

PERSONAL PREFERENCES AND ETHNIC VARIATIONS AMONG ANGLO AND HISPANIC BREAST AND BOTTLE FEEDERS

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Abstract—The preferences of Spanish-speaking Hispanics and English-speaking Anglos for breast and bottle feeding were evaluated using marketing research techniques. Preliminary interviews with 55 mothers conducted within the first 48 hr post-partum elicited a list of verbatim responses regarding the positive and negative aspects of both feeding methods. An additional 195 women rank-ordered the most frequently mentioned statements in terms of their preference for each. Socio-demographic data on the mothers were analyzed with chi-square analysis and discriminant analysis. Multidimensional scaling was used to assess the preferred characteristics of breast and bottle feeding. Results indicated that most mothers prefer a method of infant feeding that allows the mother to be 'closer to her baby' and allows the baby to 'grow up healthier.' Bottle feeders perceived bottle feeding to be superior because it insured that baby would be 'full and satisfied' and would 'get all the vitamins and nutrients it needed,' especially when 'mother was not eating right' or was 'on medications.' Analysis of cultural preference patterns revealed that there exists a strong culture pattern or preference for breast feeding and its characteristics among Anglos. In contrast, the Hispanics show no clear preference for either breast or bottle feeding.

Key words—breast feeding, Hispanics, intracultural variation

Although the rate of breast feeding in the United States has increased during the last decade, such trends have not been paralleled among minority ethnic groups. Many women still choose to bottle feed despite the reported advantages of breast feeding. What are the characteristics of breast and bottle feeding that influence women to choose one method over the other? While many previous reports have focused on the maternal socio-demographic characteristics associated with the choice of a feeding method, few have focused on the personal preferences and ethnic variations affecting this choice. This paper provides information regarding the personal preferences and ethnic variations among women from two cultural-linguistic groups residing in southern California: Spanish-speaking Hispanics and English-speaking Anglos. Unlike previous studies, marketing research techniques are used to analyse mothers' preferences for the characteristics of each feeding method.

While breast feeding is still on the decline in Third World nations, this trend has begun to reverse in industrialized nations. National samples in the United States estimate that approx. 25–28.0% of mothers initiated breast feeding (either exclusively or supplemented with a bottle) in 1973 and 35–46.6% initiated breast feeding in 1978 [1, 21]. Along the U.S.–Mexican border, Anglos follow the national trend with breast feeding increasing from 31.1% (1971–1975) to 47.1% (1976–1979), but there has not been a similar increase among Hispanics [3]. In fact, incidence among Hispanics dropped slightly: 25.7% (1971–1975) and 21.1% (1976–1979).

Much evidence has accumulated regarding the advantages of breast milk over substitutes. The anti-

infective properties of breastmilk, IgG, IgM, IgA, macrophages, lymphocytes and lactoferrin, inhibit bacterial and viral growth protecting infants from infection, especially gastroenteritis [4, 5]. Breast feeding (suckling) also provides a natural form of birth control, inhibiting ovulation when infants are fed frequently [6–8]. Child-spacing effects and anti-infective properties make breast feeding especially appropriate in underdeveloped countries. Breast feeding may also be less expensive than formulas [9]. In developed countries, where more effective birth control methods are available, breast feeding not only offers immunological protection but additionally, may protect children from obesity [4, 10].

Given the advantages of breast feeding, why do some women still choose to bottle feed? The international decline in breast feeding has been attributed, in part, to social change, i.e. urbanization and aspirations toward Western life styles. Social and familial structural changes resulting in an increasing proportion of working women [11] and less social support for mothers [12] have been identified as correlates of breast feeding behavior (especially early cessation of breast feeding). In addition the marketing and advertising practices of the infant formula/food industry have been implicated both directly and indirectly in the decline of breast feeding.

Although the cause and effect relationship between marketing practices and infant feeding behavior is unclear, during the 1970s considerable controversy existed regarding the Third World marketing practices of the infant formula/food industry. In 1979 a WHO/UNICEF conference convened to discuss infant and young child feeding practices and recommended that: more attention be paid to insuring

better health of women and adolescent girls; educational programs include nutrition information about breast feeding; breast feeding be encouraged and supported; and an international marketing code for infant foods prohibit sales promotions to the public [13]. In spite of the single negative vote (118:1) by the United States delegation at the WHO/UNICEF ratification meeting, similar recommendations regarding breast feeding have been made by health professionals in the United States concerned about promoting the health and well being of mothers and infants [4, 14, 15]. Advertising within the United States even appears to have changed course. It is now aimed at health professionals rather than mothers, advocating formula "when you can't breast feed..."

Inquiries into the typical reasons mothers state for either breast or bottle feeding indicate that mothers select breast feeding because it is best for the baby, while those who chose bottle feeding do so for other reasons, e.g. because they are too embarrassed to breast feed. Unfortunately, most researchers have simply recorded the frequencies of responses, to open-ended questions, or recorded whether or not women agree or disagree to a series of statements regarding breast feeding. By simply recording the frequencies of responses, one introduces memory bias (people 'recall' less than they 'recognize' and there are individual variations in short versus long lists). By using a standardized set of statements the problem of obtaining inconsistent or noncomparable data across subjects can be avoided. However, if the list of items is researcher generated it is subject to personal biases. A preferable approach is to combine both approaches.

