1961

The Nature of Consumer Preferences for Louisiana Canned Sweet Potatoes.

Bernis Earl Williamson
Louisiana State University and Agricultural & Mechanical College

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THE NATURE OF CONSUMER PREFERENCES FOR LOUISIANA CANNED SWEET POTATOES.

Louisiana State University, Ph.D., 1961
Economics, agricultural

University Microfilms, Inc., Ann Arbor, Michigan
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This study was conducted under the direction and supervision of Dr. Ewell P. Roy. The writer is grateful for his patient and helpful guidance in the preparation of this dissertation.

Acknowledgment is made to the Department of Agricultural Economics and the Agricultural Experiment Station for making the study possible. The helpful suggestions from members of the faculty and staff and to Dr. Barton R. Farthing for his statistical advice are also appreciated. However, the author assumes full responsibility for all errors and omissions.

The author wishes to thank personnel of Trappey's Sons, Inc., and Lormand Canning Factory for canning the sweet potatoes used in the study.

The author is especially grateful to Mr. Dudley B. Frickie, Mr. Jimmy D. Goodwin, Mr. Carter Price and to graduate assistants in the Agricultural Economics Department for their help in conducting the study. Mrs. Alice Winston typed the manuscript.
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1. Top View of Table Display for Color and Style Preference Determination, Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959.
ABSTRACT

The general purpose of the study was to get some indication of the nature of consumer preferences for selected characteristics of canned sweet potatoes. These characteristics were variety, style of cut and brix level of syrup. It was hypothesized that a knowledge of some aspects of the nature of consumer preferences would aid the market price mechanism in improving efficiency in the allocation of scarce resources.

Consumers in three selected supermarkets in Baton Rouge, Louisiana, were shown displays consisting of pans of sweet potatoes. From these displays, visual preferences as to style of cut and variety were obtained from customers. Selected consumers were given two cans of sweet potatoes—differing only in brix level—for determination of preference for brix level.

The choices that were offered to consumers were as follows:

(A) Preferences among three varieties of canned sweet potatoes at each of three levels of style of cut. The varieties were Louisiana-180, Goldrush and Puerto Rican (Unit I). The styles of cut were whole, whole/cut (50 per cent whole and 50 per cent cut) and cut.
(B) Preferences among three styles of cut of canned sweet potatoes at each of three levels of variety. The varieties and styles of cut were the same as in (A), above.

(C) Preferences between two brix levels of syrup of canned sweet potatoes. These choices were between 27 (heavy) and 35 (extra heavy) brix levels. All possible combinations of varieties and styles in this study were used to test variety and/or style of cut effect on brix level preferences.

The study was conducted for one week. Consumer preferences were analyzed by chi square.

Although consumers' preferences failed to show the same differences when tested under different days, stores and styles of cut or varieties, some conclusions were justified. Consumers' preferences, for Louisiana-180 and Goldrush (combined) over Puerto Rican, were much greater than the hypothesized two to one ratio for both whole canned sweet potatoes and cut potatoes (at the 99 per cent confidence level). However, for the whole/cut style, no conclusions could be made as to variety preferences due to interaction.

No conclusions could be made as to variety preferences between Louisiana-180 and Goldrush due to significant interaction.
Consumer preferences among styles of cut could not be generalized due to significant interaction. However, the nature of the interaction between selected factors and preferences was of preference intensity rather than a change in the order of consumers' preferences. (Intensity and order of preferences refers to number of consumers, since choices of individual consumers were not ranked.) All totals, either by variety or stores, showed whole canned sweet potatoes preferred over the whole/cut style. Except for the Goldrush variety in one store, all totals by varieties or stores showed more preference for whole/cut than for the cut style.

There was no significant interaction, at the 95 percent confidence level, between brix level preferences and each of the factors tested. Based on returns from 226 consumers who returned postal card questionnaires, 64 chose 27 brix syrup, 100 chose 35 brix syrup and 62 indicated no preference of one over the other. When preferences for 27 brix syrup were added to the "no preferences," it was concluded that 126 consumers out of 226 did not prefer the 35 over the 27 brix group. This has practical significance, especially since 49 of the consumers who chose the 35 brix syrup made some statement which indicated that their choice was difficult.
The Louisiana sweet potato canning industry could possibly effect substantial savings by a re-evaluation of their specifications of canned sweet potatoes as to varieties, styles of cut and brix levels of syrup.
CHAPTER II
INTRODUCTION

During the 1959-60 canning season, 2,806,189 standard cases\(^1\) of fruits and vegetables were canned in Louisiana. The estimated wholesale value of the pack at the plant was over ten million dollars. The most important single product canned was sweet potatoes, which accounted for 89.7 per cent of the total pack and 89.2 per cent of the total wholesale value.\(^2\)

The syrup-type pack for sweet potatoes has been used extensively by Louisiana canneries for many years. In 1959-1960 it was estimated that more than 97.5 per cent of the sweet potato pack was of this style.\(^3\)

One significant aspect of the Louisiana sweet potato industry has been the shift toward more sweet potatoes being canned in relation to the quantity moved through the

\(^1\) Standard case equals 24 No. 2 cans.

\(^2\) F. J. Host, E. P. Roy and B. E. Williamson, Commercial Fruit and Vegetable Canning Operations in Louisiana, 1958-59 (RAE Cir. 275, Baton Rouge: Louisiana Agricultural Experimental Station, 1960), pp. 2-5.

\(^3\) Ibid., p. 13.
fresh sweet potato market. (Table I). With the trend toward expansion of sweet potato canning in Louisiana, the need for certain information concerning consumer preference becomes more important. For example, the answer to the question "What quality of canned sweet potatoes do consumers prefer," is often given by technologists instead of by consumers. Appraisals of canned sweet potato quality in some consumer-type research have been based largely on U.S.D.A Grades and Standards. The usefulness of these quality appraisals is limited by the degree to which these standards coincide with consumer preferences. It is not known how or to what extent consumers are impressed by brix level, color, and style of cut, which are, nevertheless, clearly specified on the U.S.D.A. Score Sheet for Canned Sweet Potatoes. The canning industry is undergoing considerable expense to meet certain standards which, if not appreciated or desired by consumers, involves a loss of efficiency.

It is hypothesized that additional information, as to the nature of consumer preference for canned sweet potatoes,

4 Preference, as used here, refers to choice or the ordering of choices among two or more alternative products in a given environment by a consumer or a group of consumers. Acceptance refers to the degree of salability of the product in a given market situation.

5 A.J. Burns and Ewell P. Roy, Quality-Price Relationship for Canned Sweet Potatoes and Okra in Retail Food Stores (DAE Cir. 226. Baton Rouge: Louisiana Agricultural Experiment Station, 1958), pp. 3-5.

6 Ibid., p. 36.
### TABLE I

Importance of Canning Plants as a Method of Distribution for Sweet Potatoes, Louisiana, 1941-1951 and 1953-1957

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<th>Year</th>
<th>Total Production (Thousands of Bushels)</th>
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<td>3,930</td>
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<td>9,920</td>
<td>5,287</td>
<td>102</td>
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<td>1944</td>
<td>9,800</td>
<td>6,135</td>
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<td>12,180</td>
<td>8,008</td>
<td>551</td>
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<td>1946</td>
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<td>7,240</td>
<td>1,626</td>
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<td>8,928</td>
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*Data unavailable*
should aid in more efficient adjustments between producing and marketing. Information on the nature of consumer preference for canned sweet potatoes should promote a better understanding of the market environment in which the canned product must be sold.

PURPOSE OF THE STUDY

The purpose of this study is to get some indication of consumer preferences for certain characteristics of canned sweet potatoes. Knowledge of consumer preferences for these characteristics can be used to guide decision making in breeding of new varieties, labeling of cans, and advertising, merchandising and other promotional work. The three selected characteristics studied include (1) variety, (2) style of cut, and (3) brix level.

Variety Preference (Color) If consumers prefer a "light" colored variety over a "deeper" color, or vice versa, this preference can be reflected in breeding objectives. If there is no preference of one color over another then much effort can be saved by breeders in their attempts to breed for "favorable" colors in a variety.

7 Other characteristics such as disease resistance, yield, etc., will not be disregarded in order to breed for color. However, color cannot be completely neglected if the other desirable characteristics can also be incorporated into a variety.
Color preference may also affect which variety is to be used for canning, the color of the label on the can and colors used in advertising, merchandising and other promotional work.

**Style of Cut Preference** Consumer preference as to style of cut may have many implications. Whether consumers want small whole sweet potatoes, cut potatoes or a mixture of the two will have a direct bearing on breeding work. The size of sweet potatoes, whether large, small or medium, limits the flexibility as to style of cut in canning sweet potatoes.

Spacing of sweet potatoes when planting also affects the proportion of large and small sized sweet potatoes. More closely spaced sweet potatoes yield smaller potatoes which may more readily be canned as whole potatoes.\(^8\) Therefore, knowledge of consumer preferences for styles of cut will also aid in sweet potato cultural practices.

If consumers prefer cut or mixed\(^9\) potatoes or are indifferent to style of cut, much expense and effort can be saved by canning fewer whole potatoes.\(^10\)

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\(^9\)50% whole and 50% cut sweet potatoes.

\(^10\)It is assumed that some whole potatoes will be canned to satisfy desire of consumers for special dishes. Small potatoes are more expensive to can due to extra labor involved and need for being more selective in obtaining raw products.
for style-of-cut may be used to advantage also in labeling, advertising and merchandising.

**Brix Level Preference** Consumer preference for brix level of the syrup used in canning sweet potatoes is important due to the tremendous expense involved. The cost of increasing the brix level of the syrup from 27 (heavy) to 35 (extra heavy) is approximately 25 cents per standard case.\(^{11}\)

During the 1959-60 canning season, Louisiana canneries packed 2,597,410 standard cases of canned sweet potatoes of which over 97 per cent was syrup-packed.\(^{12}\) If consumers do not prefer, or cannot detect, an increase in brix level, sweet potato canners in Louisiana can effect a tremendous savings by lowering brix level of the syrup. A certain brix-level of syrup is necessary to prevent diffusion of sugar from the canned sweet potato into the juice. This diffusion is caused by osmotic pressure. However, the brix level required to prevent this diffusion is only 27.\(^{13}\)

**OBJECTIVES**

The general objective of this study is to ascertain the nature of consumer preference for selected characteristics: (1) variety (color), (2) style of cut and (3) brix

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\(^{11}\) Verbal information from three canners in Louisiana


\(^{13}\) Verbal information from Dr. Julian Miller, Head, Horticulture Department, Louisiana State University.
level. These characteristics are listed on the U.S.D.A. score sheet, yet, do not specifically enter into Federal grade determinations.

More specifically the objectives are: (1) To determine if consumers prefer either Louisiana-180, Goldrush, Puerto Rican (Unit I) or a combination of two varieties equally well over the third. (2) To determine if consumers prefer whole; 50% whole and 50% cut; cut sweet potatoes or a combination of two styles equally well over the third. And (3) to determine if consumers prefer heavy syrup (27 brix); extra heavy syrup (35 brix) or both equally well.

The three varieties mentioned above vary in color from a deep orange to a light yellow. The total pigment measured in milligrams per 100 grams are 19.6, 12.2 and 6.2 respectively.

HYPOTHESES

It is hypothesized that:

(1) Consumers prefer equally well or have no preference as to Louisiana-180, Goldrush and Puerto Rican

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14 "Consumers" is used interchangeably with "housewives" since it is assumed that housewives reflect the majority of food purchasing decisions in the market place.

(Unit I) varieties of canned sweet potatoes.

(2) Consumers prefer equally well or have no preference as to the three main styles of cut of canned sweet potatoes - whole, whole/cut (50% whole and 50% cut) and cut.

(3) Consumers prefer equally well or have no preference as to two selected levels of syrup of canned potatoes - heavy syrup (27 brix) and extra heavy syrup (35 brix).

(4) There is no interaction\textsuperscript{16} between consumer preference for the following characteristics of canned sweet potatoes and selected test variables:

(a) Varieties
(b) Styles of Cut
(c) Brix levels

\textsuperscript{16}Interaction - the failure of two levels of one factor to show the same difference when tested under two or more levels of a second factor.
CHAPTER II
THEORY OF CONSUMER PREFERENCE

Economics deals with the allocation of scarce resources. The price mechanism is relied upon to attain optimum allocations of these scarce resources. However, many decisions must be made based on phenomena other than the price mechanism. The fact that it is not feasible to offer numerous combinations of characteristics of some products limits the use of the price mechanism as the sole guide to optimum resource allocation. Alternatives must be available before choices can be made by consumers. Some decisions must be made before products reach the retail store and consumers in order to limit the number of combinations of these characteristics. This is one justification for consumer preference research.

Before the 1930's, it was not unusual for farmers to market their products directly to consumers or through only one intermediary, the retail store. Under this situation,

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1 For example, we may be confronted with varying levels of three characteristics of canned sweet potatoes—three colors (as exemplified by variety), three styles of cut and two brix levels of syrup (although brix level is continuous). Considering only these three characteristics, we have 18 different combinations.
the wants of consumers could be determined, in addition to prices, by word-of-mouth. This coordination of information between consumer and producer served to supplement prices as a guide to production, processing and marketing practices. The innovations of modern food processors and distributors have severed the flow of word-of-mouth information from consumer to producer. One objective of consumer preference research is to again achieve coordination between producer and consumer.

