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TRADITIONAL AND NONTRADITIONAL EXPLANATIONS OF FOOD CONSUMPTION: THE CASE OF BEEF[1]

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ABSTRACT Changes in the consumption of many foods, particularly beef, underlie the recent interest in isolating factors explaining these trends. This study focuses on three orienting explanations for differential beef consumption--microeconomic, social structural, and risk reduction perspectives. Consumption is defined by past and anticipated future utilization of beef, as well as present beef consumption relative to possible substitutes. While the microeconomic model is the most useful for isolating an individual's beef intake, it is clear that consumption behavior is dependent on more than income and supply factors. Social structural and risk reduction perspectives increase by 83 percent the R^2 found through inclusion of economic variables alone. Wagner's criteria for examining the complementarity of theoretical perspectives, including their similarity in predicting behavioral outcomes, was applied to the three consumption explanations. Disparate outcomes are observed in projections of future beef consumption using the microeconomic explanation relative to social structural and risk reduction perspectives.

Introduction

Perhaps now, more than at any other period, revolutionary changes can be observed in Americans' food consumption patterns. The increased availability of some foods, a rise in the proportion of meals eaten away from home, and the use of convenience foods have altered intake levels for many foods (Guenther and Chandler 1980; Havlicek et al. 1982). Among meats, there has been a large increase in poultry and fish intake and declines in beef consumption (U.S. Department of Agriculture 1984). The reasons for this decrease in beef utilization are not clearly understood. Beef is considered a normal good, meaning that consumption rises with increases in per capita income and declines when income falls. Trends in beef consumption, however, have not

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consistently followed income in recent years. It appears that other factors, such as demographic and attitudinal influences, are important explanatory referents, but research continues to focus largely on economic concerns.

Two recent studies (Cox 1984, p. 55; Sapp 1984, p. 98) cite demographic characteristics such as age, sex, race, occupation, and place of residence as the primary basis for the differential utilization of beef, after controlling for income factors. Further, a 20-year time series assessment (Sapp and Guseman 1984) showed a direct negative relation between beef consumption and the number of beef/health-related articles in the printed media, again controlling for income as well as the price of beef. Alterations in food choices thus are not dependent solely on income and price. Rather, changes in food consumption appear to emerge from long-term trends, such as the increasing information about the healthfulness of various foods, as well as the evolving demographic composition of the population.

This article attempts to clarify the ways that food choices are formed and to examine consumption trends on a limited scale, with beef as the commodity of interest. The research focuses on three explanations for the differential commodity utilization of 825 Texas residents. Microeconomic, social structural, and risk reduction explanations are identified and their functional separability, or the degree to which each explanation can stand alone, is considered. In addition, the relative importance of each explanation is examined. The results offer the basis for projecting future beef consumption, using the assumptions and conceptual domains of these perspectives. A brief presentation of each explanation provides the basis for empirical analyses of beef utilization.

Microeconomic assessments of food consumption

In a microeconomic perspective, the consumer (1) is assumed to be aware of the existence of certain foods, (2) has some preferences among these foods, and (3) has income available to apply these preferences to actual food purchases. Although these assumptions are incorporated into several forms of analysis, revealed preference theory provides a contemporary framework commonly utilized in assessing consumer choice (Redman 1979, p. 14-15). Revealed preference theory provides a formal base for food consumption analysis without requiring an interval or ordinal ranking of food items preferred. Whatever is consumed is considered to be the food item that is both preferred and of maximum utility for the consumer.

As noted, income plays a dominant role in microeconomic assessments of food consumption. Much research attention has focused on the income elasticities of foods purchased. Using time series data, beef consumption, for example, responds strongly to a change in consumer income (Harmston and Hino 1970, p. 385; Haidacher et al. 1982, p. 85). For this reason, it is useful to monitor perceived alterations in financial well-being, as well as changes in the portion of income expended for food and for specific food items.