In this report techniques from cognitive anthropology [16] and marketing research [17] are used to explore the preferences of Anglo and Hispanic mothers for breast and bottle feeding. The focus is on the reasons women give during the post-partum period for either breast or bottle feeding. Whereas many studies simply report the frequency of responses for each answer, those initial responses were used as a starting point to define a 'domain' of feeding method characteristics and additional women were interviewed regarding the relative desirability of each characteristic. Although the secular trend is clear, that breast feeding is increasing among white women, the socio-demographic characteristics associated with that choice tend to vary across different samples and little attention has been paid to minority ethnic groups. Gaining an understanding of mothers' preferences in different ethnic groups is important in order to 'market' breast feeding successfully and, perhaps more importantly, to support mothers' in their choice of a feeding method.

METHODS

Setting

Mothers were interviewed at the University of California Irvine Medical Center (UCIMC). UCIMC is located in southern California approx. 100 miles north of the U.S.-Mexican border in the city of Orange, in Orange County. Although the 1980 Census reports 15% of the population of Orange

County to be of Hispanic/Spanish origin, much of the Hispanic population is concentrated in northern Orange County where the hospital is located. In order to estimate the proportion of births to each ethnic group and the incidence of breast feeding during the study period, the UCIMC obstetrics-delivery birth log was randomly sampled three days per month July-November, 1981. Ethnicity/nationality, language and feeding method were recorded. Estimates based on these archival records [18] showed that approx. 75% of all births at UCIMC were to Hispanic women and 18% to Caucasian or Anglo women (refer to Table 1). Approximately 56% of the Hispanics and 59% of the Anglo mothers stated (at the time of delivery) their intention to breast feed. Also, the percentage of Hispanics initiating breast feeding stays relatively constant even when only monolingual Spanish-speakers were considered (54%).

Procedure

Interviews were conducted in two phases [19]. Women were sampled according to their feeding method and cultural-linguistic group. Throughout the study each of the four feeding method/ethnic group categories was sampled equally. Mothers were interviewed within 48 hr post-partum and classified as breast or bottle feeders according to the method they were using at the time of the interview. In order to maximize the differences between breast and bottle feeders, only those women that were breast or bottle feeding exclusively were included. Cultural-linguistic group was determined by a woman's stated ethnicity and her 'language.' In order to be included in the study, Spanish-speakers had to know Spanish well enough to be interviewed in Spanish.

During the first phase of interviewing, 55 women (Anglo and Hispanic breast and bottle feeders with an approximately equal number in each category) were asked to describe breast and bottle feeding. Open-ended questions focused on eliciting lists of positive and negative aspects of both feeding methods from each woman. This 'free recall listing' technique was used to establish a 'domain' of salient characteristics. (The most frequently mentioned items for the English-speaking Anglos and the Spanish-speaking Hispanics appear in approximate order of frequency, from most to least, in Appendices A and B.) The 18 most frequently mentioned statements from both lists were chosen for further study. These items appear in Table 2 changed to 'neutral' statements of the form, "A way to feed your baby that..." The list was balanced to include an equal number of positive and

Table 1. Local estimates of breast feeding incidence by ethnic group*

Feeding method	Hispanic	Anglo	Other	Total
Breast	121 (56.3%)	30 (58.5%)	6 (29.6%)	157 (54.7%)
Bottle	81 (37.7%)	20 (39.2%)	14 (66.7%)	115 (40.1%)
Not stated or missing	13 (6.0%)	1 (2.0%)	1 (4.7%)	15 (5.2%)
Total	215 (74.9%)	51 (17.8%)	21 (7.3%)	287 (100%)

*The birth log was randomly sampled three days per month for the period July-November 1981, and ethnicity/nationality, language and feeding method were recorded.

Table 2. Feeding method characteristics

1.	A way that's convenient because you don't have to prepare bottles.
2.	A way that allows you to feel closer to your baby.
3.	A cheaper and more economical way.
4.	A way that is convenient because it allows you to feed your baby anywhere, without embarrassment.
5.	A way so your baby will grow-up healthier.
6.	A way that won't hurt your baby even when you are angry or upset.
7.	A way that will allow you to go to work.
8.	A way that will provide all the vitamins and nutrients your baby needs.
9.	A way that protects your baby from getting sick as often.
10.	A way so that your baby feels full and satisfied.
11.	A way to feed your baby even when you are sick or taking medications.
12.	With a bottle.
13.	Breast feed.
14.	A way that doesn't tie you down, so you are free to do more things.
15.	A way that your husband (or boyfriend) likes, too.
16.	A way to feed your baby with milk that's richer and better.
17.	A way that allows you to lose weight and regain your figure.
18.	A way so that your breasts won't sag.
19.	A way that is nutritious for your baby, even if you are not eating right.
20.	A way so that others can help feed your baby.

negative statements. 'Breast feeding' and 'bottle feeding' were included to aid in the interpretation of subsequent analyses.

