A SOCIOECONOMIC EVALUATION OF CONSUMER ACCEPTANCE OF BUFFALO FISH

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CHAPTER I

INTRODUCTION

The Problem

Rice farmers, in an attempt to utilize land diverted from rice production by the Government Price Support Program, have initiated the production of farm-raised fish on a commercial basis. Fields that could not be seeded to rice were diked, flooded, and stocked with fish. Growing fish on rice land restores soil fertility, while flooding destroys weeds and grass that reduce rice yields. Total beneficial effects of fish and water on subsequent rice crops have not been completely determined.

The fish farming industry has grown from a few reservoirs in the 1940's to approximately 30,000 acres by 1960. It is estimated by the Fish and Wildlife Service that low lands in Arkansas and adjoining states offer a potential of several million acres for the commercial production of fish.

Production of fish in rice fields and reservoirs has been primarily on a trial and error basis. Very little technical knowledge is available on the most suitable species to stock, on combination, time and rate of stocking, supplemental feeding, fingerling production, and reservoir limnology. Present harvesting methods are inefficient and costly because of the tremendous amount of hand labor involved.

The Bureau of Sport Fisheries of the Fish and Wildlife Service in cooperation with the Division of Agriculture of the University of Arkansas has established a fish experiment station at Stuttgart, Arkansas to aid farmers with their biological, production, and management problems.

In any stocking combination, the buffalo fish is the major specie used. It has several beneficial characteristics that are not common to other species. The buffalo fish is a good herbivorous feeder and is tolerant to water with high temperature, high mineral and low oxygen content. It has the ability to grow rapidly and to propagate freely in impounded waters.

For the fish enterprise to fit into the crop rotation system used on most rice farms, a marketable product must be produced in a two-year period. In a growing period of this duration, a high percentage of the fish will weigh less than four pounds which will result in a price discount in the wholesale markets.

As is the case in many newly developed industries, buffalo fish producers encountered difficulty in establishing a market for their product. In 1958, the fish farmers formed a cooperative association to facilitate the marketing of farm-raised fish. A modern processing, freezing and cold-storage plant was built in Dumas, Arkansas.

Historically, fresh fish have moved to the consumer through wholesale distributors to retail fish markets. During the decade of the 1950's the number of retail fish markets in the United States decreased by approximately one-half. Thus, it was imperative that the Fish Marketing Cooperative Association evaluate modern merchandising methods and changing food preferences and buying practices of consumers.

Included among today's fishery products are a wide and diversified number of prepared and semi-prepared items, mostly frozen. There are fish sticks, fish portions, and any number of different seafoods, all of which are ready to put into the oven, heated, and served. Therefore, in order for farm-produced buffalo fish to compete successfully with these products in the market place, the cooperative must market it in the form, size, and place most desired by consumers.

Purpose of the Study

The primary purpose of this study was to evaluate the economic feasibility of marketing packaged buffalo fish through meat counters in supermarkets. Specific objectives were: (1) To evaluate the market potential of buffalo fish in terms of sales per thousand store customers, (2) to analyze the effects of socio-economic characteristics of the population on consumer acceptance of buffalo fish, and (3) to examine the influence of ethnic group values in consumers' conceptual image of buffalo fish.

To measure the importance of the objectives, the following hypotheses were developed as a basic framework for the study:

1. The housewife prefers to purchase fish in a pan-ready form rather than whole-dressed.
2. A higher proportion of mid-south consumers would purchase fish through supermarkets than would mid-west consumers, if buffalo fish were available at comparable prices.
3. There is an inverse relationship between income status of consumers and sales of buffalo fish through supermarkets.

4. Buffalo fish sales are higher among Negro than Caucasian store patrons of supermarkets.
5. Group value associated with different occupational groups, different sizes of households and different compositions of families will influence sales of buffalo fish.
6. The socio-cultural background of the homemaker--such as nationality, religious preferences, income status, occupation, size of household and composition of family--influences her conceptual image of the product and her willingness to use it again.

Definition of Terms

The following definitions were selected as the most useful for this study:

Belief--"A belief is an enduring organization of perceptions and cognitions about some aspect of the individual's world. A belief is a pattern of meaning of a thing; it is the totality of the individual's cognition about things."[1]

Attitudes--An attitude is an "enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individual's world."[2]

Product--A product is defined as that combination of attributes of a good which distinguishes it from some other combination of attributes of a good.

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[1] David Kreck and Richard S. Crutchfield, Theory and Problems of Social Psychology (New York, 1948), pp. 150-151.

[2] Ibid., p. 152.

Consumer acceptance--The term as used in this study refers to the extent to which a product will sell in a given market situation in competition with certain other products at a fixed price relation. A product may not sell at all in one situation and hence is unacceptable; in other situations it may sell very well. This definition appears to be in general agreement with Burrow's definition of an "acceptance study" as a measure of the quantities bought or number of buyers of a commodity.[3]

Consumer preference--The "preference" of a consumer or group of consumers for a product means that in a given situation that product is the most desirable of two or more alternatives. Preference, like acceptability, is thus defined in terms of a given situation.[4]

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[3] Glenn L. Burrows, "Consumer Acceptance or Consumer Preference," Agricultural Economic Research, IV (1952), pp. 52-56.

[4] Ibid.

CHAPTER II

REVIEW OF LITERATURE

A diligent search of the literature failed to disclose any studies of consumer acceptance of fish. This section will review briefly some of the more recent consumer acceptance studies of other selected products concerning the purpose, objectives, procedure, analysis and conclusions.

Purpose and Objectives

In the literature on consumer behavior, there seems to be no clear demarcation between consumer acceptance studies and those of consumer preference and product evaluation studies. The purpose of preference studies is to obtain a certain ranking, an assertion that one member of a class of alternatives is preferred over other members. The purpose of an acceptance study is to measure the extent to which a product will sell in a given market situation or will be consumed in a given eating situation.

The implied objective of most studies has been the selection of the most popular one of two or more alternatives. However, the emphasis of this broad objective was usually conditioned by other objectives. In an acceptance study by Drvoskin and Jacobs, the major objective was to

assess the potential market for potato flakes and to appraise the effect of potato flakes as a method of expanding the market for potatoes.[1]

Another study, in an attempt to evaluate the market success of a new product, had as an objective, "What could be expected by way of consumer acceptance and rate of sales of the new product?"[2]

Greene stated as an objective, "to determine if waxing and coloring resulted in an increase in sales of potatoes so treated."[3]

Campbell's objective "was to gain knowledge about consumer preferences for various qualities of beef under actual purchase and consumption conditions."[4]

Rhodes and associates studied consumer acceptance, but from an entirely different point of view than in the above studies. The objectives as given were one of consumer evaluation of product attributes and whether the consumer's idea of quality difference agreed with the quality differences as now recognized by the grading system.[5]

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[1] Phillip B. Drvoskin and Milton Jacobs, Potato Flakes -- A New Form of Dehydrated Mashed Potatoes; Market Position and Consumer Acceptance in Binghamton, Endicott and Johnson City, New York, U. S. Department of Agriculture, Marketing Research Report, Number 186 (Washington, 1957), p. 3.

[2] Robert V. Enockin, J. Scott Hunter, and Roland G. Harris, Canned Cooked Rice, The Market Potential for a New Food Product, U. S. Department of Agriculture, Marketing Research Report Number 249 (Washington, 1958), p. 3.

[3] R.E. L. Greene, Consumer Acceptance of Waxed and Colored Potatoes Southern Cooperative Series Bulletin Number 22, February, 1952, p. 4.

[4] George W. Campbell, Consumer Acceptance of Beef, A Controlled Retail Store Experiment, Arizona Agricultural Experiment Station, Report 145 (Phoenix, 1956), p. 1.

[5] V. James Rhodes, et al., A New Approach to Measuring Consumer Acceptability of Beef, Missouri Agricultural Experiment Station Research Bulletin 677 (Columbia, 1958).

Statistical Design

There are several techniques designed to measure consumer behavior and product acceptance. Greene used a matched-lot experimental design in his potato studies.[6] This technique involves offering simultaneously two or more separate lots of the product under study, varying only in the attributes being tested. The differences in volume of sales between the lots are assumed to indicate the extent of consumer acceptance.

Campbell used a combination of store sales plus home interviews to obtain information on consumer acceptance of beef. In the store sales, all test products were displayed for sales in an experimental design consistent with acceptable procedures, yet indistinguishable from other products. Home interviews, using a 100 percent sample of the purchasers of the products tested, were designed to obtain information about family characteristics, methods of preparation, satisfaction rating and the attributes contributing to these ratings, and the purchaser's knowledge and use of official U. S. Department of Agriculture beef grades.

Studies with the major objective of determining "market potential" for selected products generally used the method of retail store audits for obtaining sales information. Most of these studies supplemented these audit data with information on consumers' opinions and attitudes of the test product obtained by household interviews.

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[6]Max E. Brunk, Methods of Research in Marketing Paper Number 1, Evaluation of Research Techniques Used for Measuring the Influences of Factors Believed to be Associated with Volume of Consumer Purchases in Retail Stores, Cornell University Agricultural Experiment Station, (Ithaca, 1951), pp. 25-31.

In most retail store audits, a detailed inventory of the test item, as well as closely competing items, was taken at the beginning, at specific intervals during and at the conclusion of the test period. Actual sales were obtained by adding deliveries to beginning inventories and then subtracting from this total, ten ending inventory.

The only valid inference that can be drawn from these results is an indication of what consumers choose among offered alternatives. However, they offer an excellent means of eliminating the influence of price and other variables in measuring consumer acceptance of a product. Rhodes and his co-workers used a two-stage cluster sampling procedure to select a panel of 266 households.[7] This represented a probability sample of the white households with annual income of $2500 in the city and county of St. Louis. Two adults in each household received a total of 6 pairs of frozen steaks which they cooked, ate, and evaluated. These 6 pairs of steaks included 2 replicates of 3 comparisons, commercial-choice, prime-good, and choice-choice. Acceptance rating and a preference choice was obtained on each pair of steaks.

In the study evaluating consumer acceptance of tenderized beef, the experiment was designed so that each household received two control and two tenderized steaks of each grade tested.[8] The four treatments of each grade for one household were prepared from the same beef carcass. The control steaks were tenderized in a commercial cubing machine and the test steaks were dipped in the tenderizing solutions. The steaks

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[7]Rhodes, Predicting, pp. 8-9.

[8]McHugh, p. 6.

were delivered to the household once a week for eight weeks. At each delivery the interviewer furnished the householder with an evaluation schedule on which the two adult members of the family listed their separate opinions of the product. (A nine-point hedonic scale was used to indicate acceptability of the steak while a four-point scale was used to measure each of three sensory characteristics.)

Analysis

The analysis of the acceptance situations of a number of studies relied upon either the quantity sold or the distribution of sales. In some cases these were correlated with responses to the characteristics of the product.

Consumer acceptance of waxed and colored potatoes was measured by the ratio of sales of waxed to unwaxed potatoes. "When waxed and colored and unwaxed, new-crop potatoes were displayed side-by-side and offered at the same price per pound, consumers purchased more waxed than unwaxed potatoes."[9]

Campbell measured acceptance by the distribution of beef purchases and related these to consumers' opinions of and satisfaction with the product. "That most consumers preferred lean-beef is shown in the analysis of what consumers bought, why they bought, and the degree of satisfaction they experienced after consuming the 'experimental' beef they had bought."[10]

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[9] Greene, p. 18.

[10] Campbell, p. 3.

In a study evaluating market potential for new products, acceptance was interpreted by the quantity sold and the ratio of sales of the new product to sales of closely competing products.

Rhodes and associates at Missouri interpreted acceptance as a favorable score on a hedonic scale. "The descriptive hedonic rating scale used to obtain ratings of each steak sample in the comparisons by each panel member in the household assigned a numerical rating of 1 to 9 to facilitate analysis. The smaller number denoted a superior rating while the higher number indicated an inferior rating on the hedonic scale."[11]

Summary

The research techniques which have been employed in the literature reviewed, represents a variety of approaches. Some methods do not exercise control over variables except through restrictive sampling. These methods prescribe statistical analysis in controlling the effect of nontest variables after the data have been collected. Other techniques exercise some degree of control over variables through experimental designs.

The matched-lot, controlled experimental design used by Greene provides the analyst with an automatic means of eliminating the effects of a major proportion of nontest variables, if care is taken to alternate display locations of the matched-lots and to maintain constant differences between lots. A careful analysis of the results is necessary so that inference will not be drawn regarding sales volume or

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[11] Rhodes, Predicting, p. 13.

degree of acceptance by the customer when either of the matched-lots is offered alone. This is one of the criticisms Burrows made of Greene's analysis.[12]

Campbell, Drvoskin and Enochian in their studies used the store audit technique to measure consumer acceptance. The final decision to buy or not to buy, to select this over that, must be at the time and place of purchase. Consumers' actions are recorded, hence the results should be more reliable than certain types of questionnaire techniques. However, it is difficult to actually generalize the impulse within the consumer which induced this behavior and the reasons for the behavior. Thus, it records only positive action, and it indicates quantity sold, not why or to whom.

Because of the above limitations, stores' audits were supplemented with data obtained by the personal interview technique. By using the two techniques, there was the possibility of overcoming some of the weaknesses of both techniques. But the researcher was still faced with the problem of time limitations because it is very difficult to determine whether the person would make the same choice the second time.

In the three studies, the authors gave no criticism of the techniques used in analyzing their data, nor limitations to the use of the results due to analytical techniques used.

In the Missouri studies reviewed, the researchers used a taste-test panel to discriminate among product attributes being evaluated. The panel members were usually families drawn from a predetermined universe. The measure of acceptance of the attributes being tested was a favorable score on a hedonic rating scale.

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[12]Burrows, p. 55.

The ranking or multiple comparison test requires the panel member to evaluate one attribute against another in the experiment. In a paired comparison test, one of a pair becomes a standard by which the other attribute is measured; but whether either attribute is actually preferred for use, or is acceptable, cannot be detected by this technique. Such a test has limited value because the test is confined to the comparison on only two attributes. The number of attributes may be expanded to permit multiple ranking, but the number of items which can be compared at one time is limited. However, the scoring method allows opportunity for panel members to express a measure of intensity of preference.

No single method is adequate for prediction of consumer choice. Prediction remains an art, but the techniques that have been developed for measuring consumer reaction to products and for uncovering consumer attitudes can help to reduce the margin of error in the practice of the art of prediction.

CHAPTER III

THEORETICAL MODEL AND EXPERIMENTAL PROCEDURE

The purpose of this chapter is to (1) present a conceptual framework for estimating the influence of various factors on consumption and (2) describe the empirical methods used for quantifying the relevant variables of the model and their impact on consumer acceptance of buffalo fish.

The Conceptual Framework

The theory of consumer behavior provides a conceptual framework for estimating the influence of various factors on consumption.

In the study of demand, an approach is needed that will allow the analyst to deal directly with heterogeneous choices among unlike goods as compared with choices among different quantities of the same good. It needs to provide an effective way of getting at the dynamic aspect of demand and identifying the motives which lead to changes in the pattern of living.

Consumer expenditure behavior is a function of economic conditions and motivational forces. Economic conditions such as price, price relationships, income and availabilities of goods and services set more or less flexible limits within which motivational forces operate. It is necessary to distinguish between two kinds of motivational forces,

those that depend on or vary with situational or environmental circumstances, and those that depend on individual attitudes and beliefs. Changes such as income status, occupation, family formation, birth, and growth of children are examples of environmental precipitating circumstances. The second kind of motivational forces, beliefs, attitudes and expectations, operate as a kind of filter. They may hinder action even though enabling conditions are favorable and precipitating circumstances are strong.

Motivation

Human behavior has been grouped into three major categories: motivation, cognitions and learning.[1] Motivation arises out of tension systems which create a state of disequilibrium. This triggers a sequence of psychological events directed toward the selection of a good which the consumer anticipates will bring about the release from tension and the selection of patterns of action he anticipates will bring him to the good.

The problem of identifying human needs has caused considerable controversy among psychologists. Numerous lists of motives have been devised, most of which have placed major emphasis on the emotional aspect of behavior.

Maslow has pointed out that basic needs may be either unconscious or conscious, but they are often largely unconscious. In his opinion, several or all of the basic motives work simultaneously to determine a given behavior. His lists of basic needs to be used in the theory of

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[1] James A. Bayton, "Motivation, Cognition, Learning - Basic Factors in Consumer Behaviors," The Journal of Marketing, Volume XXII-3, January, 1958, p. 282.

human motivation include physiological safety, belongingness, love, esteem, self-actualization, and aesthetic needs, and the desire to know and understand.[2]

Bayton states that psychologists agree that human needs fall into two general groups--biogenic (hunger, thirst, and sex), and psychogenic (affectional, ego-bolstering and ego-defensive).[3] There is considerable disagreement relative to this latter category.

Murphy has stated "The trouble with lists of motives lies not in their length but their sharp separation of one drive from another, their sharp separation of innate from acquired needs, and their sharp demarcation of focus points in the body which are supposed to underly motive toward a goal."[4]

Motives do not exist as separate unrelated entities, but rather as dynamic interdependent needs. Every human being shows behavior directed toward the satisfaction of needs, some of which are present because he is a biological organism, some because he is a member of a social group, and some because he is a unique individual whose history of experience and learning is different from that of anyone else.

Exact classification of the motivating forces is not necessary. It is important to consider them as a set of needs; that is, several

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[2]Abraham H. Maslow, Motivation and Personality, (New York, 1954), pp. 80-106.

[3]Bayton, pp. 282-283.

[4]Gardner Murphy, Lois B. Murphy and Theodora M. Newcomb, Experimental Social Psychology (revised ed., New York: 1937), pp. 98-99.

physical or social, or a combination of physical and social combined into a set, recognizing that there can be complementary, supplementary or competing needs. Thus, action is not necessarily meant to gratify a specific need, but it may be directed toward the fulfillment of a combination of needs.

Cognition

Cognition refers to the behavior space in which all of the mental phenomena are grouped. Through perception, memory, evaluating, and thinking, the individual attempts to integrate the needs on one hand, and the facts of the external world on the other. The integrating is done in a manner which he anticipates will have the highest probability of bringing him gratification of a particular need-pattern. Thus, behavior space is the conceptual area of selections among alternative goal objects and the physical activities requisite to the final behavior.

The structuring of psychological reactions may serve to clarify the concept of the behavior space. This structuring has been described as follows:

> An event occurring first in the real world sets up a disjointed chain of psychological reaction. Roughly speaking, facts, which we shall conceive of as occurring in some kind of "stage one," influence perceptions (stage 2), but in an imperfect way, as already pointed out. These in turn, affect valuations (stage 3), which emerge as intentions (stage 4), finally resulting in some kind of observable behavior (stage 5), which may be followed by a perception of the discrepancy between what was intended and what was accomplished (stage 6).

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[5] Joseph Clawson, "Lewin's Vector Psychology and the Analysis of Motives in Marketing," Theory in Marketing, R. Cox and W. Alderson, eds. (Chicago, Irwin, Inc., 1950).

The principal concepts of the theory can be explained relative to this structuring. These principal concepts are individually patterned totalities, immediacy, subjectivity, and dimensionality. Human personality and behavior are thought to be individual totalities since all the desires within a person are considered. There may be an array of many factors which can possibly influence the behavior of an individual, but the concept of immediacy explains behavior in terms of those factors that are operating the instant the event occurs. The concept of subjectivity limits the variables important to behavior to those which a person perceives. The person may perceive only a small number of the "observable" variables in a purchase situation, and furthermore, the valuation of those perceived variables is in terms of what the person thinks and believes about them. That is, satisfactions exist only if the individual thinks they do. The concept of dimensionality means that the property of each object or event is conferred with specific intensities, or degrees. These intensities are conceived as weights in favor of, or against, an action.

