



5-1983

## A Proposed Procedure to Determine Consumer Reaction to Retort Packaging

Nancy Clairmont

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A PROPOSED PROCEDURE TO DETERMINE CONSUMER  
REACTION TO RETORT PACKAGING

by  
Nancy Jean Clairmont

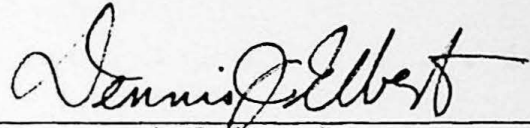
Bachelor of Science, University of North Dakota, 1978

An Independent Study  
Submitted to the Graduate Faculty  
of the  
University of North Dakota  
in partial fulfillment of the requirements  
for the degree of  
Master of Business Administration

Grand Forks, North Dakota

May  
1983

This independent study submitted by Nancy Jean Clairmont in partial fulfillment of the requirements for the Degree of Master of Business Administration from the University of North Dakota is hereby approved by the faculty advisor under whom the work has been done.



(Advisor)

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## ACKNOWLEDGEMENTS

I am grateful for instruction, patience and advice given me by my advisor, Dr. Dennis J. Elbert. I would also like to thank Dr. Lloyd Blackwell for his statistical advice and support.

I thank Mr. Bud Corbit for his assistance in conducting the pilot study, Ethel Fontaine for her patient and excellent typing, and the staff at Chester Fritz Library for their help in obtaining research materials.

A special acknowledgement and thanks go to Dr. Dominique Khactu and my family for their friendship and support during my studies and research.

## CHAPTER I

### INTRODUCTION

For the last fifty years, standard preserving procedures in the food industry have consisted of freezing, canning, drying or using preservatives of some kind. Recently, packaging technicians and scientists have developed an alternative packing method. This relatively new method is known as retort packaging. Retort packaging uses a retort pouch made up of a thin, three-layer laminate of polyester, aluminum foil and a polyolefin blend to form a flexible package around a product. The pouch stores food much like a frozen food package does, but without refrigeration.<sup>1</sup> Food treated in these light, flexible retort pouches can be stored in the cupboard for up to three years. Retort packaged foods are ready for serving five minutes after the pouch is dropped into boiling water.<sup>2</sup>

There are many advantages to retort packaging, only one of which is cost efficiency. In an industry where packaging and container costs were 2.5 times as high in 1980 as in 1970 and where packaging costs average one-third of

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<sup>1</sup>Anthony E. Gallo and John M. Connor, "Packaging in food marketing," National Food Review (Spring 1981):10-13.

<sup>2</sup>C.E.R., "Fresh milk on the pantry shelf and other new food ideas," Good Housekeeping (April 1982):235.



the value of the ingredients protected, cost efficiency becomes an important feature.<sup>3</sup> With retort packaging, cost efficiency is achieved through energy savings via shorter processing times, decreased storage space, reduced spoilage, lighter packages and no required refrigeration.<sup>4</sup>

The retort pouch was first introduced to the U.S. via the military. It was conceived of as a replacement for the combat-ration used from WWII through the 1980's. At the time of this study, retort packaging was a major component of the MRE (Meal-Ready-to-Eat), which is the official ration for use in military situations where kitchens are not feasible.<sup>5</sup>

Retort pouch foods have a 23-year history of research and development and have been sold commercially outside the U.S. since 1967. Japan and Europe have been using this shelf-stable pouch commercially for over ten years.<sup>6</sup> The retort package has been very successful in Japan, because of the lack of an elaborate frozen food industry, and because Japanese do not cook extensively in the home. Both of these factors make the retort packaging concept very adaptable to the Japanese lifestyle. The European frozen

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<sup>3</sup>"Packaging in food marketing," p. 10.

<sup>4</sup>"Only speed is holding up the food can's rival," Canadian Packaging (September 1981):15.

<sup>5</sup>Jack Mans, "Kraft coattails provide lift for Retort Pouch," Processed Prepared Food (October 1980):88-90.

<sup>6</sup>"Watch for new food packages," Changing Times (April 1981):71.

food industry has developed even more recently than the Japanese market, therefore the introduction of the shelf stable retort pouch was also successful in this market.

The U.S. frozen food packaging industry was established over 50 years ago.<sup>7</sup> Due to the fact that the U.S. frozen food industry is so strongly established and well accepted by consumers, traditional packaging may pose a threat to the introduction of a new packaging concept such as the retort pouch. In the U.S., new product introductions have averaged an 80 percent failure rate in the consumer market.<sup>8</sup> For this reason, it is important to determine demand before mass marketing a new product, especially a product as unique as the retort package.

#### Statement of the Problem

One tool that could be utilized to determine consumer reaction to retort packaging is marketing research. At the time of this study, there was no available evidence of a specific methodology that could be used to assess the market potential for retort packaged products. Further, inadequate evidence existed to indicate the type of planning elements that should be included in such an assessment procedure. If developed, such a procedure could potentially

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<sup>7</sup>Ibid.

<sup>8</sup>"Only speed," p. 15.

provide guidelines for obtaining information regarding the consumer's familiarity with retort pouches. More importantly, information could also be obtained regarding consumer willingness to purchase retort packaged products.

The problem that provided the focal point for this study was that there was inadequate evidence to indicate the components that should be included in a marketing research procedure to assess the opportunities for retort packaging.

#### Purpose of the Study

The major purpose of this study was to develop a procedure that would allow a marketing decision maker to determine the potential demand for retort packaged products. More specifically, this study was designed to analyze the following questions:

1. What type of packaged food does the consumer prefer?
2. What is the consumers' reaction to the flexible packaging concept?
3. How important are the features of the retort pouch to the consumer?
4. What is the consumers' reaction to the taste of retort packaged foods?
5. What is the profile of the potential target market for retort packaged foods?

### Scope and Limitations

The procedure developed in this study was designed to be used in determining ultimate consumer potential demand for retort pouches. For purposes of this study, the procedure and questionnaire were oriented toward an SMSA (Standard Metropolitan Statistical Area) similar in size to the Grand Forks, North Dakota-Minnesota SMSA.<sup>9</sup> However, the procedure utilized was not designed to be strictly confined to this area.

At the time of this study, several organizations were researching and test marketing retort packaged products. Due to the highly competitive nature of the marketing environment, these organizations were not willing to share any information regarding the results of their efforts. Therefore, this study was based on data obtained from other secondary sources, primarily periodicals. Little information was available on the marketing research efforts of organizations testing retort packaging potential.

### Definition of Terms

For the purposes of this study certain terms were defined as follows:

1. Aseptic packaging is a type of packaging that contains food products that have been heated to

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<sup>9</sup>An SMSA is defined as a county or group of contiguous counties with a total population of at least 100,000 and a central city with a minimum population of 50,000, according to William J. Stanton, Fundamentals of Marketing (New York: McGraw Hill, 1981) p. 74.

a certain temperature (milk, 280°F for 3 seconds; fruit juices, 200°F for 10-15 seconds) and placed into a sterilized container made of plastic, paperboard and aluminum. When an aseptically prepared carton is sealed, the contents will remain fresh without refrigeration for up to three months.<sup>10</sup>

2. Film laminates are comprised of a layered construction of films that are bonded together with adhesives. The layers may be separated from exterior layers by a functional barrier such as light resistant aluminum foil.<sup>11</sup> The combined laminates are used as the packaging material for retort pouches. (See Figure 1.)
3. Flexible packaging refers to aseptic, hotfill or retort packaging. (See individual definitions.)
4. Form-fill-seal machines form a cavity in the plastic, fill the impression with a food product and then seal the package with a top layer of plastic. (See Figure 2.)
5. Hotfill packaging places hot sterilized liquid into an untreated container, thereby sterilizing the container too.<sup>12</sup>

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<sup>10</sup>"Fresh milk on the pantry shelf," p. 235.

<sup>11</sup>Judy Rice, "Basic users guide to packaging films," Food Processing (March 1982):74.

<sup>12</sup>"Fresh milk on the pantry shelf," p. 71.

