

A Macroeconomic Study of the Effects of Promotion on the Consumption of Infant Formula in Developing Countries

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During 1975, Nestle and other infant formula manufacturers agreed to curtail promotion of their products in developing countries. This curtailment resulted in a decrease in consumption of infant formula (when controlling for other variables) in 79 developing countries. Thus a causal link between promotion and consumption of the product is supported by the data and macroeconomic analyses in the study.

Few issues have stirred more controversy among marketers, governmental organizations, and consumer activists than the Nestle's infant formula boycott of the late 1970s (see Cateora 1983; Sethi et al. 1985). The crux of the debate was the causal effect of promotion by manufacturers on the breast-feeding behavior of women in less developed countries. Nestle and other infant formula manufacturers strongly argued that their advertising and personal selling efforts did not influence women to stop breast-feeding their children. That is, the only effect of their promotional expenditures was to distribute market share among competitors, *not* to increase the size of the market (Nestle 1980). Several critics vehemently disagreed (for example, Schudson 1984; James 1983). The purpose of this study is to test these competing hypotheses. Examination of infant formula imports by 79 developing countries during the 1970s provides an answer to this debate.

The remainder of the article is divided into four sections. First, the literature pertinent to the study is briefly described, including a statement of hypotheses. Next, the methods used are discussed. Third, results are presented.

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The article concludes with an interpretation of the findings and implications for managers and policymakers.

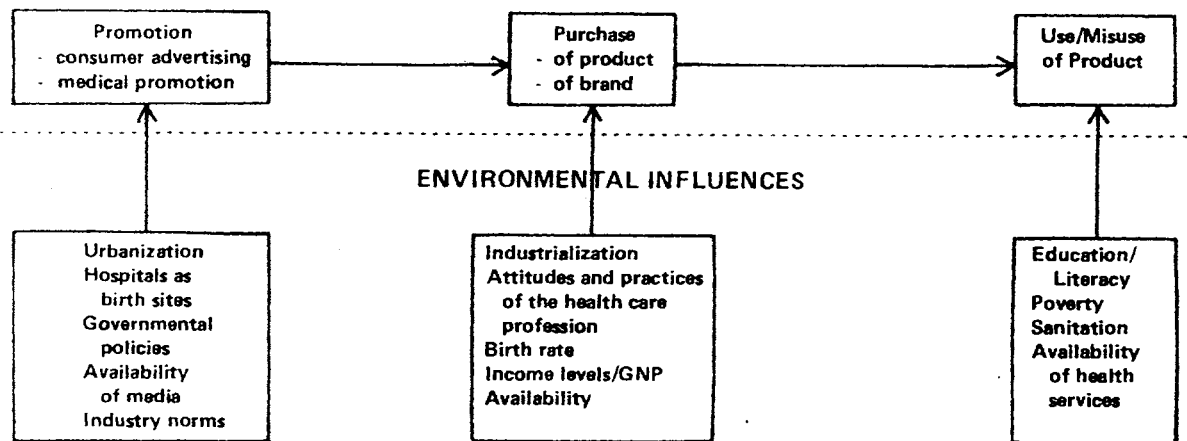
BACKGROUND LITERATURE

According to Sethi et al. (1986, p. 26), "all market actions have some nonmarket or indirect consequence for societies." In the case of marketing infant formula in developing countries, one consequence was an increased potential for infant malnutrition and mortality. No one has claimed that infant formula is an inherently bad or unsafe product (Pagan 1986). In fact, physicians consider infant formula superior to other breast-milk substitutes, such as powdered milk (Post 1978). But while a "mother can safely and adequately breast-feed a child in conditions of poverty and inadequate sanitation. . . , safety and adequacy cannot be guaranteed or achieved with any degree of consistency when bottle-feeding is attempted under the same conditions" (Post 1985, p. 116).

It is useful to discuss the issues surrounding this problem within the framework of marketing's effect on purchase and consumption and the environmental influences on this process. Figure 1 offers such a framework. Promotion is shown as influencing purchase of infant formula, which leads to use (or misuse) of the product. Environmental factors are shown as affecting all three components of the purchase and consumption process: promotion, purchase, and use. This framework serves as the basis for the

FIGURE 1

COMMERCIAL AND ENVIRONMENTAL INFLUENCES ON THE PURCHASE AND CONSUMPTION OF INFANT FORMULA



following discussion of the infant formula problem.

Promotion of Infant Formula

The promotion of infant formula products was "rampant and unchecked before 1970" (Post 1985, p. 116). Two types of companies produced and marketed formula, depending on the promotion strategy favored. Pharmaceutical firms (typically American) used medical promotion, while the food companies (typically European) preferred consumer advertising (Post 1978). Several environmental factors influenced the amount and type of promotional efforts. One example is the growing urbanization of the developing countries, which increased the food companies' ability to use consumer advertising efficiently (Post 1978). Hospitals became more popular birth sites, and newborns typically are fed at the hospital for the first few days. The medical community became a logical focus for the promotion of infant formula by pharmaceutical companies through free samples and other incentives (Sethi and Post 1979). Thus, the industry norms guiding the two types of marketers of infant formula in developed nations were reinforced by changes occurring there. Most governments of developing nations were cautious and reserved in their regulation of infant formula promotion (Post 1985), not wishing to alienate business or the medical

community. Furthermore, the institutional mechanisms necessary for inspection and regulation generally were lacking (Sethi and Post 1979).

Purchase of Infant Formula

Consumer advertising and medical promotion contributed to the purchase of infant formula. Critics claimed that most of the advertising was misleading or used "hard sell" techniques to persuade mothers not to breast-feed (Sethi and Post 1979).

A general criticism of advertising is that it manipulates the minds of consumers so that they buy things they do not need or should not have (Schudson 1984). This has been the reasoning behind the ban on cigarette advertising on television (McGuinness and Cowling 1975) and the proposed ban on beer and wine advertising (Hume 1985). The argument that promotion shapes consumers' desires has also been the basis for the censure of marketers of infant formula in developing countries (see James 1983; Muller 1975). It was claimed that they were overpromoting their products to poor, uneducated people living in economic and hygienic conditions which made appropriate usage of powdered formula almost impossible (Sethi et al. 1985). According to critics, marketers were contributing to, if not responsible for, women opting for bottle-feeding rather than

breast-feeding, resulting in infant sickness and death.

In their defense marketers maintained that advertising cannot manipulate consumers because it is ineffective or only modestly influential in changing consumption habits. Promotion seeks to change not people's product choices but their *brand* choices (Schudson 1984). In a public relations pamphlet, Nestle (1980) made just such a claim regarding the influence of promotion on breast-feeding and the use of infant formula:

QUESTION: Doesn't the promotion of infant formula in developing countries lead to lower levels of breast-feeding?

ANSWER: The best evidence we have to date shows quite the opposite—the promotion of infant formula is *not* related to less breast-feeding in developing countries.