Finally, microeconomic research (Haidacher et al. 1982, p. 6) stresses the importance of cross-product effects in food choices, in that an individual's decision to consume a particular food is not made independently, but rather with reference to other items that are available. Consumers are faced with a budget constraint, so that trade-offs among foods must be made constantly. The household budget provides the basis for evaluating the mix of foods to buy, as well as the quantity of each food item. The implication is that consumption of beef is dependent on the price of substitutes with similar utilities. In some cases, only a few potentially relevant substitutes are assessed, with the assumption that the remaining goods and services have an implied zero effect on consumption of the commodity of interest. In this way, restrictions are placed on the number of foods requiring examination as possible substitutes.

Social structure and food consumption

For a number of years, attempts have been made to incorporate variables such as age, sex, race, educational level, and occupation into food consumption analyses (Salathe and Buse 1979; Haidacher et al. 1982; Sapp 1984; Cox 1984). However, these variables have been treated as gross demographic indices, without an overarching explanatory framework within which to locate them.

Smelser (1963, p. 96-98) suggests a social structural explanation of consumption, which can be accomplished by classifying consumers into different sociodemographic dimensions. According to Smelser, consumers are differentially involved in various social structures. Thus, for any given consumer, the kinds and levels of consumption symbolize his/her involvement in social structural contexts, such as age-specific or occupation-specific structural arrangements. "By aggregating these attachments to such contexts, a consumption function, or rather a series of consumption functions, could be reproduced" (Smelser 1963, p. 96-97).

Although the approach that Smelser suggests is in an ambryonic stage, it can be readily observed that certain social structural characteristics assist in explaining the structure of demand for various foods. The property of membership within specific groupings, such as age, ethnic, educational, or marital categories, can be viewed as directing and channeling behavior. Because eating is a social activity, structural affiliation has a pronounced effect on the types of foods consumed. Further, the relative size of each of these population segments affects per capita and aggregate food consumption. Because of this, many changes in food consumption behavior are largely reflections of changes in the composition of the population.

The notion of structure in the social sense depicts relationships among individuals that are relatively orderly and stable. Social structure is also a structure of behavioral expectations, so that knowledge of what positions a person fills provides a mechanism for predicting how that person will behave (Bertrand 1972; Bates and Harvey 1974). For example, knowledge that a person is a young rural male

suggests beef consumption higher than that of an elderly central city female.

This discussion suggests three underlying assumptions: (1) individuals are distributed among social positions, so that the position is the appropriate unit of analysis; (2) the positional identities of individuals channel their consumption behavior; and (3) any individual may occupy several of these positions simultaneously.

From the third assumption, it can be concluded that many structural arrangements should be considered. Several studies from the 1977 Nationwide Food Consumption Survey have indicated that social structural characteristics make substantial contributions to explaining the variance in individual food intake and in expenditures (Guseman and Sapp 1985; Haidacher et al. 1982; Sapp 1984). Particularly important for beef purchases were age, sex, hours worked per week, occupation, and race (Sapp 1984, p. 99). Others have emphasized that place of origin and education play significant roles in determining food consumption patterns (Ryan 1981; Burk 1961, p. 99).

Consumer sentiment and food consumption

Like much human behavior, consumption is the product of a number of factors. Food patterns heretofore unexplained by economic models have often been treated as nonutilitarian and considered nonrational behavior. Likewise, the social structural position suggests that consumers behave solely on the basis of shared values accrued by occupying positions in the social structure. For both explanations, however, there is a residual factor, often referred to as "consumer sentiment," which allows for a set of decisions where personal motives are salient (Katona 1960).

Consumers react to food commodities on the basis of meanings, in terms of perceived risks as well as positive consequences, that foods have for them (Shifflett and Nyberg 1978; Walters 1978, p. 467). Although both microeconomic and structuralist perspectives emphasize consumer conformity based on objective characteristics of consumers, intake levels can be more directly predicted by subjective variables.

