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# Seasonings and health consciousness : consumer perceptions

Marjaneh Ravai  
*San Jose State University*

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Ravai, Marjaneh, M.S.

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SEASONINGS AND HEALTH CONSCIOUSNESS:  
CONSUMER PERCEPTIONS

A Thesis

Presented to

The Faculty of the Department of  
Nutrition and Food Science  
San Jose State University

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

By

Marjaneh Ravai

May, 1989

APPROVED FOR THE DEPARTMENT OF NUTRITION AND  
FOOD SCIENCE

*Miriam Saltmarch*

---

Miriam Saltmarch, Ph.D., Graduate Advisor  
Department of Nutrition and Food Science

*Lucy M. McProud*

---

Lucy M. McProud, Ph.D., R.D., Dept. Chairman  
Department of Nutrition and Food Science

*David Kruegel*

---

Dave Kruegel, Ph.D., Committee Member  
Department of Marketing

APPROVED FOR THE UNIVERSITY

*Serena H. Stanford*

---

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## Abstract

A two-part study was conducted to investigate consumer perceptions of seasoning usage in relation to health parameters. The seasonings studied were: black pepper, nutmeg, cinnamon, oregano, garlic powder, garlic, and salt. The health parameters were: careful shopping, awareness of health and nutrition news, regular exercise, and health consciousness. Part one of the study was conducted at Bay Area Safeway supermarkets and part two was conducted at San Jose International Airport. Seasonings with significantly different responses from salt were ranked in descending order of health association: oregano, black pepper, and nutmeg. Garlic, garlic powder, and cinnamon were not associated with health parameters. Results of the study indicated that, in general, seasonings were perceived to be associated with health parameters to a greater degree than salt. However, it is important to consider the relationship of individual seasonings and health parameters as well as the overall relationship when the situation is analyzed.

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## Chapter 1

### INTRODUCTION

Clinical studies indicate that the role of sodium is controversial in hypertension. However, most authorities believe that moderation of salt intake to a relevant extent is justifiable (Singh, Singh, Mody, & Cameron, 1987). It has been suggested that consumers would accept a 50% reduction in the salt content of their diets (Wallace, Wellman, Dierkes, & Johnson, 1987). Salt-free versions of popular food products have always existed for individuals with dietary restrictions. However, consumers with no dietary restrictions have also increased their demands for low-salt products (Agnew, 1987; New Products Annual, 1987).

It would be useful for consumers to know that substitutes for salt exist and can be used with the same degree of ease and satisfaction. Numerous efforts have been made by the food industry to decrease salt consumption and increase usage of seasonings in order to add flavor to foods. However, it is still not known whether people are consciously responding to these efforts. Although seasonings are good substitutes for salt, many people only use them on special occasions or when the recipe calls for this use. Most people regard seasonings as flavoring agents that should be used in recipes along with salt in order to enhance the flavor of salt. However, no studies have

evaluated whether people indeed do associate seasoning usage with a healthy lifestyle.

There is little doubt that nutrition plays a major role in the long-term onset of chronic diseases. In the case of excessive sodium consumption, this could mean the development of such diseases as hypertension and cardiovascular disease. Although a direct relationship between sodium intake and hypertension has not yet been established, it would be beneficial to modify certain potentially hazardous dietary habits.

It is necessary to reemphasize the fact that Americans, in general, consume too much salt. Many people salt their food before even tasting it. Also, the majority of prepared foods are rich sources of sodium. Frequent consumption of these foods could lead to a high rate of nondiscretionary salt usage. Direct measures on a small sample of subjects have indicated that less than 10% of sodium intake is discretionary (Altschul & Grommet, 1982). Modification of discretionary salt usage along with measures taken by the food industry could help aid consumers in their efforts to reduce their sodium intake. Substituting seasonings for salt in foods could be the key to solving the problem of excessive sodium intake. It is necessary to conduct studies which give reliable feedback on consumer beliefs and practices regarding reduction of salt intake. The

information gathered could aid the food industry and the health professions in further consumer education and marketing efforts. This study will attempt to initiate and pave the path for future research in this area. It is essential that such a study be done, since without a knowledge of consumer perceptions, efforts to decrease sodium intake and increase seasoning usage will be futile.



## Chapter 2

### REVIEW OF LITERATURE

#### Introduction

Salt has been popular among people due to the taste and flavor that it imparts to foods. This would be apparent from an old Sanskrit proverb which says, "There are six flavors of food of which salt is the greatest" (Singh, Singh, Mody, & Cameron, 1987).

Concerns about dietary sodium intake are primarily related to health considerations. From the ancient times, salt has been known to be a health hazard (Singh et al., 1987). A relationship between dietary sodium intake and the development of hypertension has been proposed since antiquity (Luft, Myron, & Weinberger, 1982). Hypertension is known to be a primary factor in the onset of cardiovascular diseases. The development of thiazide diuretics--drugs that both facilitate renal sodium excretion and lower blood pressure--enhances the notion that hypertensives have an abnormal sodium balance (McCarron, Holly, & Morris, 1982). However, the identification of a relationship between salt intake and hypertension goes back to the earlier part of this century.

#### Sodium and Hypertension

In 1904, Ambard and Beaujard first identified a relationship between salt and blood pressure (Rubin &

Bladen, 1982). From their studies came the first recommendations for salt-free diets for hypertensives. By 1920, it was established that sodium caused water retention. Dahl (1972) gave epidemiological evidence associating the high incidence of raised blood pressure in different races, including Eskimos, Marshall Islanders, Americans, and Japanese, with a high dietary intake of salt. In 1979, the Surgeon General reported that a high dietary salt intake may produce high blood pressure, especially in susceptible people. This statement was supported by studies in genetically predisposed animals which show a cause-effect relationship between high salt intake and elevated blood pressure (Rubin & Bladen, 1982).

Today between 23-60 million Americans are hypertensive. It is hypothesized that an excessive dietary sodium intake contributes to the development of essential hypertension (Luft et al., 1982). The American diet and eating habits promote the consumption of sodium-rich foods and the use of salt in food preparations. Clinical studies in humans support the sodium hypothesis. The kidney's ability to excrete sodium and its sodium regulatory system are genetically determined (Luft et al., 1982). In hypertensive individuals, blood pressure is directly correlated with total body and exchangeable sodium, a relationship that increases with age. Although it has not been shown that

sodium restriction will prevent the development of hypertension in normal individuals, it is clear that sodium restriction is an important aspect of management (Luft et al., 1982). When high sodium intake combines with numerous personal and environmental characteristics it becomes a major factor in the etiology of hypertension.