The facts in stage one do not have a logic of their own that results in the same conseptions and cognitions for all people.

These facts must be taken into account in explaining human behavior only to the extent that they make a difference to the individual at the moment in question. New facts received by an individual are essentially filtered through his belief matrices; as a consequence, these belief matrices determine what he actually perceives.

It is to be expected therefore, that beliefs and attitudes not only will select an individual's perceptions, but will also tend to

determine the meaning with which the individual will experience the perceptions. New facts, in one way or another, will be assimilated, and the basic beliefs and attitudes may not have changed.[6]

When the initiating force asserts itself, a variety of goal-objects come into awareness as potential sources of gratification. The belief-value matrices are the cognitive categorization, beliefs and values of an individual relative to these potential sources of gratification. The matrices contain the typed images of objects which the individual possesses by virtue of the differentiations and categorizations of the goal objects which he has previously acquired. The typed images can be conceived to be arranged along functionally defined "generalization dimensions." The relative location along these dimensions stated in terms of such units, of the different images, would indicate the degree of functional similarity among such images.[7]

The goal-objects can be grouped on the basis of the extent to which they arouse similar expectancies. This phenomenon of similarity of expectations within a set of different goal-objects is known as generalization. A goal-object, because of its associated expectancies, can be assumed to have maximum appeal within a set of alternative goal-objects. The alternates then can be ordered in terms of how their associated expectancies approximate the one with the maximum appeal. This difference in ordering and the psychological distance are referred to as generalization gradients.[8]

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[6]Krech, p. 191.

[7]Edward C. Tolman, "A Psychological Model," Toward a General Theory of Action, eds., T. Parsons and Edward A. Shils (Cambridge, 1951), pp. 290-291.

[8]Bayton, p. 287.

The generalization gradients and locomotion are centered in the behavior space. The various goal-objects have attributes which permit the individual to differentiate between them. These differentiating attributes, from the viewpoint of the individual's perception, are called signs or cues. All signs or cues are not equally important in consumer decisions.

Locomotion is the selection from one or more perceived immediately-possible behaviors. A locomotion in the behavior space is thus, not a behavior itself, but a selection or a series of selections which results in a behavior or in behaviors.[9]

The generalization, discrimination, and evaluation motives are all a part of orientation of a personality. In the process of orientation, products are generalized, particular attributes of each product are discriminated, and finally, the product is evaluated. Discrimination concerns the cognition of differences between generic categories of objects, different objects within a category and different attributes of the same object in terms of the significance of these differences for the individual. Generalization is the process by which different objects and classes of objects are grouped together with respect to those properties which they have in common.[10]

Each variable and each class of variables can be visualized as a generalization gradient. There are as many generalization gradients as

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[9] Tolman, p. 300.

[10] Parsons, p. 126.

variables and the objects in each gradient are ranked. Besides being ranked, each object has acquired positive and negative valances corresponding in strength to the force for, or against, a particular action.

Where there exist alternative opportunities for gratification in a present situation and alternatives distributed among present and expected situations, the individual must have some means of deciding which of the alternatives or combination of alternatives he shall choose. The process of deciding among alternatives, and the assessing of the properties of the objects of valuation entails expectations.[11]

Learning

The evaluation of generalized groups of products and specific attributes is on the basis of expected contribution toward gratifying some set of needs. A choice must be made and an evaluation given productducts and attributes. In other words, beliefs about outcomes in part, determines action or behavior. But the beliefs do not need to be true, nor the action produce the expected outcome. If the outcome is not as expected and the individual recognizes this, then it may have an effect upon the personality system, and therefore, future responses to the same situation. This is called learning and is defined as a change in the categories designated as orientation. Learning involves how a person generalizes groups of products, how he discriminates between attributes, and how he evaluates them after this re-orientation to the

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[11]Parsons, et al., "Some Fundamental Categories of the Theory of Action," Toward a General Theory of Action, p. 11.

object world. Or, learning may involve some degree of substitution of one set of needs for another, or a change in the complementary relationship within a set of needs.

A choice is made from the orientation matrix which determines, in part, the action or behavior which results. But as suggested above, the results of the action may or may not be that which was expected. In either case, there is a feedback system which changes the orientation of the individual or the set of originating forces.

When utilization of the goal-object leads to gratifications of the initiatory needs, there is "reinforcement." When the same needs are activated again, the individual will tend to repeat the process of selecting the same goal-object. Each succeeding time that the goal-object brings gratifications, further reinforcement occurs. Continued reinforcement will influence the cognitive processes. Memory of the goal-object will be increasingly enhanced, and the generalization gradient will be changed in that the psychological distance on the gradient between products will be increased.

With continued reinforcements, the amount of cognition actively decreases; the individual engages less and less in decision-making mental activities. This can continue until, upon need aroused, the object-obtaining activities are practically automatic. At this stage, there is a habit.[12]

The perception and valuation of alternative goal-objects may be distorted or imperfect. The individual may come to the realization

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[12]Bayton, p. 288.

that there is a discrepancy between what is expected and what is actually obtained. This realization results in a reconstruction of the behavior space. It is not necessary that this realization of the discrepancy be at the extreme of the psychological chain. The re-evaluation can result from changes in the perceived alternative goal-objects at any time causing an adjustment.

Demand Theory

Demand theory is an area of economics which has not shown large change through the years. "During the three-quarter century of its existence, demand theory has passed through four recognizable stages."[13]

The first stage culminating in Marshall's theory of demand may be summarized as follows:

> A consumer with a given money income is confronted with a market for consumption goods, on which the prices of those goods are already determined; the question is, how will he divide his expenditures among different goods? It is supposed for convenience, that the goods are available in very small units. It is assumed that the consumer derives from the goods he purchases so much "utility," the amount of utility being a function of the quantities of goods acquired; and that he will spend his income in such a way as to bring in the maximum possible amount of utility. But utility will be maximized when the marginal unit of expenditure in each direction brings in the same increment of utility. For, if this is so, a transference of expenditure from one direction to another will involve a greater loss of utility in the direction where expenditure is reduced than will be compensated by the gain in utility in the direction where expenditure is increased (from the principle of diminishing marginal utility). Total utility must therefore be diminished, whatever transfer is made. Since, with small units, the differences between the marginal utilities of

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[13] J. R. Hicks, A Revision of Demand Theory (London: 1956), p. 1.

> two successive units of a commodity may be neglected, we can express the conclusion in another way; the marginal utilities of the various commodities bought must be proportional to their prices.[14]

Pareto's contribution of the indifference curve concept marks the second stage of demand theory. This circumvents the matter of utility, requiring instead that we know the individual's indifference map.

> The basic assumption now is that the consumer distributes his expenditures on the two goods according to a definite "scale of preferences." His "tastes" on this assumption are such that he can arrange all possible purchases of the goods in ascending order of preference and, given any two alternative sets of purchases, he can either tell which purchases are preferable or say they are indifferent to him.[15]

The third stage includes, among others, the works of W. E. Johnson, E. Slutsky, and Hicks' Value and Capital. A number of attempts were made to provide a theory which was capable of being applied.

> It may be claimed that some progress was made by writers of this group toward making Pareto's theory more usable, and at the same time of weaving the Marhsallian and Paretian threads together. Though the terminology, and the diagrammatic apparatus, remained Paretian, the substance of the theory drew steadily closer to Marshall.[16]

Samuelson's development of a mathematical argument to show that a theory of consumer demand does not even require knowing the individual's preference differences, marks the beginning of the fourth stage of the

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[14] J. R. Hicks, Value and Capital, (2nd ed. Oxford, 1946) pp. 11-12.

[15] I. M. D. Little, A Critique of Welfare Economics, (Oxford, 1950) p. 15.

[16] Hicks, A Revision, pp. 2 and 3.

development of demand theory. Samuelson's "Revealed Preference" theory submits that consistency of choice is sufficient; the only requirement is that there be a unique reaction to a given price and income situation. "The econometric theory of demand does study human beings, but only as entities having certain patterns of market behavior."[17]

Two general approaches to the indifference surface seem to be an analysis of group behavior and revealed preferences of individuals. The purposes of both approaches are the same and that is to tell how consumers react to variations in current prices and income.

The consumer is a member of society in which socio-cultural norms, group attributes and beliefs, as well as her own emotions, all influence her purchasing decisions. She is a member of a group, and group belonging exerts a powerful influence on her decisions and behavior even without consultation or discussion. In addition to primary groups to which individuals belong, reference groups influence them. In many instances, group influence takes the form of similar stimuli affecting all group members and similar needs arising in them. This may be true of "statistical" groups; therefore, similarities in the behavior of income, occupational, age and life-cycle groups need to be included in the study of consumer behavior.

An Illustration of the Framework

An illustration may help to clarify the ideas embodied in the theoretical framework. A schematic outline of a model is presented in

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[17] Ibid., p. 6.

Figure 1. The explanation will be made in general terms without reference to a specific situation.

Knowing little about needs does not prevent using this model, nor does it prevent developing a better understanding of the other stages. However, the more that can be learned about needs, the more effective will be product design, production advertising, and consumer education.

The originating forces of action are simply listed as biogenic and psychogenic motives. It is important to note that there can be interaction among the drives.

Superimposed upon the originating drives and perception are the facts of the real world. These facts include the economic conditions and environmental circumstances. Facts are perceived and interpreted in terms of the individual perceiver's own needs, own emotions, own personality, and own previously formed cognitive patterns.[18]

The orientation of the individual in the schematic diagram is often called the belief matrix because all aspects of orientation are part of valuation. The particular grouping of products according to common properties, in part, determines if a product will be considered for a particular purpose. In the same way, the attributes of a product, contributing to the sum of the overall evaluation, in part, determines the value placed on a product for a specific purpose. The value placed on an attribute or product may be one thing for one set of needs, and an entirely different value with respect to another set of needs.

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[18]Krech, p. 94.

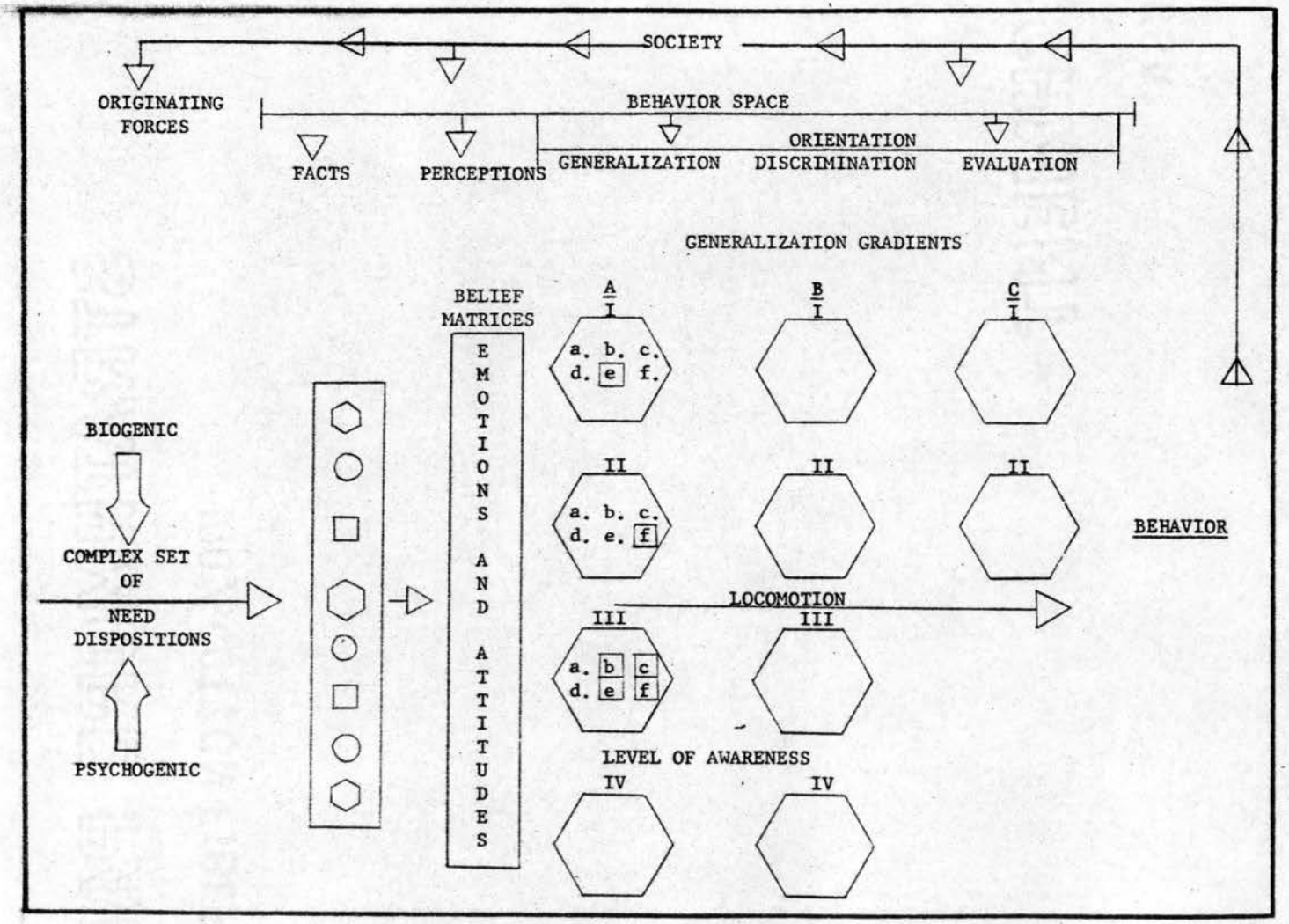

Figure 1. An Illustration of the Conceptual Model.

In the model, there are three generalization gradients of which the individual is aware, consciously or subconsciously. All three represent means of potentially fulfilling a set of needs. Generalization gradients A, B, and C may be thought to represent generic categories of variables. Generalization gradient A may be a product. In this case, A-I, A-II, A-III, and A-IV in Figure 1 could be different brands of Product A. However, brand A-IV is not conceived as an alternative. The consumer may not be aware that this brand exists. An obvious reason may be the consumer has never been exposed to the fact that it exists, or if she has been, the omission may be one of memory. These goal-objects (brands) have attributes which permit the individual to differentiate between them. In the example in brand A-I, the attribute a, may be price; attribute b, size; attribute c, taste; attribute d, tenderness; attribute e, texture and attribute f, odor. It should be noted that this individual is not aware of attribute e of product A-I, f of product A-II, nor b, c, e, or f of product A-III. Generalization gradients B and C may be other generic variables such as stores and distance. All attributes are not equally important in consumer behavior. The evaluation of each attribute can be positive or negative, hence the sum for one product can be positive or negative in the sense that it will contribute to the gratification of whatever set of needs has been set in motion. In terms of this model, objects and the attributes of objects become the means to an end...the means of gratification of needs.

In the diagrammatic illustration, the feedback system operates back through society. Obviously the sanctions of society delineate areas

where behavior is permissible. But learning also is conditioned and determined by the particular social institutions and sanctions. Therefore, learning will depend upon communicative ability, the language, interaction of people in groups, and institutions contributing to and controlling communications.

A common theoretical position among sociologists, economists and social psychologists is that much behavior is influenced by the reference groups to which individuals belong. Recently, there has been a tendency to speak of status role rather than reference groups, avoiding the necessity for specifying some actual groups of people. In any case, prediction of individual behavior requires predicting just which groups or status role will be seen as relevant and important, and second, what sort of actions will be seen as increasing status affiliations or as satisfying the requirements of that group or role.

Level of Consumer Decision-Making

It is the thesis of this paper that consumer purchasing behavior patterns are determined by economic and environmental factors, in relation with the values of the ethnic groups which she is associated. How she orientates the product to a particular situation with her ethnic-group values or status role will depend to a large extent on her individuality, opinions, beliefs, and past experiences.

The writer has endeavored to prove this hypothesis by analyzing data on sales of, and consumers' favorableness toward, buffalo fish for significant differences among economic and environment factors, and ethnic groups.

Recognition by the consumer of their needs to be satisfied is the beginning process. The intervening processes involve the orientation of factual information about product attributes and evaluation of the relative effectiveness. Such technical know-how must then be matched with market know-how; that is, how these products are identified in the market, how they are packaged, displayed, advertised and sold and where they are available. The final step prior to purchase is a resolution of the cost with other demands on the funds available. This resolution within a family may take several forms depending upon the household organization and relative power of the decision-making forces within the household. Actual purchase is followed by preparation for use and decision as the competing or complementary products that will accompany evaluation of the end product in use. The evaluation supplies information about the future needs and the potentialities of similar products for meeting such needs in the future.

Experimental Procedure

There is no known method for predicting the future with certainty. Instead, generalizations can be made about the influence of variables when they are studied in relation with other variables under controlled conditions. Generalizations can indicate the direction of change, and perhaps the magnitude of change in certain basic assumptions are maintained. Through this knowledge of the way in which certain variables react under assumed conditions, it may be possible to predict the way in which the variables will react under similar conditons in the future.

Sample Design

Variations in consumer behavior arising out of differences in background can be determined only with a sample sufficiently large and diversified to permit the isolation of homogeneous sub-groups.

The metropolitan areas of Oklahoma City, Oklahoma, and Little Rock, Arkansas, were selected as providing sufficient diversity to permit the study of variations in sales of buffalo fish. The areas also presented different levels of consumer awareness of the product, as well as regional differences in consumption patterns.

Two experimental techniques for measuring variations in consumer behavior were used in the study. To determine if homemakers would discriminate between a ready-to-cook product and conventional form of dressed fish, and to gain knowledge about consumer acceptance under actual purchasing conditions, a matched-lot experimental design was used to display fish for sale in 12 supermarkets.[19] Six of the food stores were in the Oklahoma City area and six in the Little Rock area. To evaluate consumer satisfaction with and opinions of the test products, a household survey was made among the fish-purchasing families contacted at these 12 retail outlets.

The selection of the sample stores was made by the management of the cooperating chains in consultation with the people connected with the study. An effort was made to select two stores with similar characteristics and trade areas to be representative of three levels of income in each metropolitan area.

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[19] The term "dressed" refers to a fish that has had the head removed, and has been scaled and gutted.

The fish used in the study were packaged in conformity with the usual packaging procedure of the cooperating stores. Special care was taken to insure that the packages appeared no different to the buyers than the usual package of fresh meat. The ready-to-cook and the whole-dressed forms of buffalo fish were offered for sale in adjacent displays in the self-service meat counter in harmony with the usual method of display. The position of the two forms of fish were alternated at regular intervals to eliminate any possibility of influence on sales due to one product having a more convenient location.

Analytical Methods

The survey was conducted during the first two weeks in November and the first two weeks in December of 1958, in both metropolitan areas. The fish were offered for sale on Wednesday, Thursday, and Friday of each week in the Oklahoma City area and on Thursday, Friday and Saturday in the Little Rock stores. The difference in the days of week used between the two cities was due to sales policies of the cooperating grocery chains.

To obtain data on volume of sales and merchandising methods, information was collected by the store audit technique from the six retail food outlets in each metropolitan area. Four audits were made, each covering a three-day period. During each audit period, data were collected from each sample store on number of purchases, price, form, and volume of fish sold. In addition, information on the number of customers patronizing the test stores during the audit period was obtained from the store management.

Store patrons were interviewed just after they had purchased a prepackaged fish item in the selected stores. Interviewers were stationed near the meat counter during certain store hours. The hours the interviewers were in the stores were varied by days and stores to provide a random sampling of customers throughout the store's operating hours.

Since it was impractical to conduct very long interviews in the stores, only readily apparent questions were ascertained along with the name, address, telephone number and permission to interview them after the fish had been consumed. The telephone method of interviewing was used to obtain information from purchasers of fish. When families did not have telephone service, an interviewer visited the home to obtain the information.