OBJECTIVES OF CONSUMER PREFERENCE RESEARCH

As defined earlier, consumer preference refers to choice or the ordering of choices among two or more alternative products in a given environment by a consumer or a group of consumers.

According to Branson, the objective of consumer marketing research... "is to provide any commodity group, or group of producers within a commodity, with those tools that can enhance their competitive position against other producers of the same or other products." He further states that... "marketing research must have the objective of maximizing a particular product's sales through a

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better understanding of the environment in which the product must be sold."

"In general terms, the objectives of consumer market research are: (1) to determine the products consumers want, (2) to determine the form and size in which the product is desired and (3) to assist producers and/or processors in developing and delivering the type of product required." 3

This study attempts only to determine if consumers recognize and show a preference for one or more particular characteristics of a product. 4 It is assumed that this knowledge will aid the pricing mechanism in coordinating production, processing and consumption toward more efficient resource allocation.

INFLUENCES UPON CONSUMER BEHAVIOR

Waite and Cassady 5 believe that - "Selection of specific commodities is primarily the result of our environment and seems to be made principally because of habit, impulse, or imitation, and only slightly upon the basis of any rational calculation."

3Robert Branson, "Problems and Opportunities in Consumer Market Research in Agricultural Colleges" (Winnipeg: Marketing Section of the American Farm Economics Association, 1958), pp. 1-2. (Mimeographed)

4Recognition and preference of product differences are inseparable in this study.

Cheskin\textsuperscript{6} states that - "Each hue, tint, shade or tone has a specific optical and psychological effect .... on product images." He rates color very high as to its effect on consumer preferences.

Woods\textsuperscript{7} is of the opinion that - "Theories of consumer behavior have tended to ignore important determinants such as habit, cognition, and learning." He also recognizes that different forces influence consumers under different situations when he says -- "Habitual and rational forces are more at work with cereals, irrational forces with cars. Consumers identify with and get more involved emotionally with automobiles than with cereals. All consumer behavior is motivated, but actual choices made to satisfy motives may depend on other psychological variables. Motivation, per se, is most often a secondary factor in consumer choice, although it underlies all consumer behavior. Two sets of factors determine the choices which are made: personality of the purchaser and character of the product. There are thus two sets of variables...."


\textsuperscript{8}Woods, \textit{op. cit.}, p. 16.
Woods groups the effect of product characteristics on demands of consumers into three classes, (1) demand of ego-involvement in the external symbols which the product conveys (for prestige), (2) hedonic demand (sensory appeal) and (3) functional demand (need for food, etc.). This study involves hedonic demand as affected by visual features (style and color) and taste (brix level).

Woods also lists personality of the purchaser. Waite and Cassady and Cheskin class consumers as somewhat impulsive. The very nature of impulsivity as a personality characteristic leads to greater susceptibility to products with hedonic appeal. Although we class canned sweet potatoes as a food, its functional nature as a food seems to be of lesser consequence due to its relationship to the more staple food items (bread, potatoes, meat, etc.).

In considering consumer preference, we must consider personality of consumer, basic characteristics of the product and environment in which the preference decision is made. However, the human mind is forced to start with

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9This study is concerned with consumer preference, not demand in the conventional economic sense.

10Waite and Cassady, op. cit., p. 145.

11Cheskin, op. cit., p. 72.

12Environment includes those activities surrounding the offering of commodities to consumers such as displaying, packaging, pricing, advertising, labeling and other practices.
some over-simplifications in classifying phenomena or activities. Therefore, this study is concerned with consumer preference as affected primarily by hedonic demand (sensory appeal) since it involves visual and taste characteristics. Preference is also related to some socio-economic characteristics of the consumers. Any factor, whether price, color, or style, should be recognized as being only a part of the total complex of forces influencing behavior, not interpreted as a situation in which no other factors are seen as influencing consumer behavior.

NEED FOR CONSUMER PREFERENCE RESEARCH

George Katona\(^{13}\) states that consumer attitudes need to be known in order to predict their future actions. His opinion is that their attitude does reflect future action. Charles Roos, a noted mathematical economist, is quoted as saying: "The most favorable criticism that can be made is that data on intentions to buy should be used with considerable caution.\(^{14}\)

Realization of the need for consumer research is typified by Cheskin's following statement: "Managers of automobile manufacturing companies in Detroit have finally

\(^{13}\)George Katona, "The Consumer Calls the Tune," Business Week, Number 1595 (March, 1960), 64-68.

\(^{14}\)Ibid.
become aware that they do not know what the consumers want. Executives of large corporations should at this stage of our national development realize that they cannot possibly behave like typical consumers, for the simply reason that they are not typical consumers.\(^{15}\)

Burns and Roy commented on quality characteristics in canned foods as follows: "Prosperity is likely to reduce the discipline that costs impose upon the buyer."\(^{16}\) This statement simply meant that, as consumers become more prosperous, the choice between products will be decided to a lesser extent on price and to a greater extent on other factors. In economic terms, a good will then become more price inelastic.

According to Chamberlin\(^ {17}\) preferences affect consumer purchases as follows:

A general class of product is differentiated if any significant basis exists for distinguishing the goods (or services) of one seller from those of another. Such a basis may be real or fancied, so long as it is of any importance whatever to buyers, and leads to a preference for one variety of the product over another. Where such differentiation exists, even though it may be slight, buyers will

\(^{15}\)Cheskin, op. cit., p. 85.

\(^{16}\)Burns and Roy, op. cit., p. 9.

be paired with sellers, not by chance and at random (as under pure competition) but according to their preferences.

When producers or processors know what consumers prefer, they have an intelligent basis for adjusting their production and marketing programs accordingly. This is not to say that preference is the only determinant of acceptance. However, consumer preference is an important determinant in the pairing of sellers with buyers in the market place. This is especially relevant in situations where the practice of non-price competition is to a firm's advantage due to existing market structures.

ORDERING OF PREFERENCES IN ARRIVING AT CHOICES BETWEEN GOODS

One of the assumptions of economic theory is that people are able to arrange their preferences in a consistent order. The significance of the ordering of preferences, in making choices between goods, is given by Norris in the following manner:

18 Non-price competition - Competitive practices not involving prices


Any item which is more expensive than an alternative preferred to it is dropped from consideration. In the above schedule, product D would be eliminated since the lower cost products, A and B are preferred to it.

Norris states that:

The simplification arising from this rule may be exceedingly important. Except for goods in which conspicuous consumption is involved — in which the estimate attached to the goods is itself a function of price — it is a common and a salutary thing that many goods are ranked in one's estimation other than in the same order as their prices.

Once the eliminations have occurred, the buyer is still faced with a difficult problem. He typically has several alternatives left, which are subject to being arranged in order of preference, and they necessarily are priced in the same order. The new schedule might appear as follows:

<table>
<thead>
<tr>
<th>Product</th>
<th>Cost of Production</th>
<th>Preference Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>$900</td>
<td>First</td>
</tr>
<tr>
<td>D</td>
<td>850</td>
<td>Fourth</td>
</tr>
<tr>
<td>A</td>
<td>800</td>
<td>Second</td>
</tr>
<tr>
<td>B</td>
<td>700</td>
<td>Third</td>
</tr>
</tbody>
</table>

Norris, p. 117.
This study is concerned only with determining information on consumer preference. Cost of production is not included. The choice among the above three products depends on the consumers' competence and desire to pay the differentials between product C, A and B. The determination of how consumers arrive at these choices is beyond the scope of this study.
CHAPTER III
METHODOLOGY

Consumer preference may not correspond with consumer acceptance in every case since product acceptance involves prices (among other things) in addition to preference. However, the first step in the study of consumer acceptance for canned sweet potatoes is the determination of consumer preference. One reason is that consumers have very little choice among the various combinations of color, style and brix level. Most stores only handle two or three brands which, in some instances, represent only one combination of characteristics. (Example—cut potatoes in light syrup)

The consumers, it is felt, are not afforded alternatives. Therefore, consumer purchases do not serve as an efficient guide for processors and marketing agencies.

In some areas of consumer investigation the consumer is not likely to accurately convey preference in her response. This is especially true of the direct question and answer approach. The individual may rationalize as to what he ought to think, or ought to prefer in a given situation, rather than reporting true thoughts or preferences. In a meeting with Dr. Ray Loree,¹ Louisiana State

¹ Conference with Dr. Ray Loree, Fall of 1959.
University Psychology Department, he stated that the most
dependable answers could be obtained by having the consumer
choose between two or more alternatives without actually
being told what factor is being selected.

No attempt was made to determine the underlying
psychological explanations of consumer preference for a
certain characteristic. However, consumer preferences
were compared at various levels of selected socio-economic
factors.

The best method of experimentation was hypothesized
to be a matched lot technique. By this technique, two or
more lots of the product under study, varying only in the
characteristic being tested, are placed side by side. A
choice is then made by the consumer as to which is preferred.
This method has been used successfully by Abrahamsen, Godwin
and others.\(^2\) One advantage of the matched lot technique is
that the influence of the non-test variables is eliminated
in the gathering of data instead of in the analysis.

Offering two or more lots of a given product at
different values of the test variable side by side gives
customers an opportunity to compare lots before making
their choice. Such a procedure automatically eliminates

\(^2\) Max S. Brunk, *Methods of Research in Marketing*
(Department of Agricultural Economics, Paper Number 1,
the effect which size and type of store; income and purchasing habits of consumers; size of display; number and quality of competing products; time, and day of week have on the consumer's choice. Any differences in the choice between lots are then assumed to be attributable to the differences in the test variables. Differences in consumer preferences due to interaction, however, must be determined by statistical analysis.

Another important variable that requires attention in the matched-lot technique is display position of each experimental lot.

Brunk stated the following about including price as a factor in preference determination:

Many studies based on matched-lots have incorporated price differentials on the various lots in order to determine the price premium customers would pay for specified levels of a factor in a commodity. Obviously in such tests a second variable (price) has been added to the variable being tested making it impossible to assign the degree of causality due to either of the variables...price is used by many people as an indicator of quality although quality differences are not apparent.

Although matched-lot tests can be used to indicate preference, they do not indicate the extent to which this preference will be translated into purchases under normal conditions.

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4 Interaction - the failure of two levels of one factor to show the same difference when tested under two or more levels of a second factor.
5 Ibid., p. 29.
EXPERIMENTAL DESIGN

Three stores of a national retail grocery chain in Baton Rouge, Louisiana, were selected for the experiment. The stores represented North, Central and South Baton Rouge. The South Baton Rouge store had a weekly estimated customer traffic of 5,000. The clientele of this store were largely composed of university students, faculty and staff. The Central Baton Rouge store had a weekly estimated customer traffic of 10,000. The clientele of this store were not known to fit any particular pattern as to the characteristics of the customers. The North Baton Rouge store had a weekly estimated customer traffic of 7,000. The clientele of this store were predominately industrial workers.

The experiment was conducted from Monday through Saturday during store hours. Every 25th female customer was selected for the sample. Only females were interviewed since it was assumed that they reflect the majority of consumers' food purchasing decisions in the market place.

6 Number of customers based on number of cash register sales.

7 December 7 through December 12, 1959.

8 Only female customers with carts were counted and selected. Consumers who refused to cooperate in the experiment were replaced by the next customer. Customers who were selected the second time were replaced in the same manner.
Variety and Style Preference Design

In order to determine consumer preference for variety (color), three varieties were displayed so that a choice could be made among the varieties. This was done under three levels of style of cut (for design see Appendix, Table 1).

In determining consumer preference for style of cut, the sweet potatoes were displayed so that a choice could be made among the styles. This was done under three levels of variety (for design see Appendix, Table 2).

Each decision as to level of factor preferred was made with all other factors held constant. All of the above displays were in 27 brix syrup.

Differences in preference may sometimes vary with the order in which the different displays are shown to customers. For this reason, the displays were rotated within each section and among sections of each factor. (Each side of the table represented three levels of one factor.)

The displays were rotated daily within the sections by moving the tray on the left to the right side. The center tray was moved to the left position and the tray on the right was moved to the center position. The sections within each side of the table were rotated in the same manner except sections were moved instead of trays. Sections I and IV correspond to the left tray position, (for
FIGURE 1

Top View of Table Display for Color and Style Preference Determination,
Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Section VI</th>
<th>Section V</th>
<th>Section IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole</td>
<td>Whole Cut</td>
<td>Cut</td>
</tr>
<tr>
<td>Goldrush</td>
<td>L-180</td>
<td>Goldrush</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>Louisiana-180</td>
<td>Puerto Rican</td>
</tr>
</tbody>
</table>

Vertical divider made of 1/8" plywood, 12" in height, was used to divide sections. The sections were 12" by 16". The table was 2' by 4'.
section design (see Figure 1). The side of the table which consumers approached was rotated. The sections were selected so that when consumers were rotated between sides the same sections would not be first. However, they viewed the sections in a counter-clockwise sequence so as not to conflict with the rotation of the sections.