#### Educational Programs and Initiatives

Several efforts have been made to educate the public about salt reduction. In 1979, the National High Blood Pressure Education Program (1979) attempted to bring health care providers and consumers the pertinent results of hypertension research in a format appropriate to their varied needs and roles in the community. The Food and Drug Administration (FDA) has also put out sodium reduction initiatives. The primary focus of these is the moderation of sodium content of the national food supply through mechanisms fostering increased consumer understanding (Forbes, 1982). Pietinen, Tanskanen, Nissinen, Tuomilehto, and Puska (1982) completed a 3 year salt project which evaluated the feasibility and the effects of salt reduction in a community in Eastern Finland. This involved the health education of the whole population and the hypertensive population, the training of health personnel, and environmental changes. They found no change in the salt knowledge index and the level of salt intake upon the

completion of the program. In other words, these educational programs have not been completely successful since they usually fail to recommend substitutes for salt. Also, since people have long depended on salt to enhance the flavor of their foods, they often associate lack of salt flavor with blandness.

#### Alternatives and Substitutes for Salt

Bearing in mind the steps that have been taken so far, the role of nutrition remains significant in the development of certain chronic diseases. It is essential for people who believe that they are sensitive to sodium or hypertensive to reduce their risk by restricting their sodium intake. There are two categories of sodium intake: a) discretionary, that amount of sodium intake controlled directly by the individual with a salt shaker either at the table or in the kitchen; and b) nondiscretionary intake, that which comes from the food purchased for home use or in a restaurant (Altschul & Grommet, 1982). These are partly artificial distinctions because it might be argued that all sodium intake is discretionary since anyone can determine which foods to eat. But the decisions are more difficult. It is easier to use or not to use the salt shaker than to decide to forego such popular foods as bread, cheese, processed meat, soup, or pickles.

Seasonings such as spices and herbs offer hope to those who want to season their foods while they forego salt. Seasoning manufacturers are trying to increase the use of basic seasonings such as garlic powder in the midst of a heated exotic seasonings market (New Products Annual, 1987). People have started to prepare spicier foods and there is an increase in low-sodium foods (Agnew, 1987; New Products Annual, 1987). Sodium-free seasoning blends with no salt, MSG, sugar, additives, or preservatives have been introduced. These are examples of the efforts made by the food industry to facilitate consumers' choices. Although sales figures may show an increase in seasonings sales, the degree to which this increase is related to a conscious effort on the part of the consumers to increase their orientation towards personal health has not been determined. In other words, it is not known whether consumers choose seasonings as healthy substitutes for salt in an effort to reduce their sodium intake. Thus, there is an immediate need to increase the body of knowledge in this area by conducting studies which provide a better understanding of consumers' perceptions of seasoning usage in view of a reduction in salt intake. It is essential that such studies be done since without a knowledge of consumer perceptions, efforts to promote sodium reduction and seasoning usage may fail. This study was done to fulfill the need for increased

knowledge in this area. The data generated by this study could make a significant contribution to the existing body of knowledge regarding sodium reduction. This study would be the first study which deals with consumers' perceptions of the health consciousness of individuals who use seasonings.

#### Projective Measuring Techniques and Substitutes for Salt

One in-depth way to measure consumers' perceptions of seasoning usage and sodium reduction, is to utilize a design based on projective measuring techniques. Basically, a projective technique involves presenting an individual consumer with an ambiguous stimulus--one that does not make sense in itself--and asking the individual to make sense of it (Haire, 1950). In order to make sense of it, the individual will have to add to it and fill out the picture. In so doing, one has to project oneself into the situation. Since the researcher knows what was in the original stimulus, the researcher can quite easily identify the parts that were added, and in this way painlessly obtain information about the person.

Projective techniques have long been used by clinical psychologists in order to uncover patients' motivations. These motivations are of importance to the process of cure. The development of projective techniques as diagnostic tools

has been one of the most useful means to uncover such motivations. The market-researcher has borrowed the essentials of these techniques from the therapists.

Projective techniques are useful since it has been proposed that when a consumer is approached directly with questions about the consumer's reaction to a product, the consumer often gives false or misleading answers to these questions (Haire, 1950). Such answers are given since people believe that their responses reveal what kind of person they are like. In effect, when one asks questions about a product one is often asking also about the respondent. The answers to these questions will carry cliches and stereotypes, blocks, inhibitions, and distortions, whenever an area that challenges one's idea of oneself is approached. Often the respondent gives incorrect answers to questions because the interviewer-respondent relationship puts a good deal of pressure on the respondent to reply and to make sense in the reply. Therefore, the person gives stereotypical answers that use cliches which are often commonly acceptable but are not representative of the person's true motives. In other cases, the respondents may be unaware of certain motives that may exist. They may relate certain products to other aspects or values in their lives, yet they may be unable to describe these relationships in response to a direct question. It is

essential to uncover these motives and one way to arrive at them is through projective techniques.

Haire (1950) used such a technique in a conventional survey design to measure attitudes towards Nescafe, an instant coffee. He wanted to know if there was a negative sanction in the society against housewives who used instant coffee (Nescafe) versus drip coffee. For the purposes of experiment, a conventional survey was made of attitudes toward Nescafe, an instant coffee (Haire, 1950). The questionnaire asked the respondents whether or not they used instant coffee. If they did not use instant coffee, they were asked to give their reasons. The majority of the respondents who gave unfavorable responses said they did not like the flavor. However, this could be a stereotypical response which could have been used to get rid of the interviewer. To get at the respondents' interior motives, Haire used an indirect approach (the projective measuring technique). He prepared two identical shopping lists. The only item that differed in the two lists was the type of coffee. One list had Maxwell House Coffee (drip ground) and one list had Nescafe Instant Coffee. Haire's shopping lists are presented in Table 1.



Table 1

Haire's Shopping Lists

Shopping List I	Shopping List II
Pound and a half of hamburger	Pound and a half of hamburger
2 loaves Wonder bread	2 loaves Wonder bread
Bunch of carrots	Bunch of carrots
1 can Rumford's Baking Powder	1 can Rumford's Baking Powder
Nescafe Instant Coffee	1 lb. Maxwell House Coffee (drip)
2 cans Del Monte peaches	2 cans Del Monte peaches
5 lbs. potatoes	5 lbs. potatoes

Note: From "Projective Techniques in Marketing Research" by M. Haire, 1950.