Consumer sentiment as an explanation of food consumption patterns suggests that food expenditures, as well as food intake, are mediated by a subjective factor known as "willingness to buy" or "willingness to eat" a particular commodity or product (Didow et al. 1983, p. 339). This explanation proposes that consumption is not just a function of objective factors such as household income and sociodemographic characteristics. Rather, it suggests consumption will be high when sentiment is positive and low when sentiment is negative regarding a particular food.

Measurement of consumer sentiment occurs through attitude measurement and, because attitudes are combinations of feelings and perceptions, can be expected to remain fairly stable. Attitudes toward beef would include feelings and perceptions of fat and caloric content, dietary value, and price. Attitudes, however, are subject to alteration as major circumstances or information changes. For example,

perceptions of what constitutes an acceptable meal may change with the accumulation of new knowledge.

The use of foods can be gauged according to perceived risk and the need to maximize positive consequences, such as to maintain or improve one's health, weight, or social standing. Recent evidence indicates consumers are altering their diets--adding some foods and avoiding others--primarily in response to health and nutrition concerns. Almost two-thirds of those surveyed in a U.S. Department of Agriculture study stated they had adjusted their diets in the past 3 years for health or nutrition reasons (Jones and Weimer 1980, p. 16). Of those noting changes in their diets, respondents were avoiding sweets and snacks, fried foods, fatty red meat, ice cream, and soft drinks.

Weight control also played a prominent factor in food choices. The USDA survey indicated that 61 percent of households sampled contained at least one dieter (Jones and Weimer 1980, p. 16).

Consumer sentiment taps attitudes toward categories of eating behavior, including "acceptable" eating patterns. Health, nutrition, the importance of dieting, and social acceptance concerns all appear to play a major role in attitude formation regarding food commodities. The following assumptions relate to this conception of consumer decision making:

(1) Consumer sentiment regarding foods stems from health and safety concerns, as well as social acceptance and status concerns.
(2) These personal motives channel and prescribe consumer behavior.
(3) Consumers seek to reduce risk, so that willingness to purchase or eat a food relates to this underlying factor.

A general explanation is that whatever information individuals have available to them is used to maximize pleasant or useful consequences of their actions, i.e., they are risk reducers (Bauer 1960, p. 389-398). The consumer, faced with a decision such as which meat to consume, acts to reduce risk (Taylor 1974). This may entail getting just enough information to feel secure making such a decision, from either formal or informal sources. When there is conflicting information regarding a commodity, such as the recent evidence of the high protein and mineral content of beef and at the same time evidence of cholesterol hazards to beef consumption, the consumer may avoid the food because the risk is more than the consumer is willing to take.

The remainder of the article attempts to identify the explanatory power of economic, social structural, and consumer sentiment models for beef consumption. In addition, possible relationships between the models are examined.

Data and measures

Data for this study were obtained through a 1983 statewide omnibus survey of Texas adults, selected randomly and interviewed by telephone. An overall response rate of 57.3 percent was obtained, with 978 completed interviews

available for analysis. When compared with the Texas population in 1980, the sample appeared to over represent females, persons 25 to 39 years of age, and black respondents. For this reason, 153 respondents with these characteristics were randomly drawn from subsets of the original sample, leaving a representative sample of 825 adults.

Beef utilization, the dependent variable, was represented by three indicators that were highly intercorrelated and formed a single factor (Appendix A). These variables included perceptions of changes in beef intake over the past year, anticipated future alterations in consumption levels, and a ranking of beef relative to other meats in amount consumed.

Table 1. Measurement of independent variables

I. Economic variables (income and substitution effects)
1. Per capita income (household)
2. Change in amount of income spent on food (household)
3. Current intake of pork relative to past year (respondent)
4. Current intake of poultry relative to past year (respondent)
5. Current intake of fish relative to past year (respondent)
6. Current intake of vegetables relative to past year (respondent)
7. Current intake of fruit relative to past year (respondent)
II. Social structural variables (sociodemographic effects) (respondent)
1. Age
2. Sex
3. Educational attainment
4. Place of origin (where raised)
III. Risk reduction (consumer sentiment and behavioral effects) (respondent)
1. Frequency of dieting during past year
2. Health concerns[a]
3. Social acceptance concerns[a]

[a] See Appendix B for listing of variables contained in these two factors.