Brix Level Preference Design

In order to determine consumer preference for brix level, two size 303 cans of sweet potatoes were given to every second person interviewed (every 50th consumer). These cans were paired so that style of cut and color (variety) were the same for each consumer. Only brix level was different. One can contained heavy syrup (27 brix) and one contained extra heavy syrup (35 brix) - (Appendix, Table 3). The combinations of style of cut and color (variety) were changed in rotation for each successive customer selected in each store.

TECHNIQUES AND EXECUTION OF THE EXPERIMENT

The following items were used in the experiment:

A folding table - was used with vertical dividers to separate each section, (Figure 1). This was done so that the consumer would concentrate her attention on only one section at a time. Each section contained three levels of a particular factor at one level of all other factors, (Figure 1). Each section then constituted a unit from which a decision as to preference could be made.

Small rectangular aluminum pans - were used to display the canned sweet potatoes. These pans were identified by two letters printed on the end of the pan in order to minimize errors in recording preferences. Very few
housewives indicated any curiosity as to the meaning of the letters. Therefore, it is assumed that they did not affect preference.

One-page questionnaire - was used to record socio-economic factors as well as preferences. (Appendix B)

A package - of two cans of sweet potatoes, a post card questionnaire (Appendix B) was given to every 50th customer. A six pound white paper bag was used to package these items.

Surveying of Consumers

After the consumer was selected, the experiment was explained briefly to her. The questions which did not have obvious answers were read to her and answers requested (Questionnaire, Appendix C). She was then asked to look at each section of the displays and give her preference, if any. No second choices were requested. "Brix level preference" cans were given to every second consumer selected. Names and addresses were obtained from consumers so that reminder letters could be sent to those who failed to return the post card questionnaire.

Maintaining the Display

Cans were opened and contents poured into the appropriate display pans each morning. The syrup in the pans was poured over the potatoes frequently with a spoon in order to maintain appearance of the potatoes. Plans were made for changing the potatoes in the display twice daily. However, the displays were not changed since the appearance was maintained adequately without doing so.
Location of the Display

The displays were located between the cash register and the produce bin. In all three stores this was on the right-hand side of the store as viewed by entering the front door.

METHOD OF STATISTICAL ANALYSIS\(^9\)

In research, problems are encountered in which the interest is in the number of subjects, objects, or measurements falling in each of various categories. This experiment is an example of such a situation. In problems such as these, the chi square test of significance is used. This is useful when testing numerous hypotheses concerning the expected number of observations in each of the various categories. The expected numbers are obtained from the "null hypothesis" that specifies the proportion of the observations in the population falling in each of the categories.

Calculation of Chi Square

If we let \( f_i \) represent the proportion in the \( i \)th category in terms of the null hypothesis, with

\[
\sum_{i=1}^{k} f_i = 1.00,
\]

where $n_i$ = the sample size or $\sum_i^n n_i$

$\gamma_i$ = the theoretical proportion in the $i^{th}$ category

$n_i'$ = the expected number in the $i^{th}$ category

The null hypothesis may be tested in terms of the distribution. We take the difference between each observed and expected number, square these discrepancies, divide each squared discrepancy by the corresponding expected number, and sum. The result is a value of chi square. Thus

$$\chi^2 = \sum_i^k \left( \frac{n_i - n_i'}{n_i'} \right)^2$$

where $\chi^2$ = chi square

$n_i$ = the observed number of observations in the $i^{th}$ category

$n_i'$ = the expected number of observations in the $i^{th}$ category and the $k$ over the summation sign indicates that we sum over all $k$ categories

This is the chi square for any given row.

There are two other chi squares that may add to information about populations sampled. First, there is the chi square calculated from the totals of a table. Here all the groups are treated as a single large sample. The degrees of freedom for the total row is the number of columns minus one.
Finally, there is a chi square that measures the inconsistency of the deviations of the sample ratios from the hypothetical. This is called "heterogeneity" or "difference" chi square. Its calculation is as follows:

<table>
<thead>
<tr>
<th>Degrees of Freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of individual chi squares</td>
</tr>
<tr>
<td>Chi square of total</td>
</tr>
<tr>
<td>Heterogeneity (difference)</td>
</tr>
</tbody>
</table>

Where \( k \) = number of columns
\( r \) = number of rows

The heterogeneity chi square measures interaction.

Measuring Significance of Chi Square

The chi square obtained is evaluated by comparing it with a tabular chi square at the appropriate number of degrees of freedom available. The degrees of freedom for any given row is the number of columns minus one. For an "r times k" contingency table, the number of degrees of freedom will be given by:

\[ df = (r - 1)(k - 1) \]
CHAPTER IV

CONSUMERS' PREFERENCES FOR SELECTED VARIETIES, STYLES OF CUT AND BRIX LEVELS OF CANNED SWEET POTATOES

Consumer preference for a product may be affected by certain socio-economic characteristics as well as the characteristics of the product itself. Preferences for styles of cut, varieties and brix levels of canned sweet potatoes have been classified by selected socio-economic characteristics of consumers. Other classifications were also made by selected aspects of consumer use of sweet potatoes.

This chapter is organized as follows: First, socio-economic characteristics of consumers and some use aspects of sweet potatoes are classified by days within stores. Second, consumers' preferences among varieties, among styles of cut and among brix levels are classified. Variety preferences are classified by styles of cut, days and stores. Style of cut preferences are classified by

1 Aspects of use includes several questions concerning consumer use of sweet potatoes.

2 Included as control factors were stores, days, styles of cut and varieties. Style of cut preferences were tested at three levels of variety. Variety preferences were tested at three levels of style of cut. Brix level preferences were tested at nine combinations of style-of-cut/variety.
varieties, days and stores. Brix level preferences are classified by days and stores. Variety and style of cut classifications are also made for brix level preference but only as a total of these classes, not within days or stores. Third, consumer preferences among varieties and among styles of cut were analysed within style of cut/variety\(^3\); within stores; by socio-economic characteristics of consumers and aspects of sweet potato use. Brix level preferences were analyzed by consumer socio-economic factors and use aspects as a total of all control factors.

**SOCIO-ECONOMIC CHARACTERISTICS OF CONSUMERS AND ASPECTS OF SWEET POTATO USE**

The socio-economic characteristics and use characteristics obtained to classify style of cut and variety preferences are as follows:

1. Consumer income  
2. Rural or urban background  
3. Race  
4. Geographical region where reared  
5. Consumer use of fresh sweet potatoes (use or do not use)  
6. Primary method of preparation of canned sweet potatoes  
7. Frequency of use of canned sweet potatoes

To classify brix level preference, other factors, in addition to the above, were used as follows:

8. Portion of liquid that was used in the preparation of the sample potatoes

\(^3\)Style of cut was used to classify variety preference and vice versa.
9. Reasons why one can of sweet potatoes was preferred over the other
10. Method of preparation of the sample potatoes
11. Number of school age children in family
12. Number of children in family under school age

No significant differences in consumer characteristics were found at the 95 per cent confidence level among days within stores. The number of consumers classified by all consumer and use characteristics was significantly different among stores at the 99 per cent confidence level with the following exceptions. The number of consumers by "whether consumers use fresh sweet potatoes" was not significant at the 95 per cent confidence level. When consumers were classified by primary methods of preparation, there was a significant difference in the number of consumers in each category. However, when method-of-preparation was divided into candied and "all other," there was no significant difference at the 95 per cent confidence level.

Consumer Income*

Consumer incomes varied significantly among stores. (Table II). Consumer incomes were determined by allowing consumers to check the range wherein the family income fell. This technique was used in preference over asking the precise income level, since exact income is usually regarded as confidential information.

*Total income of husband and wife
TABLE II

Number and Per Cent of Respondents by Store and Income Level of Family*
Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Income Level of Family (Dollars)</th>
<th>Store A</th>
<th>Store B</th>
<th>Store C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>0-2,999</td>
<td>16</td>
<td>13.3</td>
<td>11</td>
<td>4.5</td>
</tr>
<tr>
<td>3,000-4,999</td>
<td>26</td>
<td>21.7</td>
<td>42</td>
<td>17.4</td>
</tr>
<tr>
<td>5,000-6,999</td>
<td>24</td>
<td>20.0</td>
<td>106</td>
<td>43.8</td>
</tr>
<tr>
<td>7,000-8,999</td>
<td>17</td>
<td>14.2</td>
<td>60</td>
<td>24.8</td>
</tr>
<tr>
<td>9,000-over</td>
<td>36</td>
<td>30.0</td>
<td>15</td>
<td>6.2</td>
</tr>
<tr>
<td>Refused to give income</td>
<td>1</td>
<td>0.8</td>
<td>8</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100.0</td>
<td>242</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Total income of husband and wife
The model groups of consumers were as follows:

Store A - $9,000 and over, Store B - $5,000 through $6,999,
Store C - $9,000 and over and the average of all stores -
$5,000 to $6,999. Consumers from stores A and C had a wider
variation of incomes than did store B.

Background (Rural or Urban)\(^5\)

The background of consumers, as to whether reared in
a rural or urban community, is classified by stores.
(Table III)

The majority of consumers sampled in stores A and C
were from an urban background while the majority of those
in store B were from a rural background. The per cent of
all consumers from an urban background comprised 54 per
cent of the sample.

Geographical Region Where Reared

Geographical region of rearing was determined by
asking in what state the consumer was reared. The divisions
by region were Louisiana, the South (excluding Louisiana),^6
the United States (excluding the South) and non-United
States. (Table IV)

---

^5 Consumers' own interpretation of rural or urban was
accepted.

^6 The South includes Texas, Oklahoma, Mississippi,
Tennessee, Alabama, Georgia, Florida, North Carolina, South
Carolina and Louisiana.
The per cent of consumers from Louisiana was as follows: Store A - 56.7 per cent, Store B - 74.8 per cent and Store C - 62.7 per cent. The per cent of consumers from the South (excluding Louisiana) was around 20 per cent for all stores. The per cent of consumers from the United States (excluding the South) was 19.2 for store A, 5.0 per cent for store B and 14.6 per cent for store C. The consumers from store B were not from as wide a geographic area as those from Store A and C.

Race

The race of consumers varied significantly at the 99 per cent level between stores. The per cent of non-whites was 5.8 per cent for store A, 1.2 per cent for store B and 7.8 per cent for store C. (Table V) The non-whites were all Negro except one.

Consumer Use of Fresh Sweet Potatoes

Answers to the question "Does consumer use fresh sweet potatoes" did not vary significantly between stores. Between 80 and 85 per cent of consumers did use fresh sweet potatoes. (Table VI)

Primary Preparation Method

The primary methods of preparation which consumers used to prepare canned sweet potatoes were candied, mashed for casserole, heat and serve, and all others. (Table VII) "All others" included only 6.3 per cent of all consumers. There was a significant difference among stores in the primary
### TABLE III

Number and Per Cent of Respondents by Store and Background (Rural or Urban),
Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Background of Consumer</th>
<th>Store A</th>
<th>Store B</th>
<th>Store C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Rural</td>
<td>50</td>
<td>41.7</td>
<td>136</td>
<td>56.2</td>
</tr>
<tr>
<td>Urban</td>
<td>70</td>
<td>58.3</td>
<td>103</td>
<td>42.6</td>
</tr>
<tr>
<td>Not obtained</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100.0</td>
<td>242</td>
<td>100.0</td>
</tr>
</tbody>
</table>
### TABLE IV

Number and Per Cent of Respondents by Store and Geographical Region of Rearing, Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Geographical Region</th>
<th>Store A</th>
<th></th>
<th>Store B</th>
<th></th>
<th>Store C</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Louisiana</td>
<td>68</td>
<td>56.7</td>
<td>181</td>
<td>74.8</td>
<td>168</td>
<td>62.7</td>
<td>417</td>
<td>66.2</td>
</tr>
<tr>
<td>South (Excluding Louisiana)</td>
<td>24</td>
<td>20.0</td>
<td>46</td>
<td>19.0</td>
<td>56</td>
<td>20.9</td>
<td>126</td>
<td>20.0</td>
</tr>
<tr>
<td>United States (Excluding South)</td>
<td>23</td>
<td>19.2</td>
<td>12</td>
<td>5.0</td>
<td>39</td>
<td>14.6</td>
<td>74</td>
<td>11.7</td>
</tr>
<tr>
<td>Non-United States</td>
<td>2</td>
<td>4.2</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>1.9</td>
<td>10</td>
<td>1.6</td>
</tr>
<tr>
<td>No answer</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>1.2</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100.0</td>
<td>242</td>
<td>100.0</td>
<td>268</td>
<td>100.0</td>
<td>630</td>
<td>100.0</td>
</tr>
</tbody>
</table>
### Table V

Number and Per Cent of Respondents by Store and Race, Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Race</th>
<th>Store A</th>
<th></th>
<th>Store B</th>
<th></th>
<th>Store C</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>White</td>
<td>113</td>
<td>94.2</td>
<td>239</td>
<td>98.8</td>
<td>247</td>
<td>92.2</td>
<td>599</td>
<td>95.1</td>
</tr>
<tr>
<td>Non-white*</td>
<td>7</td>
<td>5.8</td>
<td>3</td>
<td>1.2</td>
<td>21</td>
<td>7.8</td>
<td>31</td>
<td>5.0</td>
</tr>
</tbody>
</table>