The questionnaires were administered to alternate subjects, with no subject knowing of the existence of the other list. The respondents were asked to read the shopping lists and project themselves into the shopping situation as far as possible until they could more or less characterize the woman who bought the groceries. The respondents had to assume that the shopper was a housewife, since the study intended to measure a housewife's attitude towards Nescafe

and drip coffee. They were then asked to write a brief description of her personality.

The results were interesting. The respondents described the woman who used instant coffee as lazy, spendthrift, a poor wife, and a poor planner. Those who rejected instant coffee in the original direct questionnaire had blamed its flavor. However, their dislike could be due to a fear of being seen by others in the role they projected onto the Nescafe woman in the description. When asked directly, the respondents felt uncomfortable in saying that they did not use Nescafe because people will think they are lazy and not good housewives. The data from the projective technique showed that the feeling associating Nescafe usage with laziness was there. These feelings in turn affected the buying habits of the shoppers.

Thus, by using the projective measuring technique, Haire had succeeded in getting to the respondents' interior motives. This was not possible in the conventional survey since the respondents hid their true feelings and motives behind stereotypical answers. Thus, the use of projective techniques provides the investigator with a valid tool for getting true and unbiased answers to the research questions. Webster and Pechman (1970) replicated Haire's shopping list study. Their null hypothesis was that the differences between the "Maxwell House" housewife and the "Nescafe"

housewife which Haire identified in 1950 would not be found in 1968. Their hypothesis was based on the fact that convenience foods in general and instant coffee in particular have become much more acceptable to the American housewife. The researchers attempted to duplicate Haire's methodology as closely as possible. They delivered the questionnaires (same questionnaires as Haire's) to a sample of urban and suburban housewives in Hartford, Connecticut.

The results of the Webster and Pechman (1970) study confirmed the researchers' null hypothesis. There were no significant differences between characteristics ascribed to the Maxwell House shopper and those for the Nescafe shopper in 1968. The researchers explained their results by noting that convenience foods enjoyed a larger degree of acceptance in the late 1960s than they did in early 1950s. By replicating Haire's projective techniques, the researchers were able to obtain similar response categories. Thus, they were able to use the projective techniques as a valid tool to test their hypothesis.

The projective measuring technique was used to measure consumer perceptions of seasoning usage in the following study. The reliability of the projective measuring technique allowed the researcher to replicate Haire's methodology as closely as possible. The validity of this

technique enabled the researcher to obtain unbiased and true responses to the research questions.

## Chapter 3

### METHODS AND MATERIALS

#### Variables and Hypotheses

This study was concerned with consumer perceptions. The central question was whether consumers perceive that seasoning usage was associated with various practices fostering personal health. This study was particularly concerned with perceptions about seasoning usage in lieu of salt. For instance, the researcher sought to answer the question: "Do people believe that persons who use seasonings instead of salt are more concerned about their health?"

The study had two sets of variables. One set of four variables related to personal health practices. They were: health consciousness, regular exercise, health awareness, and careful shopping. The second set of variables was concerned with usage of six seasonings: black pepper, garlic powder, garlic, nutmeg, cinnamon, and oregano.

This study was descriptive, not causal. For example, the study did not seek to demonstrate that health consciousness caused seasoning usage or vice versa. The objective was only to determine whether correlations among perceptions existed.

This study had four guiding hypotheses:

1. Health consciousness is associated with seasoning usage;
2. Awareness of health and nutrition news is associated with seasoning usage;
3. Regular exercise is associated with seasoning usage; and
4. Careful shopping (reading of food product labels) is associated with seasoning usage.

Each of the preceding hypotheses was tested for the six individual seasonings: black pepper, garlic powder, garlic, nutmeg, cinnamon, and oregano. In addition, an aggregate analysis is presented. In this analysis, the same set of four health related variables were tested for cinnamon and garlic.

#### Research Tool

Haire's projective measuring technique (Haire, 1950) was used in this study to measure shoppers' perceptions of seasoning usage and its association with health consciousness. The study intended to find out if a correlation existed between seasoning usage and health consciousness. An experimental design was used. Seven identical shopping lists were prepared. The only item that differed in each list was the specific seasoning. Each list was followed by four yes/no questions measuring health

related variables. Samples of the questionnaires are included in Appendices B through H. A pretest of 50 people was conducted at the Foster City Safeway supermarket location to test the validity of the questionnaires. The intent was to find out, if in fact people associated the health related variables chosen by the researcher with health measures. The respondents were able to answer the questions with ease and no one expressed any confusion about the nature of the questions.

#### Health Related Variables

The health related variables were: careful shopping, awareness of health and nutrition news, regular exercise, and health consciousness. They were operationally measured by presentation on the questionnaires (see Appendices B-H).

The operational indicator for careful shopping was question 1: "I'd guess this person is a careful shopper (i.e. reads product information on labels)." The operational indicator for regular exercise was question 2: "I'd guess this shopper exercises regularly." The operational indicator for awareness of health and nutrition news was question 3: "I'd guess this shopper is aware of health and nutrition news." The operational indicator for health consciousness was question 4: "I'd guess this shopper is health conscious."

### Seasoning Usage Variables

Six seasonings other than salt were studied. These were garlic powder, garlic, nutmeg, cinnamon, black pepper, and oregano. These particular seasonings were selected because they represent various classes of seasonings. Garlic powder and garlic are condiments; black pepper, cinnamon, and nutmeg are spices; and oregano is an herb. Also, care was taken to select seasonings with which people are familiar.

The seasoning usage variables were the individual seasonings: black pepper, garlic powder, garlic, oregano, cinnamon, and nutmeg. These were operationally measured by inclusion in the shopping lists. Garlic and cinnamon were used to test the reliability of measurement of seasoning usage variables. The intention was to find out whether consumers would respond differently if garlic instead of garlic powder were included in the shopping lists, and if cinnamon instead of nutmeg were included in the shopping lists.