The WHO Collaborative Breast-feeding Study (1979), which interviewed more than 23,000 mothers in nine nations, showed *no* association between breast-feeding decline and formula promotion. Of fundamental importance is the fact that the WHO Collaborative Study, in reporting reasons why mothers from nine countries did not breast-feed or stopped breast-feeding, listed the main factors as insufficient milk, maternal illness, infant illness, and new pregnancy. *Not once was any commercial factor even mentioned.*

Thus, the defenders of this view would point to other environmental factors that contribute to demand for infant formula and the decline in breast-feeding. For example, the industrialization of the developing countries, which has caused a westernization of social mores and has increased the need for mobility in employment, has been suggested as a contributing factor. It was a simple matter for mothers to breast-feed in an agricultural setting, but most places of industrial employment do not provide facilities for nursing (Sethi and Post 1979). The attitudes and practices of the health care profession also have been cited as factors (Benton et al. 1978). Doctors, nurses, and clinicians, as well as the policies of hospitals and clinics, often endorsed the use of infant formula. In many hospitals, newborns were routinely bottle-fed regardless of whether the mother planned to breast-feed (Sethi and Post 1979). Rising birth rates and income levels also increased potential demand.

A third view of the effects of advertising on purchase is offered by Schudson (1984). He claims that under certain conditions advertising

can have a significant effect on sales and, furthermore, may influence cultural life even when it does not do much in the way of selling goods individually. While Schudson feels that advertising is generally ineffective, he believes some groups are particularly vulnerable to advertising. Among these are citizens of developing countries, due to poverty and illiteracy, lack of governmental consumer protection, and lack of personal experience with products. He said this about infant formula: "The powers of marketing here—through the medical professionals as much or probably more than through direct advertising—influence consumer choice" (1984, p. 125). Likewise, Farley, Louis, and Reddy (1980) report consumption of weaning foods in Sri Lanka to be positively influenced by direct mail advertising and free samples.

James (1983) supports this latter view, stating that multinationals use promotional techniques in competing for the mother's initial choice. Once committed to bottle-feeding, mothers then seek reinforcement of the correctness of their decision. James hypothesized that if the infant becomes ill, cognitive dissonance theory predicts that anxiety will be aroused. Because switching to breast-feeding may be impossible at that point, the mother must reduce anxiety by denying the association between infant formula and the baby's illness, thus perpetuating the influence of promotion on consumer choice of infant formula.

In summary, on the one hand, some authors suggest that promotion/advertising is ineffective in increasing product demand and only distributes demand among brands—for our purposes, a null hypothesis. On the other hand, particularly in the case of marketing infant formula in developing countries, other researchers suggest that promotion is effective in increasing product demand. The hypotheses considered in this study are:

- H₀: Consumption of infant formula is unrelated to changes in promotional efforts of manufacturers in developing countries. Or, sales of infant formula in developing countries during 1972-1974 were no different from those during 1976-1978.
- H₁: Consumption of infant formula is positively related to changes in

promotional efforts of manufacturers. Or, sales of infant formula in developing countries were higher during 1972-1974 than during 1976-1978.

The rationale for choosing the specified test periods is delineated in the Methods section.

Product Use/Misuse

Although not specifically addressed in this study, a brief discussion of the factors causing misuse of infant formula is pertinent. Consumer research typically focuses on product and brand choice, but it is important that marketers consider how consumers *use* products as well as how they purchase them (Nicosia and Mayer 1976). The infant formula controversy highlights this importance dramatically. The following quotation from Post (1985, pp. 127-128) concisely summarizes the effect of environmental factors on consumers' use of infant formula:

The reason that children die in developing nations is not because infant formula is a bad product. Rather, there is an environment of poverty, illiteracy, inadequate sanitation, unhealthy water and limited health services that create dangerous conditions for the use of formula. Marketing did not create these conditions, but marketing was a more *actionable* aspect of the problem than poverty, water or education. Moreover, the manufacturers were placing their products in the stream of commerce without attempting to find out who actually used them, under what circumstances, and with what consequences.

Post went on to say that industry executives admitted at later hearings that their firms had done no research following up the purchase of their products. Thus, poor understanding of product use led to infant death and controversy.

METHODS

The Independent Variable

Measurement of the independent variable in this study, promotional efforts by infant formula manufacturers, is most difficult. Information regarding actual expenditures and/or marketing practices has been closely guarded by the firms because of their involvement in lawsuits associated with the controversy. In 1975, however, the leading companies in the industry agreed to

a fundamental curtailment of promotional efforts in developing countries. The events leading up to this crucial change are described below.

As can be seen in Exhibit 1, the controversy regarding promotion of infant formula in developing countries was sparked in 1970 at a conference in Paris sponsored by a United Nations agency, the Protein Advisory Group (PAG). A key recommendation of PAG stated: "It is clearly important to avoid any action which would accelerate the trend away from breastfeeding" (PAG 1972). Jelliffe (1971), a consultant to PAG at the Paris conference and then director of the Caribbean Food and Nutrition Institute, claimed that the marketing practices of the infant formula manufacturers were the "major factor" contributing to the decline in breast-feeding and the associated increase in consumption of breast-milk substitutes. From these beginnings the controversy grew to be one of the most debated issues of the 1970s, including lawsuits in several countries, international consumer group protests and boycotts, and even U.S. Senate hearings. The history of the controversy is interesting in and of itself and is well documented by others (see Sethi et al. 1985). The focus of this article is not the controversy, however, but the promotional behaviors of the infant formula manufacturers.

Prior to 1970 almost all the manufacturers used a wide variety of promotional techniques in developing countries. Six were considered most objectionable by the several critics (McComas et al. 1983; Nestle 1983): advertising to the general public; samples given to new mothers; personal selling through mothercraft workers (that is, women presenting themselves as nutritional experts, often dressed in nursing uniforms); point of sale advertising; the use of commissions/bonuses for sales; and copious samples to physicians.

In response to the criticism of Jelliffe, PAG, and other consumer activists, formula manufacturers began to examine their marketing in developing countries. Nestle (1983, p. 1), the industry leader (largest market share worldwide), reports beginning "to review its marketing practices on a region-by-region basis" in the early 1970s. In 1974 in the United States Bristol-Myers was the subject of a shareholder lawsuit demanding information regarding the firm's marketing practices in developing countries

EXHIBIT 1

IMPORTANT EVENTS IN THE INFANT FORMULA CONTROVERSY

Date(s)	Event	Reference
1867	Henri Nestle introduces first commercially produced infant formula	Post (1978)
1945-1959	Infant formula sales soar in industrialized countries because of post-World War II baby boom	Post (1978)
1960s	Birth rates in industrialized countries decline, manufacturers begin "rampant and unchecked" promotion of bottle-feeding in developing countries	Post (1985)
1970	At U. N. conference in Paris, Jelliffe blames formula manufacturers for infant deaths in less developed countries	Sethi et al. (1986)
Early 1970s	Nestle begins to review marketing practices on a region-by-region basis	Nestle (1983)
1972	Abbott/Ross introduces code to control promotions practices	Beaver and Silvester (1982)
1974	Bristol-Myers in the United States is subject to shareholder lawsuit demanding information regarding formula promotion in developing countries	McComas et al. (1983)
1974	First public identification of issue with publication of <i>The New Internationalist</i> and <i>The Baby Killer</i>	Sethi and Post (1979)
1974-1978	Nestle phases out all direct promotional practices	Armstrong (1985)
1975	Nestle trial in Switzerland and shareholder resolutions filed in the United States	Sethi and Post (1979)
1975	Formation of International Council of Infant Food Industries (ICIFI) and promulgation of code of marketing ethics	Sethi and Post (1979)
1976	Borden stops all promotion and sales of infant formula in Hong Kong and Taiwan	Post (1978)
1977	Boycott against Nestle begins	Pagan (1986)
1978	U.S. Senate hearings regarding United States firms' role in controversy	
1981	First developing country government (Kenya) takes legislative action to curtail promotion of infant formula	James (1983)
1981	World Health Organization passes code on marketing breast-milk substitutes	Pagan (1986)
1982	Nestle creates Nestle Infant Formula Audit Commission (NIFAC)	Pagan (1986)
1984	International Nestle Boycott Committee announces termination of seven-year boycott	Post (1985)