*All Negro except one*
TABLE VI

Number and Per Cent of Respondents by Store and Whether or Not Fresh Sweet Potatoes are Used, Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Does consumer use fresh sweet potatoes</th>
<th>Store A</th>
<th>Store B</th>
<th>Store C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Yes</td>
<td>98</td>
<td>81.7</td>
<td>200</td>
<td>82.6</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>17.5</td>
<td>37</td>
<td>15.3</td>
</tr>
<tr>
<td>No answer</td>
<td>1</td>
<td>0.8</td>
<td>5</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100.0</td>
<td>242</td>
<td>100.0</td>
</tr>
</tbody>
</table>
### TABLE VII

Number and Per Cent of Respondents by Store and Method of Preparation of Canned Sweet Potatoes, Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Method of Preparation of Canned Sweet Potatoes</th>
<th>Store A</th>
<th>Store B</th>
<th>Store C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Candied</td>
<td>61</td>
<td>62.2</td>
<td>153</td>
<td>74.6</td>
</tr>
<tr>
<td>Mashed for Casserole</td>
<td>18</td>
<td>18.4</td>
<td>17</td>
<td>8.3</td>
</tr>
<tr>
<td>Heat and serve*</td>
<td>14</td>
<td>14.3</td>
<td>22</td>
<td>10.7</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>5.1</td>
<td>13</td>
<td>6.3</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>100.0</td>
<td>205</td>
<td>100.0</td>
</tr>
<tr>
<td>Candied</td>
<td>61</td>
<td>62.2</td>
<td>153</td>
<td>74.6</td>
</tr>
<tr>
<td>All others**</td>
<td>37</td>
<td>37.8</td>
<td>52</td>
<td>25.4</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>100.0</td>
<td>205</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Pineapple and/or Orange peel sometimes added
**Mashed for casserole, heat and serve and other
method of preparation by consumers. However, when the method of preparation was divided into candied and "all others" there was no significant difference at the 95 per cent confidence level among stores. (Table VII) Candying was the primary method of preparation of 71.2 per cent of all consumers.

Frequency of Use of Canned Sweet Potatoes

Frequency of use is classified as never use, use maximum of once monthly, use twice monthly to once in two months and twice yearly or less - but still use. (Table VIII) Consumers in store B who used canned sweet potatoes a minimum of once monthly made up 27.7 per cent of the consumers in that store while this group constituted only 17.5 in store A and 13.3 per cent in store C. The consumers in store B who used canned sweet potatoes twice yearly or less comprised only 0.7 per cent of the store total in contrast to 21.7 per cent in store A and 22.0 per cent in store C.

CONSUMER PREFERENCE FOR VARIETY

Consumers' preferences for varieties were first classified and analyzed by the control variables - stores, days and styles of cut. Then, the preferences were classified and analyzed within selected control factors by socio-economic characteristics of consumers and factors associated with the use of sweet potatoes. All "no preference"
TABLE VIII
Number and Per Cent of Respondents by Store and Frequency of Use of Canned Sweet Potatoes, Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Frequency of use of canned Sweet Potatoes</th>
<th>Store A</th>
<th></th>
<th>Store B</th>
<th></th>
<th>Store C</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Never Use</td>
<td>20</td>
<td>16.7</td>
<td>37</td>
<td>15.3</td>
<td>31</td>
<td>11.6</td>
<td>88</td>
<td>14.0</td>
</tr>
<tr>
<td>Minimum of once monthly</td>
<td>21</td>
<td>17.5</td>
<td>67</td>
<td>27.7</td>
<td>49</td>
<td>18.3</td>
<td>137</td>
<td>21.7</td>
</tr>
<tr>
<td>Twice monthly to once in two months</td>
<td>53</td>
<td>44.2</td>
<td>117</td>
<td>48.3</td>
<td>129</td>
<td>48.1</td>
<td>299</td>
<td>47.5</td>
</tr>
<tr>
<td>Twice yearly or less (still use)</td>
<td>26</td>
<td>21.7</td>
<td>21</td>
<td>8.7</td>
<td>59</td>
<td>22.0</td>
<td>106</td>
<td>16.8</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100.0</td>
<td>242</td>
<td>100.0</td>
<td>268</td>
<td>100.0</td>
<td>630</td>
<td>100.0</td>
</tr>
</tbody>
</table>
answers were distributed equally among each of the three varieties. This was done for two reasons: (1) only a small proportion of consumers gave "no preference" as an answer and (2) consumers' indifference as to preference and consumers' inability to distinguish among varieties could not be separated. Consumer preferences for variety by days and styles of cut are shown in Tables IX, X, XI and XII for the three stores and store totals, respectively.

Since there were two degrees of freedom in testing preferences among the three varieties, two non-orthogonal comparisons were made. Orthogonality has been defined as that property of the design which ensures that the different classes of effects, to which the experimental material is subject, shall be capable of direct and separate estimation without any entanglement. All possible comparisons could not be made due to lack of degrees of freedom. Therefore, the comparisons that were made are termed non-orthogonal comparisons.

One set of comparisons that were made were Louisiana-180 and Goldrush (combined) versus Puerto Rican. The hypothesized expected proportions were two-thirds and one-third of the preferences, respectively. A second set of comparisons that were made included Louisiana-180 versus Goldrush.

### TABLE IX

**Consumers' Preferences for Variety of Canned Sweet Potatoes by Days and Styles of Cut - Store A, Baton Rouge, Louisiana, Fall, 1959**

<table>
<thead>
<tr>
<th>Day</th>
<th>Whole Varieties*</th>
<th>Whole/Cut Varieties</th>
<th>Cut Varieties</th>
<th>Total Varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L-180</td>
<td>GR</td>
<td>PR</td>
<td>L-180</td>
</tr>
<tr>
<td>Mon.</td>
<td>10.00</td>
<td>8.00</td>
<td>0.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Tues.</td>
<td>1.00</td>
<td>14.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Wed.</td>
<td>1.50</td>
<td>12.50</td>
<td>1.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Thur.</td>
<td>6.50</td>
<td>11.50</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Fri.</td>
<td>3.33</td>
<td>18.33</td>
<td>0.33</td>
<td>12.00</td>
</tr>
<tr>
<td>Sat.</td>
<td>16.00</td>
<td>14.00</td>
<td>2.00</td>
<td>20.33</td>
</tr>
<tr>
<td>Total</td>
<td>38.33</td>
<td>78.33</td>
<td>3.33</td>
<td>51.33</td>
</tr>
</tbody>
</table>

* *L-180 = Louisiana 180  GR = Goldrush  PR = Puerto Rican*

**Fractions are due to all "no preference" answers being distributed equally among the three varieties**
TABLE X
Consumers' Preferences for Variety of Canned Sweet Potatoes by Days and Styles of Cut - Store B, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th></th>
<th>Whole</th>
<th>Whole/Cut</th>
<th>Cut</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td></td>
<td>Varieties</td>
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<td></td>
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<td>Varieties</td>
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<td>Varieties</td>
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</tbody>
</table>

Number of Consumers Preferring**

<p>| | | | | |</p>
<table>
<thead>
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</tr>
</tbody>
</table>

* L-180 = Louisiana 180  GR = Goldrush  PR = Puerto Rican

** Fractions are due to all "no preference" answers being distributed equally among the three varieties
TABLE XI
Consumers' Preferences for Variety of Canned Sweet Potatoes by Days and Styles of Cut - Store C, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Day</th>
<th>L-180</th>
<th>GR</th>
<th>PR</th>
<th>L-180</th>
<th>GR</th>
<th>PR</th>
<th>L-180</th>
<th>GR</th>
<th>PR</th>
<th>L-180</th>
<th>GR</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>121.00</td>
<td>120.00</td>
<td>27.00</td>
<td>288.00</td>
<td>426.50</td>
<td>89.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mon.</td>
<td>17.50</td>
<td>18.00</td>
<td>2.50</td>
<td>1.00</td>
<td>21.00</td>
<td>16.00</td>
<td>7.00</td>
<td>28.00</td>
<td>3.00</td>
<td>25.50</td>
<td>67.00</td>
<td>21.50</td>
</tr>
<tr>
<td>Tues.</td>
<td>19.00</td>
<td>18.00</td>
<td>0.00</td>
<td>12.00</td>
<td>24.00</td>
<td>1.00</td>
<td>32.00</td>
<td>2.00</td>
<td>3.00</td>
<td>63.00</td>
<td>44.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Wed.</td>
<td>25.00</td>
<td>9.00</td>
<td>1.00</td>
<td>3.00</td>
<td>17.00</td>
<td>15.00</td>
<td>25.00</td>
<td>5.00</td>
<td>5.00</td>
<td>53.00</td>
<td>31.00</td>
<td>21.00</td>
</tr>
<tr>
<td>Thurs.</td>
<td>9.00</td>
<td>38.00</td>
<td>2.00</td>
<td>6.00</td>
<td>35.00</td>
<td>8.00</td>
<td>20.00</td>
<td>24.00</td>
<td>5.00</td>
<td>35.00</td>
<td>97.00</td>
<td>15.00</td>
</tr>
<tr>
<td>Fri.</td>
<td>30.00</td>
<td>19.00</td>
<td>4.00</td>
<td>15.00</td>
<td>27.00</td>
<td>11.00</td>
<td>28.00</td>
<td>22.00</td>
<td>3.00</td>
<td>73.00</td>
<td>68.00</td>
<td>18.00</td>
</tr>
<tr>
<td>Sat.</td>
<td>20.00</td>
<td>34.00</td>
<td>2.00</td>
<td>9.50</td>
<td>46.50</td>
<td>0.00</td>
<td>9.00</td>
<td>39.00</td>
<td>8.00</td>
<td>38.50</td>
<td>119.50</td>
<td>10.00</td>
</tr>
</tbody>
</table>

*L-180 = Louisiana 180  GR = Goldrush  PR = Puerto Rican

**Fractions are due to all "no preference" answers being distributed equally among the three varieties.

**
TABLE XII
Consumers' Preferences for Variety of Canned Sweet Potatoes by Stores and Styles of Cut, Three Supermarkets, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Style of Cut</th>
<th>Whole Varieties*</th>
<th>Whole/Cut Varieties</th>
<th>Cut Varieties</th>
<th>Total Varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-180</td>
<td>GR</td>
<td>PR</td>
<td>L-180</td>
<td>GR</td>
</tr>
<tr>
<td>Store A</td>
<td>38.33</td>
<td>78.33</td>
<td>3.33</td>
<td>51.33</td>
</tr>
<tr>
<td>Store B</td>
<td>126.50</td>
<td>98.50</td>
<td>17.00</td>
<td>88.67</td>
</tr>
<tr>
<td>Store C</td>
<td>120.50</td>
<td>136.00</td>
<td>11.50</td>
<td>46.50</td>
</tr>
<tr>
<td>Total all stores</td>
<td>285.33</td>
<td>312.83</td>
<td>31.83</td>
<td>186.50</td>
</tr>
</tbody>
</table>

Number of Consumers Preferring**

- L-180 = Louisiana
- GR = Goldrush
- PR = Puerto Rican

**Fractions are due to all "no preference" answers being distributed equally among the three varieties.
The hypothesized expected proportions were one-half of the preferences for each variety.

The effects of days, stores and styles of cut on consumer preferences for variety were tested by the use of interaction chi square. Interaction chi square values between stores and variety preferences are shown in Appendix, Table 4. Interaction chi square values between days and variety preferences are shown in Appendix, Table 5. Interaction chi square values between styles of cut and variety preferences are shown in Appendix, Table 6.

Comparison of Louisiana-180, Goldrush and Puerto Rican

To obtain store, day and style of cut effect on consumers' preferences, interaction chi square values were computed between each of these factors and style of cut preferences.

**Store Effect** Interaction between stores and variety preferences was significant at the 99 per cent level of confidence for all styles of cut. (Appendix, Table 4) However, as a total of all styles this interaction was not significant at the 95 per cent confidence level.

**Day Effect** Interaction between days and variety preferences was significant at the 99 per cent confidence level within all varieties within stores and as a total of varieties within stores. (Appendix, Table 5)

**Style of Cut Effect** Interaction between styles of cut and variety preferences was significant at the 99 per cent
confidence level for three days in store A, all days in store B and four days in store C. (Appendix, Table 6) This interaction was significant at the 95 per cent level for one day in store A, two in store C and not significant at the 95 per cent level for two days in store A. This interaction was significant at the 99 per cent level for all stores and as a total of all stores.

Comparison of Louisiana-180 and Goldrush (Combined) Versus Puerto Rican

Comparisons between Louisiana-180 and Goldrush (combined) and Puerto Rican canned sweet potatoes were made to determine where the differences occurred. Store Effect Interaction between stores and variety preferences was significant at the 95 per cent confidence level for the whole/cut style. (Appendix, Table 4) For the two other styles and as a total of styles interaction was not significant at the 95 per cent level.