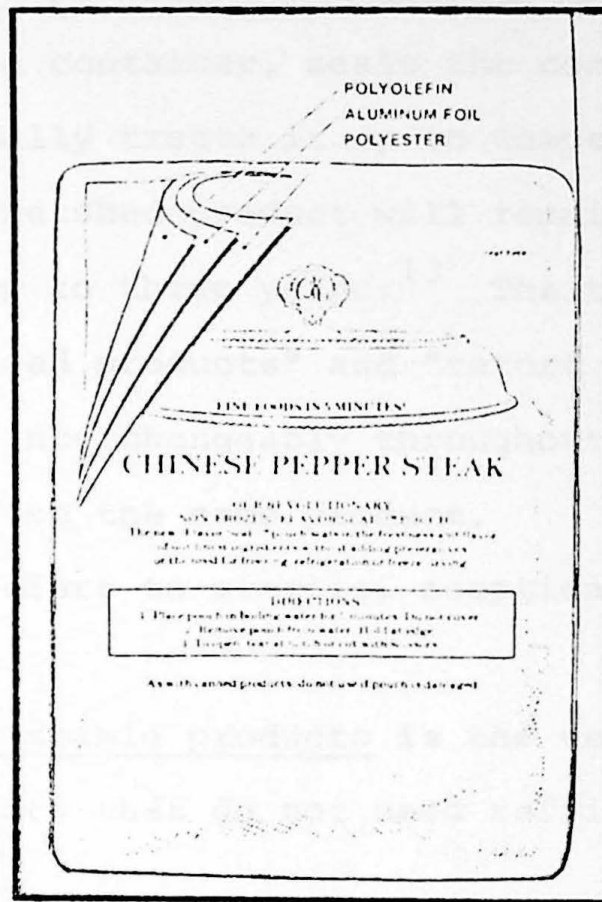


Figure 1. This three component film laminate is what makes up the flexible retort pouch. The aluminum foil which provides the moisture, oxygen and light barrier properties is the key component of the package. SOURCE: Kraft Coattails Provide Lift for Retort Pouch," Jack Mans, Processed Prepared Food, October 1980, p. 88.

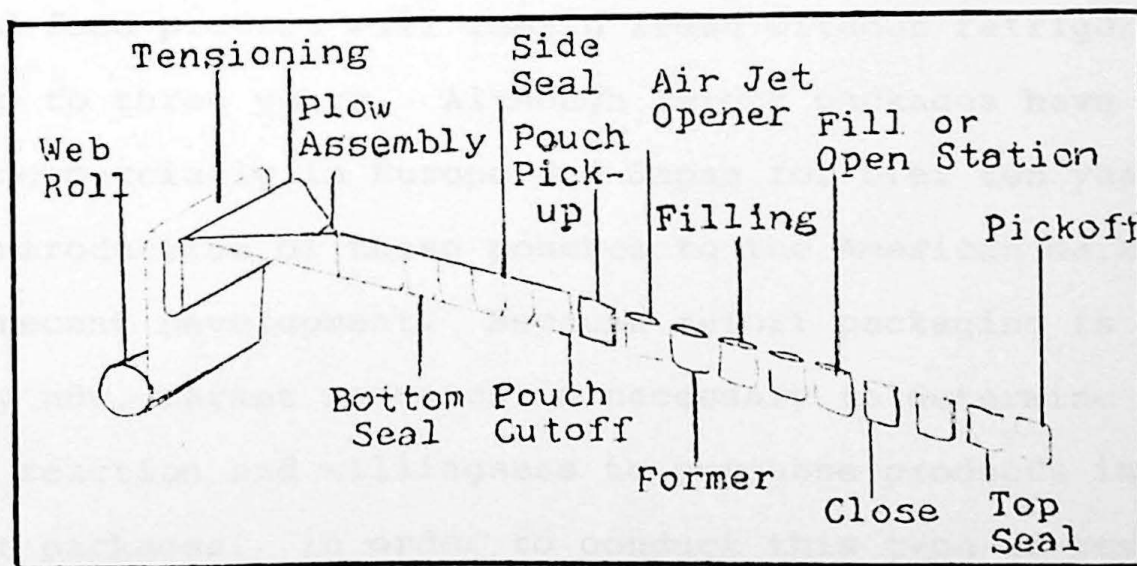


Figure 2. Typical pouch-forming, filling, closing, and sealing flow chart. SOURCE: Rexhan Corp., Sarasota, Florida. Specifications obtained from this corporation.

6. Retort packaging places untreated food products into a container, seals the container and then thermally treats it up to temperatures of 280°F. The finished product will remain shelf stable for up to three years.<sup>13</sup> The terms "retort packaged products" and "retort pouches" were used interchangeably throughout this study and refer to the same product.
7. SAP refers to sterile, aseptically packaged foods.
8. Shelf stable products is the term given to food products that do not need refrigeration.

#### Summary

Retort packaging is a relatively new method of food preservation which applies very high temperatures to sealed containers of untreated food products. Once packaged, the sealed food product will remain fresh without refrigeration for up to three years. Although retort packages have been used commercially in Europe and Japan for over ten years, the introduction of these pouches to the American market is a recent development. Because retort packaging is relatively new, market research is necessary to determine consumer reaction and willingness to purchase products in retort packages. In order to conduct this type of research,

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<sup>13</sup>"Watch for the new food packages," p. 71.

procedures are necessary to provide guidelines for obtaining information on potential demand for retort pouches. The purpose of this study was to develop a prototype of such a procedure. The study used Grand Forks, North Dakota-Minnesota Standard Metropolitan Statistical Area as the geographical location in which such a procedure could be field tested.



## CHAPTER II

### REVIEW OF RELATED LITERATURE

#### Background

The retort pouch was first designed by scientists at the Army Research and Development Laboratory at Natick, Massachusetts in the early 1960's. These scientists were looking for ways to replace the bulky and relatively heavy combat-ration that soldiers carried into the field.<sup>14</sup>

Although the idea for the pouch was conceived of in the early 1950's, it took more than a decade to develop a material that could withstand the 280<sup>o</sup>F needed to sterilize the food contents.

The pouch is made up of three layers of material-- polyolefin, aluminum foil and polyester. The aluminum foil provides a barrier to moisture, oxygen and light, and is the key component of the pouch.<sup>15</sup> The three materials combine to form a soft, flexible container that looks much like the boil and serve bags which are used for frozen food products.

This flexible packaging concept gained wide popularity in Europe and Japan in the late 1960's, but was not

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<sup>14</sup>Bryan Miller, "Will the pouch be the new tin can?" New York Times 12 August 1981, p. C1, C12.

<sup>15</sup>Mans, "Kraft coattails," p. 90.

acceptable to the U.S. consumer market until after it was cleared by the Food and Drug Administration and the U.S. Department of Agriculture.<sup>16</sup> The FDA standards were finally satisfied in 1976 when adhesives used to make the pouch no longer seeped into the food.

The potential of the retort pouch for providing quality products while offering energy savings in processing, plus savings in distribution and storage is what made the retort package attractive to food processors and major food companies.

#### Retort Packaging Potential

The advantages of the retort pouch at each level from producer to all members within a channel of distribution made retort packaging a potential threat to the established tin can and frozen food container industries. At the same time it offered a multitude of opportunities to all organizations within the food processing and packaging industry.

#### Production Level Advantages

Introducing a new product to a well established industry requires that there be something outstanding or different in the product for it to succeed. The outstanding production feature of the retort pouch was the savings created

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<sup>16</sup>"Real test of retort pouch potential due as packer interest begins to quicken," Quick Frozen Foods (November 1981):42-47.

by the design of the pouch. One study, based upon annual production of 36 million 303 X 406 cans and comparable pouches, showed a projected \$1.5 million savings in thermal energy, labor, electrical costs, transportation and storage of packaging materials.<sup>17</sup>

The contents of the retort pouch go through the same sealing and sterilizing process as canned foods, but in far less time. Specifically, the process involved in canning requires 15 percent more thermal energy than when foods are packed in retort pouches, while freezing requires 60 percent more energy.<sup>18</sup> The thin profile and large surface to volume ratio of the special pouch design also provided a 40 percent reduction of cooling time over cans.

Storage of packaging materials was decreased because the pouch roll stock needed 85 percent less storage space compared to an equivalent number of empty cans. Packaging space was further reduced because the flexible nature of the pouch allowed it to be sized to the food product. In addition, savings on transportation was possible due to the light weight of the pouches. The retort pouch weighed only 11 percent of an equivalent number of cans.<sup>19</sup>

All of the savings created by using this flexible packaging method made the retort pouch look more economical

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<sup>17</sup>"Real test of retort pouch," p. 44.

<sup>18</sup>"Only speed," p. 15.

<sup>19</sup>"What's cooking in the marketplace? Retort pouches," Plastics World (November 1981):72-74.

production-wise than either the canning or freezing methods of packaging. Since costs are a very important consideration in any production process, these savings provided an important advantage for the retort pouch.

#### Retail Level Advantages

From the retailers' perspective, there were three main advantages. Retort pouches require less shelf space than an equivalent number of cans due to the package's thin, rectangular design. While the existing pouches of early products were enclosed in a cardboard box, some manufacturers were planning on producing retort packages without the cardboard exterior. The pouch would then require even less shelf space.