Variations in consumer concepts and sales of buffalo fish, rising out of differences in ethnic groups, can be determined only if the distribution of socio-cultural characteristics of the population is known. Information on population characteristics, such as number of households, size of households, number of families with children under 12 years of age, nationality, income, and occupational distribution in the trade area of each sample store was ascertained from the 1960 United States Census of Population.

The trade areas for each test store were delineated by marking the home address of each fish purchaser on a city map. These area boundaries were then substantiated by personnel of the cooperating stores. When a trade area fell wholly within a census tract, tract

information was obtained. Whenever a trade area fell within two or more census tracts, individual city block data were used.

Scale analysis was used to rank the respondents in terms of favorableness of their attitudes toward buffalo fish. Answers to questions from the household interviews were used to construct an acceptability scale. These questions were described to obtain not only the opinions of the homemaker for, or against, the test item, but to measure the intensity of these likes and dislikes.

These ratings were not expected to form a true scale. They did, however, result in a quasi-scale suitable for grouping the respondents into categories based on different levels of favorableness. Since the primary purpose in using scale analysis in this instance was to have an objective basis for separating the respondents into broad groupings based on differing degrees of favorableness of attitudes toward the products, a high degree of reproducibility of ranking was not considered essential.

The scale ranged from 1 for extreme dislike, to 5 for complete satisfaction. The midpoint in the scale, "neither like, nor dislike," was equivalent to 3, numerically.

Statistical Model

A multiple regression model was developed to estimate the influence of selected socio-economic characteristics of the population on the ratio of purchasers of buffalo fish to store customers and to the intensity of consumer satisfaction with the fish. The regression analysis technique possesses the advantage of allowing combinations of all types of

characteristics, psychological, economic and sociological, in a single equation. Classifying variables can be included in a regression model by assigning, for each observation, a value of unity to the sub-class in which that particular observation occurs and zero to all other sub-classes.

The analysis of aggregates affords caution in certain respects; statistical significance does not imply economic significance. The statistical test affords confidence in a statement about differences relative to the measurement data which have been utilized.

A large number of factors were expected to affect the sales of buffalo fish. Those considered most important, and which were measurable, were price of fish, geographic location of markets, income status of consumers, race of purchaser, occupation of head of household, size of household and composition of the family.

The following equation was used as the model.

$$Y_j = a + m_1 x_{m_1 j} + m_2 x_{m_2 j} + g_1 x_{g_1 j} + g_2 x_{g_2 j} + g_3 x_{g_3 j} + t_1 x_{t_1 j} + t_2 x_{t_2 j} + r_1 x_{r_1 j} + r_2 x_{r_2 j} + o_1 x_{o_1 j} + o_2 x_{o_2 j} + o_3 x_{o_3 j} + s_1 x_{s_1 j} + s_2 x_{s_2 j} + s_3 x_{s_3 j} + c_1 x_{c_1 j} + c_2 x_{c_2 j} + p_1 x_{p_1 j} + p_2 x_{p_2 j} + p_3 x_{p_3 j} + p_4 x_{p_4 j} + p_5 x_{p_5 j} + p_6 x_{p_6 j} + p_7 x_{p_7 j} + E_j \qquad (3.1)$$

where:

a = constant

m = market locations

g = income areas

t = time periods

r = race of customers

o = occupation of head of household

s = size of household

c = composition of family

p = price per pound for fish

E_j = random error in observation j (j = 1, 2 ..., 189,942)

Y_j = 1 if customer bought buffalo fish
0 if customer did not buy buffalo fish
where j = 1, 2, ..., 189,942

x_{m_i} = 1 if customer falls in sub-class m_i
0 otherwise
where i = 1, 2

x_{g_i} = 1 if customer falls in sub-class g_i
0 otherwise
where i = 1, 2, 3

Similarly for x_{t_i}, i = 1, 2; x_{r_i}, i = 1, 2; x_{o_i}, i = 1, 2, 3; x_{s_i}, i = 1, 2, 3; x_{c_i}, i = 1, 2; x_{p_i}, i = 1, 2, ..., 7.

This implies that $x_{m_i j} + x_{m_2 j} = N$ (the total number of observation), $x_{g_1 j} + x_{g_2 j} + x_{g_3 j} = N$, and similarly for each classification.

The system of normal equations is as follows where the summations are over all observations.

$$
\begin{aligned}
aN + {}_{m_1}\Sigma x_{m_1} + {}_{m_2}\Sigma x_{m_2} + {}_{g_1}\Sigma x_{g_1}, + \ldots + {}_{p_7}\Sigma x_{p_7} &= \Sigma Y \\
a\Sigma x_{m_1} + {}_{m_1}\Sigma x_{m_1}^2 + {}_{m_2}\Sigma x_{m_1} x_{m_2} + {}_{g_1}\Sigma x_{m_1} x_{g_1}, + \ldots + {}_{p_7}\Sigma x_{m_1} x_{p_7} &= \Sigma x_{m_1} Y \\
a\Sigma x_{m_2} + {}_{m_1}\Sigma x_{m_2} x_{m_1} + {}_{m_2}\Sigma x_{m_2}^2 + {}_{g_1}\Sigma x_{m_2} x_{g_2}, + \ldots + {}_{p_7}\Sigma x_{m_7} x_{p_7} &= \Sigma x_{m_2} Y \\
\cdots & \\
a\Sigma x_{p_7} + {}_{m_1}\Sigma x_{p_7} x_{m_1} + {}_{m_2}\Sigma x_{p_7} x_{m_2} + {}_{g_1}\Sigma x_{p_7} x_{g_1}, + \ldots + {}_{p_7}\Sigma x_{m_2} x_{p_7}^2 &= \Sigma x_{m_2} Y
\end{aligned}
\qquad (3.2)
$$

Notice that $\Sigma x_{m_1} x_{m_2} = 0$, since for any observation either $x_{m_1} = 1$ and $x_{m_2} = 0$ or $x_{m_1} = 0$ and $x_{m_2} = 1$ and $\Sigma x_{g_1} x_{g_2} = 0$; $\Sigma x_{g_1} x_{g_3} = 0$, and similarly for all cross-products within classifications.

Also notice that Σx_{m_1} for instance, equals the number of customers in market 1, as does $\Sigma x^2_{m_1}$ since $x^2_{m_1} = 0$ or 1. Also $\Sigma x_{m_1} x_{g_2}$ = number of customers, in market 1 within income 2 since $x_{m_1}, x_{g_2} = 1$ if and only if both x_{m_1} and $x_{g_2} = 1$.

Equation 3.2 has 25 unknowns and only 17 independent equations, when all sub-classes are included, the coefficients are not independent. In order to overcome this difficulty, one sub-class is given a value of zero in all classifications. The coefficient associated with each of the other sub-classes is then interpreted as a deviation from the base. The coefficients can be estimated by the method of least squares as in the usual regression procedures; however, the intercept includes the value for the base classes. Also the unknown are the constants which define the functional relationship among the variables.[20]

The equations for the modified system becomes:

$$Y_j = a' + m'_1 x_{m_1 j} + g'_1 x_{g_1 j} + g'_2 x_{g_2 j} + t'_1 x_{t_1 j} + r'_1 x_{r_1 j} + o'_1 x_{o_1 j} + o'_2 x_{o_2 j} + c'_1 x_{c_1 j} + p'_1 x_{p_1 j} + p'_2 x_{p_2 j} + p'_3 x_{p_3 j} + p'_4 x_{p_4 j} + p'_5 x_{p_5 j} + p'_6 x_{p_6 j} + E_{ij} \quad (3.3)$$

To analyze the relationship between ethnic group values and homemakers' favorableness toward buffalo fish as measured by their

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[20] A. D. Seale, Jr., R. A. King and L. C. Martin, Vegetables Prices and Market Structure in Southeastern North Carolina, North Carolina Agricultural Experiment Station, Technical Bulletin No. 134, August, 1958. p.48.
Thomas E. Tramel, Advanced Statistics for Agricultural Economists, unpublished manuscript, pp. 286-300. R. L. Anderson and T. A. Bancroft, Statistical Theory in Research, (New York, 1952) pp. 278-284.

acceptability score on an hedonic scale, a similar model was constructed. Four socio-economic characteristics, were added to those analyzed in equation 3.1, with the exception of price of fish. These were: form of fish purchased, frequency of serving fish, impulse buying and religious preference of the purchasers.

The following model including the additional variables was used:

$$Y_j = a' + m_1' x_{m_1 j} + g_1' x_{g_1 j} + g_2' x_{g_2 j} + t_1' x_{t_1 j} + r_1' x_{r_1 j} + o_1' x_{o_1 j} + o_2' x_{o_2 j} + c_1' x_{c_1 j} + f_1' x_{f_1 j} + z_1' x_{z_1 j} + z_2' x_{z_2 j} + b_1' x_{b_1 j} + d_1' x_{d_1 j} + E_{ij} \quad (3.4)$$

In using these models, the following two assumptions are necessary: (1) that the error term is normally and independently distributed with zero means and constant variance, and (2) the classifying variables are independent of each other with no interaction.

The deviation coefficient associated with each of the sub-classes is interpreted as a premium or discount from the base sub-class in each classification.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

The major constituents believed important in determining if a product will sell at any given time are the economic conditions and the consumer conception of the product. The economic variables assumed to affect sales of buffalo fish were price, form and availability of the product, and the economic status of the consumer. The conceptual image of the product developed by the consumer was assumed to be conceived by her past experiences, beliefs, and attitudes, and with these harmonizing with the values of the socio-ethnic groups of which she is associated.

A marketing innovation or acceptance of product may have a better chance of success if it is introduced in a community where the product or similar products are widely known than in a community where the awareness level of the product is low. Little Rock, with its location on the Arkansas River, and its proximity to the rice area and the rivers of Eastern Arkansas, has considerable trade in fresh fish. On the other hand, Oklahoma City, located on the edge of the Great Plains area, has very limited access to fresh fish. Therefore, the differences in the level of awareness of buffalo fish by the population of the two areas was extremely large.

The Influence of Economic Factors on Sales

To eliminate the effects of the variability in customer traffic flow among the 12 test stores and to facilitate the analysis of the data, all sales data were converted to sales per thousand store customers. Hereafter, all sales will be reported on the basis of sales per thousand store patrons unless otherwise noted.

Effects of Income Status of Consumer on Sales

Considerable variability occurred among the stores in the sale of buffalo fish. Sales ranged from a low of 5.3 to a high of 22.6 per thousand store patrons. When the stores were grouped according to regional location, the sales were highest in Little Rock (11.6) and the lowest in Oklahoma City (8.0). Holding other factors constant, Little Rock stores averaged 2.9 sales per thousand store customers more than did Oklahoma City stores. This difference was highly significant (see Appendix Table 1).

The clientelle of stores located in the low income areas purchased considerably more buffalo fish per thousand customers than did patrons of stores in the upper two income areas (Table I). The computed deviations in sales of buffalo fish associated with income status of consumers were substantial between the low income area and each of the two higher income areas. However, a large proportion of patrons of stores in high income areas purchased buffalo fish than did customers of medium income stores. The deviations in sales were small and insignificant. This relationship confirms the expectation that families in low income areas consume more buffalo fish than do families living in higher income areas.

TABLE I

BUFFALO FISH SALES PER THOUSAND STORE CUSTOMERS AND SELECTED STATISTICS RELATED TO INCOME AREAS, OKLAHOMA CITY AND LITTLE ROCK

Markets	- Sales by Income Areas[a] - Low	Medium	High	All
	Number	Number	Number	Number
Combined markets	16.2	7.2	7.9	9.7
Oklahoma City	13.3	6.0	6.5	8.0
Little Rock	19.7	8.5	9.4	11.6

	Selected Statistics on Differences			
	Income Comparison	Deviation Values	Standard Error	"t" Value[b]
Combined markets	Low-medium	-7.3032	0.9634	7.5806**
Oklahoma City	Low-medium	-6.9163	1.1234	6.1566**
Little Rock	Low-medium	-6.3782	1.1638	5.4805**
Combined markets	Low-high	-6.0782	.6756	8.9967**
Oklahoma City	Low-high	-6.0840	.8462	7.1898**
Little Rock	Low-high	-5.3521	1.5111	3.5418**
Combined markets	Medium-high	1.2250	.9634	1.2715
Oklahoma City	Medium-high	.8823	1.5592	.5659
Little Rock	Medium-high	1.0261	1.0886	.9426

[a]The median annual incomes were:
Low income areas, Oklahoma City, $3,696; Little Rock $3,328,
Medium income areas, Oklahoma City, $6,382; Little Rock, $5,669,
High income areas, Oklahoma City, $9,194; Little Rock, $10,048.

[b]The degree of freedom for this model equals the number of observations minus one. Then for "t" values in this study, the degrees of freedom will be infinite.

**Significant at the one percent level.

Effects of Time of Study on Sales

Sales data were obtained for two periods of two weeks each. A sale-week ran from Wednesday through Friday in Oklahoma City, and from Thursday through Saturday in Little Rock. Preliminary analysis of the sales data indicate that there was not any significant difference in sales due to the different days making up a sales week.

For the Oklahoma City market, sales during the second period--the first two weeks in December--were two per thousand store patrons less than during the first two-week period in November. This deviation coefficient was significant at the one percent level (Appendix Table I). The difference in sales of buffalo fish due to the different time-period was not a major consideration in the Little Rock market.

Effects of Form of Fish on Sales of Buffalo Fish

At the time of this study, relatively little information was available as to consumers' satisfaction with, reaction to, and knowledge of sales of a ready-to-cook package form of fresh fish through supermarkets. The retail store displays provided consumers an opportunity to express their preferences. Homemakers in Oklahoma City purchased the dressed form more extensively than did homemakers in Little Rock. Combining the two markets, housewives failed to show any definite preference for either form. Approximately one out of two homemakers purchased the ready-to-cook form (Table II).

In the case of the whole dressed form, the incidence of purchases differed considerably among the income groups, especially in Little Rock. However, when the effects of price variations were eliminated,

TABLE II

SALES OF BUFFALO FISH PER THOUSAND STORE CUSTOMERS AND PERCENTAGE DISTRIBUTION OF FORM OF FISH, BY INCOME AREAS, OKLAHOMA CITY AND LITTLE ROCK

Location	Sales by Income Areas and Form of Fish[a]											
	Low			Medium			High			Total		
	Quantity	Percentage		Quantity	Percentage		Quantity	Percentage		Quantity	Percentage	
		Dressed	Pan-Ready		Dressed	Pan Ready		Dressed	Pan-Ready		Dressed	Pan-Ready
	No.	Percent		No.	Percent		No.	Percent		No.	Percent	
Oklahoma City	12.4	66.7	33.3	5.6	54.8	45.2	6.0	70.0	30.0	8.0	57.2	42.8
Little Rock	18.3	55.4	44.6	7.9	62.9	37.1	8.7	45.9	54.1	11.6	46.1	53.9
Both Areas	15.0	58.7	41.3	6.7	59.6	40.4	7.3	56.4	43.6	9.7	50.5	49.5

[a]Dressed form is with the head off, scaled and gutted. Pan-ready is cut-up, ready to cook.

difference in sales between the two forms and among the income areas were not significant.

Effects on Price on Sales

If an industry is to be successful, the price of the product in the market must cover the cost of producing and marketing the product. Also, if a product is to be acceptable to the consumer, it must be priced competitively with competing products. An attempt was made to use prices in this study that would be in line with these conditions.

Dressed buffalo fish was priced at 49 cents per pound in the stores in the low income areas and in one-half of the stores in the medium income areas. For the other stores in the medium income areas and for all stores in the high income areas, the price was 54 cents per pound.

Eliminating the effects of income areas and other factors, the deviation coefficient is an estimate of the effects of price on sales of dressed buffalo fish. The effect of a five-cent change in price per pound resulted in a change in the opposite direction in purchases of buffalo fish of 5.25 and 7.38 per thousand store patrons in Oklahoma City and Little Rock, respectively. The difference for the two markets combined was 5.97 sales per thousand store customers. The differences in sales due to a five-cent divergence in price were significant at the one percent level (Table III).

The relationship between prices paid for dressed buffalo fish and adjusted average household purchases for the three areas is presented graphically in Figure 2.

TABLE III

BUFFALO FISH SALES PER THOUSAND STORE CUSTOMERS AND SELECTED STATISTICS RELATED TO PRICE VARIATIONS, OKLAHOMA CITY AND LITTLE ROCK

Markets	Dressed		Pan-ready		
	49 Cents	54 Cents	65 Cents	70 Cents	75 Cents
Combined markets	21.2	8.7	13.2	7.0	5.0
Oklahoma City	18.4	8.7	7.9	5.0	3.7
Little Rock	24.7	8.7	20.2	11.1	5.1

	- Selected Statistics on Differences -			
	Price Comparison	Deviation Values	Standard Error	"t" Value
Combined markets	49¢-54¢	-5.9718	.9933	6.0121**
Oklahoma City	49¢-54¢	-5.2522	1.0347	5.0760**
Little Rock	49¢-54¢	-7.3828	1.1753	6.2816**
Combined markets	65¢-70¢	-6.0858	1.0095	6.0285**
Oklahoma City	65¢-70¢	-3.2082	1.0191	3.1481**
Little Rock	65¢-70¢	-11.5914	1.2741	9.0977**
Combined markets	70¢-75¢	-2.9851	.9640	3.0966**
Oklahoma City	70¢-75¢	-2.2854	1.0058	2.2722*
Little Rock	70¢-75¢	-5.4294	1.2911	4.2053**
Combined markets	65¢-75¢	-9.0709	1.8743	4.8396**
Oklahoma City	65¢-75¢	-5.4936	1.2491	4.3980**
Little Rock	65¢-75¢	-17.0208	1.6410	10.3722**

**Significant at the one percent level.

*Significant at the five percent level.

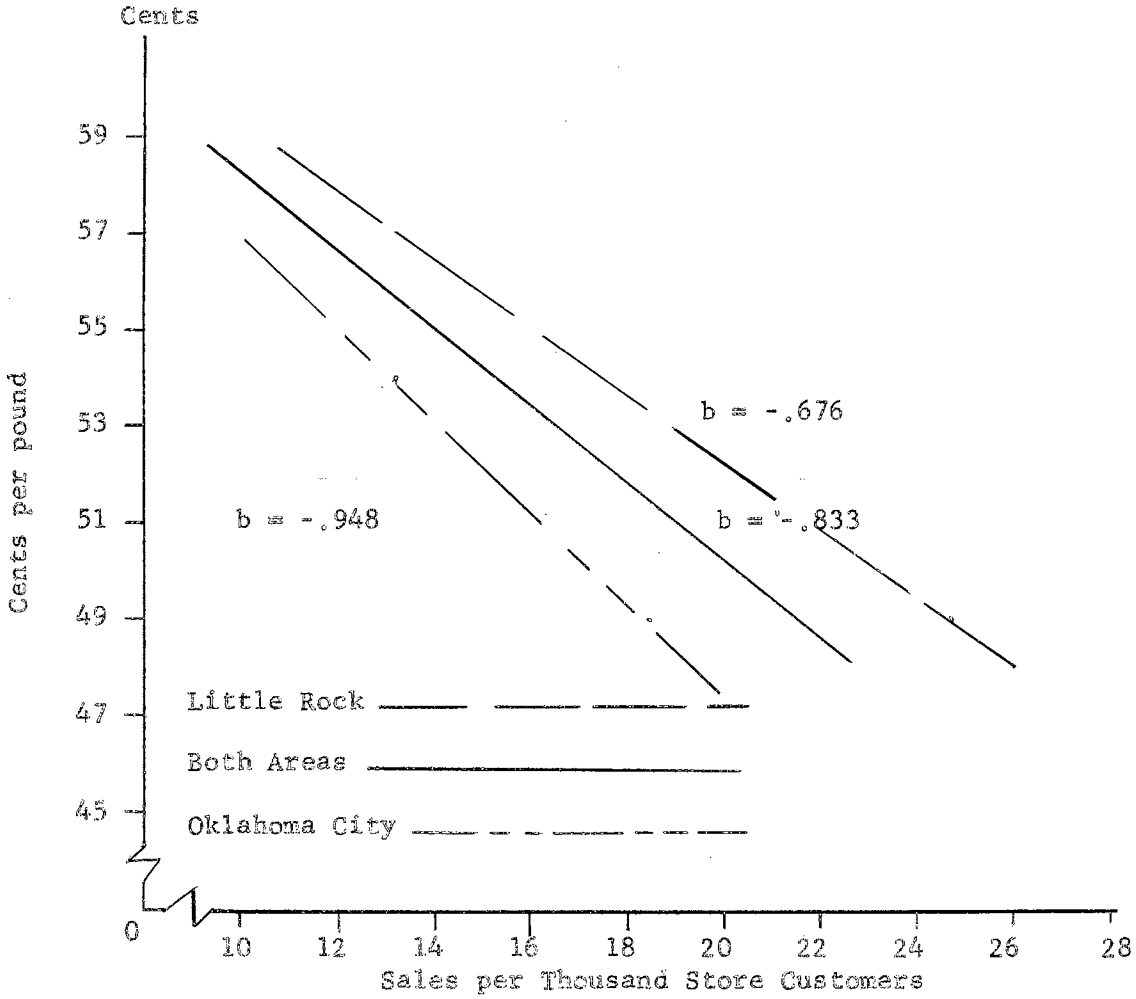

Figure 2. Relationship between prices of dressed buffalo fish and adjusted sales per thousand store customers, Oklahoma City and Little Rock.

