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AN INQUIRY INTO THE EFFECTS OF SELF-CONFIDENCE  
AND INFORMATION ON POST-DECISION DISSONANCE

by

GERALD D. CAVALLO

A dissertation submitted to the Graduate Faculty  
in Business in partial fulfillment of the require-  
ments for the degree of Doctor of Philosophy, The  
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1972

This manuscript has been read and accepted for the Graduate Faculty in Business in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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Abstract

AN INQUIRY INTO THE EFFECTS OF  
SELF-CONFIDENCE AND INFORMATION  
ON POST-DECISION DISSONANCE

by

Gerald O. Cavallo

Adviser: Professor Conrad Berenson

This study examines the relationship between individual self-confidence, pre-decision information level and post-decision dissonance; obtaining post-decisional information and dissonance reduction; post-decision attitude change and dissonance; and dissonance and brand switching. Specifically, the following hypotheses are tested:

1. As the degree of self-confidence and the level of pre-decision information about the alternatives to the choice decreases, individual dissonance will increase.
2. Individuals most active in obtaining additional post-decision information will experience the greatest decrease in dissonance.
3. Dissonance reduction will be accompanied by a more favorable attitude towards the chosen alternative.
4. Brand switchers are individuals who are unable to reduce their initial dissonance level.

A factorial experimental design is employed as a means of testing the above hypotheses. The sample, consisting of 217

undergraduate and graduate students (110 women and 107 men) is divided into six groups -- three levels of self-confidence and two levels of information. Assignment to high, moderate and low self-confidence groups is accomplished by means of subjects' scores on the self-confidence scale of the Edwards Personality Inventory. The investigator controlled the level of information to which each respondent is exposed (high or low).

After subjects make a choice among five brands of eight-track cartridge tape players, they are questioned about the certainty of their choice and their attitude towards each brand. Perceived doubt is used as an indicator of post-decision dissonance and brand ratings on a ten-point rating scale are used as an indicator of attitudes towards each brand.

Perceived dissonance and attitudes towards the brands are again measured among subjects from four to eight days after the initial selection. In addition, the investigator asked a series of questions of each subject to ascertain activities relating to eight-track tape players engaged in in the interim period.

The major findings of this study are:

1. There is a significant relationship between self-confidence, information and post-decision dissonance. Differences in group dissonance are in the hypothesized direction (the lower the self-confidence and information level, the higher the dissonance) with the exception of one study group. These differences appear to be related to pre-decision information level primarily and to self-confidence when considered together with

information level.

2. Women are somewhat more dissonant than men when asked to evaluate a large amount of information prior to making a brand choice.

3. Obtaining additional post-decisional information appears to be associated with an increase as well as a decrease in dissonance. Dissonance may actually increase with additional information.

4. The selection of an alternative appears to result in an enduring attitude towards the selection, regardless of changes in dissonance level. In this study, although nine out of ten subjects experienced a change in dissonance level, two-thirds did not change their attitudes towards the selected alternative.

5. Individuals who switch brands appear to be those who have a relatively high level of initial post-decision dissonance and who are unable to reduce their dissonance level.

## ACKNOWLEDGEMENTS

Although one person is responsible and ultimately receives credit for a dissertation, it is by no means an individual effort. This author would like to express his gratitude to his supervisory committee -- Dr. Conrad Berenson, Dr. Henry Eilbrit, Dr. Robert Parket, Dr. Manus Rabinowitz for their guidance, with a special note of thanks to Dr. Sidney I. Lirtzman for his continuous help and encouragement. Also, Father Frederick Kelly, S.J., of the Fairfield University Computer Center for giving so generously of his patience and skills. Finally, to my wife Mary, who was a constant source of love and understanding.

- Gerald O. Cavallo

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## CHAPTER I

### INTRODUCTION

#### Background and Objectives of the Study

Judging by the volume of research conducted and the amount of attention being given to it, one can safely say the subject of consumer behavior is the "in" topic in Marketing today. Because of this attention our knowledge of consumer purchase behavior has greatly expanded since the days it was thought that consumers were walking calculators seeking out the best way to allocate their limited resources. We have learned that the decision to purchase is an emotional as well as a rational one. We have learned much of how the consumer reacts to such stimuli as the product, the package, and advertisements for the product. We have learned much about how forces in the consumer's environment -- such as family, reference groups, and neighbors -- affect the decision to purchase. Great strides are being made in understanding consumer search behavior and product adoption.