Because the pouch is shelf stable at room temperature, retort packaged items do not need expensive freezer display storage. The in-store energy savings ranges from eight to 17 cents per unit over frozen containers. This provided major savings to the retailer, considering the fact that frozen food display cases account for 38 percent of the average supermarket's energy bill.<sup>20</sup>

Finally, there was an important merchandising advantage to the retailer. The fact that the pouch does not require freezer space allowed the pouch to be placed anywhere in the store, including high impulse areas near the checkout counter or end aisle displays.

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<sup>20</sup>"Real test of retort pouch," p. 44.

### Consumer Level Advantages

For the consumer, convenience and flavor best describe the benefits of the retort pouch. The five-minute preparation time was a major advantage over frozen foods.<sup>21</sup> To be able to prepare a meal quickly allows the busy homemaker time for other important tasks. This advantage was one of the main marketing points for the retort pouch.

Retort packaged foods had the color and flavor retention quality of frozen foods but did not need any refrigeration. The superior quality of retort packaged food was the result of the decreased processing time provided by the design of the pouch. (See Figure 3.)

The shelf stability made the pouch competitive with the tin can and the taste made retort packaged foods

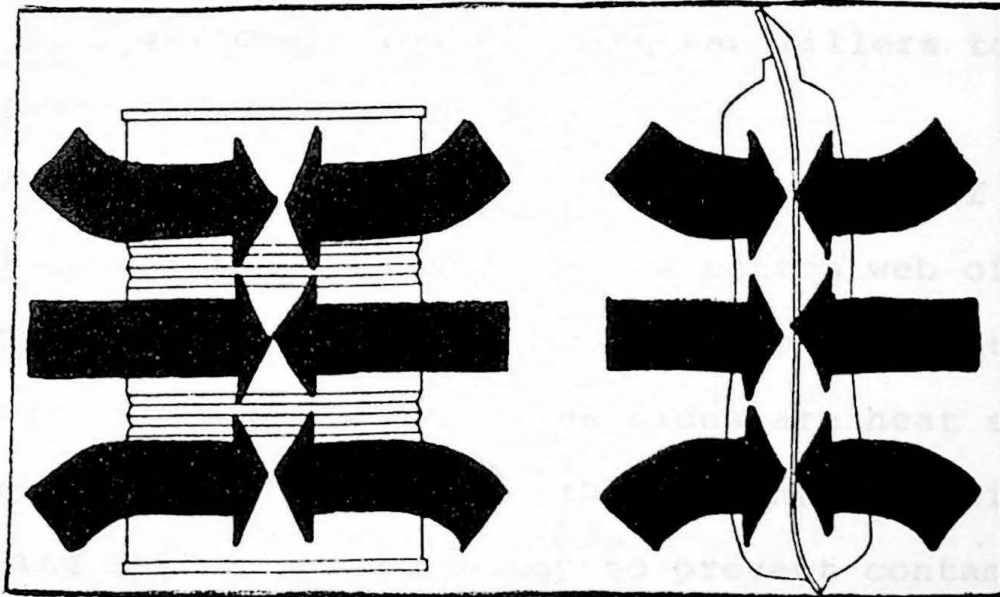


Figure 3. Thin profile of the retort pouch helps protect food's flavor and texture. Cooking heat penetrates to the interior faster than with cans, preventing overcooking of outer layers and saving energy. SOURCE: Plastic World, November 1981, p. 73.

<sup>21</sup>"What's cooking," p. 73.

competitive with frozen foods. Thus, for better tasting food and ease of preparation, the retort pouch has several advantages over canned and frozen foods.

#### Retort Package Limitations

For all the advantages of the flexible retort pouch, there were some major barriers that caused concern for its success.

#### Production Problems

Initial production level problems were mainly technological. To set up a small pilot plant was not a major problem, but gearing up from a pilot plant capacity to a system capable of mass production required major changes. In order for organizations to produce retort packages, equipment had to be switched from existing can fillers to equipment for filling retort pouches.

The retort pouch filling process consists of a horizontal form/fill/seal unit where a bottom web of packaging material is continuously unrolled from roll stock. It is formed into a pouch and three sides are heat sealed. The filler then inserts the food through the open side, usually using bottom up technology to prevent contamination of the seal area.<sup>22</sup> (See Figure 2.) This process is much

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<sup>22</sup>"Innovative food concepts now available in retort pouch," Food Processing (April 1982):28-30.

slower than canning. Where cans are filled at a rate of 300-400 units per minute, machines only fill 60 pouches per minute.<sup>23</sup> Therefore, the retort pouch advantage of decreased thermal processing time is possibly outweighed by a slower filling process.

Proper production line layout and efficient but safe handling of the relatively fragile retort packages were areas that organizations needed to study further. These two problems contributed to inconsistency in the production process. Running four to five hours and then having a breakdown caused very undependable and costly production lines.<sup>24</sup> Keeping that pace of breakdowns would have made all other cost savings negligible.

#### Retail Problems

During the introductory stage, the primary retort problem at the retail level dealt with the competition. There was very little need for a shelf stable food in a retort pouch. Low priced foods were available in other types of shelf stable containers, such as the variety of canned products found on grocery shelves.

Competitive foods were available in frozen varieties also. Examples of this were boil-in-the-bag entrees and heat and serve dishes. The presence of the large and

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<sup>23</sup>"What's cooking," p. 73.

<sup>24</sup>"Retort pouch acceptance reported in test markets," Paper Film Foil Converter (April 1982):88.

efficient frozen food industry was a major deterrent to the introduction and success of the retort pouch.<sup>25</sup>

Creative marketing and appealing margins for the retailer were necessary for cooperation in replacing existing successful canned and frozen food products with a new and very different type of food packaging.

The hardest barrier to overcome was the high cost of introducing a major change in food packaging and distribution in the existing economy. It cost \$35-40 million to launch an innovative packaging concept such as the single serve retort pouch.<sup>26</sup>

#### Consumer Problems

The consumer presented a different set of problems for the introduction of retort packages. To the average consumer, product personality and product performance are projected just as much by the package's mechanical function, shape, texture, materials, color and utility as by the product it contains.<sup>27</sup> Thus, the less than 10 percent of U.S. consumers who had seen or heard of the flexible retort pouch didn't really understand that the contents didn't have to be stored in the freezer or cooked before using to be safe.<sup>28</sup>

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<sup>25</sup>"Kraft coattails," p. 15

<sup>26</sup>"What's cooking," p. 73.

<sup>27</sup>Walter Stern, "Packaging Technology," Paperboard Packaging (April 1982):60-62.

<sup>28</sup>"What's cooking," p. 73.



Consumers also found it hard to accept the fact that the retort packed food contained no preservatives or additives and was not canned, condensed, dehydrated or freeze dried.<sup>29</sup>

The consumer was exposed to a new packaging concept, and as with any new idea, it took time to be accepted. This type of packaging concept was compared to where the frozen food package was in its life cycle 50 years ago. An innovation such as retort packaging was projected to take as long as ten years to test. Novel marketing techniques were needed to make the consumer aware of the retort pouches unique features.

Time was also necessary for the packaging and food industry to break out of their traditional patterns of behavior. This included adapting to external changes such as the nature of demand, and certain environmental, energy and economical concerns which didn't exist when the present food packaging and distribution methods were developed.

The future potential and success of the retort package depends on producer, retailer and consumer acceptance. Each of these groups plays a critical role in determining the success of new product introductions.

One way of creating producer acceptance is the reduction of filling time of the pouches. With the development

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<sup>29</sup>Paul La Chance, "Where have all the fridges gone?" Health (January 1980):40-50.

of a high speed continuous retort machine, retort packaging would be directly competitive with the canning process. High speed filling of the pouch would open up new avenues to include packaging commodity products.

The retailers' acceptance of this new packaging concept will depend on the consumers' willingness to purchase the pouch. A successful test market will assure retailers that the pouch has high potential.

For the consumer, time and effective marketing techniques will aid acceptance of the retort package. These two elements must prove that the retort pouch is a viable packaging alternative to the well established tin can and frozen food containers.

#### Summary

The flexible retort package was finally approved for consumer use after satisfying FDA standards in 1976. Producers looked favorably on the retort package because of the potential economical savings allowed in processing and distribution. Retailers considered retort packages worthwhile because they were very merchandisable and demanded no special expensive freezer display space. Consumers liked retort packages for the quality of food and ease of preparation.

At the same time, there were disadvantages at each level of the channel of distribution. Special technological production changes were necessary which could make

retort packaging a risky investment. Retailers were not sure about the demand for the new type of packaging and consumers were not really convinced of the pouches' shelf stability.