Table 1 lists the independent variables.[2] These independent variables represent the three separate models of food consumption.

[2] Earlier analyses allowed deletion of economic, demographic, and attitudinal variables not significant at the 0.05 level for explaining the consumption of any meat commodity. These variables, including ethnicity and occupation, were excluded prior to the analyses undertaken here for beef.

The first model (MI) examines the effects of (1) per capita income (for the household), (2) changes in household spending for food, and (3) cross-product effects on the consumption of beef (Table 1). The perceived changes over the past year in consumption levels of poultry, pork, fish, vegetables, and fruits were included to measure cross-product or substitution effects.

Social structural variables were then assessed to measure the effects of structural positioning. Educational attainment, age, sex, and size of the place where the respondent was raised represented the sociodemographic variables in this second model (MII).

The third model (MIII) focuses on explanatory referents associated with risk reduction, including a factor scale score of health concerns (as reflected in eating habits) and a scale score for social acceptance concerns with regard to consumption behavior (Table 1). Finally, frequency of diet during the past year was included to reflect behavioral intentions toward dieting, apart from health concerns per se.

Results

The findings are presented in the following manner. First, the three models are examined and compared. Second, interactions between variables are assessed to determine the functional separability of the three sets of determinants.

The first portion of Table 2 portrays the importance of substitutes, as well as changes in income spent on food, for explaining beef utilization. Perceptions of heavy use of beef--past, present, and future--showed a strong positive association with pork utilization and were negatively related to fish and poultry intake. These cross-product effects are presumably due to the relative prices of the commodities, as well as to additional factors affecting the substitutability of foods. Other economic effects provided significant as well. Dummy variables reflecting increases in the proportion of income spent for food, as well as no change in this proportion (with decreases in food consumption as the reference category), were both significantly related to beef utilization. Per capita income was not related to beef consumption at a significant level.

The second model in Table 2 presents significant sociodemographic determinants of beef consumption, which include gender, age, and size of the place of origin. Women, for example, consumed less beef relative to other meats and had reduced beef intake over the past year more than men. Older respondents generally indicated reduced beef consumption, while young adults tended to show no decreases in intake and had no plans to curb beef intake. Consumers raised in rural and small places evidenced greater preferences for beef than did those who grew up in larger urban areas. Educational attainment did not assist in explaining beef consumption.

Finally, the third model in Table 2 examines indicators of risk reduction in beef consumption decisions. Health and safety attitudes toward beef, such as the concern that animal fats are unhealthy and that beef is high in

Table 2. Unstandardized coefficients for three models of beef consumption (maim effects) (N = 632)[a]

	Model I: Economic determinants	Model II: Social structural determinants	Model III: Consumer sentiment determinants	Full model
Pork consumption	.23(.05)*[b]			.16(.04)*
Fish consumption	-.13(.05)*			-.13(.04)*
Poultry consumption	-.23(.05)*			-.18(.05)*
Vegetable consumption	.04(.05)			-.03(.05)
Fruit consumption	-.01(.05)			.01(.05)
Per capita income	-.02(.02)			-.01(.02)
Change in % of income spent on food				
Larger percent	.24(.11)*			.30(.11)*
Same percent	.34(.12)*			.46(.11)*
Sex of respondent				
Female		-.36(.08)*		-.16(.08)
Respondent's age		-.01(.00)*		-.01(.00)*
Respondent's education		-.03(.02)		.00(.02)
Respondent's place of origin (by size)		0.7(.02)*		-.06(.02)*
Health concerns			-.25(.04)**	-.19(.04)*
Social acceptance concerns			-.01(.03)	-.01(.04)
Dieting intentions			-.17(.03)*	-.15(.04)*
R^2	0.12	0.05	0.10	0.22

[a] The sample size was 632 for these models because of missing data for one or more variables in 193 cases.