All of these advances have been enthusiastically received by the open arms of the scientific community, which seeks the "truth" about consumer behavior, and by the business community, which attempts to translate these findings into competitive strategies. But these advances have shed light primarily on the behavior of consumers

prior to the time the purchase is made, providing thus far an incomplete picture of the consumer. Is the consumer to be forgotten once the purchase transaction takes place? Obviously not! He may inform others of his satisfaction (or dissatisfaction), he may repeat the purchase behavior at some future time, or he may change his attitude towards the product purchased.

Investigators, however, have badly neglected this post-transactional side of the consumer's behavior. Only since Festinger proposed the Theory of Cognitive Dissonance, almost fifteen years ago, has research been stimulated on this subject. Unfortunately, most of this post-decisional research has been concerned with either establishing the fact that dissonance occurs or attempting to refute the fact that dissonance was found. Few have sought to establish the conditions under which post-transactional dissonance arises -- to examine the determinants of dissonance. This neglect generated the present inquiry. The objective of this dissertation is to explore the effects of some personality and decisional variables on the occurrence of post-decision doubt. Ultimately, this investigator hopes he has taken one further step towards the better understanding of consumers' post-transactional behavior.

#### Cognitive Dissonance Theory in Brief

The Theory of Cognitive Dissonance is actually a refinement and amplification of the theory of social comparisons.

Festinger's theory differs from these other theories (of social comparisons) in two respects: it places unique emphasis on the consequences of decisions and it has stimulated abundant research . . . He makes the unique and original assumption that making a decision per se arouses dissonance and pressures to reduce the dissonance.<sup>1</sup>

As Festinger states, "Dissonance then will be a result of the simple act of having made a decision. Consequently, one may expect to see manifestations of pressures to reduce dissonance after the choice has been made."<sup>2</sup>

Cognitive dissonance can arise in any of three ways:<sup>3,4</sup>

1. When a person is choosing among several alternatives he will find that each has attractive and unattractive features. Dissonance results from the positive cognitions of the rejected alternative and the negative cognitions of the selected alternative (post-decision dissonance). The "magnitude of post-decision dissonance is an increasing function of the general importance of the decision and of the relative attractiveness of the unchosen alternative."<sup>5</sup>

2. When a person is exposed to information that is contrary to his values, beliefs and behavior (cognitive intrusion).

3. When a person is forced to say or do something which is contrary to his opinions or beliefs (coercion).

Dissonance, being a psychologically uncomfortable state, motivates the individual to reduce it and return to consonance.

The principal modes he may employ to reduce dissonance are:<sup>6</sup>

1. He can change his evaluation by decreasing the importance of dissonant cognitions or increasing the importance of favorable cognitions, or both.
2. He may expose himself to supportive information or ignore conflicting information, or both.
3. He may distort his perceptions of the alternatives.
4. He may withdraw from the situation and either postpone the decision or select another alternative.

### Hypotheses

As stated above, the present investigation is directed to establishing some of the determinants of dissonance of the post-decision type. This investigator believes that the forces acting upon an individual who is in the position of making a choice among several alternatives are of two basic types. The first is a situational force -- the importance of the decision, the consequences of the decision, the risk associated with the decision and the level of information about each alternative. The second is a personality force -- the individual's self-confidence, his persuasibility and his attitudes.

The principal thesis of this dissertation is that the magnitude of post-decision dissonance is the direct result of the interplay of these two forces (situational and personality) upon the individual. For the sake of making the investigation comparable to already published findings, and to limit the analysis

to manageable proportions the situational variable focused on is the level of pre-decision information while the degree of individual self-confidence constitutes the personality variable.

From this point of departure the following guiding hypotheses are offered:

1. The lesser the degree of individual self-confidence and the lower the level of pre-decision information about the alternative from which to choose, the greater the magnitude of post-decision dissonance. Individuals with a large amount of information and a high degree of self-confidence are expected to have less dissonance than those with less information and lower self-confidence.

2. Dissonance theory predicts that post-decision exposure to supportive information facilitates dissonance reduction. Some investigators (see Chapter II) have found this to be the case, while others, however, have found exposure to both supportive and non-supportive information occurring after a choice. This study hypothesizes that dissonance reduction is related to the amount of additional information sought. Individuals who are most active in seeking additional post-decision information of any kind, either from personal sources (friends, relatives, salesmen) or impersonal sources (advertisements, catalogues) will experience the greatest decrease in dissonance.