Despite the disadvantages, interest and research continued on the retort pouch and a variety of retort products were developed for use in consumer, military and institutional markets. With the development of technological advancements and decreased processing time, retort packaging could become a competitive force within the packaging industry. If accepted as a container for ultimate consumer food products, areas other than the single serving entree would be candidates for the retort pouch.

## CHAPTER III

### RESEARCH DESIGN

The purpose of the study was to develop a research format to solicit consumer food purchaser reaction information about retort packaged food. Although the study would not actually be completed, all processes and procedures are established in anticipation of conducting such a study. The key issue of this study was to develop the format itself. To best solicit the information desired, a survey would be conducted in major grocery stores and supermarkets within a selected SMSA. The main consideration in selecting research prototype SMSA format was proximity to the researcher. For this reason, the Grand Forks, North Dakota-Minnesota Standard Metropolitan Statistical Area was selected.

The Grand Forks, North Dakota-Minnesota SMSA includes the inhabitants of Grand Forks, North Dakota and East Grand Forks, Minnesota, plus rural residents in Grand Forks and Polk counties. It was determined that the best way to solicit consumer reaction to retort packaged foods was to conduct personal interviews in grocery stores while consumers were making food purchases. Grocery stores utilized during the study were limited to those located within

the two city SMSA as described.

Pricing, merchandising, and size were all options which could have been used to determine the store candidates. After completing personal interviews with several grocery store managers, it was determined that size was the most objective of the three options and therefore size alone was utilized as the store selection consideration element.

To determine the size of survey facility consideration was given to the type of grocery store in which the retort pouch would most likely be test marketed. It was decided that major grocery stores and supermarkets would provide the most exposure to the ultimate consumer, and therefore would be a logical choice for a test market store. The range in store size was from 10M to 42M sq. ft. according to store managers. Grocery stores with at least 10,000 square feet qualified as a major grocery store.

Based on this, each store participant had to have at least 10,000 square feet to be utilized. The Grand Forks telephone book provided a listing of all the grocery stores and supermarkets within the city limits of Grand Forks, and East Grand Forks. After speaking with a representative of each major grocery store and a chain of convenience stores, ten stores were found that fit the size qualification. Due to the small number of stores that met the size requirement, it was determined that all ten stores should be used as interview sites for the study.

### Selection of the Sample

A sample size of 659 was calculated using the formula for computing sample size for inferences involving proportions in a finite universe.<sup>30</sup> With this sample size, the probability that the sample proportions would vary from the population proportion by more than  $\pm .01$  is .01. (See Appendix A for the calculation of sample size.)

The Grand Forks, North Dakota-Minnesota SMSA is comprised of 70% urban and 30% rural residents.<sup>31</sup> In order to accurately represent this population breakdown, respondents would be drawn from the universe to reflect the proper proportion of urban and rural residents. The total SMSA population is 100,944. Therefore, of the sample size of 659, 461 respondents would be from the urban group and 198 respondents would represent the rural group. Table 1 shows the population breakdown of urban and rural subgroups.

The number of customers shopping at a grocery store is typically relative to the size of the store.

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<sup>30</sup>Balsley, Howard L. and Clover, Vernon T. Business Research Methods. Columbus: Grid Publishing Inc., 1979.

<sup>31</sup>U.S. Department of Commerce. Bureau of the Census, United States Census of Population & Housing, 1980, Summary Characteristics of Governmental Units & Standard Metropolitan Statistical Areas, North Dakota. Issued September 1982.

TABLE 1

BREAKDOWN OF SAMPLE SIZE  
BY URBAN AND RURAL SUBGROUPS

Group	Total Popu- lation	% of Popu- lation		Sample Size	=	Sub Group Size
Rural	30,616	.30	X	659	=	198
Urban	70,328	.70	X	659	=	461
	<u>100,944</u>					<u>659</u>

Therefore, it was decided to use the square footage as a determining factor in dividing the sample of 659 among the ten stores. Table 2 illustrates the individual store customer quota by square footage.

TABLE 2

INDIVIDUAL STORE CUSTOMER QUOTA  
BY SQUARE FOOTAGE

Store Name	Square Footage	% of Universe	Store Quota
Fairway Village	15,000	.06	39
Millers Town & Country	17,000	.07	46
Warehouse Foods	20,000	.08	53
Piggly Wiggly #6	21,500	.08	53
Piggly Wiggly #5	21,500	.08	53
Warehouse Market	25,000	.10	66
Piggly Wiggly #2	27,000	.11	72
Red Owl	32,000	.13	86
Piggly Wiggly #3	33,000	.13	86
Albertsons	42,000	.16	105
TOTALS	254,500	1.00	659

Each store manager was asked to provide an estimate on the breakdown of rural and urban customers for their particular store. Based on the information provided, quota samples would be taken in each store according to urban and rural customer classification. Table 3 shows the subgroup size for each store by customer classification.

TABLE 3

## RURAL AND URBAN CUSTOMER CLASSIFICATION BY STORE

Store Name	Over all Store Quota	% Rural Cus- tomers	Rural Cus- tom- ers	Over all Store Quota	% Urban Cus- tomers	Urban Cus- tomer Quota
Fairway Vil- lage	39	X .05	= 2	39	X .95	= 37
Millers Town and Country	46	X .20	= 9	46	X .80	= 37
Warehouse Foods	53	X .25	= 13	53	X .75	= 40
Piggly Wiggly #6	53	X .10	= 5	53	X .90	= 48
Piggly Wiggly #5	53	X .20	= 11	53	X .80	= 42
Warehouse Market	66	X .75	= 49	66	X .25	= 17
Piggly Wiggly #2	72	X .15	= 11	72	X .85	= 61
Red Owl	86	X .15	= 65	86	X .25	= 21
Piggly Wiggly #3	86	X .20	= 17	86	X .80	= 69
Albertsons Totals	105	X .15	= $\frac{16}{198}$	105	X .85	= $\frac{89}{461}$



### Questionnaire Design

In order to solicit consumer reaction information about retort packaging, in-store personal interviews would be utilized. Because retort packages were a new packaging concept, product examples and consumer taste tests would be utilized during the personal interviews. A researcher developed questionnaire was designed to achieve study objectives. The complete questionnaire is shown in Appendix B.

Question one on the questionnaire is a filter question included to insure that the quota from the rural and urban subgroups is attained. After question one, the first section of the questionnaire (Questions 2 to 11) was designed to establish consumer preference for food packaging types. Section two (Questions 12 to 14) attempts to determine the consumer reaction to the different features of the flexible retort pouch. The third section (Questions 15 to 21) requires the consumer to compare the taste of a retort packaged food with two other packaged forms of the same type of food. This section of the questionnaire also attempts to measure the consumers' willingness to purchase the retort packaged food. Section four (Questions 22 to 26) solicits consumer profile information of the potential target market for retort packaged foods.

The questionnaire was structured to insure that all questions are either multiple choice, with only one possible response from a selection of more than two responses or dichotomous, with one response possible from a choice of two responses. This format should aid the interviewer in recording answers and facilitate analysis. The numbers in parenthesis on the questionnaire are for coding purposes and do not reflect a particular value to any response. The questionnaire will not be seen by the respondents at any time during the interview.

#### Questionnaire Administration

The personal interview questionnaire will be administered in ten grocery stores in Grand Forks, North Dakota and East Grand Forks, Minnesota. Booths will be set up within each grocery store close to a main entrance but not interfering with incoming and outgoing traffic.

Two individuals would be responsible for each interview booth. One would be the trained interviewer who would remain seated at the booth. The other would be the counter whose responsibility it would be to draw the customer to the booth. The counter would stand by the main entrance and count the customers that cross a designated line. Upon reaching the  $n^{\text{th}}$  customer, the counter would approach this person and say, "We are conducting a survey of consumer reaction to a new food packaging concept. Would you be willing to participate by

tasting some food samples and answering a few short questions?"

If the customer agrees, then the counter would bring the person over to the booth, at which point the interviewer would administer the questionnaire. Upon completion of each interview, the counter would repeat the process until the quota is met. If a customer does not agree to participate in the survey, that person would be thanked and the counter would begin the selection process again. This would continue until the quota of individuals is obtained.

For stores with two or more entrances, the counter would take turns drawing individuals from each entrance, insuring that the same pattern of selection was followed at each entrance.

The quoted statements within the box in the questionnaire is to be read to each respondent. For each question, the interviewer is to read the question and all possible answers to the respondent. For multiple choice questions, the interviewer will put a checkmark by the respondents' answer. For the questions that require a written answer, the interviewer will record the answer exactly as it is given by the respondent. If the respondent requests to have the question repeated, the interviewer will do so. However, the interviewer will not interpret any of the questions for the respondent.