Day Effect Interaction between days and variety preferences was significant at the 99 per cent confidence level for whole/cut in stores B and C. (Appendix, Table 5) For the two other styles, within stores and as a total of each store, interaction chi square was not significant at the 95 per cent level.

Style of Cut Effect Interaction between styles of cut and variety preferences was significant at the 99 per cent confidence level for one day in store B, two days in store C,
for totals of store C and for totals of all stores.
(Appendix, Table 6)

Comparison of Louisiana-180 Versus Goldrush

Comparisons between Louisiana-180 and Goldrush were made to determine where differences occurred. Preferences for Puerto Rican were omitted.

**Store Effect** Interaction between stores and variety preferences were significant at the 99 per cent confidence level for all styles of cut, but as a total of all styles of cut this interaction was not significant at the 95 per cent level. (Appendix, Table 4)

**Day Effect** Interaction between days and variety preferences was significant at the 99 per cent confidence level for all styles of cut except whole/cut in store C. (Appendix, Table 5) This interaction was significant at the 99 per cent level as a total of styles of cut for stores A and C. For store B this interaction was not significant at the 95 per cent level.

**Style of Cut Effect** Interaction between styles of cut and variety preferences was significant at the 99 per cent confidence level for four days in store A, four days in store B and five days in store C. (Appendix, Table 6) For the other days, this effect was not significant at the 95 per cent level. As a total of all days, this interaction was significant at the 99 per cent confidence level for each of the stores and as a total of all stores.
Effects of Selected Factors on Variety Preferences

The effect of consumer characteristics and the characteristics of use of sweet potatoes on consumer preferences for varieties were each tested by interaction chi square. This interaction was calculated within styles of cut within stores (as a total of days), between each of these factors and variety preferences. No significant interaction was found at the 95 per cent confidence level for any of the characteristics. Therefore, classifications of preferences by those factors are not shown.

Consumers' Preferences for Varieties

Before any conclusions are made concerning preferences for varieties, consumer preferences by stores, days and styles of cut are given. In store A as a total of days, for whole and whole/cut styles of cut and as a total of all styles of cut, consumers preferred Goldrush, Louisiana-180 and Puerto Rican, in that order. (Table IX) However, for cut potatoes, Louisiana-180, was first, with Goldrush and Puerto Rican being preferred in that order. For four days, as an average of styles of cut, Goldrush was preferred over Louisiana-180. For the other two days Louisiana-180 was preferred over Goldrush. Puerto Rican preferences were last for each of these categories.

8 These preferences are not to be interpreted as significant at any particular confidence level of probability.
In store B, for whole potatoes, Louisiana-180 was preferred over Goldrush. (Table X) For whole/cut and cut styles, Goldrush was preferred over Louisiana-180. As a total of all styles of cut, Goldrush was preferred over Louisiana-180. Louisiana-180 was preferred over Goldrush in only one day. Puerto Rican was least preferred in all of these categories.

In store C, Goldrush was preferred over Louisiana-180 for whole and whole/cut. (Table XI) There was no preference between these two varieties for cut sweet potatoes. For half of the days, Goldrush was preferred over Louisiana-180 and vice versa. As a total of styles of cut, Goldrush was more preferred than Louisiana-180. Puerto Rican was least preferred in all of these categories.

As a total of all days, stores and styles of cut, Goldrush, Louisiana-180 and Puerto Rican varieties were preferred in that order. (Table XI) As a total of days and stores, Goldrush was preferred for each style over Louisiana-180 and Puerto Rican. Preferences for Puerto Rican were least in each of these categories.

CONSUMER PREFERENCE FOR STYLE OF CUT

Consumers' preferences for styles of cut were first classified and analyzed by the control variables—stores, days and styles of cut. The preferences were then classified and analyzed within selected control factors by socio-economic characteristics of consumers and factors associated
with the use of sweet potatoes. All "no preference" answers were distributed equally among each of the three varieties, as were variety preferences. Consumer preferences for style of cut by days and varieties are shown in Tables XIII, XIV, XV, and XVI for the three stores and store totals, respectively.

Since there were two degrees of freedom in testing preferences among the styles of cut, two additional comparisons could be made between two sets of selected styles of cut. The non-orthogonal comparisons that were selected were between whole and whole/cut preferences and between whole/cut and cut preferences. The nature of these comparisons are the same as explained under consumer preference for variety.

The effects of days, stores and varieties on consumer preferences were tested by the use of interaction chi square. These values were first computed among preferences for the three styles of cut. Secondly, comparisons were made between whole and whole/cut preferences. Finally, comparisons were made between preferences for whole/cut and cut styles of canned sweet potatoes.

Interaction chi square values between stores and variety preferences are shown in Appendix, Table 7. Interaction chi square values between days and variety preferences are shown in Appendix, Table 8. Interaction chi square values between styles of cut and variety preferences are shown in Appendix, Table 9.
TABLE XIII

Consumers' Preferences for Style of Cut of Canned Sweet Potatoes by Days and Varieties - Store A, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Day</th>
<th>Variety</th>
<th>Louisiana-180</th>
<th>Goldrush</th>
<th>Puerto Rican</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Whole W/C* Cut</td>
<td>Whole W/C Cut</td>
<td>Whole W/C Cut</td>
<td>Whole W/C Cut</td>
</tr>
<tr>
<td>Mon.</td>
<td></td>
<td>14.00 3.00 1.00</td>
<td>7.83 7.83 2.33</td>
<td>4.67 11.67 1.67</td>
<td>26.50 22.50 5.00</td>
</tr>
<tr>
<td>Tues.</td>
<td></td>
<td>10.00 5.00 0.00</td>
<td>14.00 1.00 0.00</td>
<td>12.00 1.00 2.00</td>
<td>36.00 7.00 2.00</td>
</tr>
<tr>
<td>Wed.</td>
<td></td>
<td>15.00 0.00 0.00</td>
<td>15.00 0.00 0.00</td>
<td>7.00 8.00 0.00</td>
<td>37.00 8.00 0.00</td>
</tr>
<tr>
<td>Thurs.</td>
<td></td>
<td>17.00 1.00 0.00</td>
<td>13.33 3.33 1.33</td>
<td>9.33 5.33 3.33</td>
<td>39.67 9.67 4.67</td>
</tr>
<tr>
<td>Fri.</td>
<td></td>
<td>19.00 2.00 1.00</td>
<td>17.83 1.83 2.33</td>
<td>19.67 .67 1.67</td>
<td>56.50 4.50 5.00</td>
</tr>
<tr>
<td>Sat.</td>
<td></td>
<td>29.00 3.00 0.00</td>
<td>21.00 11.00 0.00</td>
<td>25.67 5.67 0.67</td>
<td>75.67 19.67 0.67</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>104.00 14.00 2.00</td>
<td>89.00 25.00 6.00</td>
<td>76.33 32.33 9.33</td>
<td>271.33 71.33 17.33</td>
</tr>
</tbody>
</table>

*50 per cent whole and 50 per cent cut

**Fractions are due to all "no preference" answers being distributed equally among the three varieties.
**TABLE XIV**

**Consumers' Preferences for Style of Cut of Canned Sweet Potatoes by Days and Varieties - Store B, Baton Rouge, Louisiana, Fall, 1959**

<table>
<thead>
<tr>
<th>Day</th>
<th>Louisiana-160</th>
<th>Goldrush</th>
<th>Puerto Rican</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole W/C Cut</td>
<td>Whole W/C Cut</td>
<td>Whole W/C Cut</td>
<td>Whole W/C Cut</td>
</tr>
<tr>
<td>Mon.</td>
<td>27.33 7.33 1.33 30.33 5.33 0.33</td>
<td>29.00 45.83 4.00</td>
<td>86.67 15.67 5.67</td>
<td></td>
</tr>
<tr>
<td>Tues.</td>
<td>19.00 5.00 2.00 17.00 8.00 1.00</td>
<td>13.33 12.33 0.33</td>
<td>49.33 25.33 1.33</td>
<td></td>
</tr>
<tr>
<td>Wed.</td>
<td>24.00 7.00 0.00 28.00 3.00 0.00</td>
<td>7.33 16.33 5.33</td>
<td>59.33 28.33 5.33</td>
<td></td>
</tr>
<tr>
<td>Thur.</td>
<td>35.00 0.00 0.00 30.00 5.00 0.00</td>
<td>25.33 5.33 4.33</td>
<td>90.33 10.33 4.33</td>
<td></td>
</tr>
<tr>
<td>Fri.</td>
<td>66.00 1.00 1.00 25.83 37.33 4.33</td>
<td>33.33 29.33 5.33</td>
<td>125.17 68.17 10.67</td>
<td></td>
</tr>
<tr>
<td>Sat.</td>
<td>44.00 1.00 1.00 40.00 6.00 0.00</td>
<td>26.50 17.50 2.00</td>
<td>110.50 24.50 3.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>215.33 21.33 5.33 171.17 65.17 5.67</td>
<td>134.63 85.83 21.33</td>
<td>521.33 172.33 32.33</td>
<td></td>
</tr>
</tbody>
</table>

*50 per cent whole and 50 per cent cut*

**Fractions are due to all "no preference" answers being distributed equally among the three varieties**
TABLE XV

Consumers' Preferences for Style of Cut of Canned Sweet Potatoes by Days and Varieties - Store C, Baton Rouge, Louisiana, Fall, 1959

<table>
<thead>
<tr>
<th>Day</th>
<th>Louisiana-180</th>
<th>Goldrush</th>
<th>Puerto Rican</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole $\div$/C* Cut</td>
<td>Whole $\div$/C Cut</td>
<td>Whole $\div$/C Cut</td>
<td>Whole $\div$/C Cut</td>
</tr>
<tr>
<td>Mon.</td>
<td>21.00 16.00 1.00</td>
<td>22.00 9.00 7.00</td>
<td>11.00 25.00 2.00</td>
<td>54.00 50.00 10.00</td>
</tr>
<tr>
<td>Tues.</td>
<td>27.00 2.00 8.00</td>
<td>27.00 3.00 7.00</td>
<td>17.00 19.00 1.00</td>
<td>71.00 24.00 16.00</td>
</tr>
<tr>
<td>Wed.</td>
<td>32.00 3.00 0.00</td>
<td>31.00 3.00 1.00</td>
<td>27.00 8.00 0.00</td>
<td>90.00 14.00 1.00</td>
</tr>
<tr>
<td>Thur.</td>
<td>42.00 5.00 2.00</td>
<td>40.00 6.00 3.00</td>
<td>37.00 10.00 2.00</td>
<td>109.00 21.00 7.00</td>
</tr>
<tr>
<td>Fri.</td>
<td>46.00 1.00 4.00</td>
<td>27.00 6.00 20.00</td>
<td>48.00 2.00 3.00</td>
<td>123.00 9.00 27.00</td>
</tr>
<tr>
<td>Sat.</td>
<td>46.33 7.33 0.33</td>
<td>50.00 2.00 4.00</td>
<td>50.00 6.00 0.00</td>
<td>148.33 15.33 4.33</td>
</tr>
<tr>
<td>Total</td>
<td>216.33 34.33 15.33</td>
<td>197.00 29.00 42.00</td>
<td>190.00 70.00 8.00</td>
<td>605.33 133.33 65.33</td>
</tr>
</tbody>
</table>

* 50 per cent whole and 50 per cent cut

**Fractions are due to all "no preferences" answers being distributed equally among the three varieties
<table>
<thead>
<tr>
<th>Stores</th>
<th>Louisiana-180</th>
<th>Goldrush</th>
<th>Puerto Rican</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Styles of Cut</td>
<td>Styles of Cut</td>
<td>Styles of Cut</td>
<td>Styles of Cut</td>
</tr>
<tr>
<td></td>
<td>Whole  W/C*  Cut</td>
<td>Whole  W/C  Cut</td>
<td>Whole  W/C  Cut</td>
<td>Whole  W/C  Cut</td>
</tr>
<tr>
<td>Store A</td>
<td>104.00  14.00  2.00</td>
<td>89.00  25.00  6.00</td>
<td>76.33  32.33  9.33</td>
<td>271.33  71.33  17.33</td>
</tr>
<tr>
<td>Store B</td>
<td>215.33  21.33  3.33</td>
<td>171.17  65.17  5.67</td>
<td>134.83  85.83  21.33</td>
<td>521.33  172.33  32.33</td>
</tr>
<tr>
<td>Store C</td>
<td>218.33  34.33  15.33</td>
<td>197.00  29.00  42.00</td>
<td>190.00  70.00  8.00</td>
<td>605.00  133.33  65.33</td>
</tr>
<tr>
<td>Total</td>
<td>537.67  69.67  22.67</td>
<td>457.17  119.17  53.67</td>
<td>403.17  188.17  38.67</td>
<td>1398.00  377.00  115.00</td>
</tr>
</tbody>
</table>

* 50 per cent whole and 50 per cent cut

** Fractions are due to all "no preference" answers being distributed equally among the three varieties
Comparison of Whole, Whole/Cut and Cut

To obtain store, day and variety effects on consumers' preferences, interaction chi square values were computed between each of these factors and style of cut preferences.