(McComas et al. 1983). Post (1978) reports that Borden stopped all advertising for its infant formula in Hong Kong and Taiwan in 1976. Beaver and Silvester (1982, pp. 2-3) state: "The companies had responded quietly but continuously. Nestle stopped direct contact between employees and mother and introduced stringent controls over sampling. Abbott/Ross introduced a code in 1972 and by the mid-1970's there was a general tightening up."

At a meeting sponsored by PAG in Singapore in 1974, executives from several formula manufacturing companies first discussed the possibility of forming an industry council to consider marketing practices in developing countries. In 1975 the International Council of Infant Formula Industries was formally organized in Zurich, Switzerland, bringing together eight of the largest U.S., European, and Japanese firms, Nestle among them. One of their first actions

was to develop a code of conduct embodying the principles of the 1970 PAG recommendations. Beaver and Silvester (1982) agree with Armstrong (1985, p. 8): "From 1974 to 1978, Nestle phased out all direct promotional practices."

Considering the published information summarized in Exhibit 1, 1975 is chosen as the critical year when the industry, based on previous examination of marketing practices, began to curtail its marketing efforts. That is, promotion by the infant formula manufacturers in developing countries was greater immediately before than immediately following 1975. Thus, a dichotomous independent variable is defined—more promotional effort before 1975 versus less promotional effort after 1975.

Imports as an Indicator of Consumption

Direct measurement of infant formula consumption in low income countries is not possible using publicly available data. Post (1978, p. 223) explains: "There is no precise information about the world market for infant formula products. Moreover, virtually no individual countries require disclosure of information from manufacturers or sellers by line of business." Post does venture an estimate. Based on extrapolations from bits of information from three U.S. companies, he speculates sales in less developed countries in 1978 to be approximately \$600 million. Using company data, Cox (1978, p. 243) provides a much lower estimate for the same period. "The prepared infant formula market in the one hundred countries generally considered to be third world is about U.S. \$350,000,000."

Infant formula imports *are* tracked by most countries, and those data are made available through the United Nations. Imports (SITC 048.82) to the 79 low income countries included in our data base amounted to \$148.4 million in 1978. Thus, using Cox's lower estimate of the total market, imports appear to account for about 54% of infant formula consumption, that is, \$148.4 million/(\$350 million x (79/100)).

Obviously, imports do not take into account local production, but they are directly related to strategies common to several firms. Post (1978) reviewed the operations of formula producers and concludes that in addition to production in

the United States and other industrialized countries, a common approach is to produce in a third country or region combined with export distribution. Indeed, Stafford (1978) reports that his firm, Wyeth International, manufactures formula in the United States and 14 foreign countries and markets the product in 90 countries. Since formula production is a high technology process (Post 1978), requiring the strictest sanitation (Stiegler 1985), it tends to be concentrated in the industrialized countries. Moreover, when multinationals invest in production facilities, they favor larger markets; for example, American Home Products announced in 1978 that it would be opening a new plant for infant formula production in Indonesia (Post 1978). Thus, it is reasonable to assume that imports best reflect consumption in smaller, low income countries.

Dependent Variable

The dependent variable considered in this study is infant formula imports (IFI) (SITC 048.82) as a percentage of total food imports (TF) (SITC 0). These data were obtained from the *United Nations Trade Statistics Annual* (1969-1980) for the 79 low income countries listed in Exhibit 2. The data are summarized in Table 1.

This percentage of food imports measures controls for several potential monetary and economic biases. First, because both import figures (formula and food) are reported in dollars, inflation is controlled by the division. Second, and perhaps more important, economic performance variables in the countries and in the world economy might be expected to influence imports of food and formula in a similar manner. Without this control, then, fluctuations in demand/consumption of infant formula might be attributed to economic conditions, such as overall increases in world trade, changes in GNP, import restrictions, or foreign exchange availability in the individual countries. These issues are further discussed in sections to follow.

Hypothesis Tests

One-tailed T-tests were used to test the hypotheses. Imports of formula during 1972-1974 and 1976-1978 were calculated for each country, and the pairs of consumption values

EXHIBIT 2
COUNTRIES INCLUDED IN THE STUDY

Bolivia ^a	Congo	Tanzania
Brazil	Gabon	Upper Volta
Chile ^a	Algeria	Zaire
Colombia	Angola	Zambia
Ecuador ^a	Egypt ^a	Cyprus ^a
Mexico ^a	Ethiopia	Iran ^a
Peru ^a	Djibouti	Iraq
Uruguay ^a	Gambia	Jordan
Venezuela	Ghana	Lebanon
Belize	Guinea	Oman
French Guyana ^a	Ivory Coast	Syria ^a
Surinam	Kenya ^a	Yemen
Costa Rica ^a	Liberia	D. Yemen
El Salvador ^a	Madagascar	Bangladesh
Guatemala	Mali	Burma
Honduras ^a	Mauritius ^a	Hong Kong ^a
Nicaragua	Morocco	India
Panama ^a	Mozambique	Indonesia
Barbados ^a	Niger	S. Korea
Guyana	Nigeria	Malaysia ^a
Jamaica ^a	Rwanda	Pakistan
Trinidad Tobago	Senegal	Philippines ^a
Dominican Republic	Sierra Leone	Singapore
Haiti	Somalia	Sri Lanka
Cameron	S. Africa ^a	Thailand ^a
Central Africa	Tunisia ^a	

^aBirth rate statistics available (United Nations 1983).

TABLE 1
IMPORTS OF INFANT FORMULA AND FOOD

Year	Infant Formula Imports (IFI) (SITC 048.82) ^a	Food Imports (TF) (SITC 0) ^b
1969	21.6	2.38
1970	48.3	2.99
1971	-	-
1972	76.4	3.80
1973	101.0	6.41
1974	99.4	9.72
1975	107.4	10.80
1976	117.5	9.19
1977	125.5	10.64
1978	148.4	12.62
1979	157.5	15.49

NOTE: See Exhibit 2 for a listing of the countries.

^aImports (\$ millions) of "diet, infant cereal preps" (SITC 048.82) to 79 countries (*World Trade Annual* 1969-1979).