The ready-to-cook form of buffalo fish was priced at five-cent intervals. In stores in the low income areas, it was priced at 65 cents per pound in one-half, and at 70 cents per pound in the other half of the stores. In the medium income area, the prices were 70 cents per pound in two of the four stores and 75 cents per pound in the other two stores. One-half of the high income stores priced the pan-ready form at 65 cents per pound and the other half of the stores at 75 cents per pound.

Testing for differences in sales due to differences in price within income areas, by the analysis of variance technique, the only difference found to be significant was in the low-income area in the Little Rock market. It was significant at the 5 percent level of confidence.

The deviation coefficients in Table III are the estimated relationship between prices paid and purchases of pan-ready buffalo fish. The effects of an increase of 5 cents per pound (65 cents to 70 cents) was a decrease in the sales of 3.21 in Oklahoma City and 11.59 in Little Rock, or an average for both markets of 6.08 per thousand store customers.

The decrease in sales of ready-to-cook buffalo fish associated with the five-cent increase in price from 70 cents to 75 cents per pound was not as pronounced as the decrease in sales was for the preceeding price increase of 5 cents per pound. However, the effect of the five-cent price increase on sales was significant at the one percent level in both markets.

A change in the price of buffalo fish in the range of 10 cents per pound resulted in an opposite change in sales of the magnitude of 5.5

to 17.0 per thousand store patrons, assuming the effect of the other variables remained constant. The relationships between the price variation for ready-to-cook buffalo fish and the adjusted sales for the three areas are presented in Figure 3. An indication of average price elasticity of the demand for pan-ready buffalo fish, based on the relationship between the 10 cents increase in prices paid and the adjusted sales for the three areas is also presented in Figure 3.

Summary

Results of the analysis indicates that economic factors influenced consumers purchases of buffalo fish.

Sales per thousand store customers among consumers within low income status areas were considerably higher than among consumers in high income status groups. Sales were relatively low averaging 8 and 12 per thousand store customers in Oklahoma City and Little Rock, respectively. It needs to be pointed out again, that especially in Oklahoma City this was a new product on the market for the first time without any promotion and advertising program. Therefore, the level of consumer awareness of the product was extremely low.

Eliminating price variations, consumer preference for form of fish purchased was not significant. Consumers were rather responsive to small changes in price, especially for the dressed form of fish.

The Influence of Environmental Factors on Sales

A common theoretical postulate among many sociologists, economists, and some social psychologists is that purchasing behavior of the consumer

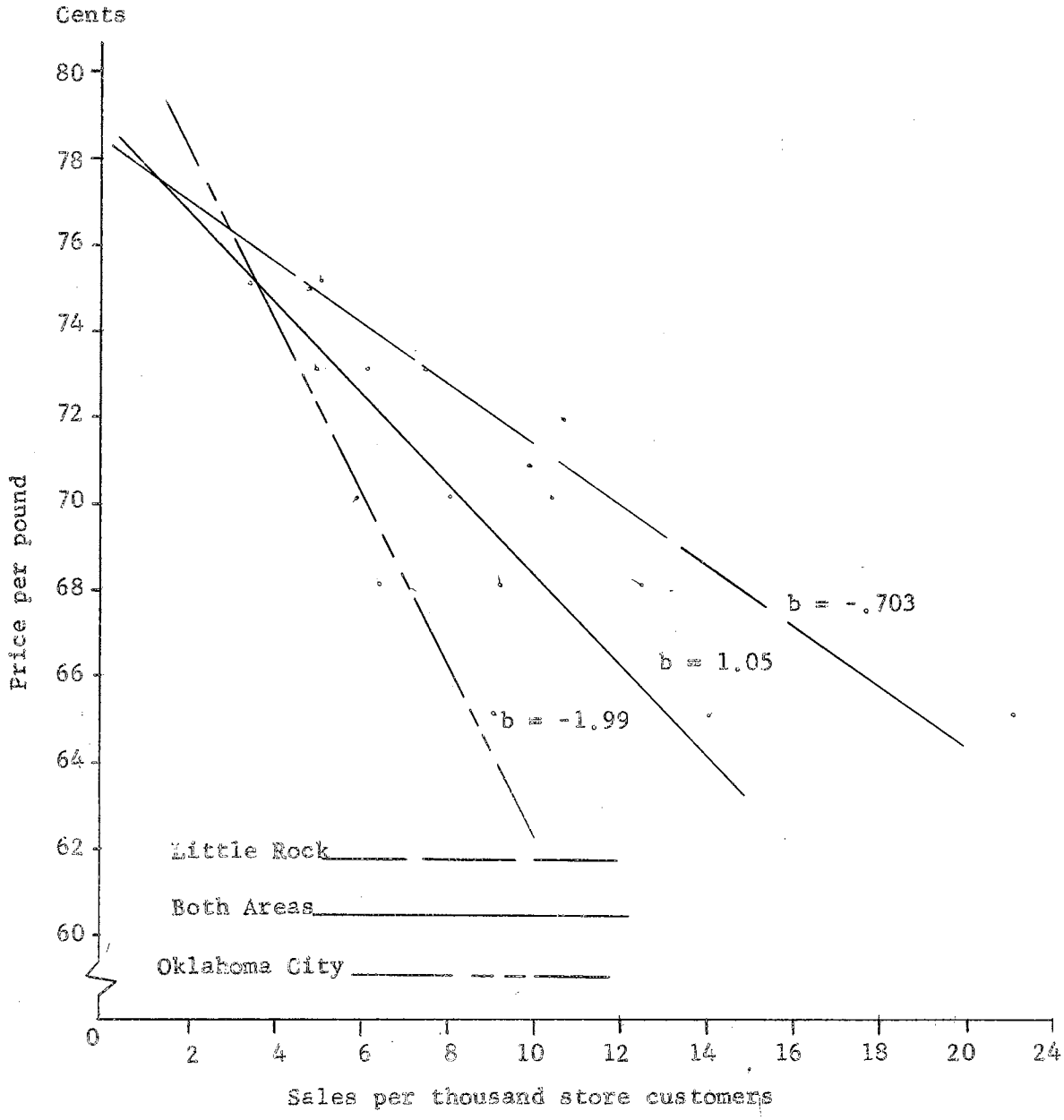

Figure 3. Relationship between prices of pan-ready buffalo fish and adjusted sales per thousand store customers, Oklahoma City and Little Rock.

is influenced by reference or environmental group values. The question then becomes, can these group values and motives be measured so that a marketer can delineate the demand for his product into more homogenous areas or sub-groups.

Effects of Occupation of Head of Household on Sales

The possibility was anticipated that family consumption of buffalo fish might be influenced by the type of occupation of the principal wage earner. Using the United States Census of Population classifications, the following three large fairly-homogeneous groups were composed: group A, the white-collar class, consisting of Professional, Semi-Professional, Proprietors, Managers, and Officials; group B, the blue-collar class, including Clerk, Sales, and kindred workers, Craftsmen, foremen and kindred workers, and operators and kindred workers; and group C, the unskilled class, composed of domestic service workers, service workers, and laborers.

There was a substantial difference in the purchases of buffalo fish among the three occupational groupings. In Oklahoma City more than 14 purchases per thousand store customers were by consumers from the unskilled group. Households in the blue-collar group accounted for seven purchases and families from the white-collar group only 4.3 purchases of buffalo fish per thousand store patrons. The pattern of sales in Little Rock was in the same direction as in Oklahoma City, but the proportion of sales was higher in the white and blue-collar groups, (Table IV).

The deviation coefficients are estimations of the differences in sales of buffalo fish associated with the different groups of occupation

TABLE IV

BUFFALO FISH SALES PER THOUSAND STORE CUSTOMERS AND SELECTED STATISTICS RELATED TO OCCUPATION OF HEAD OF HOUSEHOLD, OKLAHOMA CITY AND LITTLE ROCK

Markets	- Sales by Occupations of Head of Household - Group A[a]	Group B[b]	Group C[c]	All
	Number	Number	Number	Number
Combined markets	6.5	8.8	14.4	9.7
Oklahoma City	4.3	7.0	14.1	8.0
Little Rock	9.2	9.5	15.3	11.6

	Occupation Comparison	Deviation Values	Standard Error	"t" Value
Combined markets	Group A - Group B	2.6900	.5821	4.6212**
Oklahoma City	Group A - Group B	2.8419	.6673	4.2588**
Little Rock	Group A - Group B	2.1262	.6554	3.7441**
Combined markets	Group A - Group C	6.6135	.6393	10.3449**
Oklahoma City	Group A - Group C	8.2761	.8244	10.0389**
Little Rock	Group A - Group C	4.9176	1.0145	4.8473**
Combined markets	Group B - Group C	3.9235	.5460	7.1859**
Oklahoma City	Group B - Group C	5.4342	.7513	7.2331**
Little Rock	Group B - Group C	2.7914	.9151	3.0504**

[a]Group A includes professional, Semi-Professional, Proprietors, Managers, and Officials.

[b]Group B includes Clerk, Sales, and kindred workers, Craftsmen, foremen and kindred workers, and Operators and kindred workers.

[c]Group C includes the unskilled class, composed of domestic service workers, service workers, and laborers.

**Significant at the one percent level.

of head of household. The computed effects of unskilled workers compared with white-collar workers were an increase of 6.6 sales per thousand store patrons. The calculated deviation for blue-collar workers compared with white-collar workers was 3.9 sales per thousand store patrons.

Families of unskilled workers apparently consumed more buffalo fish than did families in the other two occupational groups. A larger deviation in sales existed among occupation groups in Oklahoma City than in Little Rock.

Effects of Size of Household on Sales of Buffalo Fish

It was assumed that differences in the size of households would result in a difference in the amount of buffalo fish purchased. The analysis of the data shows that a positive relationship exists between size of household and purchases. The ratio of purchasers to nonpurchasers was considerably larger among the smaller two size groups.

In the Little Rock market, as household size decreased from the large size group to either the medium or small size group, sales decreased slightly more than seven per thousand store customers. The same pattern was true for Oklahoma City, but the decrease in sales was of less magnitude. Analysis of the data did not indicate any significant difference in sales between the medium and small size household (Table V).

Effects of Composition of Family on Sales

It was anticipated that mothers with children under 12 years of age would discriminate against buffalo fish because of the abundance of small bones. The estimated effect of children under 12 years of age on

TABLE V

BUFFALO FISH SALES PER THOUSAND STORE CUSTOMERS AND SELECTED STATISTICS RELATED TO SIZE OF HOUSEHOLD, OKLAHOMA CITY AND LITTLE ROCK

Markets	Sales by Size of Households			
	Small[a]	Medium[b]	Large[c]	All
Combined markets	7.7	8.7	12.5	9.7
Oklahoma City	6.6	8.3	12.2	8.0
Little Rock	9.2	9.5	15.3	11.6

	Selected Statistics on Differences			
	Household Comparison	Deviation Values	Standard Error	"t" Value
Combined markets	Small-medium	0.9126	.6279	1.4550
Oklahoma City	Small-medium	0.9468	.6747	1.4033
Little Rock	Small-medium	0.0305	1.0306	.0296
Combined markets	Small-large	4.8778	.8273	5.8960**
Oklahoma City	Small-large	4.2199	.5012	8.4196**
Little Rock	Small-large	7.1320	1.0436	6.8340**
Combined markets	Medium-large	3.9652	.8682	4.5672**
Oklahoma City	Medium-large	3.2731	.6515	5.0239**
Little Rock	Medium-large	7.1015	1.0471	6.7821**

[a]Small size household includes 1 or 2 members.

[b]Medium size household includes 3 or 4 members.

[c]Large size household have 5 or more members.

**Significant at the one percent level.

household purchases was an increase of 8.3 sales per thousand store patrons in Little Rock and a decrease of 2.4 sales in Oklahoma City. These differences were highly significant (Appendix Tables II and III). This relationship contradicts the expectation that families with children under 12 years of age would consume less buffalo fish than families without small children.

Summary

The variation in the ratio of purchasers to nonpurchasers of buffalo fish varied significantly among sub-classes within the major reference groups. Analysis of data for sub-groups within the occupation and household size classifications indicated significant differences existed in sales per thousand customers. Families with children under 12 years of age purchased buffalo fish at the approximate ratio of 3 to 2 over families without young children.

The Influence of Ethnic Group Values on Sales

In every society children belong to the social and religious groups of their parents. By virtue of these kinships the children usually take on the likes, dislikes and prejudices of their parents.

Effects of Race of Purchaser on Sales

All respondents were classified as either Negro (Colored) or White. Oriental and other races were relatively unimportant in the two areas covered by this study. In the combined market area, Negroes accounted for slightly more than one-tenth of the sample number, but represented approximately one-third of the purchasers of buffalo fish. This

relationshp was practically the same for both markets, the differences being more pronounced in Oklahoma City (Table VI).

The deviation coefficients are estimates of the effects of race on the purchases of buffalo fish. The values of the deviations varied for the two markets, but were significant at the one percent level in both cities. When other factors were held constant, the deviation coefficients for Oklahoma City and Little Rock were -24.4 and -21.5, respectively.

Effects of Religious Preference on Sales

It was assumed that differences in religious preference of the consumer would influence the sales of buffalo fish. Unfortunately, the 1960 United States Census of Population data did not list religious preference of the population on a census tract or city block area.

By making certain assumptions, an indication of the effect of religious preference of the consumers on sales of buffalo fish may be surmised. An indication of the relationship may be indicated by assuming that the customers purchasing buffalo fish in the test stores were representative of the total population in Oklahoma City and in Little Rock, and using information on church membership affiliations compiled by the National Council of the Churches of Christ.[1]

A higher percentage of purchasers of buffalo fish in Oklahoma City were of the Catholic and Jewish Faiths than the percentage of the total population. In Little Rock the reverse of this was indicated (Table VII).

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[1]National Council of the Churches of Christ, Church and Church Membership in the United States, Series D, Number 1 and 2, (New York, 1957).

TABLE VI

SALES OF BUFFALO FISH PER THOUSAND STORE CUSTOMERS, PERCENTAGE OF SAMPLE AND SALES ASSOCIATED WITH RACE OF PURCHASER, OKLAHOMA CITY AND LITTLE ROCK

	Sales of Buffalo Fish by Race of Purchasers[a]					
	Caucasian			Negro		
Markets	Sales per 1,000 Patrons	Percentage of Total Sample	Sales	Sales Per 1,000 Patrons	Percentage of Total Sample	Sales
	Number	- Percent -		Number	- Percent -	
Combined markets	7.3	89.7	67.5	30.3	10.3	32.5
Oklahoma City	6.3	92.3	73.1	28.0	7.7	26.9
Little Rock	8.5	86.5	63.0	31.9	13.5	37.0

	- Selected Statistics on Differences -			
	Race Comparison	Deviation Values	Standard Error	"t" Value
Combined markets	Caucasian-Negro	22.6800	.8634	23.2682**
Oklahoma City	Caucasian-Negro	24.4023	1.2500	19.5218**
Little Rock	Caucasian-Negro	21.4925	1.2296	17.4793**

[a]All respondents were classified as either Caucasian or Negro.

**Significant at the one percent level.

TABLE VII

CHURCH AFFILIATIONS OF PURCHASERS OF BUFFALO FISH COMPARED TO THE TOTAL POPULATION, OKLAHOMA CITY AND LITTLE ROCK

	- Church Affiliations -					
	Protestant		Catholic		Jewish	
Location	Number	Percent	Number	Percent	Number	Percent
Oklahoma City[a]						
Population	719	87.4	95	11.5	9	1.1
Sample	632	76.7	146	17.8	45	5.5
Little Rock[b]						
Population	914	90.2	87	8.6	12	1.2
Sample	941	92.9	69	6.8	3	0.3
Both Areas						
Population	1633	88.9	182	9.9	21	1.2
Sample	1573	85.7	215	11.7	48	2.6

[a] $X^2 = 181.87$.

[b] $X^2 = 9.80$.

Effects of Awareness of the Product on Sales

One of the requisites to planning the purchase of an item is the knowledge that it is available in the market place and the purchaser being cognizant of some of its attributes. In the Oklahoma City market where consumer awareness of fresh fish in the supermarket was extremely limited, impulse buying was very common. More than 3 out of 4 purchasers said they had not planned to purchase fish when they came to the market. In Little Rock, where the buffalo fish were more widely available and had been on the market for a considerable period of time, planned buying of fish appeared to be fairly common. Slightly over one-half of the purchasers said they had planned to purchase fish before going into the store.

Appearance and freshness played an important part in stimulating impulse purchases of buffalo fish. Homemakers mentioned these two things most often in describing why they bought fish when they had not planned to in advance.

Summary

There was a larger difference in the number of sales of buffalo fish per thousand store customer between the two racial groups than between any other socio-cultural characteristic studied. A superficial investigation of the available data on religious affiliation indicated that religious preferences of the consumer may influence sales.

Economic Characteristics Associated With Consumer Satisfaction

An hedonic acceptability scale was constructed to evaluate consumers satisfaction with buffalo fish. The pattern of acceptability ratings attempts to reflect the intensity to which the homemaker would actually like to have buffalo fish served in her home. It also reflects upon the housewife's willingness toward buying buffalo fish again, and it gives an indication of her general over-all favorableness toward the product.

To obtain an acceptability scale, the homemakers were asked to score the buffalo fish after it had been eaten on the following attributes: (1) appearance, (2) taste, (3) flavor, (4) aroma, (5) texture, and (6) their over-all opinion of the product. The descriptive hedonic scale used to obtain ratings from each housewife for each attribute was assigned numerical rating to facilitate analysis. The hedonic scale used to obtain these evaluations were assigned the numerical ratings of: 1 for "Dislike Extremely," 2 for "Dislike Moderately," 3 for "Neither Like nor Dislike," 4 for "Like Moderately," and 5 for "Like Extremely."

A total score was obtained for each housewife by adding up the scores she gave each attribute. Since the minimum score for each attribute was 1, the maximum score was 5, and the number of attributes were 6, the total score for each individual ranged from 6 to 30. The respondents were grouped into broad homogeneous groups according to their over-all favorableness toward buffalo fish.