## Respondent Selection

The interview will be conducted at various times of the day and week to insure randomness. The table of random numbers (example shown in Appendix C) is used to determine both the time of day and the day of the week for each of the ten stores.

In order to select which day of the week to conduct each survey for each store, start with the fourth five digit random number and use the last digit of every third number thereafter in the random number table. The first number will be for store number one and the rest of the stores fall into place with each consecutive random number selected. Sunday is considered day number one. The selection of random numbers for the day of the week is shown in column Two in Table five of Appendix D.

To determine the time of day to begin the interviewing, start with the fifth random number, choose every fifth five-digit number and use the last three digits to determine the time. If these three numbers are not the natural times on the clock, go to the next fifth number. The first random number chosen will apply to store number one, and the rest of the stores fall into place with each consecutive random number chosen. If there are two times in the stores' hours for which the time of day number applies, alternate from morning to evening with each succeeding store for which two such numbers exist.

Column three in Table five of Appendix D illustrates the selection of time of day to administer the survey.<sup>32</sup>

### Summary

This chapter describes the methodology proposed for conducting a consumer preference study on retort packaging. Due to the unique nature of retort packaged foods, personal interviews would be utilized to obtain consumer reaction information. The interviews would be conducted in major grocery stores and supermarkets within the Grand Forks, North Dakota-Minnesota SMSA. A minimum of ten thousand square feet of floor space was utilized as the main element in selecting survey sites. Ten stores within the Grand Forks, North Dakota and East Grand Forks, Minnesota city limits met the ten thousand square foot criteria and would be utilized as survey sites.

A sample size of 659 would be utilized for the study. The sample size was broken down to represent the 70 percent urban and 30 percent rural proportions of the Grand Forks, North Dakota-Minnesota SMSA population. A quota of respondents for each store was established based on store size. The quota for each participating store was further subdivided to represent the urban and rural proportion of customers that frequent

<sup>32</sup> Sources of method for determining the sampling process includes Seymour Sudman, "Improving the quality of shopping center sampling," Journal of Marketing Research 17, (Nov. 1980): 423-31; and Balsley and Clover, 238.

each store.

A personal interview questionnaire was designed to reach the study objectives. The procedures for selecting respondents, time of day and day of week in which to conduct each store's interviews were developed to insure randomness.

that have been described thus far  
 in anticipation of conducting a  
 customer reaction study. This chapter  
 describes the guidelines for analyzing and interpreting the data  
 collected. The purpose of this report was to develop a format for  
 data collection and analysis that  
 would be part of this development process.

The questionnaire will be analyzed using the Statistical Analysis System (SAS) package. The SAS package  
 was selected for its flexibility and power  
 to handle a wide variety of data  
 analysis. Results would be presented in a summary  
 form. Cross tabulation of information is also  
 provided by the SAS package. Results of the cross tabulation  
 could be displayed in tabular form in a table.

### The Pilot Study

A pilot study was conducted to check the clarity  
 of the questions and the efficiency of the interview  
 procedures. Permission was granted by one of Grand Rapids  
 major grocery store managers to use his store as a pilot  
 study survey site.

## CHAPTER IV

### ANALYSIS OF THE DATA

The procedures that have been described thus far have been established in anticipation of conducting a retort package consumer reaction study. This chapter provides guidelines for analyzing and interpreting the data. The purpose of this report was to develop a format for study; total data collection and analysis did not take place as part of this development process.

The questionnaire will be analyzed using the Statistical Analysis System (SAS) package. The SAS package will record the responses in both frequency and percentage form. Results would be presented in a summary questionnaire. Cross tabulation of information is also provided by the SAS package. Results of the cross tabulation would be displayed in percentage form in a table.

#### The Pilot Study

A pilot study was conducted to check the clarity of the questions and the efficiency of the interviewing procedures. Permission was granted by one of Grand Forks' major grocery store managers to use his store as a pilot study survey site.

The pilot study was conducted April 20, 1983, near the front entrance of Piggly Wiggly #3, located at 1935 13th Avenue North, Grand Forks, North Dakota. This store was selected based on its size of 33,000 square feet. This site is one of the ten proposed survey sites for the major study. Respondents were selected on a random basis, using the procedures proposed in chapter three.

The researcher approached each respondent and said, "Hello, I am conducting a survey as part of an independent study for my graduate program. Would you be willing to participate by answering a few questions for me?" Of the sixteen customers that were approached, only one was unwilling to participate in the survey. The responses of the fifteen respondents were hand tabulated and the results are displayed in the summary questionnaire in Appendix E.

Pilot study results validated most of the questionnaire format. However, some problematic questions were revealed. Questions one through five were easily understood by the respondents and needed no format change. Question one was a filter question asking respondents where they currently live. These responses would insure that the urban and rural resident quota was obtained.

In questions two and three, respondents were asked where the majority of their meals were consumed and more specifically, the number of meals consumed away from home the previous week. In the actual study, this information



would be useful to retort pouch advertisers. Based on the fact that retort pouches would most likely be used at home, actual survey results indicating that respondents consume most meals at home could imply that a potential test market did exist in that survey area for the retort pouch.

Responses from questions four and five would indicate who is responsible for most of the grocery shopping and therefore to whom the retort pouch advertisements should be directed.

The format for questions six through eleven caused respondents difficulty during the pilot study. Each of the six questions asked respondents to indicate if they had purchased that particular food package form on their previous grocery shopping trip. The interviewee was to check the blank only if that particular package form had been purchased. This procedure was confusing for the interviewee because only a yes blank was provided. A format change on the questionnaire to include a yes blank and a no blank alleviated the problem.

Responses to questions six through eleven would indicate which package form presented the most competition for the pouch and thus would be helpful in determining how to market the retort pouch. The package forms listed were cans, frozen packages, bottles, jars, dehydrated and other. The selection "other" was selected by 60 percent of the respondents. This relatively high percentage

indicates that other package forms may also present significant competition to the retort pouch. Based on this observation, the researcher added two package forms to this set of questions. The added package forms were based on the respondents' comments. When respondents were asked what other package forms they had purchased, the most common responses were boxes and plastic bags. Thus, these two forms were added to the revised questionnaire.

Questions twelve through fourteen were confusing for most of the respondents. The questions asked the respondents to give their opinion of "food shoppers" purchasing habits regarding their concern for specific food package features. These features included shelf stability, and the addition of preservatives and additives to the foods. The researcher was concerned that the respondent would give responses that the interviewer was looking for instead of what the respondent actually felt. Therefore, an indirect approach was utilized in the questionnaire design. However, this indirect approach was confusing to the respondent causing discomfort with response category. As a result, a more direct approach was included in the revised questionnaire. The words "food shoppers" were replaced with "you." (See Appendix F for the revised questionnaire.) The information obtained from questions twelve through fourteen would be used to determine which

retort package features to stress in advertising.

Due to the non-availability of retort packaged foods in this survey area, the taste test section of the questionnaire was omitted in the pilot study. Thus questions fifteen through twenty-one were not utilized in the pilot study. However, in the actual survey, answers to these questions would determine the willingness of consumers to try retort packaged foods and ultimately, the potential success of test marketing retort pouches in this survey area.

No problems were encountered with questions twenty-two through twenty-six. These questions dealt with the respondents' sex, age, marital status, employment status, and household income level. This information would be used to cross tabulate information of consumer demographic characteristics with willingness to purchase retort packaged foods. The results of the cross tabulation would provide a profile of the potential target market for the retort pouch. The type of information obtained through this analysis would be helpful for advertising purposes; specifically, in deciding to whom the advertisements should be directed. Table four is a mock table which could be used to provide cross classification information.