### Survey Population and Methods

This study was conducted in two parts. In part one of the study, four seasonings other than salt were studied. These were black pepper, garlic powder, nutmeg, and oregano. The population of the first survey consisted of 200 supermarket shoppers in the Bay Area, specifically at



Safeway supermarkets in Fremont, San Jose, Berkeley, and Foster City. These store locations were chosen because they shared some basic demographic characteristics. General demographics information was obtained from the Chamber of Commerce of each city. In terms of location, the stores were all located in light industrial areas (i.e., no heavy manufacturing industries were in the immediate vicinity). In terms of income, the average mean incomes of households were similar but somewhat higher for the San Jose and Foster City locations than for the Fremont and Berkeley locations. The level of education in the four areas did differ with the Berkeley population having the highest level of the four locations (due to the proximity to UC Berkeley). The Foster City and San Jose locations had highly educated shoppers, while the shoppers at Fremont had an average level of education. The selection of these locations limited the study's conclusions to those metropolitan areas in the United States which have similar demographic characteristics.

The Safeway supermarkets were the only supermarkets which allowed surveys to be conducted in their stores. Permission was obtained from their headquarters at Fremont. A copy of the letter which was sent to them is included in Appendix A. Fifty people were surveyed at each location. The population consisted of both male and female shoppers

ranging in age from 18 to 70 years old. The 200 questionnaires were distributed such that 50 people were surveyed at each location. Five questionnaires containing either salt or one of the other seasonings were distributed such that 10 people responded to each of the 5 questionnaires at each location. In total, 40 people responded to each seasoning questionnaire. Upon entering the supermarket, the researcher would choose a location in the store with heavy traffic. The passing shoppers were approached at random and asked to fill out a brief questionnaire. The questionnaires were distributed such that the first shopper would receive the "salt" questionnaire; the second would receive the "black pepper" questionnaire; the third would receive the "nutmeg" questionnaire; the fourth would receive the "oregano" questionnaire; and the fifth would receive the "garlic powder" questionnaire. This pattern was repeated until the sufficient number of questionnaires (50) was completed at each location. Also, it must be noted that the shoppers were unaware that different versions of the questionnaire existed. Thus, they thought that their questionnaire was identical to the next shopper's. After the completion of each questionnaire the age and sex of the shopper was recorded on the questionnaire. The age of the shopper was

estimated, since it was judged to be personal information the shopper might not wish to share with the investigator.

The second phase of the study was conducted at San Jose International Airport with a test population of 100 people. This was an auxiliary test (thus a smaller test population), the purpose of which was to measure the reliability of the seasoning usage variables. The intent was to determine whether shoppers would respond differently if garlic powder were replaced with garlic and if nutmeg were replaced with cinnamon in the shopping lists. For the purposes of comparison, salt, nutmeg, cinnamon, garlic, and garlic powder were included in this test. Thus, five different questionnaires were distributed at random (see distribution techniques above) among the respondents at the airport. In total, 20 people responded to each seasoning questionnaire.

#### Statistical Analysis of Results

Data were analyzed using tests of significance. Specifically, sampling statistics were used to compare differences between the observed percentages at a 95% level of confidence. The percentages of shoppers who responded positively to each of the four questions were calculated. The positive responses for each of the seasonings were compared to those for salt. The following statistical formula has been suggested for comparing two observed percentages by Boyd, Westfall, and Stasch (1981).

In the first step the standard error was calculated:

$$S \text{ difference} = \sqrt{s_a^2 + s_b^2}$$

where

$S \text{ difference}$  = Estimated standard error of the difference.

$S_a$  = Estimated standard of error percentage a.

$S_b$  = Estimated standard error of percentage b.

The formula for the estimated standard error of a percentage is

$$S_p = \sqrt{\frac{pq}{n}}$$

Substituting this formula into the previous equation results in:

$$S_p = \sqrt{\frac{p_a q_a}{n_a} + \frac{p_b q_b}{n_b}}$$

The observed difference can be translated into an equivalent number of standard errors using the relationship:

$$Z = \frac{\text{one \%} - \text{other \%}}{S_{\text{difference}}}$$

Appendix I shows different confidence intervals and their corresponding Z values. The obtained Z values can be looked up in Appendix I to see if the differences are significant at the 95% confidence level.

## Chapter 4

### RESULTS AND DISCUSSION

The results of the study were categorized according to the particular seasonings. The answers to the four health related questions were statistically analyzed for each individual seasoning. These analyses were used to accept or reject the proposed study hypotheses.

#### Black Pepper

The four health related hypotheses concerning black pepper were: a) careful shopping is associated with black pepper usage; b) regular exercise is associated with black pepper usage; c) awareness of health and nutrition news is associated with black pepper usage; and d) health consciousness is associated with black pepper usage.

The responses for black pepper and salt questionnaires from the four Safeway locations were summarized in Table 2. The first question asked whether the person was a careful shopper. The difference between the answers for black pepper and salt questionnaires was 25%. This was a significant difference at the 95% confidence level. Thus, the respondents rated the black pepper shopper as a significantly more careful shopper than the salt shopper. The second question asked whether the shopper exercised regularly. The difference between the black pepper and salt responses was 17%. This was not a significant difference at

Table 2

Percentage of "Yes" Responses for Black Pepper and Salt  
Questionnaires at the Four Safeway Locations

Question	Black Pepper Percent "Yes" Response n = 40	Salt Percent "Yes" Response n = 40	Difference	Z-Value
Careful Shopping	67	42	25 <sup>a</sup>	2.42
Regular Exercise	62	45	17	1.55
Awareness of Health & Nutrition News	70	50	20	1.87
Health Consciousness	72	42	30 <sup>a</sup>	2.84
Mean Perception of Health	68	45	23 <sup>a</sup>	2.13

<sup>a</sup>Differences between responses are significant at the 95% confidence level.

the 95% confidence level. For the third question, which asked whether the person was aware of health and nutrition news, there was a 20% difference between the responses for black pepper and salt questionnaires. Again, this was not a significant difference at the 95% confidence level. The fourth question asked about the health consciousness of the shopper. The difference between the black pepper and salt responses was 30%. This difference was significant, at the

95% confidence level. The fifth statistic analyzed for black pepper versus salt was an aggregate measure of product perception. The "mean perception of health" was the simple average of percentage responses for careful shopping, regular exercise, awareness of health and nutrition news, and health consciousness. For black pepper, the mean perception of health was the average of 67, 62, 70, and 72 percent or 68 percent.

The mean health perception for black pepper, 68%, was compared to the mean health perception for salt, 45%. The difference of 23% was statistically significant.