Acceptability rating group 1 "Dislike Extremely," was made of housewives whose total rating ranged from 6 through 10. Acceptability rating

group 2 "Dislike Moderately," were homemakers who rated the product from 11 through 15. Group 3 "Neither Like nor Dislike," was composed of respondents giving the total rating from 16 through 20. Acceptability rating groups 4 and 5 were homemakers rating the fish from 21 through 25 and from 26 through 30, respectively. The number and frequency of these ratings are shown in Table VIII.

Thus, consumer satisfaction will be indicated by the two rating scores of 4 and 5, with consumer dissatisfaction being indicated by acceptability scores of 1 and 2.

The homemaker's attitudes and opinions of buffalo fish, as measured by her acceptability rating score, were related statistically to certain socio-economic characteristics in an effort to determine if values of the ethnic groups with which she is associated influenced her conceptual image of the product.

Effects of Income Status of Consumers on Acceptability Ratings

It is surmised that consumer satisfaction or dissatisfaction with a product is influenced to an appreciable extent by her status role or group affiliations.

A larger proportion of the families in the low income areas rated the buffalo fish satisfactory than did families in the two higher income groups (Figure 4). Among the low income families in Oklahoma City, 3 out of 4 expressed satisfaction with the product, with more than 1 out of these 3 housewives rating it 5, "Like Extremely." In Little Rock, approximately two-thirds of the families in the low income area rated

TABLE VIII

FREQUENCY OF RATINGS OF BUFFALO FISH ACCORDING TO SCALE

Hedonic Scale Rating	Numerical Rating	Oklahoma City		Little Rock	
		Number	Percent	Number	Percent
Dislike Extremely	1	122	14.8	121	11.9
Dislike Moderately	2	108	13.1	126	12.4
Neither Like nor Dislike	3	111	13.5	135	13.3
Like Moderately	4	319	38.8	325	32.2
Like Extremely	5	163	19.8	306	30.2

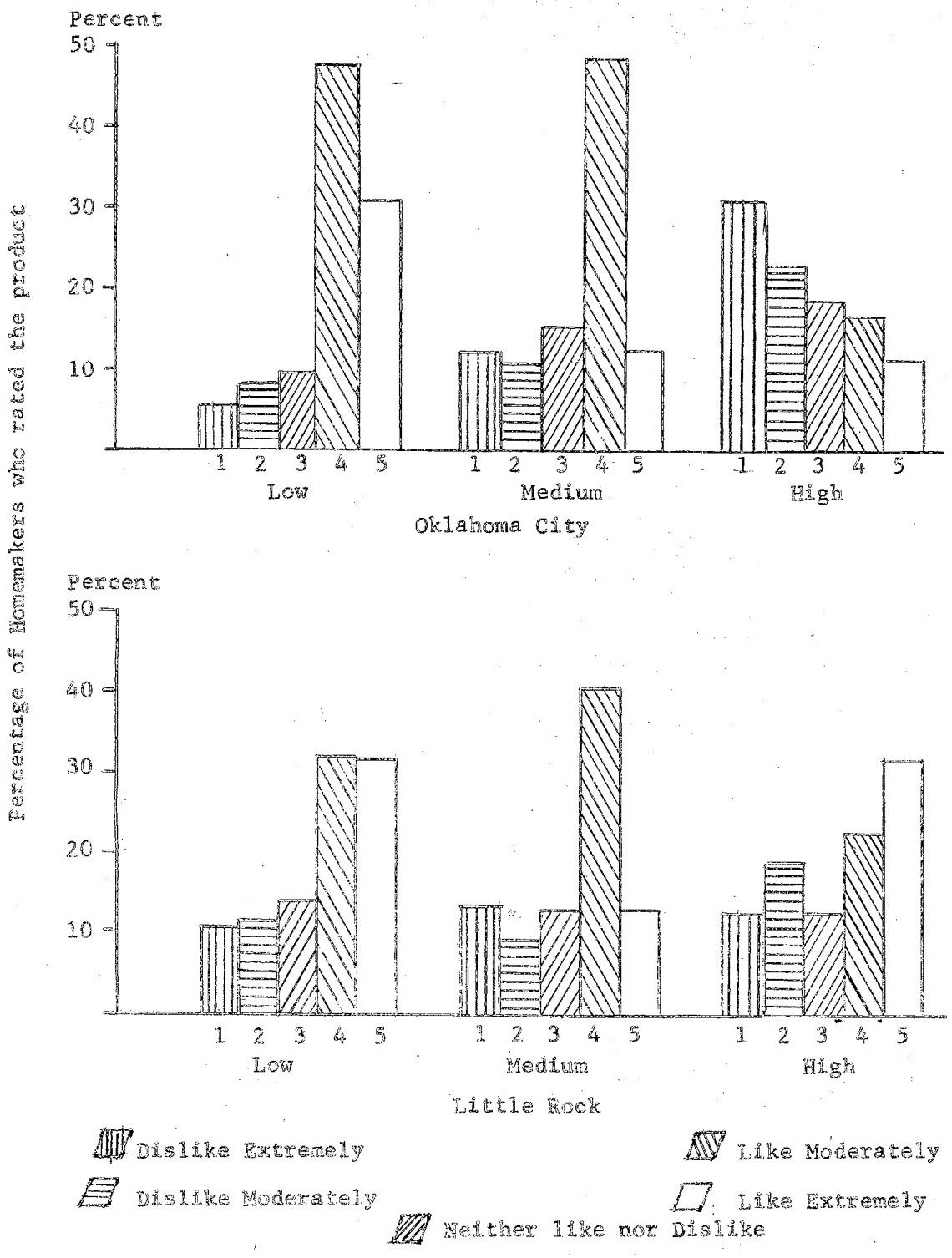

Figure 4. Frequency of Acceptability Rating by Consumers, Income Areas, Oklahoma City and Little Rock.

the buffalo fish 4 or better, with a fairly even distribution between "Like Moderately" and "Like Extremely."

In the Oklahoma City medium income group, 48 percent of the purchasers of buffalo fish gave the product a rating of 4, with the other percentage fairly evenly distributed among the other acceptability ratings. Of the families in the medium income group in Little Rock, approximately 24 percent rated the product 5, with another 40 percent rating it 4.

The pattern of acceptability rating among families in the high income groups was different in Oklahoma City than in Little Rock. In Oklahoma City, as the satisfaction ratings with the product decreased, the percentage of families in each rating category increased. In Little Rock, a larger proportion of families rated the product 5 "Like Extremely," than any other rating. More than one-half of the families rated it 4 and 5.

The mean acceptability rating for the consumers was computed for the three income groups for both cities. The rating varied from a low of 2.55 for the high income group, to a high of 3.67 for the low income group in Oklahoma City. This variation among income groups in Little Rock was of considerably less magnitude.

The computed differences in Table IX are the estimated deviations in consumer satisfaction with buffalo fish as measured by the acceptability rating score associated among income groups within markets. A significant observed "t" value would suggest that the computed differences in mean rating came from different populations. In the analysis shown in Table IX, several classifications of ratings were indicated

TABLE IX

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO INCOME STATUS, OKLAHOMA CITY AND LITTLE ROCK

Markets	Ethnic Groups Comparison	Computed Difference	Standard Error	"t" Value	Mean[a] Rating
Combined	Low-medium	-.1328	.0566	2.3462*	3.57
Oklahoma City	Low-medium	-.3832	.0959	3.9961**	3.40
Little Rock	Low-medium	-.1397	.1010	1.3831	3.67
Combined	Medium-high	-.1914	.0839	2.2812*	3.45
Oklahoma City	Medium-high	-.2328	.0772	3.0155**	2.95
Little Rock	Medium-high	-.1393	.1081	1.2886	3.52
Combined	High-low	.3242	.0777	4.1724**	3.06
Oklahoma City	High-low	.6160	.0948	6.4978**	2.55
Little Rock	High-low	.2790	.1097	2.5432*	3.45

[a]The mean acceptability rating refers to the first income group in the comparison column.

**Significant at the one percent level.

*Significant at the five percent level.

to be significant, hence these classifications may be useful in stratifying the population into homogeneous market groups for buffalo fish.

Difference in Consumers Satisfaction Due to Form of Fish Purchased

Consumers preference for the form of fish consumed, as expressed by their acceptability ratings, varied between the two cities. In Oklahoma City, a staisfactory rating score was given by 66 percent of the housewives rating the ready-to-cook form. This compares with only 44 percent satisfactory ratings for the dressed form from housewives rating it. Acceptability scores, given by homemakers in Little Rock, indicate a higher proportion favoring the dressed-form rather than the pan-ready form. Approximately 70 percent rated the dressed-form 4 or 5, while only 57 percent gave the pan-ready this favorable a rating score, Figure 5.

The mean ratings given are the weighted average of the acceptability score of all consumers rating the product within the specified ethnic group. It is an attempt to measure the group evaluation of the product. The average mean ratings for the two forms indicate some differences between the two markets. That the dressed form was more acceptable to the Little Rock consumers was reflected in the 3.81 mean rating, whereas the mean rating of 3.19 reflects a less favorable attitude toward this form in Oklahoma City.

The computed differences in Table X are estimates of the relationship between dressed and pan-ready forms for consumer acceptability ratings within the same markets, when the effects of other socio-economic characteristics are eliminated. These computed differences

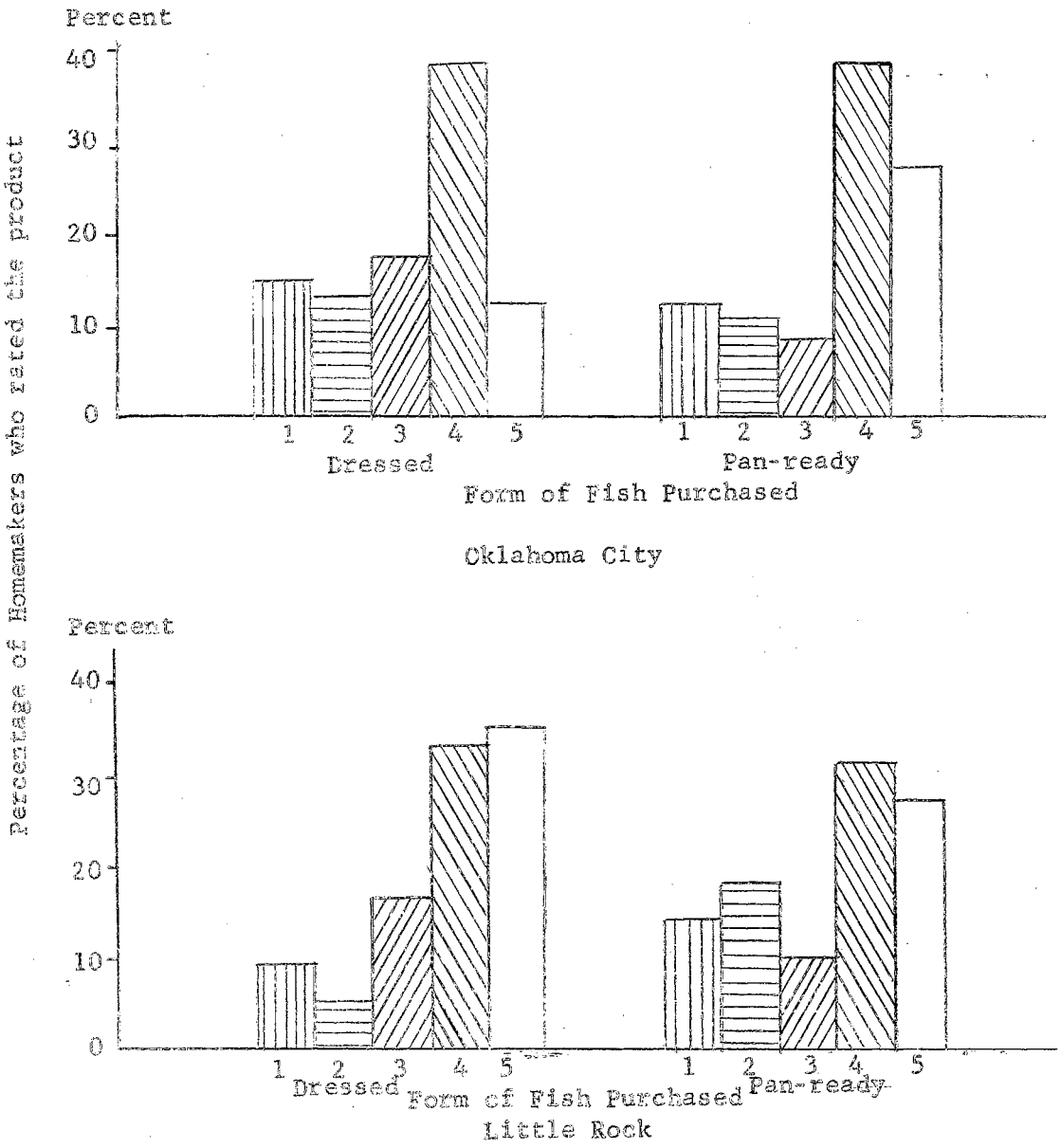

Figure 5. Frequency of Acceptability Rating by Consumers, by Form of Buffalo Fish Purchased, Oklahoma City and Little Rock

TABLE X

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO FORM PURCHASED, OKLAHOMA CITY AND LITTLE ROCK

Markets	Form Comparison	Computed Difference	Standard Error	"t" Value	Mean[a] Rating	
Combined	Dressed-Pan-ready	-.0588	.0596	0.9965	3.55	3.44
Oklahoma City	Dressed-Pan-ready	.5367	.0566	9.4823**	3.19	3.55
Little Rock	Dressed-Pan-ready	-.4685	.0883	5.6242**	3.81	3.36

[a]The first mean acceptability rating refers to the first form mentioned in the form comparison column while the second rating refers to the second form listed.

**Significant at the one percent level.

in the effects of form on consumer acceptability scores were significant at the one percent level of confidence.

Differences in Consumer Satisfaction Due to Time Period of Purchase

There was no appreciable difference in the homemakers satisfaction with buffalo fish whether she purchased it in November or December. The mean acceptability rating of housewives for buffalo fish purchased in November was 3.43 for the combined market. The mean rating for December was 3.52. This difference was not significant (Appendix Table IV).

Summary

The findings indicate that certain economic characteristics may influence consumers favorableness toward buffalo fish. There appeared to be an inverse relationship of mean acceptability rating to the income status of the purchaser. The rating scores were substantially higher for the lower income group while the higher two income groups tended to rate the fish at a lower hedonic scale rating.

The pattern of consumer preference for form of fish purchased varied rather widely, with a larger proportion of Oklahoma City housewives favoring pan-ready, compared with the Little Rock housewife preferences for the dressed-form of fish.

Environmental Characteristics Associated With Consumer Satisfaction

It is surmised that a great deal of consumer purchasing behavior is not based on highly motivated weighting of alternatives (genuine decision-making involves thought, consideration, discussion, and evaluating

many facets) but relies on group opinion, expectations and similar types of choice previously made.

Effects of Occupational Groups on Acceptability Rating

The mean acceptability ratings and the frequency patterns have fluctuated rather widely within ethnic groups at various levels of living. Income alone did not explain this variability. An evaluation of the differences in acceptability rating among the three broad occupational categories described earlier, was made to see if occupational status of the head of the household would help to explain some of this variability.

The modal acceptability rating for the white-collar group in Oklahoma City was 2, "Dislike Moderately." More than 50 percent of the respondents in this grouping, expressed a dissatisfaction with the product. Only 8 out of 100 purchasers gave the product a rating of 5, "Like Extremely." The mean acceptability rating for this group was 2.26, the lowest rating given by any of the ethnic groups.

Four was the most frequent rating given by the blue-collar group in Oklahoma City, with 5 being the next most frequent rating, and next highest in Class 5, (26 percent). It is apparent from Figure 6 that families in the unskilled working group, predominantly fall in the two upper rating classes, with 46.7 percent in class 4 and 20.7 percent in class 5. The mean acceptability ratings for the blue-collar and for the unskilled groups were 3.58 and 3.91, respectively.

The same frequency pattern existed in Little Rock markets in the white collar group. In Little Rock, the modal rating for this group 4,

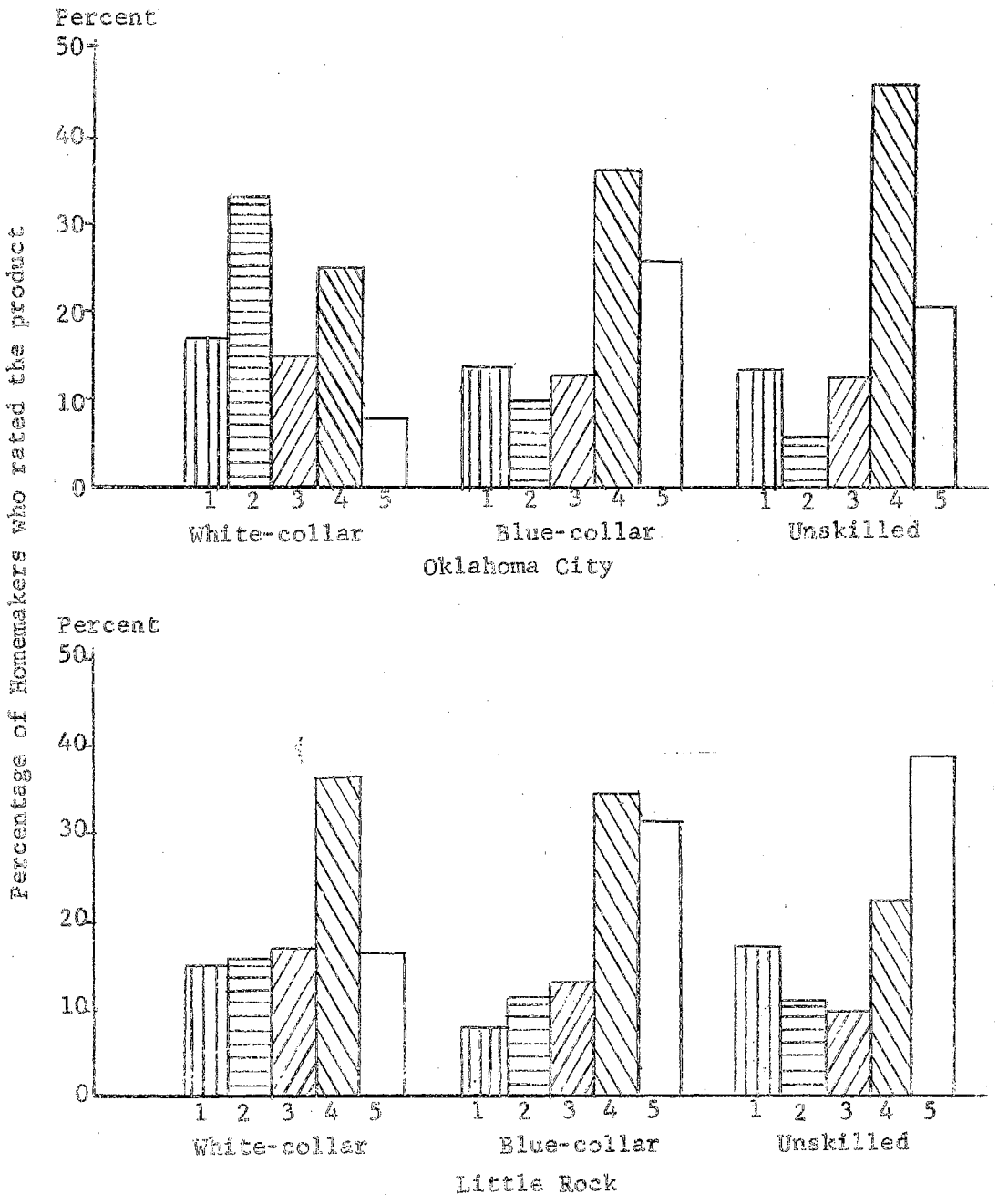

Figure 6. Frequency of Acceptability Rating by Consumer, by Occupation of Head of Household, Oklahoma City and Little Rock.