^bImports (\$ billions) of "Food all categories" (SITC 0) to 79 countries (*World Trade Annual* 1969-1979).

were compared across the two periods. Three-year periods were selected for two reasons. First, Salvatore (1983), Buzzell and Wiersema (1981), and Weede (1983) all argue for measures of

variables averaged over a number of years. Feder (1982, pp. 63-64) adds: "Annual data include substantial random effects which tend to be eliminated by the procedure of averaging. The existence of lagged responses is another element which becomes less severe when averages rather than annual data are used." Second, data for 1971 are not available, thus limiting the test to the three years before 1975 and a comparable period after 1975.

Please note that we considered aggregating the data across the 79 countries and doing a regression analysis over the ten periods for which we have data (1969 to 1979, less 1971). Then a dummy variable for promotion (0 = pre-1975, 1 = post-1975) might compete with any other possible independent variables to explain the variance in infant formula imports. However, such an approach is precluded by two problems. First, ten data points give almost no statistical power, particularly with a five-plus-variable regression equation. Second, as mentioned above, the arguments for pooling the data *across time periods* are substantial. Moreover, the pairwise analysis is appropriate for the data, given that *imports 1972-1974* and *imports 1976-1978* for each country are not independent. If they were independent, then analysis of variance or discriminant analysis would have been possible and more appropriate. The method we have chosen takes advantage of all the information in the data, across all 79 countries.

RESULTS

The competing hypotheses are:

H_0 : Consumption of infant formula is unrelated to changes in promotional efforts of manufacturers in developing countries. Or, sales of infant formula in developing countries during 1972-1974 were no different from those during 1976-1978.

H_1 : Consumption of infant formula is positively related to changes in promotional efforts of manufacturers. Or, sales of infant formula in developing countries were higher during 1972-1974 than during 1976-1978.

As indicated in Table 2, Hypothesis 1 is supported by the analysis. That is, imports of infant formula (IFI/TF), controlling for several factors, were lower in 1976-1978 than in 1972-1974. Consumption of infant formula was found to be positively related to changes in industry promotional efforts, and the relationship was statistically significant ($p < 0.05$).

DISCUSSION

Conclusions

The information in Table 2 strongly suggests that infant formula imports (IFI/TF), controlling for several economic factors in the 79 countries, were reduced by the curtailment of promotion. The empirical evidence in this study supports the views of Jelliffe (1971), Schudson (1984), and James (1983) that promotion affected overall consumption of infant formula and, by implication, breast-feeding behavior.

Indeed the model proposed in Figure 1 is supported by our data and analysis. That is, the infant formula manufacturers aggressively promoted their products, and consumption was thereby increased in environments conducive to misuse. Because the manufacturers took actions to reform and curtail promotion in low income countries, inappropriate purchase and use of infant formula was also curtailed. The tragedy here is that all the companies did not respond to their critics in an even more prudent and timely manner.

TABLE 2
RESULTS OF T-TESTS,
Infant Formula Imports (SITC 048.82) as a
Percentage of Food Imports (SITC 0)

	All 79 Countries	Sample 31 Countries ^a
Mean (1972+1973+1974)/3	2.10%	2.16%
Mean (1976+1977+1978)/3	1.75%	1.68%
T Value	2.14	2.40
d.f.	78	30
One-tail Probability	.018	.011

^a 1979 population less than five million.

In addition to statistical significance, the results also provided a measure of practical significance. That is, the reduction of infant formula imports between the two three-year periods was 20%—calculated $(2.10-1.75)/1.75$ (see Table 2). In other words, had the manufacturers maintained their much criticized promotional practices through 1978, imports to the 79 countries in 1978 might have been \$178 million instead of \$148 million, other things being equal.

Alternative Explanations

Several alternative explanations for the results reported above warrant examination.

1. It might be argued that the activities of the various protest groups influenced consumers or governments to reduce use of infant formula after 1975. Indeed, this was the time when the Nestle controversy began to gain widespread attention in the popular press. However, the protests and publicity were largely confined to the industrialized countries and did not reach Third World consumers. Indeed, James (1983, p. 165) reports: "Not until April 1981 (with the introduction of a code of ethics in Kenya) was legislative action taken in a developing country against the manufacturers of powdered baby milk. See *The Sunday Times*, London (26th April, 1981)."

2. The decline of imports of infant formula (IFI/TF) reported in the Results section may have been caused by changes in birth rates across the time periods. However, as can be seen in Table 3, the change in IFI/TF was unrelated to changes in birth rates over the test period for the 36 countries for which data were available.

3. Perhaps imports were influenced by changes in individual countries' economic conditions. As can be seen in Table 3, the decline in IFI/TF was found to be unrelated to changes in GDP and/or changes in foreign exchange available during the test period. Apparently, these economic conditions had no systematic influence on infant formula imports.

4. It may be that the decline in imports reflects increased local production. As mentioned previously, the manufacturers favored investments in production facilities in the larger countries. Therefore, we retested the hypotheses using a subset of the smallest countries (1979 population less than five million). As can be

TABLE 3
 COMPETING EXPLANATIONS FOR THE CHANGE IN IMPORTS OF
 INFANT FORMULA AS MEASURED BY IFI/TF
 (1976+1977+1978-1972-1973-1974)/3

Independent Variables	Pearson Correlation Coefficients
<u>% Change in Birth Rates</u>	
$\frac{\text{Births (1976+1977+1978-1972-1973-1974)}}{\text{Births (1972+1973+1974)}}$.098 ^a (N=36) ^b
Source: <i>Demographics Yearbook of the United Nations</i>	
<u>Change in GDP Index</u>	
$\frac{\text{GDP Index (1976+1977+1978-1972-1973-1974)}}{3}$.048 ^a (N=59) ^b
Source: <i>International Financial Statistics</i>	
<u>% Change in Available Foreign Exchange (deflated)</u>	
$\frac{\text{Foreign Exchange (1976+1977+1978-1972-1973-1974)}}{\text{Foreign Exchange (1972+1973+1974)}}$	-.081 ^a (N=66) ^b
Source: <i>International Financial Statistics</i>	

^aNot statistically significant ($p < 0.10$).

^bSample sizes limited by data available.

seen in Table 2, the decline in formula consumption (IFI/TF) is still statistically significant. Thus, increased local manufacturing does not offer adequate explanation.

5. Other marketing mix decisions, besides promotional practices, may have influenced consumption. However, promotion was the focus of the controversy, the manufacturers' remedial actions, and this study. Indeed, had the firms segmented their markets more carefully and distributed the product more narrowly, or had the product been sold in diluted form (as is done now in the United States), perhaps the negative consequences of formula sale would have been dramatically reduced. Unfortunately, no data are available with which to address such broader questions.

6. One reviewer suggests that infant formula is supplied as part of U.S. foreign aid, which will not show up in import data. Since the government sources we checked provided no information about infant formula as part of foreign aid, this last challenge to the validity of our results remains unanswered.