**Store Effect** Interaction between stores (as a total of varieties and days) and style of cut preferences was not significant at the 95 per cent level. (Appendix, Table 7) Interaction within the Louisiana-180 variety between stores and style of cut preferences was not significant at the 95 per cent level. Within both Goldrush and Puerto Rican varieties, there was significant interaction between stores and style of cut preferences.

**Day Effect** Interaction between days and style of cut preferences was tested within varieties within stores and within stores as a total of variety preferences. (Appendix, Table 8) Interaction between days and style of cut preferences was significant at the 99 per cent confidence level within all varieties except Louisiana-180 in stores A and C and Goldrush in store A. Within Goldrush in store A, day/style-of-cut-preference interaction was significant at the 95 per cent level. In the other two groups there was no interaction at the 95 per cent confidence level.

**Variety Effect** Interaction between varieties and style of cut preferences was tested within days within stores, as a total of days and as a total of all stores and days. (Appendix, Table 9) As a total of all stores and days, interaction between style of cut preferences and varieties was
significant at the 99 per cent level. Variety/style-of-cut-preferences interaction was significant at the 99 per cent level for stores B and C and at the 95 per cent level for store A. Within days, interaction was significant at the 99 per cent confidence level for two days in store A, three days in store B and four days in store C. All other tests were not significant at the 95 per cent level.

Comparison of Whole Versus Whole/Cut

Comparisons between whole and whole/cut preferences for styles of canned sweet potatoes were made to determine where the differences occurred. Preferences for cut potatoes were omitted.

**Store Effect** Comparisons between style of cut preferences revealed interaction among stores at the 99 per cent level for the Goldrush variety and at the 95 per cent level for the Puerto Rican variety. (Appendix, Table 7) Interaction existed between stores (as a total of all varieties) and style of cut preferences.

**Day Effect** Comparisons between whole and whole/cut styles of cut showed significant interaction at the 99 per cent confidence level only between days of store C and style of cut preferences. (Appendix, Table 8) At the 95 per cent confidence level, interaction was significant between the Puerto Rican variety of store B and style preferences, and between the Louisiana-160 variety of store C and style preferences. In the other groups, there was no significant
interaction at the 95 per cent confidence level.

**Variety Effect** Interaction, between varieties and style of cut preferences, was tested within days within stores, within stores as a total of days and as a total of all stores and days. (Appendix, Table 9) There was no significant interaction at the 95 per cent level within days of stores A and B or within store A or B, as a total of days, between varieties and style of cut preferences. For two days in store C, for the total of store C and for the total of all stores, interaction was significant at the 99 per cent level.

**Comparison of Whole/Cut Versus Cut**

Comparisons between whole/cut and cut preferences for styles of cut of canned sweet potatoes were made to determine where differences occurred. Preferences for whole potatoes were omitted.

**Store Effect** Interaction between stores and style of cut preferences was significant at the 99 per cent confidence level for the Goldrush variety and at the 95 per cent level for a total of all varieties. (Appendix, Table 7) Within Louisiana-180 and Puerto Rican varieties, interaction was not significant at the 95 per cent confidence level.

**Day Effect** Interaction between days and style of cut preferences was significant at the 99 per cent confidence level within each store. (Appendix, Table 8) This interaction was significant at the 99 per cent confidence level.
for Puerto Rican in store A, Goldrush and Puerto Rican in store B, and Louisiana-180 and Puerto Rican in store C. In store A, day/style-of-cut-preferences interaction was significant at the 95 per cent confidence level.

**Variety Effect** Comparisons within days within stores, within stores (as a total of days), and as a total of all stores were made to determine interaction between varieties and style of cut. (Appendix, Table 9) This interaction was significant as a total of all stores, within stores, within two days in store A, and within three days in stores B and C.

**Effects of Other Factors on Preferences**

The effect of consumer characteristics and the characteristics of use of sweet potatoes on consumer preferences for styles of cut were each tested by interaction chi square. This interaction was calculated within varieties within stores and within stores (as a total of days) between each of these factors and style of cut preferences. No significant interaction was found at the 95 per cent confidence level for any of the characteristics. Therefore, neither chi square values nor classifications of preferences by these factors are shown.
Consumers' Preferences for Styles of Cut

Before any conclusions are made concerning preferences for styles of cut, consumer preferences by stores, days and varieties are given. In store A for each variety, and as a total of varieties, consumers preferred whole, whole/cut and cut, in that order. For each day, as a total of all varieties, the styles of cut preferred by most consumers was whole, whole/cut and cut, in that order. As a total of all preferences in store A by style of cut, the same relationship was true.

In store B, for each variety as a total of days and for the total of all varieties by days, the order of preference (number of consumers preferring) was whole, whole/cut and cut. Each day, as a total of varieties and as a total of all days, the order of preference was whole, whole/cut and cut. As a total of all preferences in store B by style of cut the same relationship was true.

For all totals of styles of cut by days, consumer preferences were for whole, whole/cut and cut, in that order. For all totals of days by varieties, style preferences were the same as above, except for the Goldrush variety. The styles of cut most preferred were whole, cut and whole/cut in that order.

These preferences are not to be interpreted as significant at any particular confidence level of probability.
BRIX LEVEL PREFERENCE

Consumers' preferences for brix level of syrup of canned sweet potatoes were tested by giving two cans of sweet potatoes to every second person interviewed. The details of sampling and methodology were explained in Chapter II. The card questionnaire is shown in Appendix C.

The effects of selected factors on consumers' preferences for brix levels of canned sweet potatoes were tested by interaction chi square. (Appendix Table 10) No interaction chi squares were found to be significant at the 95 per cent level.

Some reasons given for the preferences were firmness, color, taste (general), taste-less-sweet and taste-sweeter. Of those consumers who gave "taste sweeter" as a reason, 34 chose the 35 brix level and 9 chose the 27 brix level.

It was hypothesized that if consumers did not use the liquid that a difference in brix level could not be detected and vice versa. However, there was no difference in the preference ratios between consumers who used all, part or none of the liquid.

Since there was no significant interaction chi square values, preferences can be summed. Of 226 out of 315 questionnaires returned, 64 chose 27 brix syrup, 100 chose 35 brix syrup and 62 checked no preference. The chi square value (12.147 with 2 degrees of freedom) between brix level preferences (including "no preference") was
significant at the 99 per cent confidence level. When "no preferences" were not included the chi square value was 7.90 with one degree of freedom. This is also significant at the 99 per cent confidence level. Therefore, it is valid to conclude that there is a significant difference in consumer preference between 27 and 35 brix levels of canned sweet potatoes. However, it should be noted here that when preferences for 27 brix level syrup are added to the "no preferences," it can be concluded that 126 consumers out of 226 did not prefer the 35 brix level syrup over the 27 brix level syrup. This has practical significance, especially since 49 of the consumers who chose the 35 brix level syrup made some statement which indicated that their choice was difficult. Some of the statements were "difficult choice, chose "Y" and "both very good, chose Y."\(^{10}\)

\(^{10}\) An identifying mark of "y" was printed on the 35 brix level can.
CHAPTER V
SUMMARY AND CONCLUSIONS

The general objective of this study was to ascertain the nature of consumer preference for selected characteristics of canned sweet potatoes. These selected characteristics were color (as exemplified by variety), style of cut and brix level.

Variety Preference

Variety preferences among Louisiana-180, Goldrush and Puerto Rican varieties of canned sweet potatoes cannot be generalized due to significant interaction between consumer preferences and stores, days and styles of cut.

When comparisons were made between preferences for Louisiana-180 and Goldrush varieties (combined) versus Puerto Rican, there was significant interaction between preferences and stores only for the whole/cut style. There was significant interaction between preferences and days only for the whole/cut style in stores B and C. There was significant interaction between preferences and style of cut only for one day in store B. In store C, this interaction was significant as a total of days. As a total of all stores, this interaction was also significant. Therefore, we can only conclude the following at the 99 per cent
confidence level: For whole canned sweet potatoes and cut canned sweet potatoes, most consumers preferred Louisiana-180 and Goldrush (combined) over Puerto Rican by much larger ratios than the hypothesized two to one ratio.

However, for whole/cut canned sweet potatoes, no conclusions could be made as to whether consumers preferred Louisiana-180 and Goldrush (combined) or Puerto Rican since there was significant interaction. However, it should be noted that for whole/cut style, as a total of all stores, preferences totaled 187 for Louisiana-180, 352 for Goldrush and 92 for Puerto Rican.

Comparisons between preferences for Louisiana-180 and Goldrush varieties revealed significant interaction between preferences and stores, days and styles of cut. Therefore, no conclusions could be made as to whether consumers preferred Louisiana-180 or Goldrush varieties.

**STYLE OF CUT PREFERENCE**

Consumer preferences, among whole, whole/cut and cut styles of canned sweet potatoes, cannot be generalized due to interaction. A close inspection as to the nature of the interaction reveals varying degrees of intensity of preferences rather than a change in the order of preferences. (Intensity and order of preferences refers to total number of consumers, since choices of individual consumers were not ranked). It is hypothesized that some of the variation among days was caused by inherent heterogeneity of
the product itself. Therefore, preferences are not classified by days.

Comparisons between whole and whole/cut styles of canned sweet potatoes showed a preference for whole potatoes (significant at the 99 per cent level of probability) in all totals by either variety or stores. In stores A and B, more consumers preferred whole, whole/cut and cut, in that order, of the Louisiana-180 variety. For the Goldrush variety, consumer preference was not as great for whole potatoes, although still in that same order of preference as for Louisiana-180. For the Puerto Rican variety, whole canned sweet potatoes were still preferred over whole/cut and cut although to a lesser extent than for either Goldrush or Louisiana-180.

Except for the Goldrush variety in store C, all totals by varieties or stores showed more preferences for whole/cut than for the cut style.

**BRIX LEVEL PREFERENCE**

There was no significant interaction, at the 95 per cent confidence level, between brix level preferences and each of the factors tested. Therefore, preferences for brix levels were not sub-classified. Based on returns from 226 out of 315 questionnaires, 64 chose 27 brix syrup, 100 chose 35 brix syrup and 62 indicated no preference of one over the other. The chi square value (12.147 with two degrees of freedom) between preferences (including "no
preferences") was significant at the 99 per cent confidence level. When the "no preferences" were not included, the chi square value (7.90 with one degree of freedom) was also significant at the 99 per cent confidence level.

It should be noted that when preferences for 27 brix syrup are added to the "no preferences," it can be concluded that 126 consumers out of 226 did not prefer the 35 over 27 brix syrup. This has practical significance, especially since 49 of the consumers who chose the 35 brix syrup made some statement which indicated that their choice was difficult.

CONCLUSIONS

All the null hypotheses, except 4 (c)* that were made for this study, have been rejected at the 99 per cent confidence level. The nature in which the preferences did not conform to the hypotheses has been discussed in this chapter under variety preference, style of cut preference and brix level preference. Hypothesis 4 (c) was not rejected at the 95 per cent confidence level.

IMPLICATIONS OF FINDINGS

The Louisiana sweet potato canning industry may be able to effect substantial savings by a re-evaluation of their canning specifications for canned sweet potatoes.

*See page 7-8.
The findings of this study suggest that consumers desire a minimum level of color in canned sweet potatoes. However, there was no definite preference for either Goldrush (medium pigment) or for Louisiana-180 (high pigment) over the other. Puerto Rican has a low pigmentation. This suggests that very high levels of pigment in canned sweet potatoes are not necessary. This is based on visual preferences. Therefore, the influence of visual appearance of canned sweet potatoes will have to be placed in perspective with other factors which influence consumer preference.

In most instances, consumers preferred whole, whole/cut and cut canned sweet potatoes, in that order. New techniques (such as closer spacing when planting in order to obtain a larger number of small whole potatoes) may minimize the canning cost differential between whole and other styles of cut. If costs were equal among the styles of cut for the finished canned product, then preference would specify that more whole potatoes be canned.