[b] Values in parentheses indicate standard errors of the estimates.

* Indicates significance at .01 level.

cholesterol, were negatively related to beef consumption. Frequently dieting was also related to lower beef consumption. Concerns for social acceptance that affect food intake, such as following food fads and eating what friends eat, were not directly linked to beef consumption levels.

The full main effects model is also shown in Table 2. A coefficient of determination of 0.22 for this complete model can be compared to 0.12 for economic determinants used alone, 0.10 for indicators of consumer sentiment, and 0.06 for sociodemographic determinants. While the full-model R^2 appears low, it represents an improvement over previous studies. The most current and precise data on beef intake emanate from the Nationwide Food Consumption Survey, which also includes economic and demographic variables but excludes attitudinal variables. In an analysis of this data by Haidacher et al. (1982, p. 123-132), using income and social structural variables to explain beef expenditures, an R^2 of 0.08 was obtained. Likewise, Sapp (1984, p. 99) obtained an R^2 of 0.17 using household expenditures for beef as a dependent variable and a wide range of economic and demographic indicators as explanatory variables.

Each model, to this point, has treated only the main effects, without consideration of the manner in which interactions among variables affect consumption. Table 3 shows the results of interacting variables between models (with no consideration of intramodel interaction). Only two models were interacted at a time because of the large number of variable combinations. In two of three cases, the interactions did not provide significant additions to the original main effects models, as shown by the F-tests for R^2 in Table 3. Thus, MI and MII, as well as MII and MIII, were functionally separable, so that social structural effects (MII) had no strong interactions with other variables.

Interacting MI and MII variables revealed a significant improvement in R^2 over a main effects model. An increase in pork utilization and dieting interacted positively with an increase in beef consumption. Similarly, heavier utilization of fish and a concern for health depressed beef consumption. While the microeconomic and consumer sentiment variables showed some interactive effects in regard to beef intake, the nature of the effects suggest that substitutions are occurring, especially where risks associated with beef consumption are perceived to be high. In other words, the microeconomic and risk reduction perspectives show a pronounced negative association in those cases where interaction effects were strongest.

In sum, only five interactions out of 70 were significant at the 0.01 level. The empirical separability, as well as the negative relationships, associated with the models further clarifies the functional differences in the three explanations of consumption.

Patterns in consumer decision making

In the selection of food for consumption, some sort of evaluation occurs. The basis for that ultimate food choice is the primary interest of this study. Historically,

Table 3. Additions to coefficients of determination (R^2) with interactions included in consumption models (N = 632)[a]

Aggregated models	Main effects		Main effects and Interactions
Models I and II	R^2 = .15 (df - 12)		R^2 = .22 (df = 44)
		F-test[b] = 1.67 (N.S., P < .01)	
Models I and III	R^2 = .17 (df = 11)		R^2 = .25 (df = 35)
		F-test = 2.65 (Significant, P < .01)	
Models II and III	R^2 = .13 (df = 7)		R^2 = .16 (df - 19)
		F-test = .93 (N.S., P < .01)	

[a] Because of the large number of possible interactions with the three models combined, two models at a time were considered, interacting only variables representing separate models. (No intramodel interactions were included).

[b] The F-test measures the significant change in R2 accruing from the addition of interaction effects, while controlling the number of variables in the main affects models versus the interactive models. The formula is:

$$F = \frac{(R^2_{MI} - R^2_{M})/(k^{MI} - k_{M})}{(1 - R^2_{MI})/(N - k_{MI} - 1)}$$

where "M" refers to the main effects models only, "MI" refers to the models where interaction effects have been included with main effects, and "k" represents degrees of freedom.

research has concentrated on utilitarian aspects of food choices. In spite of the importance of this approach, it obfuscates the multifaceted aspect of food consumption behavior.