During the second phase of interviewing, formal data collection tasks were used to explore systematically the relative desirability of feeding method attributes. Data collection tasks were designed using information from the preliminary interviews. An additional 195 women were asked to rank-order the 20 statements in terms of their preference for each. Women were asked to consider which characteristics they would most like their feeding method to have. Respondents were asked to rank the statements from 1 to 20 in terms of their importance, from the most to the least preferred characteristics. Women who could not or did not want to read ranked a subset of the 20 items orally. A balanced, incomplete block, paired-comparison design was used to minimize the number of paired-comparisons and to obtain a complete rank order scale for 13 items for each women [20, 21]. (The first 13 items in Table 4 were used.) Those that ranked 13 items did so, orally, by ranking items in subsets of 3 a time (λ one design).

Additionally, socio-demographic and other variables were collected on the mother. Such information included: ethnicity, education, age, number of children, religion, marital status, occupational status, health related behaviors (smoking, drinking, prenatal care) and breast feeding experience. Mother's birth place, length of residency in the United States, and the dominant language spoken in the home were collected to provide more information on the ethnic classification.

Analysis

Socio-demographic data were analysed using analysis of variance, contingency tables, and discriminant analysis [22]. Two-way analysis of variance was used to test for differences and interactions between ethnicity and feeding method on interval scale variables (e.g. age, education and number of children). Contingency table analysis (χ^2) was used to analyse the relationship between feeding method and nominal scale variables (e.g. marital status, religion, occupational status and prior experience with breast feeding) while controlling for ethnicity. Discriminant

analysis was used to examine the simultaneous predictive power of the socio-demographic characteristics on choice of a feeding method [23].

The relative desirability of the feeding method characteristics was estimated from the rank-order preference data by two methods. Because preference data can be somewhat idiosyncratic, i.e. there is not always high concordance about what is desirable, averaging ranks across subjects can sometimes lead to a nonsensical answer. If the concordance among respondents is low, an average rank-order is not a good representation of the data. For example, if subject *i* ranked stimuli A,B,C,D and subject *j* ranked the same stimuli D,C,B,A, averaging the two orders would conclude that all items were equally preferred. A different way to analyse such low concordance data, would be to calculate the proportion of times that each statement was ranked in first place, or alternatively, the proportion of times that each statement was preferred over the current choice of a feeding method. Thus in this study, the relative desirability of each characteristic was assessed by calculating both the average preference ranking assigned to each item and the proportion of women that ranked each higher than their current choice. Agreement or variability among subjects was measured with Kendall's coefficient of concordance. Because some of the respondents ranked only 13 items, average rank-orders and Kendall's coefficient of concordances were calculated for each group across all respondents on 13 items and across literate respondents on all 20 items.

In order to determine which characteristics were associated with each feeding method, the rank-order preference data were analysed descriptively with multidimensional scaling [17, 24, 24]. Given the four preference profile matrices (one for each ethnic group/feeding method combination) a model can be developed depicting the perception of feeding method characteristics for each group. A quantitative and visual representation of the mothers' perceptions of the similarity among characteristics can be obtained with multidimensional scaling (MDS). MDS provides a visual representation—a 'cognitive map'—of the perceived relationships or similarity among stimuli. Items with similar patterns of preference across

women, i.e. those items that are liked and disliked by the same people, are represented as being 'closer together' and those with dissimilar patterns of preference are 'further apart' in the spatial model. The inclusion of 'breast feeding' and 'bottle feeding' aids in the interpretation and allows us to see which characteristics are associated with each of these feeding methods. Similarity between feeding method characteristics across women was measured with Pearson correlation coefficient and represented with MDS.

To determine the similarity in perceptions among the four ethnicity/feeding groups, the item by item correlation matrices were compared with the quadratic assignment procedure [26, 27]. The quadratic assignment procedure provides a nonparametric, inferential test of the similarity between two matrices by testing the null hypothesis that the observed correspondence between two matrices is the result of random matching. The observed correspondence between two matrices is compared to the distribution of possible ways the two matrices could have matched. The probability of observing such an occurrence can be estimated using the theoretical moments of the permutation distribution and conducting a normal deviate test (where Z scores greater than 1.96 usually indicate probability levels less than 0.05). Groups that were not statistically different were aggregated, i.e. new item by item correlation matrices were calculated across the larger group of subjects, and an MDS analysis was conducted.