3. Dissonance reduction will be accompanied by a more favorable attitude towards the chosen alternative. Conversely, the failure to reduce one's dissonance or an increase in dissonance

will be accompanied by a less favorable attitude towards the chosen alternative.

4. Brand switching results from a failure to reduce one's dissonance level. Individuals who change their minds and select another alternative are those with high post-decision dissonance and who are not able to resolve this dissonance.

### Methodology

The methodology used in this study is explained in detail in Chapter III (Research Design). It is repeated here briefly to acquaint the reader with the data collection procedure. The study was experimental in nature and can be classified as a three by two factorial design, the two major factors being information level and self-confidence. Subjects were divided into six groups (high self-confidence - high information; high self-confidence - low information; moderate self-confidence - high information; moderate self-confidence - low information; low self-confidence - high information and low self-confidence - low information), illustrated as follows:

		<u>Self-Confidence</u>		
		High	Moderate	Low
<u>Information Level</u>	High	$S_s$	$S_s$	$S_s$
	Low	$S_s$	$S_s$	$S_s$

$S_s$  = Subjects

Subjects were assigned to self-confidence groups according to the scores obtained on the self-confidence scale of the Edwards Personality Inventory. The level of information to which respondents were exposed was controlled by the investigator.

After making a choice among five brands of eight-track stereo tape players, subjects were questioned about the certainty of their choice and their attitude towards each brand. The investigator then returned to the subjects about one week later and again ascertained the certainty of their selection, the activities relating to their choice engaged in since the selection, and again their attitudes towards each brand. This procedure was settled upon after a pilot study was conducted for the purpose of refining the data collection method.

#### Implications of the Study for Marketing

The findings derived from this study have the following implications for marketing:

1. Knowing what determines post-decision dissonance will be of great value to the marketer in the planning of his marketing strategy. If the principal factor is the personality variable, then the marketer must devise a means of assessing the personality makeup of the individual prior to the decision. This is obviously a difficult task but it could be done, for example, in a personal sales situation. Once the dissonance potential of the individual is assessed, it can be determined by what means dissonance can be held to a minimum.

If, on the other hand, the principal factor is the level of information, and post-decision dissonance decreases as the amount of pre-decision information increases, then the marketer can see to it that a sufficient amount of information (advertisements, brochures, pamphlets, etc.) is made available to the consumer prior to his selection.

2. The marketer should be aware of the ways in which dissonance is reduced after a purchase has been made. Is dissonance reduction a process that is internal to the consumer, a result of rationalization or some other reconciliation process, or will the desire to reduce dissonance cause greater exposure to information of all types about the product just purchased? If it is the latter, then obviously the marketer will benefit from providing some follow-up to the sale in the form of a communication designed to provide additional product information and purchase reassurance.

3. The relationship between dissonance and one's attitude towards the product purchased is important. It has been demonstrated<sup>7</sup> that one's attitude towards the alternative selected becomes more favorable after the selection. Does one, however, retain this more favorable level regardless of whether dissonance is reduced, unchanged, or increased? This is one of the questions the study is designed to answer.

4. Marketers must live with a basic fact of life -- consumers are brand switchers. Much of their efforts are aimed at retaining existing customers (brand loyalty) or attempting to convince purchasers of competing products to buy theirs (brand switching).

What is the relationship, if any, between brand loyalty, brand switching, and dissonance? Are consumers brand loyal because they are able to reduce their dissonance to a satisfactory level and are they brand switchers because they could not? If so, then the marketer who wants to maintain his existing franchise should certainly assist the consumer in bringing about a reduction in dissonance.

#### Limitations of the Study

Any study based on the experimental design is not without its limitations. The following apply here:

1. The study was conducted among college students, the results of which may not apply to other population groups.

2. The product used in this study was an eight-track tape player. The results may not apply to other products.

3. A purchase was not actually made but simulated. The question can be raised as to whether the selection made here generated the same level of commitment and involvement as an actual purchase. Also, the effects of actual experience with the product on dissonance cannot be ascertained.

4. As in any experiment, variables that are not controlled by the experimenter may affect the outcome of the experiment. Such variables as ownership, prior knowledge, and interest in tape players may have affected the findings in this study.