TABLE 4

CROSS CLASSIFICATION OF PACKAGE FORM PREFERENCE  
WITH SELECTED DEMOGRAPHIC CHARACTERISTICS

Demographic Characteristics		Package form preference at same cost and size								Row Total
		Retort Pouch		Frozen		Jar		Other		
		Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total	
Sex of respondent	Female	xx*	xx	xx	xx	xx	xx	xx	xx	xxx
	Male	xx	xx	xx	xx	xx	xx	xx	xx	xxx
Age in Years	0-20									
	21-30	xxx	xx	xx	xx	xx	xx	xx	xx	xxx
	31-40	"	"	"	"	"	"	"	"	"
	41-50	"	"	"	"	"	"	"	"	"
	51-60	"	"	"	"	"	"	"	"	"
	Over 60	"	"	"	"	"	"	"	"	"
	Marital Status	Not Married	"	"	"	"	"	"	"	"
Married		"	"	"	"	"	"	"	"	"
Other		"	"	"	"	"	"	"	"	"
		"	"	"	"	"	"	"	"	"
Employment status	Full time	"	"	"	"	"	"	"	"	"
	Part time	"	"	"	"	"	"	"	"	"
	Unemployed	"	"	"	"	"	"	"	"	"
	Other	"	"	"	"	"	"	"	"	"
Total annual income	0-10,000	"	"	"	"	"	"	"	"	"
	10,001	"	"	"	"	"	"	"	"	"
	20,000	"	"	"	"	"	"	"	"	"

TABLE 4--Continued

Demographic Characteristics	Package form preference at same cost and zize					Row Total
	Retort Count	Pouch % of Total	Frozen Count	Jar % of Total	Other % of Total	
Total annual income level						
\$20,001	xxx	xx	xx	xx	xx	xxx
30,000						
30,001	"	"	"	"	"	"
40,000						
40,001	"	"	"	"	"	"
50,000						
Over						
50,000	"	"	"	"	"	"

\*Indicates data that will be recorded from the study results.

### Summary

This chapter attempts to provide guidelines for analysis of the questionnaire for the proposed study. Questionnaire results for the actual study would be computer analyzed using the Statistical Analysis Systems package. This standard statistical package is commonly utilized because of the flexible components for questionnaire analysis.

A pilot study was conducted to check for ambiguous questions and to validate the interview procedure sequence. Two major problems were revealed in the questions. First, questions six through eleven dealing with commonly purchased package forms did not provide blanks for a "no" response and were confusing. These questions were revised to include a "yes" and "no" response for each question. In addition to facilitating response, the revised format would make recording procedures much easier.

The second problem area included questions twelve through fourteen dealing with consumers' awareness of specific package features. Respondents were unclear as to whose shopping habits were being evaluated, and were hesitant to answer for the broad category of "food shoppers." A change was made in the form of the question "food shoppers" to "you." This should remove any confusion and eliminate explanations needed by the interviewer.

The secondary purpose for conducting the pilot study was to test the interview procedure sequence. No problems were revealed in the procedures, and it is recommended that the interview procedure sequence as proposed be adhered to in actual conduct of the overall study.

## CHAPTER V

### SUMMARY, RECOMMENDATIONS, AND PROBLEMS FOR FURTHER STUDY

#### Summary

The purpose of this study was to provide a procedure to determine the consumer reaction to, and potential demand for retort packaged foods. To meet these objectives, an in-store survey procedure was established for a Standard Metropolitan Statistical Area.

Specifically, the procedure was oriented towards the Grand Forks, North Dakota-Minnesota SMSA. However, based on the structure and procedures developed, the format could be modified for use in other SMSA's.

A personal interview questionnaire format was developed and a pilot test was conducted to discern any ambiguous questions. A detailed procedure for sample selection and questionnaire administration were also developed.

The pilot study revealed several problem areas in the questionnaire. As a result of the pilot study, the following changes were made:

1. In questions six through eleven, a "no" response was added to facilitate recording answers.
2. "Boxes" and "plastic bags" were added to the selection of responses of most recently purchased package



forms in question six through eleven. These packaged forms were selected based on respondents' comments during the interview.

3. In questions twelve through fourteen the words "food shoppers" were replaced with "you" in an effort to obtain respondents' feedback on their level of awareness concerning specific food package features. The overall revised questionnaire is illustrated in Appendix F.

Overall the questionnaire was fairly easily understood. The respondents were cooperative and receptive to the idea of responding to the questionnaire. The researcher believes the questionnaire and procedures established in this study provide a structure adaptable for use in other SMSA's as well as the Grand Forks, North Dakota-Minnesota SMSA.

#### Problems For Further Study

Other considerations for further research include the following:

1. Utilize demographic characteristics other than geographic location to stratify the population. Possibilities include income level, age, ethnic background and sex of the respondents.
2. Incorporate more than one type of retort packaged food in the taste test.
3. Compare the retort packaged food to packaged foods other than frozen and canned.
4. Include more detailed questions regarding the

price ranges within which consumers would be willing to try retort pouches.

5. Conduct a pretest and post test to determine differences in consumer reaction to retort pouch introduction in an SMSA.

6. The study could be conducted on a nationwide level, using major metropolitan areas as survey centers.

The rationale for this study is that a research format was needed to conduct a study that would determine consumer reaction to a new food package form, the retort pouch. No such research format existed at the time of this study which could be used for this purpose.

The pilot study proceeded smoothly, due to the consumer's receptive attitude and cooperation in responding to the questionnaire. Changes were made in the questionnaire in an attempt to remove any ambiguous and confusing questions.

The researcher believes that the objectives of the study have been attained and recommends the overall study be conducted using the procedures as described.

APPENDICES

FORMULA FOR COMPUTING SAMPLE SIZE FOR ESTIMATES INVOLVING PROPORTIONS WHEN THE SIZE OF THE UNIVERSE IS KNOWN.

$$n = \frac{Z^2 \cdot p \cdot q}{e^2}$$

$n$  = size of sample  
 $Z$  = number of standard deviations above or below the mean  
 $p$  = population proportion or one-half  
 $q$  = 1 -  $p$

APPENDIX A

Computing Sample Size

$$n = \frac{(1.96)^2 \cdot (.5) \cdot (.5)}{(.05)^2} = 384.16$$

was determined from the 1980 Census, Bureau of Labor Statistics. It represents the Grand Forks, North Dakota Standard Metropolitan Statistical Area population.

FORMULA FOR COMPUTING SAMPLE SIZE FOR INFERENCES INVOLVING PROPORTIONS WHEN THE SIZE OF THE UNIVERSE IS KNOWN:

$$n = \frac{pq}{\left(\frac{p-P}{z}\right)^2 + \frac{pq}{N}}$$

Where:

- n = size of sample
- N = known size of the universe \*
- p-P = estimated deviation of sample proportion from population proportion; or one-half the estimated confidence interval
- p = the sample proportion
- q = 1-p
- z = the standard normal deviate (2.576 for 99%)

$$n = \frac{(.5) (.5)}{\frac{.05}{2.576} + \frac{(.5) (.5)}{100,944}} = 659$$

\*N was determined from the 1980 Census, Bureau of Labor Statistics. It represents the Grand Forks, North Dakota-Minnesota Standard Metropolitan Statistical Area population.

HOUSEHOLD QUESTIONNAIRE

1. Where do you currently live?

- (1)  Within Grand Forks city limits.
- (2)  Within East Grand Forks city limits.
- (3)  Outside of Grand Forks city limits but within Grand Forks county.
- (4)  Outside of East Grand Forks city limits but within Polk County.
- (5)  Other

2. Where do you eat the majority of your meals?

- (1)  Home
- (2)  Restaurant
- (3)  At work
- (4)  Cafeteria/caf board
- (5)  Laboratory
- (6)  Other

APPENDIX B

3. In the past week, how many times did you dine away from home? 4. How many times did you dine away from home?

Questionnaire

- (1)  None
- (2)  1-2
- (3)  3-4
- (4)  5-6
- (5)  7-8
- (6)  9-10
- (7)  More than 10

5. Who is primarily responsible for purchasing groceries for your household?

- (1)  Self (female)
- (2)  Self (male)
- (3)  Spouse (female)
- (4)  Spouse (male)
- (5)  Joint responsibility with other household members
- (6)  Other. Please specify \_\_\_\_\_

6. In the past week, how many times did you purchase the groceries for your household?

- (1)  0
- (2)  1
- (3)  2
- (4)  3
- (5)  4
- (6)  More than 4

RETORT PACKAGE QUESTIONNAIRE

1. Where do you currently live?

- (1) \_\_\_\_\_ Within Grand Forks city limits.  
 (2) \_\_\_\_\_ Within East Grand Forks city limits.  
 (3) \_\_\_\_\_ Outside of Grand Forks city limits but  
 within Grand Forks county.  
 (4) \_\_\_\_\_ Outside of East Grand Forks city limits  
 but within Polk County.  
 (5) \_\_\_\_\_ Other

2. Where do you eat the majority of your meals?

- (1) \_\_\_\_\_ Home  
 (2) \_\_\_\_\_ Restaurants  
 (3) \_\_\_\_\_ At work  
 (4) \_\_\_\_\_ Contract for board  
 (5) \_\_\_\_\_ Dormitory  
 (6) \_\_\_\_\_ Other. Please specify \_\_\_\_\_

3. In the past week, how many meals have you consumed away from home?

- (1) \_\_\_\_\_ None  
 (2) \_\_\_\_\_ 1-5  
 (3) \_\_\_\_\_ 6-10  
 (4) \_\_\_\_\_ 11-15  
 (5) \_\_\_\_\_ 16-20  
 (6) \_\_\_\_\_ More than 20

4. Who is primarily responsible for purchasing groceries for your household?

- (1) \_\_\_\_\_ Self (female)  
 (2) \_\_\_\_\_ Self (Male)  
 (3) \_\_\_\_\_ Spouse (female)  
 (4) \_\_\_\_\_ Spouse (male)  
 (5) \_\_\_\_\_ Joint responsibility with other household members  
 (6) \_\_\_\_\_ Other. Please specify \_\_\_\_\_

5. In the past week, how many times did you purchase the groceries for your household?

- (1) \_\_\_\_\_ 0  
 (2) \_\_\_\_\_ 1  
 (3) \_\_\_\_\_ 2  
 (4) \_\_\_\_\_ 3  
 (5) \_\_\_\_\_ 4  
 (6) \_\_\_\_\_ More than 4

6-11. Which of the following types of packaged foods did you purchase the last time you went shopping? Check all appropriate answers.