RESULTS

Socio-demographic characteristics

We begin by describing the socio-demographic characteristics of our sample and identify those variables associated with breast feeding. Included are analyses of lifestyle or health behaviors that might influence the choice of a feeding method. The sample consisted of 195 women: 50 Anglo breast feeders, 48 Anglo bottle feeders, 46 Hispanic breast feeders and 51 Hispanic bottle feeders. Ethnicity was determined by self-report and cross-verified with place of birth, language spoken at home and length of residency in the U.S. All of the Anglos declared their ethnicity as

'Anglo or white,' 95% were born in the U.S. (none were born in Latin American countries) and 98% reported English to be the dominant language at home (2% reported Spanish). All of the Anglo mothers with previous children reported English as the primary language spoken with their children. All of the 'Hispanics' reported 'Mexican-American or Mexican' as their ethnicity; 93% were born in Mexico, 5% in Central America and 2% in the U.S. All of the Hispanics reported Spanish as the primary language at home, although 2% of those with previous children reported speaking both Spanish and English to their children. Hispanics averaged 4.3 (SD = 3.9) years in the U.S.

Anglo and Hispanic respondents had significantly different ($P \leq 0.05$) socio-demographic profiles (Table 3). Anglo mothers were more educated than the Hispanic mothers (11.7 vs 6.0 years, $P \leq 0.001$), slightly younger (22.8 vs 25.5 yr, $P \leq 0.002$), had fewer children (1.8 vs 2.8, $P \leq 0.01$) and were more likely to be primiparous (53% vs 32%). Although no differences were detected between breast and bottle feeders when aggregated across ethnicity, separate analyses of Anglos and Hispanics revealed that socio-demographic variables did differentiate Anglo breast and bottle feeders. A discriminant analysis indicated that increased years of education, living with the father-of-the-child, and being primiparous were associated with breast feeding. These variables correctly classified Anglo women as either a breast or bottle feeder 22% better than 'chance' (PRE = 0.22; $P \leq 0.0001$) [28]. Among primiparous Anglos ($n = 52$), living with the child's father was the single most important variable (37% better than chance, $P \leq 0.0002$). Among multiparous Anglos ($n = 46$), years of education was the strongest predictor of feeding method (PRE = 0.51); education and maternal age correctly predicted current feeding method 33% better than chance ($P \leq 0.0002$).

In contrast, years of education, living with the father-of-the-child, employment status, maternal age, number of children and receiving food stamps or WIC (FEDAID) could not discriminate Hispanic breast and bottle feeders very well. Inclusion of length of residency improved predictability slightly. Length-of-residency, both in current domicile and in the United States, and years of education classified women 8.4%

Table 3. Sample demographics

	Education	Age	Living children	Primi (%)	Father of child (%)	Married (%)	Currently employed (%)	Federal aid* (%)
Anglo sample								
Breast fed ($n = 50$)	12.3 ± 1.6†	23.1 ± 5.9	1.8 ± 1.1	62	80	60	60	54
Bottle fed ($n = 48$)	11.2 ± 1.4	22.5 ± 4.7	1.9 ± 1.0	44	63	52	50	46
All Anglos ($n = 98$)	11.7	22.8	1.8	53	71	56	55	40
Hispanic sample								
Breast fed ($n = 46$)	6.1 ± 3.7	25.6 ± 6.6	2.8 ± 2.1	37	83	70	50	46
Bottle fed ($n = 51$)	5.8 ± 2.8	25.3 ± 6.6	2.8 ± 2.2	28	87	65	55	54
All Hispanics ($n = 97$)	6.0	25.5	2.8	32	87	67	53	36

*Food stamps and/or WIC.

†Interval scale variables are expressed with the mean ± one standard deviation.

Table 4. Health behaviors

	Percentage of women responding affirmatively	
	Anglo	Hispanic
Do you:		
Smoke*	52.0	14.4
Drink liquor or alcohol*	30.6	9.3
Drink tea*	70.4	49.5
Take vitamins or iron*	89.8	77.3
Take antibiotics or medications*	41.0	19.4
Drink herbal tea*	34.7	50.5
Drink cola or coffee	81.6	85.6
Use marijuana, etc.	9.0†	0.0
Did you:		
Have prenatal care	85.7	89.6
Plan your pregnancy	38.8	47.4
Attend birth classes	21.4	11.3
Do you plan to:		
Use oral contraceptives	47.7‡	55.0§

*P < 0.05.

†Nine women reported marijuana usage and one reported heroin/methadone.

‡47.7% of the 65 women that plan to use contraceptives.

§55.0% of the 60 women that plan to use contraceptives.

better than chance (PRE = 0.084). Residency in the United States and residency in current domicile have different 'effects' on the choice of a feeding method. Greater length at current residence was correlated with a tendency to breast feed ($r = +0.14$) and longer residency in the United States was correlated with a tendency to bottle feed ($r = -0.13$). Length of residency in current house, residency in the U.S. and maternal education predicted method among primiparous Hispanics 23% better than chance ($n = 30$) and 3% better than chance among multiparous ($P \leq 0.627$, $n = 60$).

While Anglo and Hispanic mothers tended to be different ($P \leq 0.05$) on most 'health behaviors' (Table 4), few behaviors differentiated breast and bottle feeders. Drinking caffeine products, receiving prenatal care and attending birth classes were the only health behaviors on which breast and bottle feeders differed. However, these variables only differentiated Anglo breast and bottle feeders. Anglo breast feeders were more likely than Anglo bottle feeders to receive prenatal care, more likely to not drink caffeine products, and more likely to attend birth classes. Together, these three variables correctly classified Anglo women 16% better than chance ($P \leq 0.001$).