"Like Moderately" compared with the Oklahoma City modal rating of 2, "Dislike Moderately." The mean acceptability ratings for the three occupational groups in Little Rock were 3.24, 3.60 and 3.80 for the white-collar, blue-collar and unskilled workers, respectively. The fluctuations of the ratings within the occupational groups in Little Rock were not as pronounced as in the Oklahoma City groups.

The computed differences shown in Table XI are estimates of the effects of occupational groups, when other factors were held constant, on the acceptability rating score of homemakers for buffalo fish. A negative relationship was exhibited between occupational groups and acceptability scores. That is, as occupational status increased, the acceptability rating score for buffalo fish decreased. This relationship was highly significant between all occupational groups in Oklahoma City and between the white-collar and unskilled groups in Little Rock.

Effects of Size of Household on Acceptability Ratings

It was anticipated that the size of the household of the purchaser might influence both the level of the over-all rating and the distribution among the rating classes. The households were divided into small-size categories on information obtained from the housewife. The small-size group consisted of one and two member households, the medium-size group was composed of three and four member households and the large-size classification were households with five or more members. The results of the analysis of these data are shown in Figure 7.

TABLE XI

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO OCCUPATION OF HEAD OF HOUSEHOLD, OKLAHOMA CITY AND LITTLE ROCK

Markets	Occupational Groupings[a]	Computed Differences	Standard Error	"t" Value	Mean[b] Rating
Combined	White-collar-Blue-collar	.4284	.0465	9.2129**	2.78
Oklahoma City	White-collar-Blue-collar	1.1707	.0787	14.8754**	2.26
Little Rock	White-collar-Blue-collar	.3921	.0842	4.6593**	3.24
Combined	Blue-collar-Unskilled	.2635	.0749	3.5167**	3.57
Oklahoma City	Blue-collar-Unskilled	.1295	.0713	1.8162	3.58
Little Rock	Blue-collar-Unskilled	.1602	.1162	1.3786	3.60
Combined	Unskilled-White-collar	-.6919	.0826	8.3765**	3.85
Oklahoma City	Unskilled-White-collar	-1.3002	.0830	15.6650**	3.91
Little Rock	Unskilled-White-collar	-.5523	.1086	5.0856**	3.80

[a]White-collar group includes Professional, Semi-Professional, Proprietors, Managers, and Officials.

Blue-collar group includes Clerk, Sales, and kindred workers, Craftsmen, foremen and kindred workers, and operators and kindred workers.

Unskilled group includes domestic service workers, service workers and laborers.

[b]Mean rating refers to first class listed.

**Significant at the one percent level.

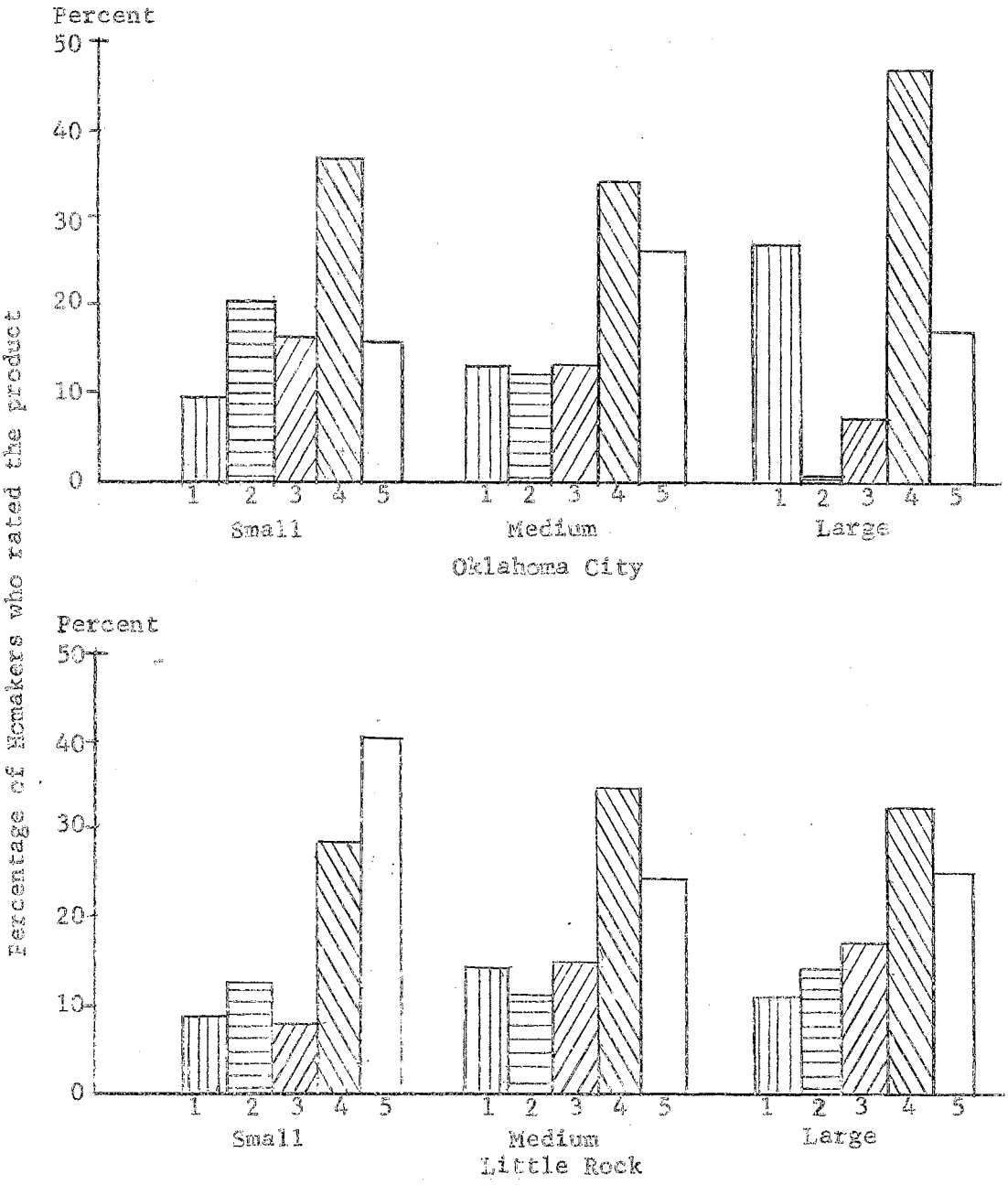

Figure 7. Frequency of Acceptability Rating by Consumers, by Size of Household, Oklahoma City and Little Rock.

It is evident that the acceptability pattern of the respondents varied widely among the household sizes and between the markets. The highest proportion of favorable acceptability ratings were found in the small-size household group in Little Rock and in the large-size group in Oklahoma City.

There was a wider fluctuation in the acceptability rating given by homemakers in the large-size household group in Oklahoma City than in any other ethnic group studied. These acceptability ratings varied, with 27 percent of the purchasers giving the product a rating of 1, "Dislike Extremely," 1.1 percent rating it 2, "Dislike Moderately," 7 percent being indifferent to the product, 47.6 percent of the consumers rating it 4, "Like Moderately," and 17.3 percent giving it a rating of 5, "Like Extremely." This difference reflects either a more diverse attitude toward buffalo fish by housewives in this group, or a difference in their interpretations of the questions from which the acceptability rating scale was constructed.

There appeared to be a positive relationship of the over-all rating, as measured by the mean rating, between size of household and acceptability of the product. That is, as household size increases, the acceptability rating score increases.

Analysis of the acceptability rating by size of household indicates that families in the large-size household group gave buffalo fish a more favorable score than families in the medium and small-size groups. Analysis also indicates that consumers of medium-size families favored buffalo fish over consumers of small-size families (Table XII).

TABLE XII

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO SIZE OF HOUSEHOLD, OKLAHOMA CITY AND LITTLE ROCK

Markets	Household size[a] Comparison	Computed Differences	Standard Error	"t" Value	Mean[b] Rating
Combined	Small-medium	.0976	.0345	2.8289**	3.35
Oklahoma City	Small-medium	.0198	.0922	.2147	2.27
Little Rock	Small-medium	.2473	.0971	2.5460*	3.20
Combined	Medium-large	.2935	.0850	3.4529**	3.38
Oklahoma City	Medium-large	.2476	.1031	2.4442*	3.30
Little Rock	Medium-large	.3969	.1248	3.1802**	3.40
Combined	Large-small	-.3911	.0880	4.4443**	3.54
Oklahoma City	Large-small	-.2674	.0776	3.4458**	3.48
Little Rock	Large-small	-.6442	.1308	4.9250**	3.78

[a]Small household had one or two members.
Medium-size household had three or four members.
Large-size household had five or more members.

[b]The mean rating refers to the first size in the column in household size comparison.

**Significant at the one percent level.

*Significant at the five percent level.

Effects of Composition of Family on Acceptability Rating

Examination of the acceptability ratings of family groups with children under 12 years of age revealed that the over-all pattern of favorableness toward buffalo fish was lower than for family groups without children under 12 years of age. In Oklahoma City, the mean rating of the family group with children was 3.09, compared with 3.52 mean rating for family groups without small children. The difference in the mean rating between the two groups in Little Rock was in the same direction, but of smaller magnitude.

The computed differences between the two groups in each market is an estimate of the effects children under 12 years of age have on the families' acceptability score for buffalo fish. The relationship was highly significant for Oklahoma City, but not significant for Little Rock (Appendix Tables IX and X).

Summary

The environmental groups of size of household, composition of family, and occupation of head of household, all had highly significant differences among sub-classes within the mean classifications. Large-size households of the unskilled workers rated the buffalo fish the highest on the acceptability scale.

Ethnic Group Characteristics Associated With Consumer Satisfaction

Every ethnic group has its own apperceptions and traditions which tend to sterotype the behavior patterns of its members. As a result of

these relations there exists habits, attitudes, and motives which intervene by influencing how stimuli are perceived and how the individuals react to them.

Effects of Race of Consumers on Acceptability Ratings

The race of the purchaser showed a more pronounced effect on homemakers' attitudes toward buffalo fish than did any other ethnic group characteristics studied.

White housewives tended to give poorer, general, over-all ratings, while colored housewives in general rated the buffalo fish higher. Eighty-five percent of the colored homemakers in Oklahoma City gave the product an acceptability rating score of 4 and 5, with less than 6 percent giving it an unsatisfactory rating. The modal acceptability rating given by Negro families in Little Rock was 5, "Like Extremely." On the other hand, although the modal acceptability rating was 4, a high percentage of white homemakers expressed a dissatisfaction with the product, Figure 8.

The computed differences in Table XIII are the estimated influences of race of purchasers on the favorableness of the housewife toward buffalo fish. These relationships between Caucasian and Negro homemakers were positive and highly significant for all markets.

Effects of Religious Preference on Acceptability Ratings

It was assumed that difference in the religious preference of the homemaker would result in differences in her favorableness toward buffalo fish. Due to the small number of non-Protestants in the sample, respondents were grouped into two groups, non-Protestant or Protestant. Non-Protestant housewives had a slight tendency to give buffalo fish a higher

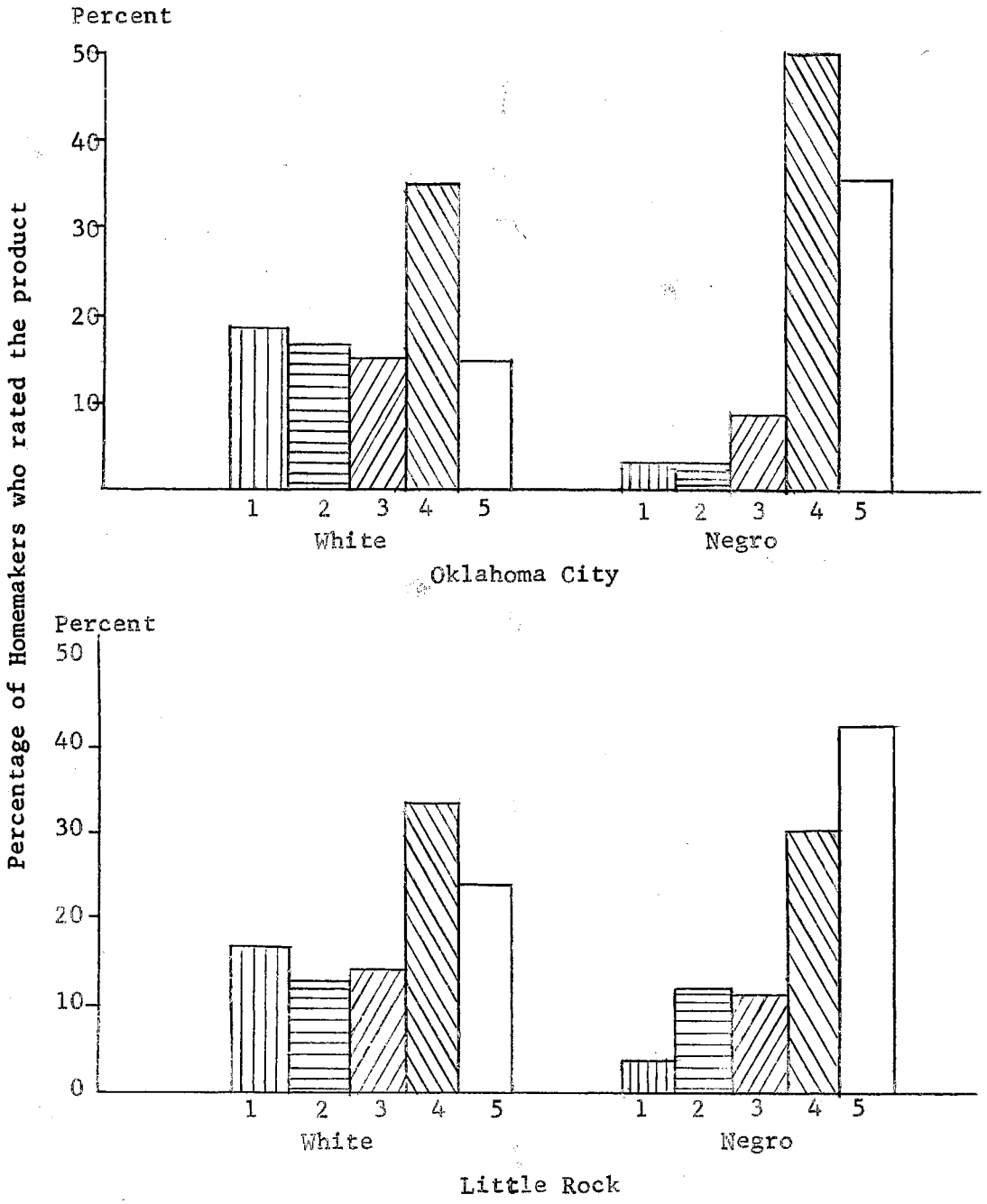

Figure 8. Frequency of Acceptability Rating by Consumers, Race of Purchasers, Oklahoma City and Little Rock.

TABLE XIII

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO RACE OF PURCHASER, OKLAHOMA CITY AND LITTLE ROCK

Markets	Race Comparison	Computed Differences	Standard Error	"t" Value	Mean[a] Rating	
Combined	Caucasian-Negro	.8670	.0845	10.2603**	3.23	4.00
Oklahoma City	Caucasian-Negro	.8311	.0894	9.2964**	3.11	4.11
Little Rock	Caucasian-Negro	1.0227	.1118	9.1475**	3.34	3.94

[a]The first mean rating refers to the first race of purchasers in the first column.

**Significant at the one percent level.

acceptability rating than Protestant housewives. The variation in the number of homemakers fall into each rating class was small within each market. There was a wider variation in the total number of homemakers within each class between markets than within markets. These variations are presented graphically in Figure 9.

The over-all rating, as indicated by the mean rating, was considerably higher for non-Protestant than for Protestant consumers. For Oklahoma City, the mean rating varied from 3.07 for Protestant households to 3.54 for non-Protestant households. The variations in Little Rock was from 3.25 for Protestant to 3.71 for non-Protestant families.

The estimated effects of religious preferences of the homemaker on her favorableness toward buffalo fish, indicated by the computed value in Table XIV, are large and positive for all markets and are highly significant.

Effects of Frequency of Serving Fish on Acceptability Rating

The question arises as to the degree of influence a housewife's preference for a similar item may have on her acceptability score of buffalo fish. The households purchasing buffalo fish in the two markets were classified according to the frequency of serving fish in the home. Families serving fish four times per month were classified as frequent users: those families serving fish from two to three times per month were classed as moderate users, and families serving fish once per month or less frequent were classified as infrequent users.

A comparison of the frequency of the acceptability ratings among the three categories as shown in Figure 10 does not indicate that frequency

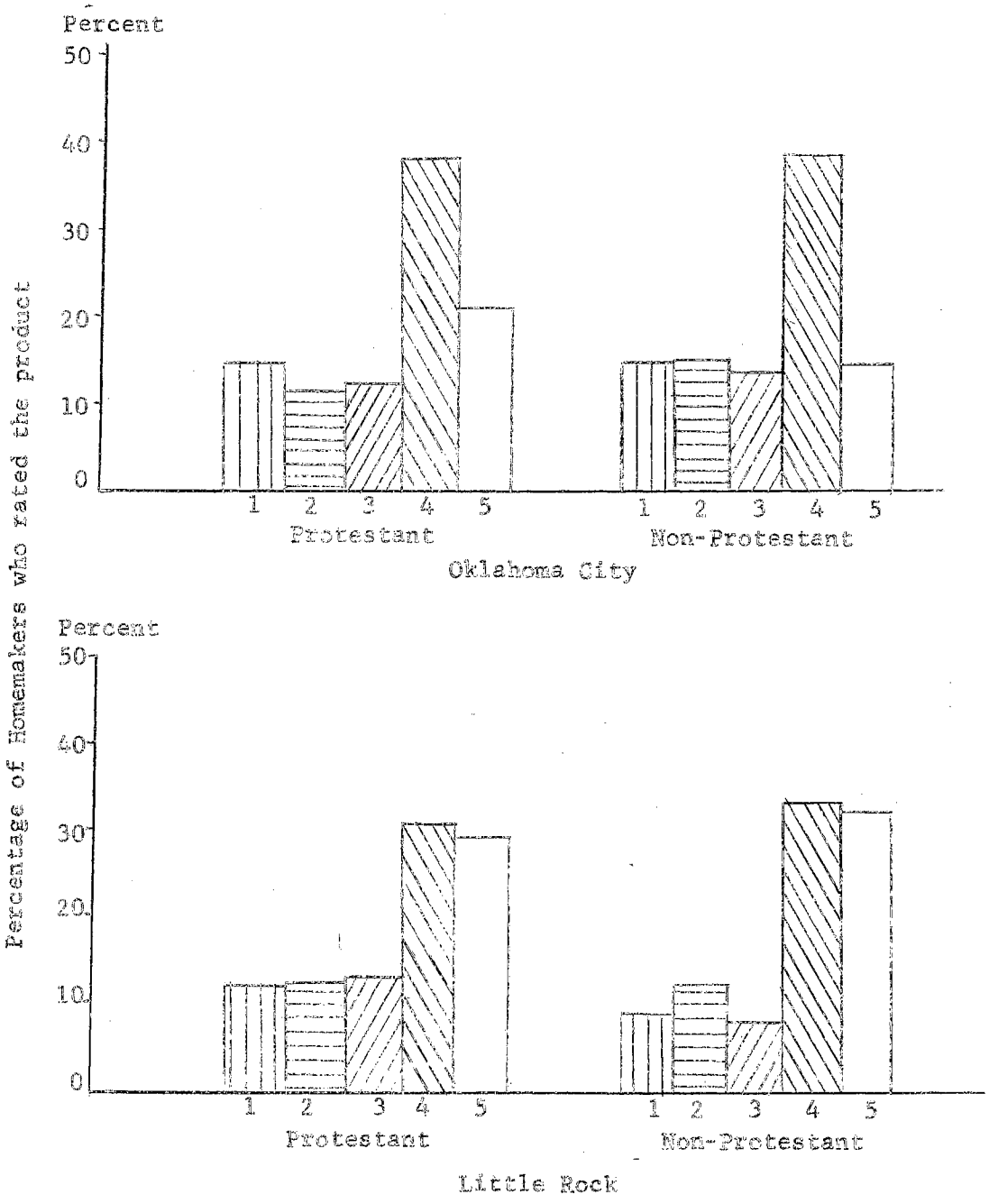

Figure 9. Frequency of Acceptability Rating by Consumers, by Religious Preferences, Oklahoma City and Little Rock.