- (1)  Cans
- (1)  Frozen
- (1)  Bottles
- (1)  Jars
- (1)  Dehydrated
- (1)  Other Please specify \_\_\_\_\_

12. How often do you think food shoppers consider the amount of preservatives contained in packaged foods when making a purchase?

- (1)  Always
- (2)  Sometimes
- (3)  Undecided
- (4)  Rarely
- (5)  Never

13. How often do you think food shoppers consider the amount of additives contained in packaged foods when making a purchase?

- (1)  Always
- (2)  Sometimes
- (3)  Undecided
- (4)  Rarely
- (5)  Never

14. How often do you think food shoppers consider freezer storage space when making food purchasing decisions?

- (1)  Always
- (2)  Sometimes
- (3)  Undecided
- (4)  Rarely
- (5)  Never

---

INTERVIEWER: Please read the following quoted statements to the respondent.

"Here are three different samples of chipped beef. Please taste each of them and answer the following questions."

---



15. Which of the three packaged forms of chipped beef tastes best to you?

- (1) \_\_\_\_\_ Number one
- (2) \_\_\_\_\_ Number two
- (3) \_\_\_\_\_ Number three

---

"A new type of food packaging has been developed recently called retort packaging. Retort packaged foods are not frozen, canned, dried or dehydrated. Retort packaged foods do not contain any preservatives or additives. Retort packaged foods have been sealed and sterilized to allow them to be stored in the cupboard for up to three years. They require only five minutes of preparation time in boiling water before they are ready to eat. The food from package number one was a retort package, number two was from a frozen package and number three was from a jar.

---

16. Which of the following describes how the retort packaged chipped beef tastes to you?

- (1) \_\_\_\_\_ Very good
- (2) \_\_\_\_\_ Good
- (3) \_\_\_\_\_ Neutral
- (4) \_\_\_\_\_ Bad
- (5) \_\_\_\_\_ Very bad

17. Which of the following describes how the retort packaged chipped beef taste compared to the frozen chipped beef?

- (1) \_\_\_\_\_ Much better
- (2) \_\_\_\_\_ Better
- (3) \_\_\_\_\_ Neutral
- (4) \_\_\_\_\_ Worse
- (5) \_\_\_\_\_ Much worse

18. Which of the following describes how the retort packaged chipped beef tastes compared to the chipped beef from a jar?

- (1) \_\_\_\_\_ Much better
- (2) \_\_\_\_\_ Better
- (3) \_\_\_\_\_ Neutral
- (4) \_\_\_\_\_ Worse
- (5) \_\_\_\_\_ Much worse

19. Would you be willing to purchase retort packaged chipped beef if the price and serving size were the same as a jar of chipped beef?

- (1)  Yes  
(2)  Undecided  
(3)  No

20. Would you be willing to purchase retort packaged chipped beef if the price and serving size were the same as frozen chipped beef?

- (1)  Yes  
(2)  Undecided  
(3)  No

21. Which of the following package forms of chipped beef would you prefer the most if they were the same serving size and price?

- (1)  Retort pouch  
(2)  Frozen  
(3)  Jar  
(4)  Other

22. Sex of the respondent?

- (1)  Female  
(2)  Male

23. What is your age in years?

- (1)  0-20  
(2)  21-30  
(3)  31-40  
(4)  41-50  
(5)  51-60  
(6)  Over 60

24. What is your marital status?

- (1)  Not married  
(2)  Married  
(3)  Other

25. Are you currently employed?

- (1)  Yes, full time (40 hours or more a week)  
(2)  Yes, part time (less than 40 hours a week)  
(3)  No  
(4)  Other

26. What is your total annual household income?

- (1) \_\_\_\_\_ 0-\$10,000
- (2) \_\_\_\_\_ \$10,001-\$20,000
- (3) \_\_\_\_\_ \$20,001-30,000
- (4) \_\_\_\_\_ \$30,001-40,000
- (5) \_\_\_\_\_ \$40,001-50,000
- (6) \_\_\_\_\_ Over \$50,000

APPENDIX C

Random Number Table

5-DIGIT RANDOM NUMBERS\*

Col. (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
10480	15011	01536	02011	81647	91646	69179	14194	62590	36207	20969	99570	91291	907
22368	46573	25595	85393	30995	89198	27982	53402	93965	34095	52666	19174	39615	995
24130	48360	22527	97265	76393	64809	15179	24830	49340	32081	30680	19655	63348	586
42167	93093	06243	61680	07856	16376	39440	53537	71341	57004	00849	74917	97758	163
37570	39975	81837	16656	06121	91782	60468	81305	49684	60672	14110	06927	01263	546
77921	06907	11008	42751	27756	53498	18602	70659	90655	15053	21916	81825	44394	428
99562	72905	56420	69994	98872	31016	71194	18738	44013	48840	63213	21069	10634	129
96301	91977	05463	07972	18876	20922	94595	56869	69014	60045	18425	84903	42508	323
89579	14342	63661	10281	17453	18103	57740	84378	25331	12566	58678	44947	05585	569
85475	36857	53342	53988	53060	59533	38867	62300	08158	17983	16439	11458	18593	649
28918	69578	88231	33276	70997	79936	56865	05859	90106	31595	01547	85590	91610	781
63553	40961	48235	03427	49626	69445	18663	72695	52180	20847	12234	90511	33703	903
09429	93969	52636	92737	88974	33488	36320	17617	30015	08272	84115	27156	30613	749
10365	61129	87529	85689	48237	52267	67689	93394	01511	26358	85104	20285	29975	898
07119	97336	71048	08178	77233	13916	47564	81056	97735	85977	29372	74461	28551	907
51085	12765	51821	51259	77452	16308	60756	92144	49442	53900	70960	63990	75601	407
02368	21382	52404	60268	89368	19885	55322	44819	01188	65255	64835	44919	05944	551
01011	54092	33362	94904	31273	04146	18594	29852	71585	85030	51132	01915	92747	649
52162	53916	46369	58586	23216	14513	83149	98736	23495	64350	94738	17752	35156	357
07056	97628	33787	09998	42698	06691	76988	13602	51851	46104	88916	19509	25625	581
48663	91245	85828	14346	09172	30168	90229	04734	59193	22178	30421	61666	99904	328
54164	58492	22421	74103	47070	25306	76468	26384	58151	06646	21524	15227	96909	445
32639	32363	05597	24200	13363	38005	94342	28728	35806	06912	17012	64161	18296	228
29334	27001	87637	87308	58731	00256	45834	15398	46557	41135	10367	07684	36188	185
02488	33062	28834	07351	19731	92420	60952	61280	50001	67658	32586	86679	50720	949

Figure 4. Random numbers.

\*SOURCE: Balsley, Howard L., and Clover, Vernon T. Business Research Methods. Columbus, Grid Publishing Inc., 1979.

TABLE 1  
SELECTIONS OF RANDOM NUMBERS FOR DAY OF WEEK,  
TIME OF DAY, AND NUMBER OF CUSTOMERS

	(1) Store Number	(2) Day of Week	(3) Time of Day	(4) Start- ing Time for Sur- veying Response Sent
Country Village	1	42167*	07119	23518
W. J. & Co. Country	2	99352	07056	22388
Supermarket	3	45475	16957	29439
Country Village	4	42167*	07119	23518
Country Village #5	5	52167	07638	07319
Country Market	6	54164	01577	77921
Country Village #2	7	14347	53343	99362
W. J. & Co.	8	97376	71043	94301
Country Village #3	9	34092	08774	89574
Alberta	10	91243	15556	45475

APPENDIX D

Application of the Random Number Table

\*The underlined digits are the numbers to be used from each five digit random number.

