Do you know what causes him to catch a cold sometimes?
56. When he has a cold, does he eat less or the same amount?
57. What do you do to help stop the cold?
58. When's the last time he had diarrhea?
59. How long does it usually stay?
60. How often does he get it? If answer is seldom: How many times has he had it since he was born?
61. Do you know what causes him to get diarrhea sometimes?
62. What do you do to help check the diarrhea?
63. Do you stop giving him milk or food or keep feeding him the same way?
64. Has he ever been sick in the hospital? If yes: How old was he then? How long was he in? What was wrong? Was he very thin? Did his feet swell? Did he have diarrhea and vomiting?
65. Who helps take care of him when you're gone? If a sibling: How old is s/he?
66. How many days a week are you gone? How long each time?
67. Do you listen to the radio? About how many times a week?
68. Do you read the newspaper? Which one? How often?
69. I'd just like *your* opinion of what is the best feed for a baby? If not a milk: What is the best kind of milk? If other than breast milk: Is that as good as breast milk, better than breast milk, or not as good?
70. Would a baby be healthy if its mother gave it only breast milk and nothing else for the first four months? If no: Why not?
71. Do you think that ——— (brand of tin milk used by mother with Target) and other tin milks act only as a food for a child, or do they act as a food and a tonic or a food and a medicine?
72. For each picture tell me if you've ever seen it in the shop, or ever bought it before. (When one has been bought:) Did you buy it for Target? (Mother is shown photographs of 45 infant foods available in Kingstown.)
73. (The target child is weighed and its height is measured.)

Direct reprint requests to:

Ted Greiner
Division of Nutritional Sciences
Savage Hall
Cornell University
Ithaca, New York 14853

 