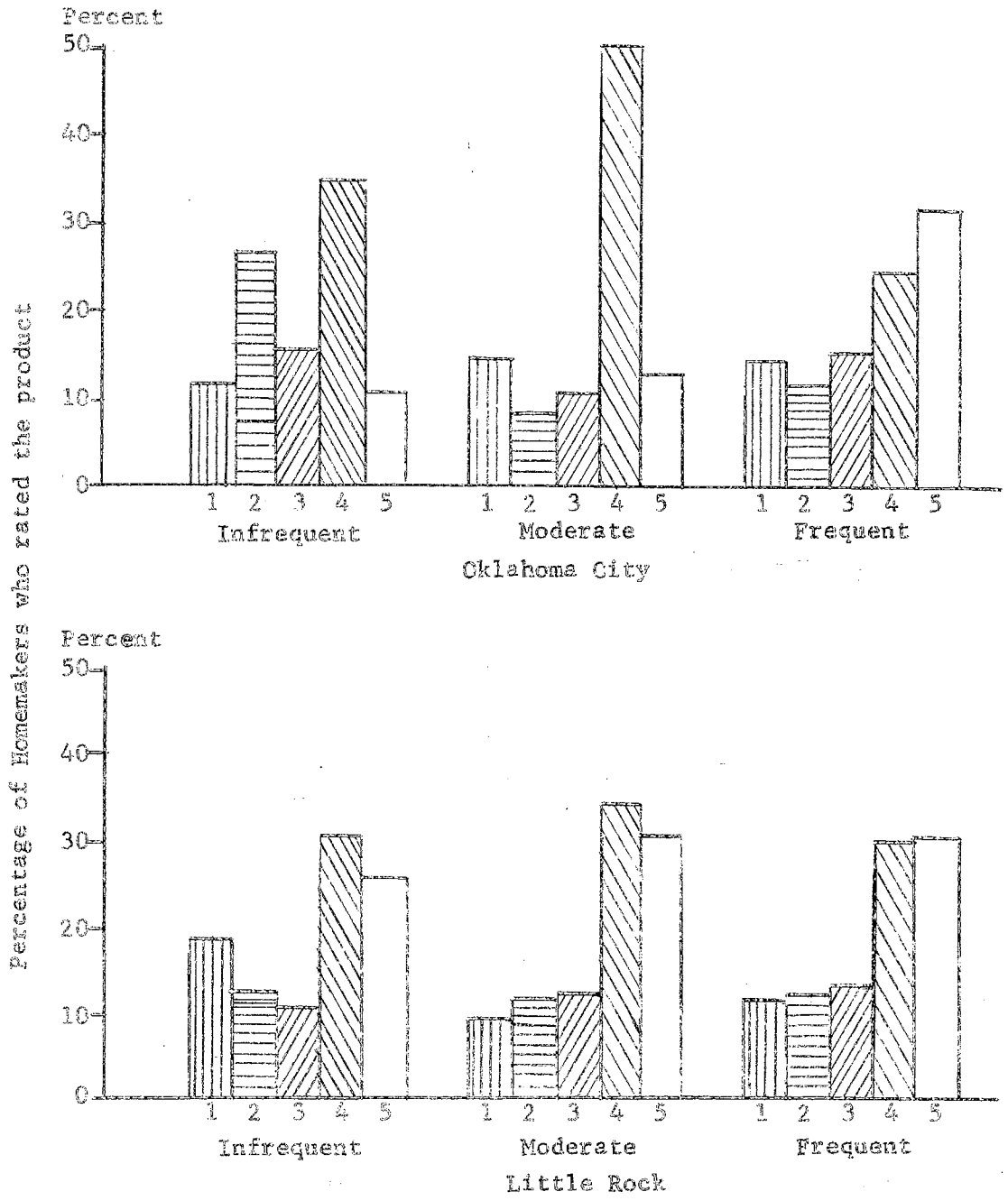

Figure 10. Frequency of Acceptability Rating by Consumers, by Frequency of Serving Fish, Oklahoma City and Little Rock.

TABLE XIV

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO RELIGIOUS PREFERENCE OF THE HOMEMAKER, OKLAHOMA CITY AND LITTLE ROCK

Markets	Preference Comparison	Computed Value	Standard Error	"t" Value	Mean[a] Rating	
Combined	Protestant-nonProtestant	.4623	.0883	5.2353**	3.15	3.49
Oklahoma City	Protestant-non-Protestant	.5018	.0706	7.1076**	3.09	3.54
Little Rock	Protestant-non-Protestant	.5550	.1554	3.5714**	3.25	3.71

[a]First column mean rating corresponds to first column of comparison column.

**Significant at the one percent level.

of use influences homemakers ratings of buffalo fish to any appreciable extent. This was especially true among the Little Rock consumers. In Oklahoma City, an exceptionally high percentage of housewives in the moderate-use group gave the product a rating of 4, "Like Moderately."

The over-all rating of buffalo fish by the three groups, as indicated by the mean rating, is given in Table XV. The estimated effects of frequency of serving fish on homakers acceptability ratings was relatively small and insignificant between adjacent groups, with one exception. The computed difference between the infrequent and moderate groups in Oklahoma City was significant at the one percent level. The computed differences between the frequent users and the infrequent users' groups were negative and significant in both markets.

Differences in Consumer Satisfaction to Impulse Buying

An attempt was made to evaluate differences in consumers acceptability scores between groups of consumers who purchased buffalo fish impulsively and those who planned to purchase when they entered the market.

In Oklahoma City, where the level of awareness of the product was low, a larger majority of the impulse buying group gave the product a more favorable rating than did the group planning to buy. In Little Rock, where consumers were more familiar with the product, the reverse was true, with the higher percentage of the group planning to purchase rating the buffalo fish favorably (Figure 11).

The mean acceptability ratings and the computed differences are shown in Table XVI. The values of the deviations between groups are nonsignificant in all markets.

TABLE XV

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO FREQUENCY OF SERVING FISH, OKLAHOMA CITY AND LITTLE ROCK

Markets	Frequency of Serving[a] Comparison	Computed Difference	Standard Error	"t" Value	Mean Rating
Combined	Infrequent-moderate	.2016	.0846	2.3829*	3.20
Oklahoma City	Infrequent-moderate	.2284	.0841	2.7158**	3.06
Little Rock	Infrequent-moderate	.1721	.1201	1.4329	3.33
Combined	Moderate-frequent	-.0558	.0333	1.6756	3.42
Oklahoma City	Moderate-frequent	-.0435	.0536	.8115	3.39
Little Rock	Moderate-frequent	-.0756	.0634	1.1910	3.55
Combined	Frequent-infrequent	-.2574	.0852	3.0211**	3.52
Oklahoma City	Frequent-infrequent	-.2720	.0776	3.5046**	3.45
Little Rock	Frequent-infrequent	-.2477	.1187	2.0865*	3.66

[a] Infrequent--once or less per month.
Moderate--two or three times per month.
Frequent--four or more times per month.

[b] Mean rating refers to the first items in the comparison column.

**Significant at the one percent level.

*Significant at the five percent level.

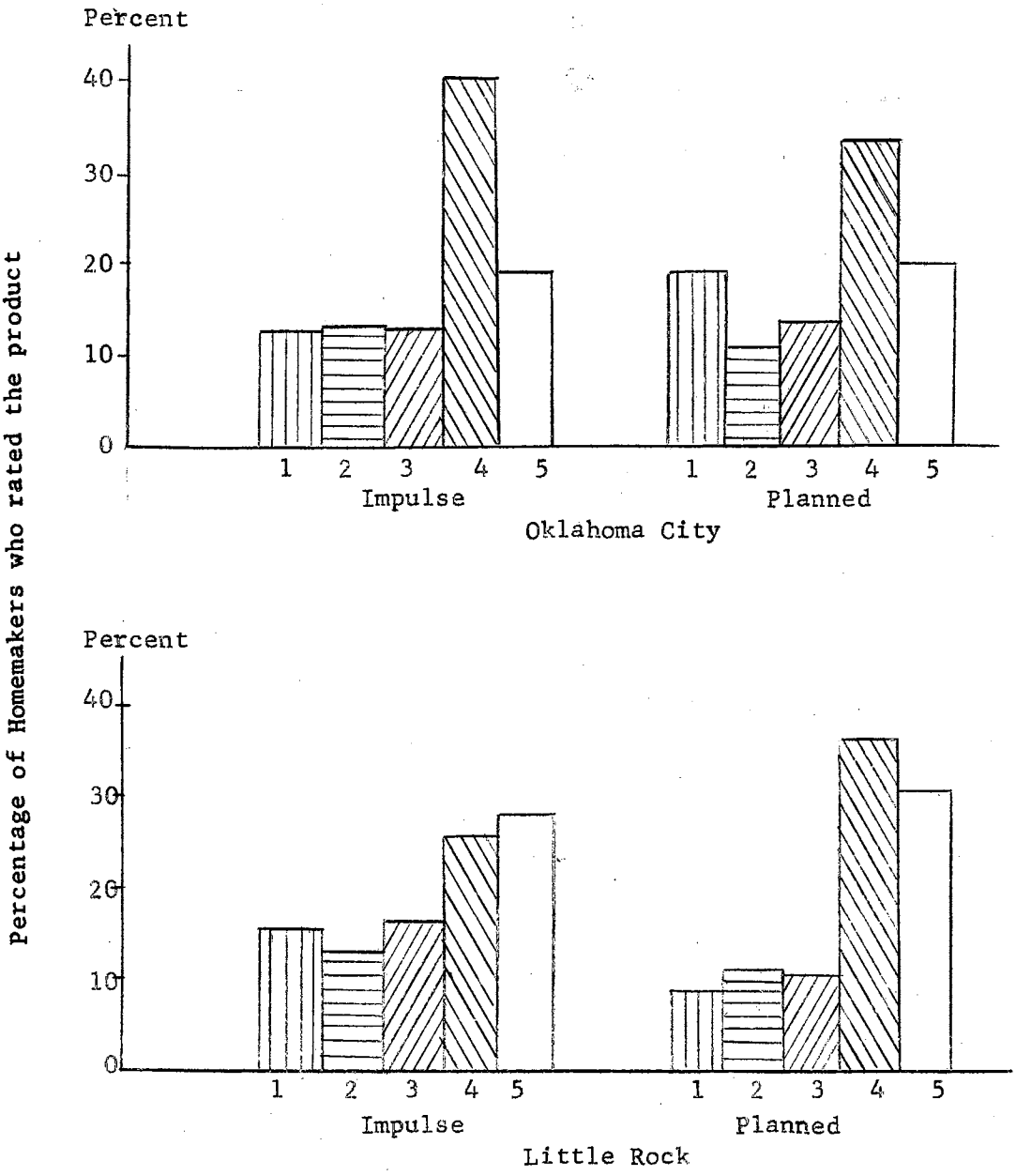

Figure 11. Frequency of Acceptability Rating by Consumers, by Intention to Purchase, Oklahoma City and Little Rock.

TABLE XVI

MEAN ACCEPTABILITY RATING BY PURCHASERS OF BUFFALO FISH AND SELECTED STATISTICS RELATED TO IMPULSE BUYING, OKLAHOMA CITY AND LITTLE ROCK

Markets	Buying Comparison	Computed Difference	Standard Error	"t" Value	Mean[a] Rating	
Combined	Impulse-Planned	.0291	.0605	.4809	3.38	3.57
Oklahoma City	Impulse-Planned	.1128	.0661	1.7061	3.24	3.40
Little Rock	Impulse-Planned	.0210	.0799	.2628	3.46	3.71

[a]The first column of mean rating refers to the first column of comparison.

The differences in the acceptability rating between Oklahoma City and Little Rock may be partially a result of the differences in awareness of the products between the two cities.

Summary

The two ethnic groups denoting the most influence on the homemakers conceptual image of buffalo fish were race and religion. Colored housewives rated it considerably higher on the hedonic scale than did white housewives. Non-Protestant consumers gave the product a more favorable rating than did Protestant consumers. There was a positive relationship between frequency of serving fish and the acceptability score given. Intention to purchase had little affect on homemakers' favorableness toward buffalo fish.

CHAPTER V

SUMMARY AND CONCLUSIONS

The raising of buffalo fish on rice farms is one of Arkansas's newest and most unique industries. It allows the rice farmer to utilize land diverted from rice production by Government Price Support Programs and thus provide him with an additional source of income.

The major purpose of this study was to evaluate the economic feasibility of marketing packaged buffalo fish through fresh meat counters in supermarkets. The basic objectives were to evaluate potential sales of buffalo fish in terms of the number of purchasers per thousand store customers; to analyze the effects of socioeconomic characteristics of the population on consumer acceptance of buffalo fish; and to examine the influence of the ethnic groups' value on the homemakers' conceptual image of buffalo fish.

There is no known method of predicting the future with certainty. Instead, generalizations can be made about the influence of variables when they are studied in relation with other variables under controlled conditions. The usefulness of these generalizations must depend upon their contribution to consumer behavior theory as an aid in understanding the functional relationship among variables.

A conceptual model of human behavior is necessary as a working framework to avoid a lack of discipline in studying the problems of consumer

choice. If consumers can be grouped in such a manner that their buying habits, attitudes and motives are different from the buying characteristics of another group of consumers, then the marketer has delineated a more homogeneous market for his product. If this market proves to be significantly different from the generalized market, then a means of stratifying to increase predictability has been found.

Two techniques for estimating variations in consumer behavior were used. A match-lot experimental design was used to display fish for sale in six supermarkets in Oklahoma City and six in Little Rock to appraise consumers acceptance and marketing behavior under actual marketing conditions in different types of locations. Two forms of buffalo fish, a ready-to-cook product, and the conventional whole-dressed form, were displayed to determine if the homemakers would discriminate between these two forms. Store audits were used to obtain data on the volume of sales and merchandising methods of the cooperating stores. A household survey was conducted among families purchasing buffalo fish to evaluate the housewives' favorableness toward the product.

Scale analysis was used to rank the respondents in terms of favorableness of their attitudes toward the product. Answers to questions from the homemakers' interviews were used to construct an acceptability rating scale. These questions were designed to obtain the intensity as well as the opinion of the housewife toward buffalo fish.

An experimental, statistical model, using discrete variables, was used to test for significant differences among sub-classes within the economic, environmental, and ethnic group classifications of the population.

Analyzing classification variables by the model used requires that one sub-class in all classes be given the value of zero. This zero class thus becomes the base class. The coefficient associated with each of the other classes is then interpreted as a deviation from the base. Thus, the estimates of the coefficients are in terms of deviation within the classifying variables.

Considerable variability occurred among the stores in the sales of buffalo fish. Sales ranged from a low of 5.3 to a high of 22.6 per thousand store customers. When the stores were grouped according to markets, sales were highest in Little Rock (11.6) and lowest in Oklahoma City (8). When stores were grouped according to income areas, sales of fish were significantly higher in the low income areas, averaging 16 per thousand customers as compared to 7 and 8 per thousand in the medium and high income areas, respectively.

Customers in the low income areas preferred to purchase fish in the whole-dressed form rather than in the pan-ready form. Oklahoma City consumers preferred ready-to-cook form, whereas Little Rock consumers purchased a larger proportion of the dressed form.

Small variations in price of buffalo fish indicate that purchases are rather responsive to price changes. The effect of a five-cent price variation on sales was significant at the one percent level of confidence.

Variations in sales of buffalo fish per thousand store patrons within environmental classifications were greatest among occupational groupings and size of household categories. There was a substantial difference

in the ratio of purchasers to nonpurchasers among the three occupational groupings. Families of unskilled workers consumed more buffalo fish than did families in the other two occupational groups. Sales of fish per thousand store patrons was significantly higher in the large household size group than in the other two size groups, with no pronounced difference between the lower two size groups. Families with children under 12 years of age purchased more buffalo fish than did families without children under 12 years of age.

The ethnic group showing the greatest variations in the number of purchases per thousand store customers was race of purchaser. Negro customers averaged at least 20 purchases per thousand more than white customers.

The awareness that the product is in the market and some familiarity with its attributes influence impulse buying to a considerable extent. In Oklahoma City in a new market, 3 out of 4 purchasers had not planned to buy fish when they entered the store. Appearance and freshness were the two attributes which consumers mentioned most often in their decision to purchase the fish.

Economic characteristics influencing consumers favorableness toward buffalo fish as measured by their acceptability rating scores were income status and form of fish purchased. There appeared to be an inverse relationship of over-all mean ratings to income levels of the households. The ratings were substantially higher for the low income groups, while the two higher income groups tended to rate it at a lower hedonic scale rating. Oklahoma City consumers gave a higher rating score to the pan-ready form, while Little Rock consumers favored the dressed-form of fish.

The three environmental characteristic classifications of occupation of head of household, size of household, and composition of family all had highly significant differences in their acceptability rating scores among the sub-groups within the main groups.

A negative relationship was indicated between occupational groups and the acceptability rating score of consumers. That is, as the occupational status of the head of household increased, the housewife's favorableness toward buffalo fish decreased. The white-collar groups gave the product a highly significant lower rating than did the other two groups.

The data indicated a positive relationship of the over-all rating, as measured by the mean rating, between household size groups and acceptability of the product. Families in the large size household groups gave the fish a considerably higher rating on the hedonic scale than families in the medium and small-size groups. The homemakers of medium-size households gave it a more favorable rating than did homemakers in the small-size household groups.

Although families with children under 12 years of age had a higher ratio of purchasers to nonpurchasers than did the families without children under 12 years of age, the reverse of this pattern was true for the acceptability rating. In Oklahoma City the deviation was highly significant.

The favorableness toward buffalo fish of the homemakers in the ethnic groups studied fluctuated widely. The race of purchasers exhibited a more striking effect on the housewife's acceptability score than any other ethnic group. Negro homemakers tended to give higher general

over-all ratings, while the white housewives in general rated it lower on the hedonic scale.

Non-Protestant consumers expressed a more favorable attitude toward buffalo fish than did Protestant consumers. The estimated effects of religious preferences of the homemakers on her favorableness toward buffalo fish, as shown by the computed value were large and positive for all areas.

A comparison of frequency rating scores of homemakers among the three categories of frequency of serving fish does not indicate that frequency of serving fish influenced their favorableness toward buffalo fish.

Housewives buying on impulse in Oklahoma City, where the level of awareness of buffalo fish was extremely low, rated it higher on the acceptability scale than did housewives who planned to purchase. These differences were small and insignificant.

In any consumer acceptance or market potential study, the economically feasibility level becomes a pertinent question. Categorically, there is no one acceptance rate or level for all product or innovations. The product's attributes, such as perishableness, cost of handling, shelf-life of product, inventory costs, and many others, all affect the necessary rate of turn-over for the product to be an economic asset to the marketing firm.