TABLE 5

SELECTION OF RANDOM NUMBERS FOR DAY OF WEEK,  
TIME OF DAY, AND NUMBER OF CUSTOMERS

Store	(1) Store Num- ber	(2) Day of Week	(3) Time of Day	(4) Start- ing # For Sel- ecting Respon- dent
Fairway Village	1	4216 <u>7</u> *	07 <u>119</u>	229 <u>18</u>
Millers Town & Country	2	9956 <u>2</u>	07 <u>056</u>	2236 <u>8</u>
Warehouse Foods	3	8547 <u>5</u>	36 <u>857</u>	0942 <u>9</u>
Piggly Wiggly #6	4	5108 <u>5</u>	97 <u>336</u>	4216 <u>7</u>
Piggly Wiggly #5	5	5216 <u>2</u>	97 <u>628</u>	0711 <u>9</u>
Warehouse Market	6	5416 <u>4</u>	81 <u>837</u>	7792 <u>1</u>
Piggly Wiggly #2	7	1434 <u>3</u>	53 <u>343</u>	9956 <u>2</u>
Red Owl	8	9733 <u>6</u>	71 <u>048</u>	9630 <u>1</u>
Piggly Wiggly #3	9	3409 <u>2</u>	28 <u>834</u>	8957 <u>9</u>
Albertsons	10	9124 <u>5</u>	16 <u>656</u>	8547 <u>5</u>

\*The underlined digits are the numbers to be used from each five digit random number.

SUMMARY QUESTIONNAIRE

Instructions for Determining Consumer Reaction to Various Food Products

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1. Where do you currently live?
  - a. Within Grand Forks City limits.
  - b. Within East Grand Forks City limits.
  - c. Outside of Grand Forks City limits but within Grand Forks County.
  - d. Outside of East Grand Forks City limits but within Polk County.
  - e. Other.

APPENDIX E

Summary Questionnaire

2. How often do you eat the majority of your meals?
  - a. Daily
  - b. 5-6 times a week
  - c. 3-4 times a week
  - d. 2-3 times a week
  - e. 1-2 times a week
  - f. Less than once a week
  - g. Other
3. In the past week, how many meals have you consumed away from home?
  - a. None
  - b. 1-5
  - c. 6-10
  - d. 11-15
  - e. 16-20
  - f. More than 20
  - g. Other
4. Who is primarily responsible for purchasing groceries for your household?
  - a. Self (Male)
  - b. Self (Female)
  - c. Spouse (Female)
  - d. Spouse (Male)
  - e. Joint responsibility with other household members
  - f. Other



SUMMARY QUESTIONNAIREProcedure for Determining Consumer Reaction to Retort  
Packaged Foods

Abs. Freq.	Rel. Freq. %	Adj. Freq. %	
<u>14</u>	<u>93</u>	<u>93</u>	1. Where do you currently live?
<u>1</u>	<u>7</u>	<u>7</u>	a. Within Grand Forks City limits.
<u> </u>	<u> </u>	<u> </u>	b. Within East Grand Forks City limits.
<u> </u>	<u> </u>	<u> </u>	c. Outside of Grand Forks City limits but within Grand Forks County.
<u> </u>	<u> </u>	<u> </u>	d. Outside of East Grand Forks City limits but within Polk County.
<u> </u>	<u> </u>	<u> </u>	e. Other.
<u>13</u>	<u>86</u>	<u>86</u>	2. Where do you eat the majority of your meals?
<u>1</u>	<u>7</u>	<u>7</u>	a. Home
<u>1</u>	<u>7</u>	<u>7</u>	b. Restaurants
<u> </u>	<u> </u>	<u> </u>	c. Contract for board
<u> </u>	<u> </u>	<u> </u>	d. Dormitory
<u> </u>	<u> </u>	<u> </u>	e. Other
<u>5</u>	<u>33</u>	<u>33</u>	3. In the past week, how many meals have you consumed away from home?
<u>7</u>	<u>47</u>	<u>47</u>	a. None
<u>2</u>	<u>13</u>	<u>13</u>	b. 1-5
<u>1</u>	<u>7</u>	<u>7</u>	c. 6-10
<u> </u>	<u> </u>	<u> </u>	d. 11-15
<u> </u>	<u> </u>	<u> </u>	e. 16-20
<u> </u>	<u> </u>	<u> </u>	f. More than 20
<u>8</u>	<u>53</u>	<u>53</u>	4. Who is primarily responsible for purchasing groceries for your household?
<u>4</u>	<u>27</u>	<u>27</u>	a. Self (female)
<u>1</u>	<u>7</u>	<u>7</u>	b. Self (male)
<u> </u>	<u> </u>	<u> </u>	c. Spouse (female)
<u> </u>	<u> </u>	<u> </u>	d. Spouse (male)
<u>2</u>	<u>13</u>	<u>13</u>	e. Joint responsibility with other household members
<u> </u>	<u> </u>	<u> </u>	f. Others

Abs. Freq.	Rel. Freq. %	Adj. Freq. %
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5. In the past week, how many times did you purchase the groceries for your household?

3	20	20	a. 0
6	40	40	b. 1
5	33	33	c. 2
1	7	7	d. 3
			e. 4
			f. More than 4

6-11. What types of packaged foods did you purchase the last time you went shopping?

11	73	73	6. Cans
7	47	47	7. Frozen
7	47	47	8. Bottles
8	53	53	9. Jars
0	0	0	10. Dehydrated
9	60	60	11. Other

12. How often do food shoppers consider the amount of preservatives contained in packaged foods when making a purchase?

2	13	16	a. Always
5	33	42	b. Sometimes
0	0	0	c. Undecided
5	33	42	d. Rarely
0	0	0	e. Never

13. How often do food shoppers consider the amount of additives contained in packaged foods when making a purchase?

1	7	8	a. Always
4	27	33	b. Sometimes
2	13	17	c. Undecided
5	33	42	d. Rarely
0	0	0	e. Never

14. How often do food shoppers consider freezer storage space when making food purchasing decisions?

3	20	25	a. Always
5	33	43	b. Sometimes
1	7	8	c. Undecided
1	7	8	d. Rarely
2	13	6	3. Never

Abs. Freq.	Rel. Freq. %	Adj. Freq. %
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15. Which of the three packaged forms of chipped beef taste best to you?
  - a. Package number one
  - b. Package number two
  - c. Package number three
  
16. Which of the following describes how the retort packaged chipped beef tastes to you?
  - a. Very good
  - b. Good
  - c. Neutral
  - d. Bad
  - e. Very bad
  
17. Which of the following describes how the retort packaged chipped beef taste compared to the frozen chipped beef?
  - a. Much better
  - b. Better
  - c. Neutral
  - d. Worse
  - e. Much worse
  
18. Which of the following describes how the retort packaged chipped beef tastes compared to the chipped beef from a jar?
  - a. Much better
  - b. Better
  - c. Neutral
  - d. Worse
  - e. Much worse
  
19. Would you be willing to purchase retort packaged chipped beef if the price and serving size were the same as a jar of chipped beef?
  - a. Yes
  - b. Undecided
  - c. No
  
20. Would you be willing to purchase retort packaged chipped beef if the price and serving size were the same as frozen chipped beef?
  - a. Yes
  - b. Undecided
  - c. No

<u>Abs.</u> <u>Freq.</u>	<u>Rel.</u> <u>Freq.</u> %	<u>Adj.</u> <u>Freq.</u> %	
			21. Which of the following package forms of chipped beef would you prefer the most if they were the same serving size and price? a. Retort pouch b. Frozen c. Jar d. Other
10	67	67	22. Sex of the respondent a. Female
5	33	33	b. Male
			23. What is your age in years? a. 0-21 b. 21-30 c. 31-40 d. 41-50 e. 51-60 f. over 60
7	47	47	
5	33	33	
1	7	7	
2	13	13	
			24. What is your marital status? a. Not married b. Married c. Other
4	27	27	
10	67	67	
1	6	6	
			25. Are you currently employed? a. Yes, full time (40 hours week or more) b. Yes, part time (less than 40 hours) c. No d. Other
8	53	53	
6	40	40	
1	7	7	
			26. What is your total annual household income? a. \$0-\$10,000 b. \$10,001-20,000 c. \$20,001-30,000 d. \$30,001-40,000 e. \$40,001-50,000 f. Over \$50,000
3	20	20	
5	33	33	
4	27	27	
2	13	13	
1	7	7	

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