Mothers' current choice of feeding method was associated with whether or not she was breast fed as a child, and how she fed her last child but these associations tended to be weaker or nonexistent among the Hispanics. Anglo mothers were more likely to choose breast feeding if she reported being breast fed herself (PRE = 0.048, $P \leq 0.02$). Among both Anglo and Hispanic women with prior children,

the method that a women chose to feed her last child was strongly and positively related to her current choice of feeding method. Almost all multiparous Anglos chose the same method that they used with their last child (PRE = 0.638, $P \leq 0.0001$). Hispanic women were 5.4 times as likely to choose the same method again (PRE = 0.155, $P = 0.004$).

Preferences for different feeding method characteristics

Phase I. Open-ended interviews revealed that work, health, modesty, economics, closeness and preparing bottles were all highly salient characteristics. Sometimes similar adjectives would be used to describe breast or bottle feeding, but with different meanings. To bottle feeders 'convenience' meant that you can feed your baby at anytime. anywhere without the embarrassment of exposing yourself while breast feeders meant that they did not have to prepare bottles, especially in the middle of the night. Breast feeding mothers said that breast feeding assists with weight loss, while bottle feeding mothers said that you can eat less when your baby is bottle fed. Safety was mentioned by breast feeders because breast milk does not contain chemicals. Bottle feeding mothers said that the bottle is safer because you can use it even when you are sick, on medications or not eating right.

While many items were mentioned by both Anglos and Hispanics, there were some differences. Concepts appearing on the Spanish lists that did not appear on English were the beliefs that: (1) emotions from the mother are transmitted to the baby via breast milk (especially anger) and that anger can do damage to the baby, and (2) that the baby 'eats a part of' the mother, and thus, women may 'waste themselves' (deteriorate) and age faster by breast feeding.

Phase II. The most salient characteristics identified during phase one interviews (Table 2) were used in subsequent data collection tasks to explore women's preferences regarding each. There was high agreement among English breast feeders and moderate agreement within each of the other three groups about the relative desirability of feeding method characteristics (Table 5). Concordances within each primi- and multiparous subcategory of each feeding method/ethnic group were equivalent to the overall concordance for that group. The desirability of each descriptive statement was estimated first by averaging ranks across respondents in each group. To do this, rank-orders of 13 items were rescaled to a mean and standard deviation equal to that of 20 item rank-orders and the ranks were averaged across all non-missing observations. The averaged scales were then restandardized to facilitate comparisons between groups (Table 6).

Table 5. Among respondents' preferences concordance

	Anglo		Hispanic	
	Breast	Bottle	Breast	Bottle
13 items	$W = 0.62$ $\rho = 0.61$ $n = 50$	$W = 0.36$ $\rho = 0.35$ $n = 48$	$W = 0.30$ $\rho = 0.29$ $n = 46$	$W = 0.28$ $\rho = 0.26$ $n = 51$
20 items	$W = 0.50$ $\rho = 0.58$ $n = 50$	$W = 0.34$ $\rho = 0.32$ $n = 48$	$W = 0.33$ $\rho = 0.31$ $n^* = 29$	$W = 0.30$ $\rho = 0.27$ $n^* = 27$

*Literates only.

Table 6. Average preference rankings

Anglo		Hispanic	
Breast	Bottle	Breast	Bottle
18.98 5—Grow-up healthier	21.09 8—Vitamins/nutrients	21.01 5—Grow-up healthier	21.73 2—Closer to baby
18.36 8—Vitamins/nutrients	19.11 5—Grow-up healthier	18.46 2—Closer to baby	18.78 8—Vitamins/nutrients
18.28 2—Closer to baby	17.82 2—Closer to baby	17.88 10—Full and satisfied	18.53 5—Grow-up healthier
17.92 13—Breast feed	17.61 10—Full and satisfied	17.18 9—Protects from sick	16.72 9—Protects from sick
17.12 14—Not tied down	16.36 9—Protects from sick	15.95 8—Vitamins/nutrients	15.91 10—Full and satisfied
16.00 9—Protects from sick	15.63 12—Bottle feed	15.03 13—Breast feed	13.83 19—Not eating right*
15.56 16—Richer milk	13.81 19—Not eating right	14.65 16—Richer milk*	13.35 12—Bottle feed
14.71 10—Full and satisfied	12.91 11—Sick or on meds	12.52 15—Husband*	11.71 4—Feed anywhere
8.82 15—Husband	12.72 16—Richer milk	10.70 3—Cheaper	11.58 6—Angry or upset
8.79 1—No bottles	8.85 6—Angry or upset	10.57 6—Angry or upset	10.25 16—Richer milk*
8.79 3—Cheaper	7.85 7—Go to work	9.90 1—No bottles	10.10 15—Husband*
7.63 17—Lose weight	7.49 4—Feed anywhere	8.57 4—Feed anywhere	8.70 20—Others can help*
7.24 6—Angry or upset	6.88 20—Others can help	8.23 19—Not eating right*	8.14 3—Cheaper
6.93 11—Sick or on meds	6.37 15—Husband	7.97 7—Go to work	8.02 11—Sick or on meds
6.67 19—Not eating right	5.30 14—Not tied down	5.59 11—Sick or on meds	7.65 7—Go to work
5.89 4—Feed anywhere	5.19 17—Lose weight	5.68 18—Breasts sag*	5.07 14—Not tied down*
4.06 7—Go to work	5.00 13—Breast feed	2.99 14—Not tied down*	4.11 1—No bottles
3.10 12—Bottle feed	4.50 3—Cheaper	2.88 17—Lose weight*	3.20 13—Breast feed
2.87 18—Breasts sag	3.90 1—No bottles	2.45 20—Others can help*	1.63 18—Breasts sag*
2.27 20—Others can help	1.68 18—Breasts sag	1.47 12—Bottle feed	0.93 17—Lose weight*