In summary, for the black pepper versus salt comparison, 3 of 5 measures indicated that use of black pepper was positively associated with health related variables.

#### Nutmeg

The four hypotheses concerning nutmeg were as follows:

- a) careful shopping is associated with nutmeg usage;
- b) regular exercise is associated with nutmeg usage;
- c) awareness of health and nutrition news is associated with nutmeg usage; and
- d) health consciousness is associated with nutmeg usage.

The data obtained from questionnaires which contained nutmeg and those which contained salt from the four Safeway locations were summarized in Table 3. Analysis of the

results showed that 4 of the 5 health-perception measures were positively associated with nutmeg usage.

Table 3

Percentage of "Yes" Responses to Nutmeg and Salt Questionnaires at Safeway Supermarkets

Question	Nutmeg Percent "Yes" Response n = 40	Salt Percent "Yes" Response n = 40	Difference	Z-Value
Careful Shopping	75	42	33 <sup>a</sup>	3.18
Regular Exercise	55	45	10	0.90
Awareness of Health & Nutrition News	75	50	25 <sup>a</sup>	2.39
Health Consciousness	75	42	33 <sup>a</sup>	3.18
Mean Perception of Health	70	48	22 <sup>a</sup>	2.05

<sup>a</sup>Differences between responses are significant at the 95% confidence level.

Cinnamon/Nutmeg

The four hypotheses concerning cinnamon were:

- a) careful shopping is associated with cinnamon usage;
- b) regular exercise is associated with cinnamon usage;
- c) awareness of health and nutrition news is associated with cinnamon usage; and
- d) health consciousness is associated with cinnamon usage.



Table 4 shows the data for cinnamon and salt questionnaires at San Jose International Airport. These questionnaires were administered at the San Jose International Airport as part of an auxiliary survey test. This test was conducted to determine whether substituting cinnamon for nutmeg in the questionnaires would have altered the results of the study. Twenty people received the cinnamon questionnaire; 20 received the nutmeg questionnaire; and 20 received the salt questionnaire. The questionnaires were distributed at random among the respondents (see section on Survey Population and Methods).

Question one asked whether the person was a careful shopper. The difference between the responses was 15%. This difference was not significant at the 95% confidence level. The second question asked whether the person exercised regularly. The difference between the responses was 15%. Again, this difference was not significant at the 95% level of confidence. The third question asked about the person's awareness of health and nutrition news. The difference between the responses was 15%. This difference was not significant at the 95% level of confidence. The last question asked whether the person was health conscious. The difference between the responses was 25%. This difference was not significant at the 95% level of confidence. The mean health perception for cinnamon, 69%,

was compared to the mean health perception for salt, 44%. The difference of 25% was not statistically significant.

Thus, the results showed that none of the health-perception measures was positively associated with cinnamon usage. It must be noted that although the differences between the cinnamon and salt responses were big, they were not statistically significant due to the small sample size of the airport study ( $n = 20$  for each seasoning).

The responses for nutmeg and salt questionnaires from San Jose International Airport were illustrated in Table 5. The same four hypotheses that were listed above for cinnamon applied in the case of nutmeg, too. The only difference was that nutmeg was substituted for cinnamon in the hypotheses' statements.

Table 4

Percentage of "Yes" Responses for Cinnamon and Salt  
Questionnaires at San Jose International Airport

Question	Cinnamon Percent "Yes" Response n = 20	Salt Percent "Yes" Response n = 20	Difference	Z-Value
Careful Shopping	65	40	25	1.64
Regular Exercise	65	40	25	1.64
Awareness of Health & Nutrition News	75	50	25	1.69
Health Consciousness	70	45	25	1.65
Mean Perception of Health	69	44	25	1.65

Table 5

Percentage of "Yes" Responses for Nutmeg and Salt  
Questionnaires at San Jose International Airport

Question	Nutmeg Percent "Yes" Response n = 20	Salt Percent "Yes" Response n = 20	Difference	Z-Value
Careful Shopping	75	40	35 <sup>a</sup>	2.39
Regular Exercise	70	40	30 <sup>a</sup>	2.00
Awareness of Health & Nutrition News	80	50	30 <sup>a</sup>	2.10
Health Consciousness	75	45	30 <sup>a</sup>	2.03
Mean Perception of Health	75	44	31 <sup>a</sup>	2.10

<sup>a</sup>Differences between responses are significant at the 95% confidence level.

The data showed that all five of the health-perception measures were positively associated with nutmeg usage.

The results of the cinnamon and nutmeg questionnaires at San Jose International Airport were summarized in Table 6. The differences between the responses to the cinnamon and nutmeg questionnaires were insignificant at the 95% confidence level for all the four questions. Thus, it was concluded that people perceived the differences between the two seasonings as insignificant. However, in relation to

salt, significant differences existed between these two seasonings in terms of consumer perceptions. That is, people perceived nutmeg usage as having a significantly higher degree of association with health related variables than salt usage. However, people's perceptions of cinnamon usage in relation to health related variables were not significantly different than those of salt usage.

This difference in response pattern could be due to the fact that most people tend to associate cinnamon with baking, and since most of the baked products (cakes, cookies, etc.) are considered high fat and high sugar items, people think of them as unhealthy products. Nutmeg is also used in baking but people could tend to also associate it more with gourmet foods and often more delicate recipes.

The other interesting finding was that the airport responses to the nutmeg questionnaires closely resembled the responses obtained at the four Safeway locations. With the exception of the second question on regular exercise, the response patterns for the airport and Safeway locations were identical. This finding reinforced the validity of the second test (conducted at the airport) in comparison to the first test (conducted at the four Safeway locations).

Table 6

Percentage of "Yes" Responses for Nutmeg and Cinnamon  
Questionnaires at San Jose International Airport

Question	Nutmeg Percent "Yes" Response n = 20	Cinnamon Percent "Yes" Response n = 20	Difference	Z-Value
Careful Shopping	75	65	10	0.69
Regular Exercise	70	65	5	0.34
Awareness of Health & Nutrition News	80	75	5	0.38
Health Consciousness	75	70	5	0.35
Mean Perception of Health	75	69	6	0.42

#### Oregano

The four hypotheses concerning oregano were as follows:

- a) careful shopping is associated with oregano usage;
- b) regular exercise is associated with oregano usage;
- c) awareness of health and nutrition news is associated with oregano usage; and
- d) health consciousness is associated with oregano usage.