Since most consumers showed no strong preference for the extra heavy brix level of syrup, a savings could possibly be effected by lowering brix levels without harming the acceptance of the canned sweet potatoes. Based on the 1952-60 volume of canned sweet potatoes it is estimated that the cost of sugar used to can sweet potatoes in Louisiana is about $1.5 million.
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APPENDIX A

TABLES
### TABLE 1

Experimental Design of Matched-Lot Tests for Determining Consumer Preferences Among Three Varieties of Canned Sweet Potatoes

<table>
<thead>
<tr>
<th>Store - Days</th>
<th>Variety</th>
<th>Louisiana-180</th>
<th>Goldrush</th>
<th>Puerto Rican</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Tuesday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Saturday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td>Store B</td>
<td>Monday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Tuesday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Saturday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td>Store C</td>
<td>Monday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Tuesday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
<tr>
<td></td>
<td>Saturday</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
<td>W vs. W/C vs. C</td>
</tr>
</tbody>
</table>

*W = Whole  
W/C = Whole and Cut  
C = Cut
<table>
<thead>
<tr>
<th>Store - Days</th>
<th>Whole</th>
<th>Whole and Cut</th>
<th>Cut</th>
<th>Color (Variety)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Store A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L = Louisiana-180</td>
</tr>
<tr>
<td>Tuesday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>GR = Goldrush</td>
</tr>
<tr>
<td>Wednesday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>PR = Puerto Rican</td>
</tr>
<tr>
<td>Thursday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td><strong>Store B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td><strong>Store C</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
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<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td>L vs. GR vs. PR</td>
<td></td>
</tr>
</tbody>
</table>
# TABLE 3

Experimental Design of Matched-Lot Tests for Determining Consumer Preference Between Two Brix Levels of Canned Sweet Potatoes

<table>
<thead>
<tr>
<th>Variety</th>
<th>Style of Cut</th>
<th>Brix Level</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Whole</td>
<td>Whole/Cut</td>
</tr>
<tr>
<td>Store A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Louisiana-180</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Goldrush</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Store B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Louisiana-180</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Goldrush</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Store C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Louisiana-180</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Goldrush</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>35 vs. 27</td>
<td>35 vs. 27</td>
</tr>
</tbody>
</table>
TABLE 4

Effect of Stores on Variety Preferences by Styles of Cut

<table>
<thead>
<tr>
<th>Style of Cut</th>
<th>Interaction Chi Square Between Stores and Variety Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparisons among Louisiana-180, Goldrush and Puerto Rican</td>
</tr>
<tr>
<td></td>
<td>(Four degrees of freedom)</td>
</tr>
<tr>
<td></td>
<td>Comparisons between Louisiana-180 and Goldrush (combined)</td>
</tr>
<tr>
<td></td>
<td>Comparisons between Puerto Rican (Two degrees of freedom)</td>
</tr>
<tr>
<td>Whole</td>
<td>25.18**</td>
</tr>
<tr>
<td>Whole/Cut</td>
<td>37.14**</td>
</tr>
<tr>
<td>Cut</td>
<td>42.79**</td>
</tr>
<tr>
<td>Total all Styles</td>
<td>5.78</td>
</tr>
</tbody>
</table>

1Preferences by days were not totaled across stores.

*Significant at the 95 per cent level of probability.

**Significant at the 99 per cent level of probability.
TABLE 5
Effect of Days on Variety Preference by Stores and Styles of Cut

<table>
<thead>
<tr>
<th>Styles of Cut - Store</th>
<th>Interaction Chi Squares Between Days and Style of Cut Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparisons Among Louisiana-180, Goldrush and Puerto Rican (Ten degrees of freedom)</td>
</tr>
<tr>
<td>Store A</td>
<td></td>
</tr>
<tr>
<td>Whole</td>
<td>24.25**</td>
</tr>
<tr>
<td>W/C</td>
<td>45.80**</td>
</tr>
<tr>
<td>Cut</td>
<td>38.30**</td>
</tr>
<tr>
<td>Total Store A</td>
<td>55.35**</td>
</tr>
<tr>
<td>Store B</td>
<td></td>
</tr>
<tr>
<td>Whole</td>
<td>83.45**</td>
</tr>
<tr>
<td>W/C</td>
<td>89.21**</td>
</tr>
<tr>
<td>Cut</td>
<td>33.81**</td>
</tr>
<tr>
<td>Total Store B</td>
<td>28.00**</td>
</tr>
<tr>
<td>Store C</td>
<td></td>
</tr>
<tr>
<td>Whole</td>
<td>44.79**</td>
</tr>
<tr>
<td>W/C</td>
<td>42.30**</td>
</tr>
<tr>
<td>Cut</td>
<td>97.97**</td>
</tr>
<tr>
<td>Total Store C</td>
<td>92.98**</td>
</tr>
</tbody>
</table>

 Preferences by days were not totaled across stores.

*Significant at the 95 per cent level of probability.

**Significant at the 99 per cent level of probability.
### TABLE 6

**Effect of Styles of Cut on Variety Preferences by Stores and Days**

<table>
<thead>
<tr>
<th>Stores - Days</th>
<th>Interaction Between Styles of Cut and Variety Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comparisons among Louisiana-180, Goldrush and Puerto Rican (Four degrees of freedom)</td>
</tr>
<tr>
<td>Store A</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>16.96**</td>
</tr>
<tr>
<td>Tuesday</td>
<td>.27</td>
</tr>
<tr>
<td>Wednesday</td>
<td>18.30**</td>
</tr>
<tr>
<td>Thursday</td>
<td>12.95*</td>
</tr>
<tr>
<td>Friday</td>
<td>14.81**</td>
</tr>
<tr>
<td>Saturday</td>
<td>7.52</td>
</tr>
<tr>
<td>Total Store A</td>
<td>17.81</td>
</tr>
<tr>
<td>Store B</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>30.78**</td>
</tr>
<tr>
<td>Tuesday</td>
<td>4.34</td>
</tr>
<tr>
<td>Wednesday</td>
<td>15.36**</td>
</tr>
<tr>
<td>Thursday</td>
<td>19.92**</td>
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<tr>
<td>Friday</td>
<td>96.35**</td>
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<tr>
<td>Saturday</td>
<td>65.75**</td>
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<tr>
<td>Total Store B</td>
<td>54.03**</td>
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<tr>
<td>Store C</td>
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<tr>
<td>Monday</td>
<td>24.41**</td>
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<td>Tuesday</td>
<td>38.08**</td>
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<td>Wednesday</td>
<td>42.96**</td>
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<td>Thursday</td>
<td>20.86**</td>
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<tr>
<td>Friday</td>
<td>11.50**</td>
</tr>
<tr>
<td>Saturday</td>
<td>10.21*</td>
</tr>
<tr>
<td>Total Store C</td>
<td>64.94**</td>
</tr>
<tr>
<td>Total All Stores</td>
<td>36.12**</td>
</tr>
</tbody>
</table>

*Significant at the 95 per cent level of probability.
**Significant at the 99 per cent level of probability.
### TABLE 7

**Effect of Stores on Style of Cut Preferences by Varieties**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Comparisons Among Whole, Whole/Cut and Cut (Four degrees of freedom)</th>
<th>Comparisons Between Whole/Cut and cut (Two degrees of freedom)</th>
<th>Comparisons Between Whole and Whole/Cut (Two degrees of freedom)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louisiana-180</td>
<td>3.53</td>
<td>1.03</td>
<td>1.95</td>
</tr>
<tr>
<td>Goldrush</td>
<td>20.64**</td>
<td>10.13**</td>
<td>39.18**</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>14.01**</td>
<td>7.21**</td>
<td>2.27</td>
</tr>
<tr>
<td>Total All Varieties</td>
<td>9.26</td>
<td>12.42**</td>
<td>6.64**</td>
</tr>
</tbody>
</table>

1 Preferences by days were not totaled across stores.

*Significant at the 95 per cent level of probability.

**Significant at the 99 per cent level of probability.
TABLE 8

Effect of Days on Style of Cut Preferences
by Stores and Varieties

| Varieties- | Interaction Chi Squares Between Days and Style of Cut Preferences |
| Stores¹ | Comparisons | Comparisons | Comparisons |
| | Among Whole, Whole/Cut and Cut (Ten degrees of Freedom) | Between Whole/Cut and Cut (Five degrees of Freedom) | Between Whole and Whole/Cut (Five degrees of Freedom) |
| Store A | | | |
| Louisiana-180 | 6.85 | 1.33 | 4.26 |
| Goldrush | 20.25* | 8.03 | 12.49* |
| Puerto Rican | 34.17** | 7.96 | 24.76** |
| Total Store A | 27.57** | 10.32 | 17.31** |
| Store B | | | |
| Louisiana-180 | 45.17** | 4.95 | 9.15 |
| Goldrush | 59.83** | .51 | 38.64** |
| Puerto Rican | 41.70** | 11.27* | 30.14** |
| Total Store B | 41.12** | 2.72 | 27.48** |
| Store C | | | |
| Louisiana-180 | 15.58 | 22.06* | 16.67** |
| Goldrush | 30.73** | 9.68 | 5.63 |
| Puerto Rican | 77.44** | 6.04 | 52.88** |
| Total Store C | 44.39** | 38.41** | 52.46** |

¹Preferences by days were not totaled across stores.

*Significant at the 95 per cent level of probability.

**Significant at the 99 per cent level of probability.
TABLE 9

Effect of Varieties on Style of Cut Preferences by Stores and Days

<table>
<thead>
<tr>
<th>Stores - Days</th>
<th>Comparisons Among Whole, Whole/Cut, and Cut (Four degrees of freedom)</th>
<th>Comparisons Between Whole/Cut and Cut (Two degrees of freedom)</th>
<th>Comparisons Between Whole and Whole/Cut and Cut (Two degrees of freedom)</th>
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<tbody>
<tr>
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<td></td>
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</tr>
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<td>1.77</td>
<td>9.75**</td>
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<td>1.87</td>
<td>3.55</td>
<td>2.69</td>
</tr>
<tr>
<td>Wednesday</td>
<td>17.04**</td>
<td>.00</td>
<td>11.32**</td>
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<td>.20</td>
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<td>.19</td>
<td>4.13</td>
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<td>6.96*</td>
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<td>Store B</td>
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<td></td>
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<td>4.05</td>
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<td>1.21</td>
<td>3.74</td>
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<td>37.36**</td>
<td>1.42</td>
<td>23.24**</td>
</tr>
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<td>6.57</td>
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<td>2.33</td>
</tr>
<tr>
<td>Friday</td>
<td>73.50**</td>
<td>3.30</td>
<td>48.79</td>
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<td>20.48**</td>
<td>4.01</td>
<td>13.28**</td>
</tr>
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<td>41.86**</td>
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<tr>
<td>Store C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
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<td>6.42*</td>
<td>11.42**</td>
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<td>19.80**</td>
<td>17.61**</td>
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<td>2.66</td>
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<td>Thursday</td>
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<td>1.17</td>
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<td>35.65**</td>
<td>12.65**</td>
</tr>
<tr>
<td>Total All Stores</td>
<td>79.66**</td>
<td>7.75*</td>
<td>49.74**</td>
</tr>
</tbody>
</table>

*Significant at the 95 per cent level of probability.

**Significant at the 99 per cent level of probability.
## TABLE 10

**Effect of Selected Factors on Consumer Preferences**

<table>
<thead>
<tr>
<th>Factors Tested to Determine Effect On Brix Level</th>
<th>Number of Questionnaires Answered</th>
<th>Interaction Chi Degrees Square Between of Selected Factor Freedom and Brix Preference*</th>
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<tr>
<td><strong>Control Factors:</strong></td>
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<td></td>
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<tr>
<td>Days within store A</td>
<td>41</td>
<td>11.903</td>
</tr>
<tr>
<td>Days within store B</td>
<td>91</td>
<td>12.303</td>
</tr>
<tr>
<td>Days within store C</td>
<td>97</td>
<td>15.444</td>
</tr>
<tr>
<td>Stores</td>
<td>226</td>
<td>1.846</td>
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<tr>
<td>Styles of Cut</td>
<td>226</td>
<td>3.158</td>
</tr>
<tr>
<td>Varieties</td>
<td>226</td>
<td>3.637</td>
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<tr>
<td>Styles-Varieties <em>(9 combinations)</em></td>
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<td>14.160</td>
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<tr>
<td><strong>Socio-Economic Characteristics of Consumers:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race (White-Non White)**</td>
<td>226</td>
<td>1.044</td>
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<tr>
<td>Where raised?(Rural-Urban)</td>
<td>226</td>
<td>1.490</td>
</tr>
<tr>
<td>Income Level</td>
<td>226</td>
<td>9.802</td>
</tr>
<tr>
<td>Geographic region of rearing</td>
<td>226</td>
<td>3.332</td>
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<tr>
<td>Number of adults in family</td>
<td>226</td>
<td>13.214</td>
</tr>
<tr>
<td>Number of school age children</td>
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<td>14.788</td>
</tr>
<tr>
<td>Number of children under school age</td>
<td>226</td>
<td>9.707</td>
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<td><strong>Characteristics of Use of Sweet Potatoes:</strong></td>
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<td></td>
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<tr>
<td>Frequency of use</td>
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</tr>
<tr>
<td>Primary method of preparation of canned sweet potatoes</td>
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<td>15.460</td>
</tr>
<tr>
<td>Buy fresh sweet potatoes <em>(Yes-No)</em></td>
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</tr>
<tr>
<td>How sample canned sweet potatoes were used</td>
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<td>3.914</td>
</tr>
<tr>
<td>How liquid of sample cans were used</td>
<td>226</td>
<td>.389</td>
</tr>
</tbody>
</table>

*No chi square values were significant at the 95 per cent confidence level.