*Averaged across literates.

Because aggregate scales are unreliable when concordance is low, desirability was also estimated by calculating the proportion of women that ranked each characteristic higher than her current method. The most desirable characteristics were items numbered 2, 5, 8, 9 and 10 in Table 2. With the exception of Anglo breast feeders, the majority of women (> 50%) considered those characteristics more desirable than their current feeding method. Among the Anglo breast feeders, few of the characteristics were considered more desirable than breast feeding. Only a third of the Anglo breast feeders ranked statements 2, 5 and 8 higher than their current method.

Breast feeding seemed to be the preferred method; more women ranked breast feeding in front of bottle feeding than vice versa. Among all Anglos, 6% of breast feeders ranked bottle feeding in front of breast feeding, while 19% of bottle feeders ranked feeding in front of bottle feeding. Among Hispanics, 6% of breast feeders ranked bottle feeding higher than breast feeding and 25% of bottle feeders ranked breast feeding higher. To discover which statements

were associated with breast and bottle feeding, similarity among statements was represented with multi-dimensional scaling (MDS). Since the quadratic assignment analysis of inter-item similarity did not reveal any significant differences between the four groups nor were the solutions different across different sets of items, a single MDS solution is presented for ease of illustration. Similarity was calculated between all 20 items across all 195 respondents on non-missing data (i.e. across all 195 respondents for items 1 to 13 and across literate respondents for items 14 to 20). The two-dimensional MDS representation provided an adequate fit to the data. Stress, an inverse measure of goodness-of-fit, was 0.09 in three dimensions, 0.16 in two dimensions and 0.35 in one dimension.

The MDS results (Fig. 1) illustrate, visually, the interrelationships among the 20 statements. The statements pertaining to bottle feeding appear on the upper left-hand side of the diagram and statements associated with or similar to breast feeding appear on the right side of the diagram. For example, bottle

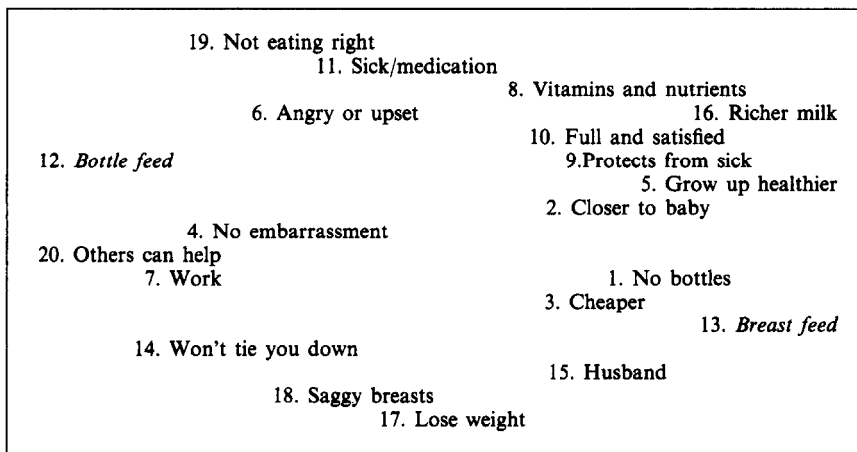


Fig. 1. Similarity among feeding methods and their characteristics.

feeding is perceived as a method that "won't hurt your baby even when you are angry or upset;" it is appropriate when "you are sick or on medications;" and it is nutritious, "even if you are not eating right." With breast feeding, you do not have to prepare bottles, it is cheaper and allows you to feel closer to your baby.

DISCUSSION

Although breast feeders can be described as younger, better educated and with fewer children (more likely to be primiparous) than their bottle feeding counterparts, such a description does not necessarily differentiate the two groups of women. In this study, Hispanic women had significantly lower education and more children than the Anglo women and yet estimates of the incidence of breast feeding obtained from archival records indicated that similar proportions of women (59% Anglo and 56% Hispanic) initiated breast feeding. While the rate of breast feeding among the Anglos is concordant with other reports, the proportion of Hispanics initiating breast feeding is quite high and was unexpected considering the very different socio-demographic profiles of the Anglo and Hispanic women.