Indeed, still other challenges may be offered, but our evidence and results must be evaluated in the context of the difficulty of investigating the negative consequences of corporate behavior. Key, even conclusive, information *is* available in company records—promotion expenditures and sales histories—but companies are unwilling to share it (Post 1978). Until such data are made available for close and objective scrutiny, studies such as this one must suffice. Until companies provide evidence to the contrary, one must conclude that their promotion of infant formula led directly to increased consumption of the product in environments where its misuse led to sickness and death. Post (1978, p. 120) makes a similar comment regarding his research for the U.S. Senate hearings in 1978:

Data relating to the infant-formula industry is difficult to acquire. Most information on sales volume, profits, market share of manufacturers, and even the manner in which firms do business is regularly denied researchers because of its proprietary nature. Published information is very limited in the United States, and even more scarce in developing nations. This void is frustrating to

researchers such as myself; it also frustrates those who want to understand the magnitude of the problems on which these hearings are focused.

Implications for Managers and Policymakers

The results of this study suggest that advertising and promotion can influence consumer behavior in socially undesirable and unintended ways. Despite the good intentions of marketers, advertising can have negative consequences. As suggested in Figure 1, marketing strategies must be evaluated in view of the environment in which they will be executed. In the case of infant formula, promotion strategies designed for *industrialized* countries resulted in sickness and death for infants in *less developed* countries. The context of promotion, purchase, and product use must be taken into account by producers and distributors. Managers marketing products with potential usage problems should attempt to anticipate these and do careful research in test markets. Furthermore, marketers should not ignore criticism from responsible sources but instead should thoroughly investigate their own culpability. Finally, as Nicosia and Mayer (1976) advocate, managers must measure and take responsibility for all the effects of their advertising and not just focus on sales.

To the extent that firms fail to recognize their responsibility, policymakers will take action. The World Health Organization's *International Code of Breastmilk Substitutes* (Anderson 1981) is the most recent example. The ban of cigarette advertising from U.S. television and the Federal Trade Commission's investigation of advertising of sugared cereals (leading to more stringent industry self-regulation) also come to mind. In a similar vein is the present controversy over beer and wine television commercials.

In this last case the arguments bear a striking resemblance to those which arose in the Nestle controversy. The critics suggest that TV advertising increases overall consumption of alcoholic beverages and, in turn, alcoholism. Brewers and vintners counter that TV advertising does nothing more than serve to distribute market share (Hume 1985). Critics maintain that TV advertising influences underage drinking; advertisers argue that the ads are carefully targeted toward adults. Likewise, Nestle argued that its advertising was aimed at the educated and high income consumers in developing countries, while

their critics suggested that baby formula ads reached other segments. Finally, *60 Minutes* reporters asked teenage drinkers if TV advertising influenced them to drink, and they said no. Similarly, Nestle cited the World Health Organization study (1979) wherein 23,000 mothers in nine developing countries were asked what induced them to stop breast-feeding. Not once was advertising mentioned. In both situations, one might ask why consumers would be expected to admit to, or even be conscious of, their response to commercial advertising.

Beer and wine advertisers may be operating under the assumption that because one part of the market can use the product safely, all consumers can. A similar assumption was made by the infant formula manufacturers. Just as Figure 1 shows that environmental influences affect purchase and use of infant formula in developing nations, environmental influences may affect the purchase and use of alcoholic beverages by certain groups (for example, teenagers) such that a great potential for misuse (alcoholism, drunk driving) exists.

The similarities in the arguments indicate possible applications of our findings concerning infant formula to the case of beer and wine advertising. The latter may be influencing product consumption rather than simply brand selection, although the study for Anheuser-Busch reported by Hume (1985) concludes the contrary. Further research is needed to learn more about the relationship between promotion, product and brand choice, and product use. This is particularly true in cases where promotion may have undesirable effects on society as well as positive effects on sales.

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Comments on Gilly and Graham's "A Macroeconomic Study of the Effects of Promotion on the Consumption of Infant Formula in Developing Countries"

Jean J. Boddewyn

Mary Gilly and John Graham (1988) have had the courage to tackle the difficult problem of unraveling the macro relationships between the promotion and consumption of a controversial product—infant formula—in developing countries (LDCs). Much of what they report and discuss is relevant for that purpose or, at least, thought provoking. However, I believe there are basic theoretical and operational flaws in their conceptualization, modeling, and analysis which vitiate their overall conclusion, namely, that there is a causal link between the promotion and consumption of that product.

UNJUSTIFIED CAUSAL STATEMENTS

We all know the difficulty if not impossibility of proving cause and effect in social science research. There are too many variables and relationships—some of which we do not even suspect—to model, and data are insufficient to reach a causal conclusion in the case of complex phenomena such as the purchase and use of infant formulas (IF) in LDCs.

Yet, from the start, Gilly and Graham use in their abstract (p. 21) such expressions as “resulted in” and “causal link between promotion and consumption.” Furthermore, they state that “one must conclude that [the] promotion of infant formula led directly to increased consumption of the product in [LDC] environments” (p. 29). Elsewhere, they use more appropriate statements of probabilistic relationship: “Consumption of infant formula was found to be positively related to changes in industry promotional effort” (p. 28), and

“advertising and promotion can influence consumer behavior” (p. 30). By then, however, the harm has been done to the extent that some foes of infant formula promotion as well as unwitting users of Gilly and Graham’s research findings will quote them as having *proved* cause and effect between IF promotion, purchase, and consumption.

A THEORETICAL MODEL AND INTERPRETATION

Gilly and Graham do not rely on any explicit and generally accepted theories regarding (1) how advertising and other forms of promotion work, (2) the factors affecting the demand for particular product categories, such as infant formulas, and (3) buyer/consumer behavior, particularly in developing countries. It is not that they ignore relevant variables, but their choice does not readily fit into any theoretical framework, notwithstanding their model (Figure 1, p. 22) and the interesting consideration of “alternative explanations” on pp. 28-30.

As we know, anyone can throw variables together to find out whether they correlate. Sophisticated research, however, requires understanding *a priori* why it makes sense to relate them. I readily acknowledge that the dominant theories of advertising, economic demand, and buyer/consumer behavior are still incomplete and in a state of flux. Still, Gilly and Graham’s text and bibliography do not reveal any profound consideration of whatever theories are available on these issues. Therefore, I will use various theoretical and methodological considerations to challenge their premises, research design, conclusions, and interpretations.

SPECIFIC CRITICISMS

First, their discussion of advertising theory is really limited to discussing whether it affects

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brand shares only, rather than overall *market* size. Besides, Gilly and Graham assume a simple stimulus-and-response model of how promotional efforts work. If women in developing countries see brand advertisements, receive company brochures, and are given free baby bottles and IF samples, then suddenly they are hooked on that product. My understanding of the current advertising theory literature is that it has moved away from a simplistic model of what advertising does *to* people to the more complex questions of what people do *with* advertising; what people use advertising *for* (Lannon 1986, p. RC-7). Just because marketing and advertising are more “actionable” than poverty and illiteracy (p. 24) does not *ipso facto* make the former “effective.”

Second, there have been many discussions of whether advertising budgets are set as a percentage of *past* sales experience—in which case sales affect advertising expenditures—or are set in terms of *targeted* sales, in which case, at least, there is an assumption that advertising drives sales even though actual results cannot be guaranteed. Gilly and Graham really assume that increased sales *always* follow increased promotion expenditures, since their second and key hypothesis about consumption (pp. 23-24) uses as its key independent variable the level of promotion—more before 1975, less after 1975.