The data obtained from questionnaires which contained oregano and those that contained salt from the four Safeway locations were summarized in Table 7. Analysis of the

results showed that four of the five health-perception measures were positively associated with oregano usage.

Table 7

Percentage of "Yes" Responses for Oregano and Salt  
Questionnaires at Safeway Supermarkets

Question	Oregano Percent "Yes" Response n = 40	Salt Percent "Yes" Response n = 40	Difference	Z-Value
Careful Shopping	57	42	15	1.36
Regular Exercise	80	45	35 <sup>a</sup>	3.47
Awareness of Health & Nutrition News	85	50	35 <sup>a</sup>	3.60
Health Consciousness	82	42	40 <sup>a</sup>	4.04
Mean Perception of Health	76	45	31 <sup>a</sup>	2.99

<sup>a</sup>Differences between responses are significant at the 95% confidence level.

Garlic Powder

The four hypotheses related to garlic powder were as follows: a) careful shopping is associated with garlic powder usage; b) regular exercise is associated with garlic powder usage; c) awareness of health and nutrition news is associated with garlic powder usage; and d) health consciousness is associated with garlic powder usage.

The data obtained from the questionnaire which contained garlic powder and salt from the four Safeway locations were summarized in Table 8. The results showed that none of the health-perception measures were positively associated with garlic powder usage.

Table 8

Percentage of "Yes" Responses to Garlic Powder and Salt Questionnaires at Safeway Supermarkets

Question	Garlic Powder Percent "Yes" Response n = 40	Salt Percent "Yes" Response n = 40	Difference	Z-Value
Careful Shopping	55	42	13	1.17
Regular Exercise	55	45	10	0.90
Awareness of Health & Nutrition News	60	50	10	0.90
Health Consciousness	62	42	20	1.83
Mean Perception of Health	58	45	13	1.17

Garlic/Garlic Powder

The responses for the questionnaires which contained garlic and those which contained salt were summarized in Table 9. These questionnaires were administered at San Jose International Airport as part of an additional survey test.



This test was conducted in order to determine whether or not substituting garlic for garlic powder would have altered the results of the study. The questionnaires were distributed in the same random fashion as described previously (see section on Survey Population and Methods).

Table 9

Percentage of "Yes" Responses for Garlic and Salt Questionnaires at San Jose International Airport

Question	Garlic Percent "Yes" Response n = 20	Salt Percent "Yes" Response n = 20	Difference	Z-Value
Careful Shopping	65	40	25	1.64
Regular Exercise	60	40	20	1.29
Awareness of Health & Nutrition News	70	50	20	1.32
Health Consciousness	65	45	20	1.30
Mean Perception of Health	65	44	21	1.36

Twenty people received the garlic questionnaire; 20 received the garlic powder questionnaire; and 20 received the salt questionnaire.

The four hypotheses concerning garlic were: a) careful shopping is associated with garlic usage; b) regular

exercise is associated with garlic usage; c) awareness of health and nutrition news is associated with garlic usage; and d) health consciousness is associated with garlic usage.

The results showed that none of the health-perception measures were positively associated with garlic usage.

The responses for garlic powder and salt questionnaires at San Jose International Airport were summarized in Table 10. The same four hypotheses mentioned for garlic were made for garlic powder. Analysis of the results showed that none of the health-perception measures was positively associated with garlic powder usage. Also, the responses for garlic powder questionnaires obtained at the four Safeway locations and those obtained at San Jose International Airport were similar. This finding confirmed the validity of the test conducted at the airport.

Table 11 shows the results of the garlic and garlic powder questionnaires at San Jose International Airport. The differences between the responses were insignificant for all of the questions. Thus, it was concluded that the differences in people's perceptions of garlic and garlic powder in relation with health related variables were insignificant. Hence, the results showed that the inclusion of either garlic or garlic powder in the shopping lists would not have altered the response patterns.

Table 10

Percentage of "Yes" Responses for Garlic Powder and Salt  
Questionnaires at San Jose International Airport

Question	Garlic Powder Percent "Yes" Response n = 20	Salt Percent "Yes" Response n = 20	Difference	Z-Value
Careful Shopping	60	40	20	1.29
Regular Exercise	60	40	20	1.29
Awareness of Health & Nutrition News	65	50	15	0.97
Health Consciousness	60	45	15	0.96
Mean Perception of Health	61	44	17	1.09

Table 11

Percentage of "Yes" Responses for Garlic and Garlic Powder  
Questionnaires at San Jose International Airport

Question	Garlic Percent "Yes" Response n = 20	Garlic Powder Percent "Yes" Response n = 20	Difference	Z-Value
Careful Shopping	65	60	5	0.33
Regular Exercise	60	60	0	0
Awareness of Health & Nutrition News	70	65	5	0.34
Health Consciousness	65	60	5	0.33
Mean Perception of Health	65	61	4	0.36

#### Health Perceptions by Site

The results in Tables 2 through 10 indicated variable responses to different questions based on the type of seasoning. An analysis based on demographics was conducted in order to determine whether location could influence the responses to different questions. The results from the overall seasoning analysis based on location were summarized in Table 12.

The results showed that in general the response patterns for the Foster City, Fremont, and San Jose

supermarkets were similar. Although individual variations existed among the four health-related questions, the responses to the overall mean perception of health showed that the results obtained at the Berkeley location were very different from those obtained at the Foster City, Fremont, and San Jose locations.

Table 12

Overall Percentages of "Yes" Responses for all the Seasonings Based on Supermarket Location

	Berkeley Percent "Yes" Response n = 40	Foster City Percent "Yes" Response n = 40	Fremont Percent "Yes" Response n = 40	San Jose Percent "Yes" Response n = 40
Careful Shopping	40	80	80	80
Regular Exercise	70	70	60	50
Awareness of Health & Nutrition News	50	80	70	80
Health Consciousness	50	80	70	90
Mean Perception of Health	52	78	70	75

This response pattern was interesting because the shoppers at the Berkeley location were the most highly educated among the four locations while their mean income was the lowest. This pattern of response could be explained

in two ways. The first explanation is that this high level of education might in fact have been the dominant factor responsible for their responses. That is, they might have thought of seasoning usage as a minor factor in relation to health. Other practices such as reduction of fat intake and regular check ups might be more important to them. Also, the population at Berkeley might have considered seasonings as "unnatural." That is, they might have thought of seasonings more in terms of processed products. This perception would in turn limit their usage by this population. The second explanation could be that seasoning usage cannot be correlated with the level of education, rather it may have to do with a combination of factors such as income and education (the shoppers at Foster City, Fremont, and San Jose were all middle to high income and relatively well educated). Income could be a factor since seasonings could be considered a luxury or an extra item to many people; hence, spending money on them would be wasteful if the person can get the same flavor out of salt.