Cultural group (ethnicity) and prior experience (parity) are important variables in determining factors associated with the choice of an infant feeding method. Maternal socio-demographic characteristics do not differentiate breast and bottle feeders if ethnicity is ignored. When Anglos and Hispanics are considered separately, Anglo breast and bottle feeders can be predicted fairly well with socio-demographic characteristics while Hispanics are not clearly differentiated. Furthermore, demographic variables, that are predictive of a feeding method among Anglos, are not predictive among Hispanics. For Anglos living with the father-of-the-child, parity and education were important variables. Living with the father-of-the-child was the strongest predictor of feeding method for both Anglo primi- and multiparas. Among the Hispanics, none of the above variables could differentiate breast and bottle feeders, although residency (in the United States and in current domicile) and years of education were predictive of method in primiparas and not in multiparas.

Even though maternal demographic variables did not have clear and consistent correlation with the choice of a feeding method, behavior of multiparous mothers seemed to be quite predictable based on prior experience. A women's prior infant feeding behavior was predictive of her current choice. Such an association can result from a correlation between past and present behavior or from cognitive consistency. The latter effect can possibly bias self-reported behavior because of a 'desire' to maintain a logical consistency between what is reasonable to do now and thus what must have been reasonable to do in the past [29, 30]. However, recall of which method was used on a last child is probably less sensitive to bias than are estimates of how long a particular method was used.

Examination of the feeding methods themselves provides insight into those attributes that are preferred by different groups of women. The results of

the preliminary, open-ended interviews were consistent with previous research. Other researchers [31] have found that women described breast feeding as better for the baby, more natural, more satisfying for the mother, cheaper, convenient (mothers don't have to prepare food), instinctive, hygienic, protective against infections, to cause a faster involution of the uterus. Bottle feeders reported that they were embarrassed to breast feed, bottle feeding was convenient (since others could help), their breasts were too small, they wanted a method their husband could share, they didn't want previous children to be jealous and many reported that they had previously failed at breast feeding or that they had no inclination or had medical reasons not to breast feed.

However, systematic analysis of the most frequently mentioned items revealed that similar characteristics are preferred by both breast and bottle feeders. Women want a feeding method that allows their babies to grow up healthier, a way that protects babies from getting sick, a way that allows them to feel closer to their baby, a way that provides all of the vitamins and nutrients that baby needs, and for baby to feel full and satisfied.

How is it that BOTH breast and bottle feeders can prefer the same characteristics and yet choose different feeding methods? The answer to this is suggested by the MDS results. The MDS results show which characteristics are perceived as similar to each feeding method. Breast feeding is a way that allows you to be closer to your baby, it protects baby from being sick, baby will grow-up healthier, it is cheaper and economical, and it is convenient because you don't have to prepare bottles. Bottle feeding, on the other hand, is perceived as providing complete nutrition when mother is not eating right or on medications. It allows you to feed your baby when you are angry or upset, so that you (the breast milk) will not 'hurt' your baby. It guarantees that your baby will get all the vitamins and nutrients it needs even when you are on a diet, not eating right or on medications. Bottle feeders are doing what they think is best for their babies, even though breast feeding is actually preferred by most mothers.

These findings raise further questions: such as, are bottle feeders more likely to be on medications, to not eat right or diet, and/or to be sick or angry? Analysis of self-reported health behaviors did not reveal significant differences between breast and bottle feeders in rates of smoking, drinking (alcohol), drugs/medications or vitamin/iron for either Anglos or Hispanics. Anglo bottle feeders were more likely to drink caffeinated beverages, to not have had prenatal care and to not have attended birth classes. Unfortunately we did not specifically ask if women were not eating right, dieting, sick or angry or if they thought that they would be likely to do any of those things in the future.

Mothers' beliefs about their lifestyles and health behaviors may be the most important factors in determining which method to use. Although research shows breast feeding to be superior, a mother who believes that she does not eat well or that she may not be able to provide the nutrients, etc. that an infant needs, would certainly be more likely to bottle feed. Similarly, cultural beliefs about the transmission of

strong emotions through breast milk (and possibly hurting the infant) would cause a mother to be very cautious about choosing breast feeding. Assuming that bottle feeders and breast feeders are equally concerned or cautious in the choice of a method, bottle feeders may be less sure of their 'physical ability' to do so.

The fact that socio-demographic variables are associated with the choice of a feeding method among the Anglos and not the Hispanics alludes to the existence of different underlying culture patterns regarding infant feeding methods. However, this is neither necessary nor sufficient evidence that such a difference exists. The strongest evidence for the existence of different culture patterns can be seen when we examine the degree of consensus or variability in preferences within each group. Recent work on the meaning and interpretation of intracultural variation has shown that high concordance among informants is synonymous with a high degree of shared knowledge [32-35].

Neither the Hispanic breast or bottle feeders showed evidence of a strong, coherent value system regarding the desirability of feeding method characteristics. Concordance was low among both groups. Among the Anglos, however, the high degree of agreement among the breast feeders and the relatively low agreement among the bottle feeders suggests that there is a single belief system among the Anglo women [36], one which the breast feeders know best.