Altogether, it is as if one did not need to know promotion theory to engage in their type of research, which is largely limited to correlating various economic and demographic variables in some sort of a black box.

Third, they ignore the extensive economic and econometric literatures on the macro relationships between demand and advertising. Promotion does not operate in an economic, social, political, and cultural vacuum. As was discovered long ago, *if underlying conditions are favorable to an increase in demand for the product, the use of advertising tends to enhance and accelerate the rising trend of demand, and vice versa* (Borden 1942, pp. xxviii-xxix). In other words, *advertising does not initiate demand but can amplify it.*

Yet Gilly and Graham’s second and central hypothesis (“consumption of infant formula is positively related to changes in promotional efforts” [pp. 23-24]), their textual analysis, and their “causal” conclusions (see above) do not provide any investigation of “underlying

conditions” for the demand for IF. I readily grant that their initial model (Figure 1, p. 22) lists 14 “environmental influences,” such as urbanization, industrialization, income levels, birth rate, and attitudes and practices of the health care profession, but few of these variables are systematically investigated in the subsequent analysis. One might also observe that their model leaves out other apparently relevant variables, such as modernization, Westernization, and the second oil crisis of 1977-1978, which made the prices of IF increase considerably.

It is as if promotion had created demand all by itself, and their numerous citations from critics of the IF industry go in the same direction (for example, “the promotion of infant-formula products was rampant and unchecked before 1970,” quoted on p. 22). Their alternative hypothesis (“consumption of infant formula is unrelated to changes in promotional efforts,” p. 23) is equally as simplistic, a strawman easy to knock off. What is missing is an “in-between” hypothesis aimed at isolating promotion’s effect from that of other variables; and their consideration of “alternative explanations” (pp. 28-29) is like a series of afterthoughts rather than part of an overall research design integrating a series of independent and moderating variables.

Fourth, Gilly and Graham erroneously assume that the demand for IF (and other breastmilk substitutes, really) is the same as the demand for all foods. For that matter, their key test and proof rest on a comparison of “infant-formula imports” and “[total] food imports” in 79 countries (p. 27). Yet, can one reasonably argue that, for example, the demand for *beer* is affected by the same factors as the demand for *all alcoholic beverages*, for *all drinks*, and for *all foods*? Of course not. Otherwise, we would lose all our rationales for market segmentation and product positioning, besides sacrificing common sense and experience.

The magnitudes involved also support the above point. IF imports in their Table 1 (p. 27) represent at best 2.1 percent of total food imports, so that one should not assume that such a small fragment is representative of all foods, a very heterogeneous group in any case, with each segment bound to be affected by very different combinations of supply and demand factors.

It is true that Gilly and Graham provide for some control factors, such as inflation and foreign exchange rates (the two are interrelated), but I think that such corrections are insufficient to address the fundamental heterogeneity of product categories and of their respective supplies and demands. Later on, their "alternative explanations" (pp. 28-30) introduce additional factors, such as public policy, economic conditions, foreign exchange availability, local production, other marketing mix variables, and foreign aid distribution of free IF. In some cases, the available information was insufficient to test the importance of these additional variables, and they cannot be blamed for it. Their Table 3 (p. 29), however, gives "not statistically significant" Pearson correlation coefficients regarding the relationships between IF imports and the respective changes in birth rates, GDP indices, and available foreign exchange, but their discussion of these additional factors (on p. 28) is so brief that I must confess I do not quite understand what they are testing and concluding.

Fifth, Gilly and Graham's justification for choosing 1975 as the "critical year" (p. 26) that separated a period of intense promotion by the IF industry from one of less intense promotion is questionable. They cite, in Exhibit 1 and on pp. 24-25, a variety of dated events to justify this choice. However, it is evident from these data that some industry curtailment of promotion had already taken place *before 1975* and that major promotional curtailments date from *later than 1978*. Why, then, leave out the post-1978 period (for which comparable statistics must have been obtainable), which witnessed major governmental controls and consumerist pressures? This later period would have provided a much more reliable testing period than 1976-1978 for measuring the effect of curtailed promotion on IF consumption.

More important still, in my opinion, is that the periods considered in their analysis (1972-1974 compared to 1976-1978) are far too short to test hypotheses in the case of an event—the infant formula controversy—that developed over a much longer time and culminated, so to speak, with the World Health Assembly approving the WHO code on the marketing of breast-milk substitutes in 1981. Gilly and Graham's only justification for comparing such short periods seems to be that no import data were available for 1971 so that only data from 1972

onward could be used. This, in turn, led to the precurtailment period for promotion being limited to 1972-1974 and the postcurtailment period to a comparable three-year span from 1976 to 1978. But was such symmetry essential to test their hypotheses? They could have used subsequent three-year periods to find out whether the rates of relative decline in imports had persisted.

Besides, my reading of the WHO (1979) study, which they cite, does not seem to justify the choice of 1975 as a critical year. The field work for this study was conducted in 1975-1977 in six LDCs, but only on p. 65 does the WHO report briefly refer to curtailed promotional activities through the mass media in four LDCs. Elsewhere, the general impression is that promotional activities were still high in these countries and—presumably—in other LDCs.

Sixth, Gilly and Graham are strangely silent about *infant formula imports still increasing in absolute terms after 1975* (from \$107.4 million in 1974 to \$148.4 million in 1978), although promotion had decreased. In other words, their conclusion is based on a decline in the *relative rate of increase* in IF imports after 1975. This leads them to claim that IF imports "might have reached \$178 million, had manufacturers maintained their much criticized promotional practices through 1978" (p. 28). This last statement is purely conjectural and unprovable. It resembles the one used by some opponents of the tobacco industry to justify tobacco advertising bans (see Bjartveit and Lund 1987). They, too, draw imaginary dotted lines past the year of the ban to claim that the advertising ban succeeded in curtailing tobacco consumption because the latter *would* have been higher in the absence of such a ban. In fact, one can never know what would or could have happened.

Seventh, as was mentioned before, Gilly and Graham considered alternative explanations of the relative decline in the IF imports' rate of increase. However, they do not envisage the possibility of a product life cycle effect where the market reaches the maturity stage. Could the LDC markets have come to that point after 1975, to the extent that the pool of mothers (particularly urban and more affluent ones) likely to adopt IF in LDCs had reached its natural limit around that time on account of various "underlying conditions" (Borden 1942)?

At the maturity stage of the cycle, promotional activities—whatever their overall size and rate of growth—tend to shift to battles for market share rather than to enhancing and accelerating the rising trend of demand.

Eighth, I believe that Gilly and Graham are too subjective in the interpretation of their findings, although we all commit that sin, since research is never value free. For example, they ignore evidence from the 1979 WHO report (which they quoted) about the real but limited effect of promotion on the LDC mothers' decisions to adopt IF. This WHO report (1979) is much subtler in its fundamental assumption and appraisal of promotion playing *some* role in fostering consumption: "The approach taken in the survey *assumes* that the adoption of bottle feeding by the mother is a function of an interplay between *a variety of factors*, and that *intensive* marketing of commercially prepared infant foods is *one* of these factors" (p. 58; emphasis added). (Notice, by the way, the mention of "intensive" marketing efforts in the WHO report for the 1975-1977 period, which challenges Gilly and Graham's characterization of 1976-1978 as a period of diminishing promotional activities.)