#### Overall Seasoning Analysis Versus Salt

An overall analysis of all the positive responses for the six seasonings (black pepper, nutmeg, garlic powder, garlic, cinnamon, and oregano) and salt at the four Safeway locations and San Jose International Airport was conducted. The results are shown in Table 13. For all six seasonings,

there were significant differences from the salt responses. This meant that in general, seasoning usage was associated with health practices to a greater degree than was salt usage. This was an encouraging finding. Although consistent patterns among the various health related variables and different seasonings were not detected, a general pattern of perceiving greater health consciousness was observed. These results could serve as basis for further inquiry in this area.

Table 13

Percentages of Overall "Yes" Responses for All Seasonings  
Versus Salt from the Four Safeway Locations and San Jose  
International Airport

Question	All Seasonings Percent Response n = 240	Salt Percent "Yes" Response n = 60	Difference	Z-Value
Careful Shopping	75	42	33 <sup>a</sup>	4.74
Regular Exercise	63	43	20 <sup>a</sup>	2.81
Awareness of Health & Nutrition News	72	50	22 <sup>a</sup>	3.11
Health Consciousness	71	43	31 <sup>a</sup>	3.98
Mean Perception of Health	70	44	26 <sup>a</sup>	3.68

<sup>a</sup>Differences between responses are significant at the 95% confidence level.

#### Seasoning Ranking

The seasonings which had significantly different mean perceptions of health from salt were ranked in descending order of health association in Table 14. As shown in the table, oregano was ranked the highest in terms of health association, followed by black pepper and nutmeg.



Table 14

Seasonings Ranked in Descending Order of Health Association:  
Supermarket and Airport Samples

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Seasoning	Difference Between Seasonings and Salt Mean Perceptions of Health
Oregano	31
Black Pepper	23
Nutmeg	22

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## Chapter 5

### CONCLUSIONS/IMPLICATIONS

This study has provided valuable data in terms of consumer perceptions of seasoning usage. The methodology allowed the researcher to ask questions which provided unbiased answers, representative of the inner motives of the respondents. The study generated very useful data, which indicated that, in general, consumers associated seasoning usage with health related measures. Particularly, oregano, black pepper, and nutmeg were ranked in descending order of health association. It is also important that cinnamon, garlic, and garlic powder were not associated with health related variables. These data have important implications for various sectors of the society.

The food industry could use these results to increase, direct, and organize its advertising and promotion efforts. According to the results of this study, the oregano, black pepper, and nutmeg producers are in a better position than the garlic, garlic powder, and cinnamon producers. Those seasonings which were not perceived as significantly different from salt need greater and better promotion campaigns. For example, it is a common belief that people, in general, associate garlic with health. However, the results of this study showed the contrary. Thus, garlic producers need to be aware that consumers' perceptions could

change and they should not take people's acceptance of their product for granted. Instead, they need to direct and increase their campaign towards the health conscious consumers by restating the benefits of their product. The same strategy could work for the garlic powder and cinnamon producers. Although these are both well-known and common seasonings, consumers need to be reminded of their health-related qualities in order to use them as salt substitutes.

The country's health educators could use the results of this study, encouraging people to use seasonings, especially oregano, black pepper, and nutmeg in lieu of salt. Consumers need to be reminded of seasonings and flavorful and easy salt substitutes. Efforts to educate the public about the characteristics, applications, and benefits of seasonings could be positively affected by the results of this study.

Consumers could also benefit from the generated data. These data could increase the public's awareness of the way different seasonings were perceived by other people. Consumers could also use these results to increase their consumption of certain seasonings (those which were highly associated with health measures) in order to enhance their health orientation.

Future research is needed in this area. A larger sample size and more varied demographics would allow making

generalizations to the whole United States population. Also, studying additional seasonings, varying the health related variables and questions, and conducting the survey at a location other than a supermarket are potential variations that could be considered by future researchers. For example, locations such as airports and train stations would be ideal for this study since a varied and nationally mixed survey sample is readily available. Also, obtaining more specific demographic information from the individual respondents, such as ethnic background, could be beneficial.

In conclusion, the seasoning industry, consumers, and country's health educators could use the results of this study to increase seasoning usage in lieu of salt. This study has paved the way for future research in this area. Hopefully, with increased efforts and initiatives on the part of those who are positively affected by decreased salt usage (which would be all of us), better and readily available salt substitutes such as seasoning will gain a dominant place on everyone's shopping list.

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APPENDIX A  
COVER LETTER SENT TO SAFEWAY  
HEADQUARTERS AT FREMONT



APPENDIX A  
COVER LETTER SENT TO SAFEWAY  
HEADQUARTERS AT FREMONT

Marjaneh Ravai is a graduate student in Food Science at San Jose State University. She is conducting a research project in order to complete her thesis. She needs consumer data related to spice usage and awareness. There is a short questionnaire that she would like your shoppers to fill out. This questionnaire will not reflect any information related to your store and its merchandise. Would you please kindly allow her to spend some time in your store so that she can obtain her data.

If you have any questions, please do not hesitate to call Dr. Miriam Saltmarch, professor of Food Science at San Jose State University at (408) 924-3107. Thank you very much for your cooperation and understanding.

Cordially yours,

Miriam Saltmarch, Ph.D.  
Associate Professor  
San Jose State University

APPENDIX B  
BLACK PEPPER SHOPPING LIST

## APPENDIX B

## BLACK PEPPER SHOPPING LIST

PLEASE READ THE FOLLOWING SHOPPING LIST. THEN ANSWER AS BEST AS YOU CAN THE FOUR QUESTIONS ABOUT THE SHOPPER.