Three explanations of beef utilization have been empirically evaluated in this article. The microeconomic perspective lends support to the assertion that an individual's decision to consume a particular food is not an independent decision, but one made with reference to the other items that are available. Changes in purchasing power, or the proportions expended for food, also was an

important parameter in explaining levels of beef consumption. Other factors, such as per capita personal income, did not increase the explanatory power of the microeconomic model.

Social structural effects were useful in explaining beef consumption, although in subsequent studies additional structural parameters should be applied. The consumer's locational configuration within the social structure provides a basis of socialization and a set of behavioral expectations. In this study, young males raised in rural or small places tended to eat more beef than older females living in larger, urban places. That place of origin was a significant factor in beef consumption also suggests that, in some cases, eating habits are retained from childhood. Those patterns established in early learning phases of the life cycle may explain a lifetime of food habits.

Risk reduction, or consumer sentiment regarding the appropriateness of beef, offered a direct explanation for perceived changes in consumption patterns. Willingness to eat beef was reflected, to a significant extent, by health concerns, such as concerns about cholesterol content and about the degree of animal fat in meats. Social acceptance concerns, including the tendency to eat what friends are eating and to follow food fads, did not account for differences in beef consumption. Although it could be presumed that the social risks attached to eating beef are negligible, dieting was significantly related to beef consumption and there is an implied need for social acceptance in much dieting behavior. Consumer sentiment tapped attitudes toward categories of behavior, including the appropriateness of foods for health and for social acceptance. Thus, examination of consumer sentiment provided the focus for obtaining information on perceived consequences of specific types of consuming behavior.

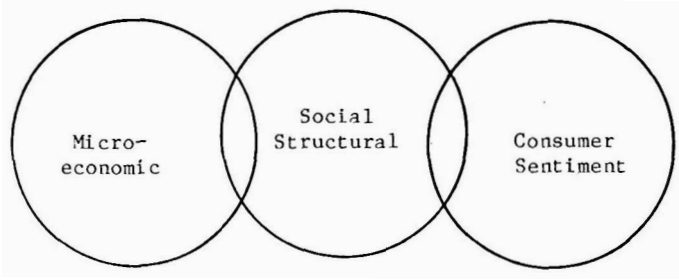
Explanations and outcomes

The three approaches, economic, social structural, and risk reduction, were intended to provide a comprehensive explanation of consumption, each yielding a single general perspective. As can be seen, however, each perspective provides a unique, but insufficient, contribution in predicting beef consumption. Further, each approach furnishes a different orienting strategy or context that proves useful.

The problem faced is one of determining whether these competitive approaches can be incorporated into a more comprehensive whole. Wagner (1984) provides a means for assessing the complementarity of the theoretical approaches. These methods include examining the (a) theoretical structure, (b) domains of explanation, and (c) conflict in predictions of separate explanations of behavior.

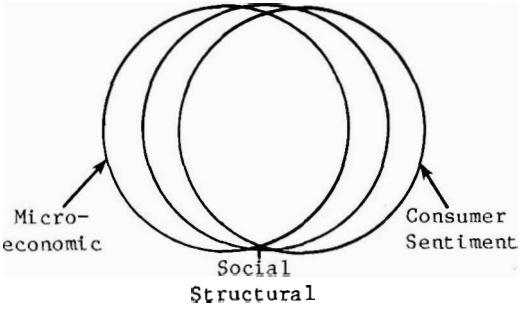
Figure 1 is generated by use of Wagner's (1984, p. 73) method. Section A of the figure suggests that the structures of the three explanations differ because of divergent assumptions regarding consumption behavior. The microeconomic perspective presumes that income and prices of beef and beef substitutes affect the choice of beef. The underlying rationale here is that beef is a preferred food