The low ratio of purchasers to nonpurchasers in the total market studied, indicates that an economic feasible rate of acceptance by consumer under the merchandising practices and pricing policy used is doubtful. It needs to be emphasized, that this was a new product and a

new innovation in merchandising fresh fish. There was no promotional or advertising campaign accompanying the product in either market. This was particularly noticeable in the rate of acceptance in the Oklahoma City market, where the awareness level was extremely low, compared with the rate of acceptance in the Little Rock market.

This difference could not be accounted for by prejudice of the homemakers in Oklahoma City, if the acceptability rating scale used gave an indication of the consumers' favorableness toward the buffalo fish.

Two other economic factors the fish farmers need to consider in developing a marketing program for buffalo fish are the higher rate of sales in the low income areas and the variations in sales associated with changes in the price of fish.

Variations in sales of and the favorableness toward buffalo fish among environmental and ethnic groups indicate to the fish industry the group with more homogeneous buying habits, attitudes, and motives, thus giving them a means of stratifying the market for their products.

The differences in sales and acceptability ratings among white and Negro homemakers denotes two separate market groups. The fish farming industry needs to recognize this, and either feature their products in areas of Negro population or initiate a campaign to raise the prestige of their products.

It is also apparent that there is a need for improvement of the product. The producers of buffalo fish should devote considerable attention to methods used in harvesting and handling to assume that a quality product reaches the market. Also, considerable attention should be given to developing new products that will be more acceptable to a larger share of the market.

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A P P E N D I X

APPENDIX TABLE I

SELECTED STATISTICS ON DIFFERENCES RELATED TO SOCIOECONOMIC CHARACTERISTICS EFFECTING SALES OF BUFFALO FISH FOR COMBINED MARKETS OF OKLAHOMA CITY AND LITTLE ROCK

Socioeconomic Characteristics	Deviation Values	Standard Error	"t" Values
A constant including base value	28.8889	1.3861	20.8418
Market regions			
Oklahoma City-Little Rock	2.9337	.4541	6.4605**
Income areas			
Low - medium	-7.3032	.9634	7.5807**
Low - high	-6.0782	.6756	8.9967**
Medium - high	1.2250	.9634	1.2715
Time periods			
November-December	-1.7103	.4472	3.8245**
Race of purchasers			
Caucasian-Negro	22.6800	.8634	26.2682**
Occupation of head of household[a]			
Group A-Group B	2.6900	.5821	4.6212**
Group A-Group C	6.6135	.6393	10.3449**
Group B-Group C	3.9235	.5460	7.1859**
Size of household[b]			
Small-medium	.9126	.6279	1.4534**
Small-large	4.8778	.8273	5.8960**
Medium-large	3.9652	.8682	4.5672**
Composition of family[c]			
Group I-Group II	-5.1371	.4817	10.6645**
Price variation in cents per pound			
Dressed 49-54	-5.9718	.9933	6.0121**
Pan-ready 65-70	-6.0858	1.0095	6.0285**
Pan-ready 70-75	-2.9851	.9640	3.0966**
Pan-ready 65-75	-9.0709	1.8743	4.8396**

R^2 (Coefficient of determination) = .791

**Significant at the one percent level.

[a]Group A includes Professional, Semi-Professional, Proprietors, Managers, and Officials.

Group B includes Clerk, Sales, and kindred workers, Craftsmen, foremen and kindred workers, and operators and kindred workers.

Group C includes the unskilled class, composed of domestic service workers, service workers, and laborers.

[b]Small size household includes 1 or 2 members.
Medium size household includes 3 or 4 members.
Large size households have 5 or more members.

[c]Group I includes families with children under 12 years of age.
Group II includes families without children under 12 years of age.

APPENDIX TABLE II

SELECTED STATISTICS ON DIFFERENCES RELATED TO SOCIOECONOMIC CHARACTERISTICS EFFECTING SALES OF BUFFALO FISH FOR OKLAHOMA CITY

Socioeconomic Characteristics	Deviation Values	Standard Error	"t" Value
A-constant including base value	37.8057	1.8056	20.9375**
Income areas			
Low-medium	-6.9163	1.1234	6.1566**
Low-high	-6.0840	.8462	7.1898**
Medium-high	.8823	1.5592	.5659
Time Periods			
November-December	-2.0775	.5544	3.7471**
Race of purchasers			
Caucasian-Negro	24.4023	1.2500	19.5217**
Occupation of head of household[a]			
Group A-Group B	2.8419	.6673	4.2588**
Group A-Group C	8.2761	.8244	10.0389**
Group B-Group C	5.4342	.7513	7.2331**
Size of households[b]			
Small-medium	.9468	.6747	1.4033
Small-large	4.2199	.5012	8.4196**
Medium-large	3.2731	.6515	5.0239**
Composition of family[c]			
Group I-Group II	-2.4531	.5987	4.0969**
Price variations in cents per pound			
Dressed 49-54	-5.2522	1.0347	5.0760**
Pan-ready 65-70	-3.2082	1.0191	3.1481**
Pan-ready 70-75	-2.2854	1.0058	2.2722**
Pan-ready 65-70	-5.4936	1.2491	4.3980**

R^2 (Coefficient of determination) = .874.

**Significant at the one percent level.

*Significant at the five percent level.

[a,b,c]See footnotes in Appendix Table I.

APPENDIX TABLE III

SELECTED STATISTICS ON DIFFERENCES RELATED TO SOCIOECONOMIC CHARACTERISTICS EFFECTING SALES OF BUFFALO FISH FOR LITTLE ROCK

Socioeconomic Characteristics	Deviation Values	Standard Error	"t" Value
A-constant including base value	23.1040	1.1085	20.8425**
Income areas			
Low-medium	-6.3782	1.1638	5.4805**
Low-high	-5.3521	1.5111	3.5418**
Medium-high	1.0261	1.0886	.9426
Time Period			
November-December	.7223	1.7612	.4101
Race of Purchasers			
Caucasian-Negro	21.4925	1.2296	17.4793**
Occupation of head of household[a]			
Group A-Group B	2.1262	.6554	3.7441**
Group A-Group C	4.9176	1.0145	4.8473**
Group B-Group C	2.7914	.9151	3.0504**
Size of households[b]			
Small-medium	.0305	1.0306	.0296
Small-large	7.1320	1.0436	6.8340**
Medium-large	7.1015	1.0471	6.7821**
Composition of family			
Group I-Group II	-8.2983	.7772	10.6771**
Price variations cents per pound			
Dressed 49-54	-7.3828	1.1753	6.2816**
Pan-ready 65-70	-11.5914	1.2741	9.0977**
Pan-ready 70-75	-5.4294	1.2911	4.2053**
Pan-ready 65-75	-17.0208	1.6410	10.3722**

R^2 (Coefficient of determination) = .761

**Significant at the one percent level.

[a,b,c]See footnotes a, b, c, Appendix Table I.

APPENDIX TABLE IV

FREQUENCY OF ACCEPTABILITY RATINGS OF CONSUMERS RELATED TO INCOME STATUS OF CONSUMERS, OKLAHOMA CITY AND LITTLE ROCK

Income Status and Markets	- Acceptability Ratings[a] - 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
Low						
Combined	8.1	9.1	11.6	39.6	31.6	766
Oklahoma City	5.5	7.2	9.0	47.8	30.5	345
Little Rock	10.2	10.7	13.8	32.8	32.5	421
Medium						
Combined	13.1	9.6	14.2	44.3	18.8	520
Oklahoma City	12.6	11.3	15.1	48.2	12.8	238
Little Rock	13.8	8.2	13.5	40.7	23.8	282
High						
Combined	20.4	20.7	15.1	20.2	23.6	550
Oklahoma City	30.4	23.3	18.3	16.3	11.7	240
Little Rock	12.6	18.7	12.6	23.2	32.9	310

[a] 1--Dislike extremely.
2--Dislike moderately.
3--Neither like nor dislike.
4--Like moderately.
5--Like extremely.

APPENDIX TABLE V

FREQUENCY OF ACCEPTABILITY RATING BY CONSUMERS RELATED TO FORM OF BUFFALO FISH PURCHASED, OKLAHOMA CITY AND LITTLE ROCK

Form and Markets	- Acceptability Rating[a] - 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
Dressed[b]						
Combined	12.3	9.9	17.4	36.0	24.4	899
Oklahoma City	15.9	14.3	17.9	38.5	13.4	447
Little Rock	8.8	5.5	16.8	33.6	35.8	452
Pan-ready[c]						
Combined	14.1	15.5	9.6	34.1	26.7	937
Oklahoma City	13.6	11.7	8.2	39.1	27.4	376
Little Rock	14.4	18.0	10.5	30.8	26.3	571

[a] See footnote, Appendix Table IV.

[b] Head removed, scaled and gutted.

[c] Cut-up, ready to cook.

APPENDIX TABLE VI

SELECTED STATISTICS ON DIFFERENCES RELATED TO ETHNIC GROUP CHARACTERISTICS INFLUENCING CONSUMER SATISFACTION FOR BUFFALO FISH, OKLAHOMA CITY AND LITTLE ROCK

Ethnic Group Characteristics	Deviation Values	Standard Error	"t" Value
A-constant including base value	3.8300	.1533	24.9836**
Market regions			
Oklahoma City-Little Rock	.0296	.0644	.4596
Income status areas			
Low-medium	-.1328	.0566	2.3462*
Medium-high	-.1914	.0839	2.2812*
High-low	.3242	.0777	4.1714**
Form of fish purchases			
Dressed-Pan-ready	-.0588	.0596	.9865
Time of purchase			
November-December	.0123	.0578	.2120
Race of purchasers			
Caucasian-Negro	.8670	.0845	10.2603**
Occupation of head of household[a]			
Group A-Group B	.4284	.0465	9.2129**
Group A-Group C	.2635	.0749	3.5180**
Group B-Group C	-.6919	.0826	8.3765**
Size of household[b]			
Small-medium	.0976	.0345	2.8289**
Medium-large	.2935	.0850	3.4529**
Large-small	-.3911	.0880	4.4443**
Frequency of serving fish[b]			
Infrequent-moderate	.2016	.0846	2.3829*
Moderate-frequent	-.0558	.0333	1.6756
Frequent-infrequent	-.2574	.0852	3.0211**
Composition of family[c]			
Group I-Group II	.0937	.0611	1.5335
Intention to purchase			
Impulse-planned	.0291	.0605	.4809
Religious preferences			
Protestant-non-Protestant	.4623	.0883	5.2355**

R^2 (Coefficient of determination) = .462.

**Significant at the one percent level.

*Significant at the five percent level.

[a,b,c]See footnotes a, b, c, Appendix Table I.

APPENDIX TABLE VII

FREQUENCY OF ACCEPTABILITY RATING BY CONSUMERS RELATED TO OCCUPATION OF HEAD OF HOUSEHOLD, OKLAHOMA CITY AND LITTLE ROCK

Occupations[a] and Markets	-Acceptability Rating[b] 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
White collar						
Combined	15.9	23.3	16.1	32.0	12.7	416
Oklahoma City	17.6	33.5	15.3	25.6	8.0	176
Little Rock	14.6	15.8	16.7	36.7	16.2	240
Blue collar						
Combined	10.1	10.9	13.4	35.9	29.7	769
Oklahoma City	14.4	9.8	13.0	36.8	26.0	285
Little Rock	7.6	11.6	13.6	35.3	31.9	484
Unskilled						
Combined	15.2	8.1	11.7	36.1	28.9	651
Oklahoma City	13.8	5.8	13.0	46.7	20.7	362
Little Rock	17.0	11.1	10.0	22.8	39.1	289

[a] See footnote, Appendix Table I.

[b] See footnote a, Appendix Table IV.

APPENDIX TABLE VIII

FREQUENCY OF ACCEPTABILITY RATING BY CONSUMERS RELATED TO SIZE OF HOUSEHOLD, OKLAHOMA CITY AND LITTLE ROCK

Household size[a] and Markets	- Acceptability Rating[b] - 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
Small						
Combined	9.3	16.8	12.7	33.0	28.2	710
Oklahoma City	9.6	20.3	16.6	37.4	16.1	355
Little Rock	9.0	13.2	8.8	28.4	40.6	355
Medium						
Combined	13.9	11.6	14.8	34.6	25.1	798
Oklahoma City	13.4	12.0	13.8	34.6	26.2	283
Little Rock	14.2	11.5	15.3	34.5	24.5	515
Large						
Combined	20.1	6.7	11.6	40.9	20.7	328
Oklahoma City	27.0	1.1	7.0	47.6	17.3	185
Little Rock	11.2	14.0	17.4	32.2	25.2	143

[a] See footnote b, Appendix Table I.

[b] See footnote, Appendix Table IV.

APPENDIX TABLE IX

SELECTED STATISTICS ON DIFFERENCES RELATED TO ETHNIC GROUP CHARACTERISTICS INFLUENCING CONSUMER SATISFACTION FOR BUFFALO FISH, OKLAHOMA CITY

Comparison of the Ethnic Group Characteristics	Computed Differences	Standard Error	"t" Value
A-constant including base values	4.6187	0.1714	26.9469**
Income status of consumers			
Low-medium	-.3832	.0959	3.9958**
Medium-high	-.2328	.0772	3.0155**
High-low	.6160	.0948	6.4978**
Form of fish purchased			
Dressed-Pan-ready	.5367	.0566	9.4823**
Time period			
November-December	.0691	.0555	1.2450
Race of purchasers			
Caucasian-Negro	.8311	.0894	9.2964**
Occupation of head of household[a]			
Group A-Group B	1.1707	.0787	14.8754**
Group A-Group C	.1295	.0713	1.8162
Group B-Group C	-1.3002	.0830	15.6650**
Size of household[b]			
Small-medium	.0198	.0922	.2147
Medium-large	.2476	.1013	2.4442*
Large-small	-.2674	.0776	3.4458**
Frequency of serving fish			
Infrequent-moderate	.2284	.0841	2.7158**
Moderate-frequent	-.0435	.0536	.8115
Frequent-infrequent	-.2720	.0766	3.5051**
Composition of family[c]			
Group I-Group II	.6428	.0843	7.6251**
Intention to purchase			
Impulse-planned	.1128	.0661	1.7065
Religious preference			
Protestant-non-Protestant	.5018	.0706	7.1076**

R^2 (Coefficient of determination) = .568.

**Significant at the one percent level.

*Significant at the five percent level.

[a,b,c]See footnotes in Appendix Table I.

APPENDIX TABLE X

SELECTED STATISTICS ON DIFFERENCES RELATED TO ETHNIC GROUP CHARACTERISTICS INFLUENCING CONSUMER SATISFACTION FOR BUFFALO FISH, LITTLE ROCK

Comparison of the Ethnic Group Characteristics	Computed Differences	Standard Error	"t" Value
A-constant including base value	3.5924	.2172	16.5395**
Income status of consumer			
Low-medium	-.1397	.1010	1.3831
Medium-high	-.1393	.1081	1.2886
High-low	-.2790	.1097	2.5432
Form of fish purchased			
Dressed-Pan-ready	-.4685	.0833	5.6242**
Time of purchase			
November-December	.1180	.0795	1.4842
Race of purchaser			
Caucasian-Negro	1.0227	.1180	9.1475**
Occupation of head of household[a]			
Group A-Group B	.3921	.0842	4.6567**
Group A-Group C	.1602	.1162	1.3786
Group B-Group C	-.5523	.1086	5.0856**
Size of household[b]			
Small-medium	.2473	.0971	2.5468*
Medium-large	.3969	.1248	3.1802**
Large-small	-.6442	.1308	4.9250**
Frequency of serving fish			
Infrequent-moderate	.0756	.0634	1.1924
Moderate-frequent	.1721	.1201	1.4329
Frequent-Infrequent	.2477	.1187	2.0867*
Composition of family[c]			
Group I-Group II	.0119	.0825	.1442
Intention to purchase			
Impulse-planned	.0210	.0799	.2628
Religious Preference			
Protestant-non-Protestant	.5550	.1554	3.5714**

R^2 (Coefficient of determination) = .555.

**Significant at the one percent level.

*Significant at the five percent level.

[a,b,c]See footnotes in Appendix Table I.

APPENDIX TABLE XI

FREQUENCY OF ACCEPTABILITY RATING BY CONSUMERS RELATED TO RACE OF PURCHASER, OKLAHOMA CITY AND LITTLE ROCK

Race of Purchasers and Markets	- Acceptability Rating[a] - 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
Caucasian						
Combined	17.6	14.5	14.7	34.4	18.8	1255
Oklahoma City	18.8	16.5	14.9	35.0	14.8	617
Little Rock	16.5	12.5	14.4	33.7	22.9	638
Negro						
Combined	3.8	8.9	10.7	36.7	39.9	581
Oklahoma City	2.9	2.9	9.2	50.0	35.0	206
Little Rock	4.3	12.3	11.5	29.3	42.6	375

[a]See footnote, Appendix Table IV.

APPENDIX TABLE XII

FREQUENCY OF ACCEPTABILITY RATING OF CONSUMERS RELATED TO RELIGIOUS PREFERENCE OF PURCHASERS, OKLAHOMA CITY AND LITTLE ROCK

Religious Preferences and Markets	- Acceptability Rating[a] - 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
Protestant						
Combined	13.2	12.4	13.6	34.4	26.4	1554
Oklahoma City	14.7	12.3	13.3	38.5	21.4	626
Little Rock	12.2	12.4	13.8	31.8	29.8	928
Non-Protestant						
Combined	13.5	14.9	12.9	38.3	20.9	282
Oklahoma City	15.2	15.8	14.2	39.6	15.2	197
Litle Rock	9.2	12.9	8.3	35.4	34.2	85

[a]See footnote, Appendix Table IV.

APPENDIX TABLE XIII

FREQUENCY OF ACCEPTABILITY RATING BY CONSUMERS RELATED TO FREQUENCY OF SERVING FISH, OKLAHOMA CITY AND LITTLE ROCK

Frequency of serving[a] and Markets	- Acceptability Rating[b] - 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
Infrequent						
Combined	15.7	19.7	12.2	33.3	19.1	294
Oklahoma City	12.9	26.4	13.6	35.7	11.4	140
Little Rock	18.2	13.6	11.0	31.2	26.0	154
Moderate						
Combined	12.2	10.4	12.2	42.8	22.4	785
Oklahoma City	15.2	8.8	11.6	51.0	13.4	388
Little Rock	9.3	12.1	12.8	34.8	31.0	397
Frequent						
Combined	13.3	12.4	15.1	27.7	31.5	757
Oklahoma City	15.3	12.5	15.9	24.1	32.2	295
Little Rock	12.1	12.3	14.5	30.2	30.9	462

[a] Infrequent, one or less times per month.
Moderate, two or three times per month.
Frequent, four or more times per month.

[b] See footnote, Appendix Table IV.

APPENDIX TABLE XIV

FREQUENCY OF ACCEPTABILITY RATING BY CONSUMERS RELATED TO IMPULSE BUYING, OKLAHOMA CITY AND LITTLE ROCK

Intention and Markets	- Acceptability Rating[a] - 1	2	3	4	5	Consumers
	Percent	Percent	Percent	Percent	Percent	Number
Impulse						
Combined	14.2	13.7	14.7	34.3	23.1	1016
Oklahoma City	12.6	13.8	13.3	40.8	19.5	580
Little Rock	16.1	13.5	16.5	25.9	28.0	436
Planned						
Combined	12.1	11.6	11.8	36.0	28.5	820
Oklahoma City	19.8	11.5	14.0	34.0	20.7	243
Little Rock	8.8	11.6	10.9	36.8	31.9	577

[a]See footnote, Appendix Table IV.

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