SHOPPING LIST

Chicken

Mushrooms

Black Pepper

Coffee

Cookies

Yogurt

1. I'd guess this person is a careful shopper (i.e., reads product information on labels).  Yes  No
2. I'd guess this shopper exercises regularly.  
 Yes  No
3. I'd guess this shopper is aware of health and nutrition news.  Yes  No
4. I'd guess this shopper is health conscious.  
 Yes  No

THANK YOU VERY MUCH!

APPENDIX C  
GARLIC POWDER SHOPPING LIST

## APPENDIX C

## GARLIC POWDER SHOPPING LIST

PLEASE READ THE FOLLOWING SHOPPING LIST. THEN ANSWER AS  
BEST AS YOU CAN THE FOUR QUESTIONS ABOUT THE SHOPPER.

SHOPPING LIST

Chicken

Mushrooms

Garlic Powder

Coffee

Cookies

Yogurt

1. I'd guess this person is a careful shopper (i.e., reads product information on labels).  Yes  No
2. I'd guess this shopper exercises regularly.  
 Yes  No
3. I'd guess this shopper is aware of health and nutrition news.  Yes  No
4. I'd guess this shopper is health conscious.  
 Yes  No

THANK YOU VERY MUCH!

APPENDIX D  
NUTMEG SHOPPING LIST

## APPENDIX D

## NUTMEG SHOPPING LIST

PLEASE READ THE FOLLOWING SHOPPING LIST. THEN ANSWER AS BEST AS YOU CAN THE FOUR QUESTIONS ABOUT THE SHOPPER.

SHOPPING LIST

Chicken

Mushrooms

Nutmeg

Coffee

Cookies

Yogurt

1. I'd guess this person is a careful shopper (i.e., reads product information on labels).  Yes  No
2. I'd guess this shopper exercises regularly.  
 Yes  No
3. I'd guess this shopper is aware of health and nutrition news.  Yes  No
4. I'd guess this shopper is health conscious.  
 Yes  No

THANK YOU VERY MUCH!

APPENDIX E  
OREGANO SHOPPING LIST



## APPENDIX E

## OREGANO SHOPPING LIST

PLEASE READ THE FOLLOWING SHOPPING LIST. THEN ANSWER AS  
BEST AS YOU CAN THE FOUR QUESTIONS ABOUT THE SHOPPER.

SHOPPING LIST

Chicken

Mushrooms

Oregano

Coffee

Cookies

Yogurt

1. I'd guess this person is a careful shopper (i.e., reads product information on labels).  Yes  No
2. I'd guess this shopper exercises regularly.  
 Yes  No
3. I'd guess this shopper is aware of health and nutrition news.  Yes  No
4. I'd guess this shopper is health conscious.  
 Yes  No

THANK YOU VERY MUCH!

APPENDIX F  
SALT SHOPPING LIST

## APPENDIX F

## SALT SHOPPING LIST

PLEASE READ THE FOLLOWING SHOPPING LIST. THEN ANSWER AS  
BEST AS YOU CAN THE FOUR QUESTIONS ABOUT THE SHOPPER.

SHOPPING LIST

Chicken

Mushrooms

Salt

Coffee

Cookies

Yogurt

1. I'd guess this person is a careful shopper (i.e., reads product information on labels).  Yes  No
2. I'd guess this shopper exercises regularly.  
 Yes  No
3. I'd guess this shopper is aware of health and nutrition news.  Yes  No
4. I'd guess this shopper is health conscious.  
 Yes  No

THANK YOU VERY MUCH!

APPENDIX G  
CINNAMON SHOPPING LIST

## APPENDIX G

## CINNAMON SHOPPING LIST

PLEASE READ THE FOLLOWING SHOPPING LIST. THEN ANSWER AS BEST AS YOU CAN THE FOUR QUESTIONS ABOUT THE SHOPPER.

SHOPPING LIST

Chicken

Mushrooms

Cinnamon

Coffee

Cookies

Yogurt

1. I'd guess this person is a careful shopper (i.e., reads product information on labels).  Yes  No
2. I'd guess this shopper exercises regularly.  
 Yes  No
3. I'd guess this shopper is aware of health and nutrition news.  Yes  No
4. I'd guess this shopper is health conscious.  
 Yes  No

THANK YOU VERY MUCH!

APPENDIX H  
GARLIC SHOPPING LIST

## APPENDIX H

## GARLIC SHOPPING LIST

PLEASE READ THE FOLLOWING SHOPPING LIST. THEN ANSWER AS  
BEST AS YOU CAN THE FOUR QUESTIONS ABOUT THE SHOPPER.

SHOPPING LIST

Chicken

Mushrooms

Garlic

Coffee

Cookies

Yogurt

1. I'd guess this person is a careful shopper (i.e., reads product information on labels).  Yes  No
2. I'd guess this shopper exercises regularly.  
 Yes  No
3. I'd guess this shopper is aware of health and nutrition news.  Yes  No
4. I'd guess this shopper is health conscious.  
 Yes  No

THANK YOU VERY MUCH!

APPENDIX I  
PERCENTAGE OF SAMPLE MEANS FALLING BETWEEN  
-Z AND +Z UNDER A NORMALIZED GAUSSIAN  
DISTRIBUTION CURVE



## Appendix I

Percentage of Sample Means Falling Between  $-Z$  and  $+Z$ 

## Under a Normalized Gaussian Distribution Curve

$Z = \frac{M - \bar{x}}{s_x}$	Percent of sample means falling within the $-Z$ to $+Z$ range
0.8	57.62
1.0	68.26
1.2	76.98
1.4	83.84
1.6	89.04
1.8	92.82
2.0	95.44
2.1	96.42
2.2	97.22
2.3	97.86
2.4	98.36
2.5	98.76
2.6	99.06

---

$M$  = True universe mean (or hypothesized universe mean, if appropriate)

$\bar{x}$  = Sample mean

$s_x$  = Standard error of the mean

$Z$  = The number of standard errors of the mean between  $M$  and  $\bar{x}$ .

## Appendix I Continued

$Z = \frac{M - \bar{x}}{s_x}$ 
Percent of sample means  
falling within the  
-Z to +Z range

---

2.7	99.30
2.8	99.48
2.9	99.62
3.0	99.72
3.1	99.80
3.2	99.86
3.3	99.90
3.4	99.94
3.5	99.96

---

M = True universe mean (or hypothesized universe mean, if appropriate)

$\bar{x}$  = Sample mean

$s_x$  = Standard error of the mean

Z = The number of standard errors of the mean between M and  $\bar{x}$ .