Besides, the WHO report states that "advice from husbands, friends *and from the media* was not commonly quoted in any country or group" (1979, p. 41; emphasis added). Gilly and Graham reject such contrary evidence by answering that "one might ask why consumers would be expected to admit to, or even be conscious of, their response to commercial advertising" (p. 30). I find this kind of answer baffling. Of course, if one accepts without question that there are "hidden persuaders" preying on "vulnerable consumers," their rebuttal makes sense. But that is a big "if" which I am not quite ready to swallow on faith when no empirical evidence is provided to buttress it. Their reply amounts to saying that we do not know how advertising works and consumers behave—but, then, why link promotion and consumption?

Similarly, to state, as Gilly and Graham do, that "until [information available in company records is] made available [by IF manufacturers] for close and objective scrutiny, studies such as this one must suffice [to prove that their promotion of infant formula in LDCs led directly to increased consumption]" (p. 29) is unfair and unscientific since one cannot prove a negative. They really want IF manufacturers to prove that promotion did *not* affect consumption, an impossible task!

Altogether, I think their case is not proven, *partly* because of the real methodological and statistical problems which they could not avoid, but *mainly* because of serious theoretical lacunas, analytical weaknesses, and partisan attitudes on their part. Ultimately, a rather tiny reed of debatable IF import evidence is all they could lean on to prove their point. That is not enough, in my opinion.

To quote Wickstrom (1979), who participated in the WHO study (1979) but also studied cigarette marketing in LDCs at about the same time: "All of this does not necessarily mean that there are no effects of advertising upon smoking, only maybe that the models are misspecified and the measurements techniques inadequate" (p. 9). Amen.

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Comment on Infant Formula: Trees or Forest?

Bill Meade

In "A Macroeconomic Study of the Effects of Promotion on the Consumption of Infant Formula in Developing Countries," Mary Gilly and John Graham (1988) set themselves the task of determining the relationship between promotion and sales. Like many other marketers in this debate, they have not focused on the crucial marketing point. Marketing affects quality of life and society negatively as well as positively, and when ineptly done has even killed people. Infant malnutrition, illness, and death are the essential problems in the formula controversy.

In *ADVERTISING, The Uneasy Persuasion*, Schudson (1986, pp. 214-215) uses the concepts of "Capitalist Realism" and "Socialist Realism" to show how presenting "reality as it should be" can be used in persuasion. These stylized persuasive modes "simplify and typify" reality, creating a "characteristic abstractness." The infant formula debate has drifted into such an abstractness. The fixation on promotion made it depart the plane of reality where negative consequences occur and made it nonmarketing because solving the problem was forgotten in fighting the battle.

The requirements domain (the market, economic, physical, resource, and competitive requirements for success) (Bacon 1981) would have been a better place for this debate. Apparently, infants are harmed and die because formula is made with contaminated water and because formula is overly diluted (due to its high price to relatively poor customers). In requirements terms, technical and economic failures caused these consequences. But this did not have to occur; good milk could have been made with bad water. Simple cold filtering *eliminates bacteria* from contaminated water.

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Solving the whole infant formula problem requires bacteria removal and lowering price so that poor customers will not dilute it too much. Both water contamination and dilution are cost reduction problems. Discovering cost reduction to open up markets is near the marrow of marketing (see Levitt 1986, p. 155).

Rather than hoping for technology to be benign, marketers should assume marketing mixes will *always fail* in new cultures. For example, in LDCs each infant marketing mix variable precipitated unique responses. *Product* shortcomings apparently harmed babies in the "poor" and "bad water" segments. *Promotion* interacted with *place* (milk-nurse missionary sales people) and was too effective, exacerbating product design problems and providing the target for attacks on formula producers. *Price* probably contributed to death through too much dilution. In this case marketing produced profits and pestilence side by side. Taking markets for granted can have great social consequences. Gilly and Graham ignore this, trivializing its significance.

Marketing is about solving problems and creating/capturing value while doing so. Formula makers responded to their critics with claims that "promotion does not increase demand." This battlefield response to criticism deflected discussion away from solutions. The anti-formula people may well have a "hidden agenda" against formula use, that is, they are against formula more than they are for babies, but such an agenda does not absolve formula suppliers from solving the mortality problem. The important lesson is that inept marketing can, and in this case did, catastrophically reduce quality of life for significant numbers of Third World mothers and babies.

The infant formula problem happened for lack of creative marketing mix development. When problems with formula surfaced, formula suppliers and antiformula people fell into a

battlefield mentality, and creative solutions were never developed. When Gilly and Graham followed the traditional abstractness of the controversy, they overlooked the essential issue. Infant death is the crucial problem. It is a micromarketing problem with macromarketing consequences.

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Rejoinder to Comments by Boddewyn and Meade regarding “A Macroeconomic Study of the Effects of Promotion on the Consumption of Infant Formula in Developing Countries”

John L. Graham and Mary C. Gilly

We very much appreciate the hard work and careful thought put into the comments by J. J. Boddewyn and William Meade regarding our article, “A Macroeconomic Study of the Effects of Promotion on the Consumption of Infant Formula in Developing Countries” (1988). Because their criticisms are quite divergent (that is, Boddewyn suggests we have overstepped the bounds of quality social science, particularly pushing our interpretation too far, whereas Meade argues that we have not studied the most important problem), we will respond to them separately.

RESPONSE TO THE COMMENTS OF JEAN J. BODDEWYN

Ordinarily, we would just deal with the issues, but Boddewyn questioned, albeit subtly, our own source credibility by accusing us of “partisan attitudes” and characterizing our study as “too subjective” and not “value free” (1988, p. 43). We cannot argue that our study does not suffer from such limitations. Indeed, Merton (1968) and others caution that all scientific work is value laden, and it is the responsibility of scientists to try to take their own biases into account.

Boddewyn’s criticism is that our study *proves* nothing. The failsafe position of the infant formula manufacturers, the tobacco producers, and the alcoholic beverage industry is that one can never *prove* that the sale of these products causes health problems. Attorneys worry about proof. The job of social scientists is to provide evidence, not to prove things. We mightily disapprove of Boddewyn’s misleading out-of-context quotes which imply that we think otherwise. He describes our statements, “causal link between promotion and consumption” and “one must conclude that promotion of infant formula led directly to increased consumption of the product in [LDC] environments” as harmful. Yet, he left out key qualifiers on our part. The more complete quotes are “a causal link between promotion and consumption of the product *is supported by the data*” and “*until companies provide evidence to the contrary*, one

must conclude that their promotion of infant formula led directly to increased consumption.” Then he adds on page 43 that it would be “unfair and unscientific” to ask the companies to prove that their promotion did not lead to consumption.