**Only one non-white was not Negro.
TABLE 11

Chi Square Value of Consumers' Preferences Among Varieties—Louisiana-180, Goldrush, and Puerot Rican

<table>
<thead>
<tr>
<th>Stores—Days</th>
<th>Whole</th>
<th>Whole/Cut</th>
<th>Cut</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Two degrees of Freedom</strong></td>
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</tbody>
</table>

**Store A**

<table>
<thead>
<tr>
<th></th>
<th>Whole</th>
<th>Whole/Cut</th>
<th>Cut</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Monday</td>
<td>9.33**</td>
<td>12.00**</td>
<td>23.44**</td>
<td>27.81**</td>
</tr>
<tr>
<td>Tuesday</td>
<td>24.40**</td>
<td>24.40**</td>
<td>19.60**</td>
<td>68.13**</td>
</tr>
<tr>
<td>Wednesday</td>
<td>13.73**</td>
<td>8.40*</td>
<td>1.20</td>
<td>5.03</td>
</tr>
<tr>
<td>Thursday</td>
<td>11.08**</td>
<td>25.33**</td>
<td>4.11</td>
<td>27.57**</td>
</tr>
<tr>
<td>Friday</td>
<td>25.38**</td>
<td>8.82*</td>
<td>8.82*</td>
<td>28.21**</td>
</tr>
<tr>
<td>Saturday</td>
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<td>16.67**</td>
<td>4.75</td>
<td>24.55**</td>
</tr>
<tr>
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<td>70.42**</td>
<td>49.82**</td>
<td>23.62**</td>
<td>126.05**</td>
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</table>

**Store B**

<table>
<thead>
<tr>
<th></th>
<th>Whole</th>
<th>Whole/Cut</th>
<th>Cut</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Monday</td>
<td>31.50**</td>
<td>9.50**</td>
<td>30.17**</td>
<td>40.39**</td>
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<tr>
<td>Tuesday</td>
<td>4.00</td>
<td>11.30**</td>
<td>8.30*</td>
<td>19.26**</td>
</tr>
<tr>
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<td>15.55**</td>
<td>2.39</td>
<td>1.36</td>
<td>3.94</td>
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<tr>
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<td>32.62**</td>
<td>3.60</td>
<td>46.69**</td>
</tr>
<tr>
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<td>60.90**</td>
<td>41.38**</td>
<td>57.73**</td>
<td>63.66**</td>
</tr>
<tr>
<td>Saturday</td>
<td>21.34**</td>
<td>32.88**</td>
<td>39.27**</td>
<td>27.74**</td>
</tr>
<tr>
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<td>80.23**</td>
<td>40.86**</td>
<td>106.62**</td>
<td>173.68**</td>
</tr>
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</table>

**Store C**

<table>
<thead>
<tr>
<th></th>
<th>Whole</th>
<th>Whole/Cut</th>
<th>Cut</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>12.25**</td>
<td>17.10**</td>
<td>28.47**</td>
<td>33.41**</td>
</tr>
<tr>
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<td>21.47**</td>
<td>47.09**</td>
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</tr>
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<tr>
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</tr>
<tr>
<td>Friday</td>
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<td>7.65*</td>
<td>19.28**</td>
<td>34.91**</td>
</tr>
<tr>
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<td>33.24**</td>
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<td>214.12**</td>
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<td>228.54**</td>
<td>164.28**</td>
<td>152.70**</td>
<td>509.40**</td>
</tr>
</tbody>
</table>

*Significant at the 95 per cent confidence level.
**Significant at the 99 per cent confidence level.
### TABLE 12

Chi Square Values of Consumers' Preferences Between Varieties - Louisiana-180 and Goldrush (Combined) and Puerto Rican

<table>
<thead>
<tr>
<th>Stores-Days</th>
<th>Styles of Cut</th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Whole</td>
<td>Whole/Cut</td>
<td>Cut</td>
<td>Total</td>
</tr>
<tr>
<td>One degree of Freedom</td>
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</tr>
<tr>
<td>Store A</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
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<td>9.00**</td>
<td>7.11**</td>
<td>25.44**</td>
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<td>7.50**</td>
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</tr>
<tr>
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<td>4.30*</td>
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<td>4.01**</td>
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<td>8.19**</td>
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<td>23.37**</td>
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<td>22.83**</td>
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<td>3.90*</td>
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<td>11.32**</td>
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<td>133.42**</td>
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</tr>
</tbody>
</table>

*Significant at the 95 per cent confidence level.

**Significant at the 99 per cent confidence level.
TABLE 13

Chi Square Values of Consumers' Preferences Between Varieties - Louisiana-180 and Goldrush

<table>
<thead>
<tr>
<th>Stores-Days</th>
<th>Styles of Cut</th>
<th>Whole</th>
<th>Whole/Cut</th>
<th>Cut</th>
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<td></td>
<td></td>
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<td></td>
<td>Whole</td>
<td>Whole/Cut</td>
<td>Cut</td>
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<td>1.54</td>
<td>.61</td>
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<tr>
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<td>24.55**</td>
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</tr>
<tr>
<td>Saturday</td>
<td></td>
<td></td>
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<td>1.27</td>
<td>50.60**</td>
<td>14.55**</td>
</tr>
</tbody>
</table>

*Significant at the 95 per cent confidence level.

**Significant at the 99 per cent confidence level.


<table>
<thead>
<tr>
<th>Stores</th>
<th>Variety</th>
<th>Two Degrees of Freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days</td>
<td>Louisiana-180</td>
<td>Goldrush</td>
</tr>
</tbody>
</table>

**Table 14**

Chi Square Values of Consumers' Preferences Among Styles of Oat - Whole, Whole/Cut and Cut

<table>
<thead>
<tr>
<th>Store A</th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Monday</td>
<td>16.33**</td>
<td>3.36</td>
<td>8.78*</td>
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<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>10.00**</td>
<td>24.40**</td>
<td>12.40**</td>
<td>44.93**</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>30.00**</td>
<td>30.00**</td>
<td>7.60*</td>
<td>50.53**</td>
<td></td>
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<tr>
<td>Thursday</td>
<td>30.33**</td>
<td>13.78**</td>
<td>3.11</td>
<td>39.82**</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>27.92**</td>
<td>22.58**</td>
<td>31.20**</td>
<td>81.16**</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>47.67**</td>
<td>20.68**</td>
<td>32.80**</td>
<td>95.02**</td>
<td></td>
</tr>
<tr>
<td>Total Store A</td>
<td>155.40**</td>
<td>94.55**</td>
<td>61.72**</td>
<td>298.42**</td>
<td></td>
</tr>
</tbody>
</table>

**Store B**

| Monday  | 30.89**        | 43.06**        | 36.17**        | 108.35**       |
| Tuesday | 18.99**        | 14.84**        | 12.07**        | 40.72**        |
| Wednesday | 29.49**    | 45.76**        | 9.49**         | 47.38**        |
| Thursday | 69.98**       | 44.27**        | 24.05**        | 131.73**       |
| Friday  | 124.25**       | 25.42**        | 20.23**        | 96.40**        |
| Saturday| 80.41**        | 60.71**        | 20.04**        | 140.68**       |
| Total Store B | 338.84** | 174.23**       | 80.35**        | 524.14**       |

**Store C**

| Monday  | 17.10**        | 10.47**        | 21.21**        | 17.89**        |
| Tuesday | 27.63**        | 26.82**        | 15.79**        | 47.73**        |
| Wednesday | 53.53**   | 48.22**        | 32.96**        | 132.05**       |
| Thursday | 48.39**       | 51.73**        | 41.19**        | 121.14**       |
| Friday  | 78.36**        | 12.94**        | 78.14**        | 141.74**       |
| Saturday| 72.02**        | 78.99**        | 79.84**        | 229.37**       |
| Total Store C | 201.45** | 198.44**       | 191.68**       | 645.53**       |

Total Stores | 772.16** | 446.58** | 319.74** | 1,458.82** |

*Significant at the 95 per cent confidence level.

**Significant at the 99 per cent confidence level.
<table>
<thead>
<tr>
<th>Store Days</th>
<th>Variety</th>
<th>One Degree of Freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Louisiana-180</td>
<td>Goldrush</td>
</tr>
<tr>
<td>Store A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>7.12**</td>
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</tr>
<tr>
<td>Tuesday</td>
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</tr>
<tr>
<td>Wednesday</td>
<td>15.00**</td>
<td>15.00**</td>
</tr>
<tr>
<td>Thursday</td>
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</tr>
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<td>Friday</td>
<td>13.76**</td>
<td>13.02**</td>
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<td>198.22**</td>
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</table>

*Significant at the 95 per cent level of probability.
**Significant at the 99 per cent level of probability.
TABLE 16

Chi Square Values of Consumers' Preferences Between Styles of Cut - Whole/Cut and Cut

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<thead>
<tr>
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<th>Goldrush</th>
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**Store A**

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<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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<td>8.00**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
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<td>.46</td>
<td>1.74</td>
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**Store B**

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<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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</thead>
<tbody>
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<td>16.81**</td>
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**Store C**

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<th>Thursday</th>
<th>Friday</th>
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<td>1.00</td>
<td>8.00**</td>
<td>11.27**</td>
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<td></td>
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<tr>
<td>Wednesday</td>
<td>1.29</td>
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<td>7.00**</td>
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<td>9.00**</td>
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<td>6.00*</td>
<td>6.15*</td>
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<tr>
<td>Saturday</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>23.28**</td>
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</table>

**Total All Stores**

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<th>24.82**</th>
<th>98.53**</th>
<th>139.52**</th>
</tr>
</thead>
</table>

*Significant at the 95 per cent level of probability.

**Significant at the 99 per cent level of probability.
APPENDIX B

QUESTIONNAIRE USED TO INTERVIEW CONSUMERS
QUESTIONNAIRE (NUMBER____)

I. Personal Data Section:

1. Race or Nationality______________________________________________________

2. Where were you raised? (a) Rural ☐ Urban ☐
   (b) State or County?______________________________________________________

3. Income level (annual)
   0 - $2,999 ☐
   $3,000 - $4,999 ☐
   $5,000 - $6,999 ☐
   $7,000 - $8,999 ☐
   $9,000 - over ☐

4. Total number of people in household____, adults____, school age children____, children under school age____.

II. Use and Purchasing Habits:

1. How often do you use canned sweet potatoes?______________________________

2. How do you prepare canned sweet potatoes?

   Uses ________________________________ Frequency ________________________________
   ________________________________ ________________________________
   ________________________________ ________________________________

3. Do you use fresh sweet potatoes? Yes___No___

   Uses ________________________________ Frequency ________________________________
   ________________________________ ________________________________
   ________________________________ ________________________________

4. How do you decide whether to purchase fresh or canned sweet potatoes?

   __________________________________________

III. Color and Style Preferences:

   Sections ___ First Preference ________________________________ Reason(s) for Choice
   ________________________________ ________________________________
   ________________________________ ________________________________
   ________________________________ ________________________________
   ________________________________ ________________________________
   ________________________________ ________________________________
APPENDIX C

POST CARD QUESTIONNAIRE FOR BRIX LEVEL PREFERENCE

No. ____
1 Family prefers can □ □ □ No Preference
2 This can is preferred because ______________________
3 The potatoes were: candied, put into a pie, other

4 Liquid was partly used; all used; not used. (Circle correct one.)
5 Other remarks or suggestions ______________________
APPENDIX D

INSTRUCTIONS FOR THE USE OF THE SAMPLE SWEET POTATOES
AND COMPLETION OF THE POST CARD QUESTIONNAIRE

INSTRUCTIONS

You have been selected as a panelist in our study to determine preference for canned sweet potato characteristics. Enclosed are two (2) cans of sweet potatoes for your use. These potatoes are for your enjoyment. In order to get a true preference we request that you prepare both of these cans for the same meal, but in separate containers. CAUTION: Keep potatoes from can X and can Y identified so that you can correctly fill out the post card.

Taste contents from can X first, then taste contents from can Y, then taste back and forth. After your family has tasted potatoes prepared from both can X and can Y, fill out the enclosed post card questionnaire and drop it in the mail as soon as possible. We would appreciate your doing this within two weeks if possible.

Please accept our appreciation for your cooperation in this research. The purpose of this study is to determine the needs and desires of the customer for particular sweet potato characteristics.

Bernis E. Williamson
Department of Agricultural Economics
Louisiana Agricultural Experiment Station
Louisiana State University
Baton Rouge, Louisiana

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VITA

Bernis Earl Williamson was born on a farm near Baskin, Louisiana on January 18, 1932. He attended both grammar and high school in Baskin, Louisiana, completing high school requirements in June, 1950. He enrolled at Northeast Louisiana State College in September, 1950, and received his Bachelor of Science degree with a major in Agronomy in August, 1954. He entered the United States Army in January, 1955 and was discharged in January, 1957 at which time he enrolled in the Graduate School at Louisiana State University. He received his Master of Science degree in Agricultural Economics at Louisiana State University in August, 1958. He is now a candidate for the Doctor of Philosophy degree in Agricultural Economics.
EXAMINATION AND THESIS REPORT

Candidate: Bernis Earl Williamson

Major Field: Agricultural Economics

Title of Thesis: The Nature of Consumer Preference for Canned Sweet Potatoes

Approved:

[Signatures of Major Professor and Chairman, Dean of the Graduate School, and Examining Committee members]

EXAMINING COMMITTEE:

Clarence L. Dunn

Bernard F. Shigin

Jerry M. Law

J. H. Wiegmann

Date of Examination:

May 11, 1961