Figure 1
Compatability of models for explaining consumption behavior



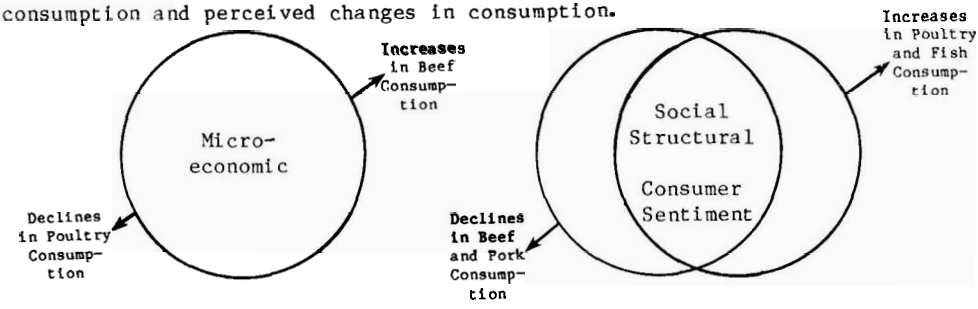
A. Structure of the Explanations

The structure of each explanation incorporates only a small portion of the concepts and ideas of the other explanations.



B. Domain of Explanations

The phenomena explained by all three is fairly similar, i.e. personal consumption and perceived changes in consumption.



C. Conflict in Predictions

There is disagreement as to future consumption, with different outcomes projected.

and that, controlling for the cost of substitutes, the more income you have, the more beef you will consume.

A basis for social structuralism is the notion that positions within the social structure provide the mechanism for explaining behavior. The underlying rationale for this framework is that eating is a social activity and that beef is consumed more heavily by members of certain groupings of individuals, in this case, young adult males with lower educations and with rural origins.

Like the other two perspectives, the risk reduction approach also possesses straightforward assumptions guiding an explanation of consumption behavior: the willingness to buy and eat food items based on health and diet concerns. Thus, the degree to which beef as a commodity is associated with such concerns affects the amount consumed.

While the underlying assumptions for the three approaches are highly variant, the domains of analysis are quite similar (Figure 1, Section B). The phenomenon each model attempts to explain is identical, although food expenditures rather than consumption per se typically provide the focus for the microeconomic theory. Additionally, the demographic inputs could be correlated with actual amounts consumed; i.e., a physiological relationship between age/sex structure and consumption could be emphasized. All three approaches, however, easily focus on beef consumption and perceived changes in consumption.

The last portion of Figure 1 (Section C) deals with the degree to which predictions provided by the explanations agree. As indicated, there exists a lack of congruency in the prediction of outcomes. With a continuation of the long-term trend of annual per capita increases in income, beef consumption should be expected to increase. As the population ages and becomes better educated, however, and as origins reflect more "urban" consumption patterns, consumption of beef is anticipated to decline, based on the Texas survey data. Finally, consumer sentiment suggests that where health and diet are concerns, beef consumption is reduced. Should information on the health risks associated with beef intake become more prominent, then consumption of this commodity should continue to decline.

If one theoretical approach proves correct and the others incorrect, can the explanations that were wrong be deleted from further research? As is the case with most theoretical explanations, each of the orienting strategies proved useful in empirical analysis. Although none of the three were empirically powerful explanations of beef consumption, each perspective made a considerable contribution. The research brings to the fore the multidimensionality of consumption behavior and provides tentative parameters for monitoring changes in consumption. Further research on the changing structure of demand for foods should be geared to this multifaceted aspect of consumer decision making.

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Appendix A. Variables comprising the "beef" factor

Item	Factor Loadings
Relative rank of beef on amount consumed	.613
Current intake of beef relative to past year	.763
Current intake of beef relative to future intake (one year forward)	.602
Percent of variance explained: 47.6	

Appendix B. Consumer sentiment variables and factors

Item	Factor labels and loadings	
	Health concerns	Social acceptance concerns
Natural foods are safer than processed	.522	.049
Beef is a good source of calcium	-.431	.481
Animal fats are unhealthy	.676	.096
Most beef is low in cholesterol	-.480	.173
Stay abreast of what experts say about food	.470	.198
Follow food fads	-.145	.753
Tendency to eat what friends eat	.157	.691
Concern over weight loss and beef consumption	.256	.497
Percent of variance explained	20.000	18.500