High concordance among the Anglo breast feeders may be indicative of a 'culture pattern,' a true belief system regarding infant feeding; or it may be indicative of a resurgence of a cultural system. (One can only speculate on what the results would have been, had the study been done in 1957). An alternative explanation is that the high concordance among the Anglo breast feeders may be an artifact of a 'recent decision' to breast feed; that because it is easier to remember the reasons for making the decision, facility in articulation results in higher concordance. However, inter-respondent agreement remains high among Anglo breast feeders regardless if one considers the subgroups of primiparas or multiparas; groups that are probably the most and the least likely, respectively, to have made a 'recent' choice of a feeding method.

These findings are in agreement with the overall secular trend. Among the Anglos there exists a clear 'cultural preference' for breast feeding. The incidence of breast feeding among Anglos will probably continue to rise as more primi- and multiparous mothers choose breast feeding. The Hispanics, however, show no clear preference pattern; a pattern which may be indicative or characteristic of a cultural group in transition. Additional studies need to be undertaken to determine if the lack of a cultural preference pattern among the Hispanics is associated with transitional or migrating cultural groups.

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 4. Breast feeding is healthier/better for your baby.
 5. Breast feeding is cheaper and more economical.
 6. Bottle feeders are less tied down; they can go more places and do more things; for people who can't be at home; breast feeders have to stay home a lot.
 7. Breast feeding is easier and more convenient.
 8. Bottle feeding is better if you work or want to go back to work; pumping your breasts is difficult.
 9. There is no soreness and pain with bottle feeding.
 10. Breast fed babies don't seem to get sick or spit up like formula fed babies.
 11. Breast feeding is natural.
 12. Bottle feeding is safer, in case you get sick; or, if you get sick and can't breast feed.
 13. Bottle feeding is more convenient.
 14. Mother's milk protects the baby; the baby gets natural immunities from mother's milk.
 15. Mother's milk is the one, perfect formula made for babies.
 16. Bottle feeding is better if the mother is taking medication (methadone).
 17. With bottle feeding, you don't have to worry about emotions interfering and your milk no coming or drying up.
 18. Formula has as many vitamins as mother's milk.
 19. Formulas have chemicals in them and sometimes these are dangerous to the baby.
 20. Bottles aren't good for baby's mouth; they don't provide the necessary sucking.
 21. You lose weight faster and get into shape faster when you breast feed.
 22. Breast feeding is more nutritious.
 23. You get stomach cramps when you breast feed.
 24. You have to be careful about what you wear if you breast feed; you leak and stain your clothes.
 25. You have to be careful about what you eat; you have to eat the right things and eat more if you breast feed.
 26. Breast feeding offends some people.

APPENDIX B: HISPANIC/SPANISH LIST

1. Because many people work, they cannot take care of the baby. Bottle feeding is beneficial for women when they are working.
2. It is less risky to bottle feed than breast feed, as with women who get angry easily. If the mother is angry, this will affect the baby.
3. Breast fed babies grow up to be healthier.
4. I would not like to be seen breast feeding around men or in a public place.
5. One does not have to spend money in buying milk, breast feeding is cheaper/less expensive.
6. I feel I am closer to my baby. I love my baby because I spend more time with him/her.
7. With breast feeding, you don't have to get up in the middle of the night and prepare bottles, breast feeding mothers don't have to clean bottles or prepare and store milk.
8. Mother's milk is richer/better than formula.
9. Many women don't want their breasts to sag.
10. You can let anyone feed the baby, you don't have to be there all the time; one is free to do more things.
11. Breast fed babies get sick less, bottles get dirtier and many women do not clean them well. Maternal milk protects the baby during the first few months.
12. A woman tends to age faster or get wasted breast feeding.
13. With breast feeding, the baby receives the vitamins and nutrients that it needs.
14. If the mother is sick, bottle feeding is better.
15. Bottle feeding is practical/easier; I can carry around a bottle easier.

APPENDIX A: ANGLO/ENGLISH LIST

1. Many women are embarrassed to breast feed in public or in front of strangers. Bottle feeding can be done anytime, anywhere.
2. When breast feeding you don't have to wash, sterilize of fix bottles.
3. Breast feeding allows you to feel close to your baby.

16. Bottle milk makes my baby feel full and more satisfied; I can see my baby finish their milk. (Formula is good if breast feeding is not enough or you have thin milk.)
17. It depends on the husband; my husband encouraged me; my husband would not want.
18. Breast feeding is advantageous for the baby.
19. Breast milk does not spoil as formula milk does; in hot/warm places the milk goes bad.
20. Breasts hurt all the time when you breast feed; bottle feeding is good when the nipples are hurting.
21. Breast feeding is healthier for both of us.
22. Babies will get chubby; good for undernourished/skinny/tiny babies.
23. The doctor/clinic told me breast feeding was better.
24. Breast feeding is easier.
25. One can feed the baby juices, cereals, raw eggs, vegetables in addition to milk (in the bottle).