Simply stated, Boddewyn’s courtroom approach asks too much of any one study. Our question for him and the infant formula manufacturers is: “Do you have evidence to show that promotion does not have a causal effect on consumption?” If so, it should be put forward for scrutiny.

Finally, our own motivations for conducting the study are relevant. The two of us had a disagreement about the issue—our disparate *a priori* views are reflected in the hypotheses. We decided to settle the disagreement by seeing which view was supported by the data.

BODDEWYN’S SPECIFIC CRITICISMS

Initially, Boddewyn complains that our study lacks a foundation in “generally accepted theories” (p. 40). In a sense we agree. Rather than merely a generally accepted theory, our study rests on an axiom of marketing—promotion increases sales. The only people who disagree with this basic truth are those who have a stake in the disagreement, namely, the advertisers of alcoholic beverages, tobacco products, and infant formula producers. Indeed, a multi-billion dollar advertising industry is built upon the axiom. We cannot argue that more complex theories

of advertising's effects (for example, Lannon 1986) are not useful, but the parsimony of the axiom is compelling. Boddewyn's summary charge of "serious theoretical lacunas" (p. 43) is simply untrue.

Regarding theories of advertising's effects on consumer behavior in developing countries, we cite several studies in the original paper, all more relevant and recent than Boddewyn's key reliance on Borden (1942). We see no need for reviewing this well-trodden ground. And we will certainly not argue with Boddewyn's point that "advertising does not initiate demand but can *amplify* it" (p. 41). Webster defines amplify as "to make stronger"—precisely our finding!

Boddewyn's second point regards an assumption he assumes we made in the study, namely, that "increased sales always follow increased promotion" (p. 41). He implies that the relationship we discovered between promotion and consumption was due to the companies anticipating reduced demand and concomitantly cutting back promotional expenditures. Yet, in the voluminous literature regarding the controversy there is no evidence to support such a view. No one in the industry at that time talked about a potential decline in demand. Indeed, the comments and testimony of the manufacturers emphasized the expected growth in the market. Also, please notice the inconsistency in Boddewyn's statements. Here he allows the relationship between promotion and consumption but argues that the causal arrow is reversed. Later he attacks the relationship itself on several grounds.

Third, Boddewyn makes the easiest criticism of all—that our model is incomplete and does not consider *all* the relevant variables. All social science research is subject to this obvious criticism. We have examined relevant variables to the extent possible. Indeed, with support from the infant formula manufacturers we might specify and test more complex models of the phenomenon. We would be most pleased to have access to sales and advertising records of the companies involved.

In the fourth section of Boddewyn's criticism the inconsistencies of his own arguments again surface. Having complained about the incompleteness of our model, in this section he voices concern about our attempt to be more comprehensive through controlling for several kinds of exogenous economic factors. We cannot necessarily disagree with his comments here; however, we would have appreciated some actionable suggestions of *better* alternatives for controlling for exogenous factors.

Next, Boddewyn attacks our choice of 1975 as the key year of change of promotional practices in the industry. However, we feel the support for our choice

is quite strong and well documented. He also argues that the three-year test periods we used in the analysis are too short to demonstrate the changes in demand we report. We wonder how long a period would satisfy him? Of the several colleagues reviewing our study, only he has found fault with the three-year test periods. Boddewyn also mentions that the infant formula controversy "culminated" in 1981. Others report that it is not over yet, that Nestle's promotion of infant formula in less developed countries (Duncan 1988) and in the United States (Sanchez 1988) deserves renewed scrutiny.

In his sixth section Boddewyn takes issue with our suggestion that infant formula sales would have been even higher in 1978 had not the companies curtailed their promotional efforts. The reader will note that again he quotes us out of context, leaving off our qualifying remark, "*other things being equal.*" In his words, our statements are "purely conjectural and unprovable." Yes, better *proof* might be developed using some sort of field experiment wherein promotion levels are varied across regions. But hypothesis confirmation in such a study would be grisly indeed.

The seventh issue raised by Boddewyn regards a product life cycle effect as an alternative explanation. That is, perhaps infant formula reached the maturity stage in its product life cycle in less developed countries. Perhaps. However, nowhere in the literature, including the testimony of industry representatives, is such a leveling off of demand mentioned. Again, this is an area where industry supplied data may help answer questions.

Boddewyn's eighth specific comment accuses us of selectively quoting the 1979 World Health Organization report. He seems to ignore that Nestle reprinted that particular section of the report in one of its own public relations brochures. We do applaud Boddewyn for pointing out that the report does describe "the intensive marketing of commercially prepared infant foods" as one of the causal factors influencing breast feeding behavior.

This last point is crucial. Throughout his criticism, Boddewyn implies that we attribute consumption of infant formula *solely* to its advertising and promotion. Yet, from the very beginning of our article, we present a quite comprehensive model of the factors influencing breast feeding behavior and consumption of infant formula. Granted, our data allow us to study only one part of the model. Our findings are consistent with the theory that promotion has a causal effect, but we *never* argue that promotion is the only factor.

Our findings support the theory that industry advertising and promotion can have a causal effect on primary demand for products. Boddewyn frequently

cites the cigarette advertising controversy as being analogous to the issue examined in our study of infant formula marketing. Curiously, he stands silent on the most recent studies in the marketing literature which support the causal relationship between industry advertising and primary demand for cigarettes. (See Leeftang and Reuijl 1985; a careful reading of Holak and Reddy 1986.) Such other studies are quite important, because only through a body of research is the truth revealed. That is, it is always easy to attack a single study; limitations are unavoidable. But *consistent findings*, from a series of studies with different limitations and different researchers, are a bit more difficult to criticize convincingly. Boddewyn states: "Ultimately, a rather tiny reed of debatable [infant formula] import evidence is all they could lean on to prove their point" (p. 43). Rather, our study well represents the continuing accumulation of evidence that industry advertising and promotion increase primary demand for products.

RESPONSES TO THE COMMENTS OF MEADE

Contrary to Boddewyn, Meade does not criticize our theory or method; rather, he indicates that we defined the problem incorrectly. Meade claims we have ignored the fact that "taking markets for granted can have great social consequences" and that we "trivialize its [the problem's] significance" (1988, p. 44). We would argue that we were trying to address the problem by investigating how one component of marketing, promotion, had an effect on the sales of infant formula in developing countries. Meade advances, and we agree, that other elements of the marketing mix, such as distribution and price, also contributed to the infant formula problem. But if it were possible (as Meade implies) to design and conduct a study in which all marketing mix variables are included as the independent variables and "infant malnutrition, illness, and death" (p. 44) are measured as the dependent variables, we would certainly applaud such an effort.

Meade's claim that "solving the whole infant formula problem requires bacteria removal and lowering price so that poor customers will not dilute it too much" (p. 44) fails to consider other contributing factors, such as illiteracy and lack of education. Studying macromarketing problems, such as marketing's effects on society and quality of life, involves complex relationships like those represented in Figure 1 of our original paper.

Finally, we very much agree that infant death is the crucial problem. But lacking infant mortality information and data regarding other relevant contributing causes, we decided to study the variables we could access and at least make a contribution toward understanding this important macromarketing problem.

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