5. No universally accepted technique has been devised to measure dissonance. In this study, subject's perceived dissonance

was used as the measure of post-decision dissonance.

### Organization of the Paper

This study is divided into five chapters:

- I. Introduction
- II. A Review of Experimental Findings
- III. Research Design
- IV. Evaluation of Research Findings
- V. Summary, Conclusions and Recommendations for Future Research.

In Chapter I the basic purpose of the study is set forth along with the hypotheses to be tested. A brief review of the theory of cognitive dissonance is presented, the implications of the study for marketing and the limitations of the study are also considered.

Chapter II brings the reader up to date on the current status of post-decision dissonance theory as it applies to consumer behavior, by presenting the findings of empirical research conducted in this area. Studies are reviewed and findings presented with respect to factors that determine dissonance, attitude change and dissonance, commitment and dissonance, and dissonance reduction.

Chapter III outlines the basic research design employed to fulfill the objectives of this study. The nature of the sample, the stages of data collection, the questions asked and the statistical analyses utilized are presented here.

Chapter IV presents the detail findings of this study and discusses the findings in terms of the hypotheses stated above.

The findings are then evaluated and the marketing implications of these findings are considered.

Chapter V presents a brief summary of the study, draws major conclusions from the findings and makes recommendations for future research.

## CHAPTER I FOOTNOTES

<sup>1</sup>Merton Deutch, and Robert Krauss, Theories in Social Psychology (New York, N.Y.: Basic Books, Inc., 1965), pp. 68 and 70.

<sup>2</sup>Leon Festinger, A Theory of Cognitive Dissonance (Evanston, Ill.: Row, Peterson, Inc., 1957), p. 35.

<sup>3</sup>Bruce Strait, "The Pursuit of the Dissonant Consumer," Journal of Marketing, 28 (July, 1964), p. 62.

<sup>4</sup>Sadaomi Oshikawa, "Can Cognitive Dissonance Theory Explain Consumer Behavior," Journal of Marketing, 33 (October, 1969), p. 44.

<sup>5</sup>Leon Festinger, "Cognitive Dissonance," Scientific American, 207 (October, 1962), p. 93.

<sup>6</sup>Robert Holloway, "An Experiment on Consumer Dissonance," Journal of Marketing, 31 (January, 1967), p. 40.

<sup>7</sup>Jack Brehm, "Post-Decision Change in the Desirability of Alternatives," Journal of Abnormal and Social Psychology, 62 (July, 1956), pp. 384-389; L. R. Loscuito, and R. Perloff, "Influence of Product Preference on Dissonance Reduction," Journal of Marketing Research, 4 (August, 1967), pp. 286-290; R. Knox and J. Inkster, "Post-Decision Dissonance at Post Time," Journal of Personality and Social Psychology, 4 (1968), pp. 319-323.

## CHAPTER II

### A REVIEW OF EXPERIMENTAL FINDINGS

#### Introduction

In this chapter, findings are presented from twenty empirical investigations relating dissonance theory to consumer behavior within the context of the proposed hypotheses. These studies result from an extensive search into the past seventeen years of behavioral science as well as marketing and related business literature. The search ranged from the time Festinger first proposed dissonance theory (1956) to the most recent studies, and represents the state of our knowledge of the extent to which dissonance theory explains consumer behavior. The purpose here is not to present supportive or nonsupportive material for the hypotheses, but to provide the reader with a theoretical perspective, founded in previous empirical investigations, within which to consider the present inquiry. The literature review is divided into the following sections:

1. Pre-decision information level and dissonance.
2. Personality and dissonance.
3. Attitude change and dissonance.
4. Dissonance reduction.

#### Information and Dissonance

In this section three experiments relating to this study's hypothesis that more pre-decision information about the alternatives results in less dissonance will be presented. These are experiments

conducted by Holloway,<sup>1</sup> Murray,<sup>2</sup> and Cangelosi, et al.<sup>3</sup>

Robert Holloway reported an experiment on consumer dissonance conducted among eighty male college students who played the part of automobile battery buyers. The experiment manipulated four dissonance-producing factors: inducement to buy, anticipated dissonance, information level, and cognitive overlap. Each of these conditions had a high and low dissonance producing level which resulted in sixteen experimental cells.

The eighty subjects were randomly assigned to these sixteen cells. Each was asked to rate twelve brands of automobile batteries prior to and after the experiment. The difference in the two rating scores was used as a measure of the extent of dissonance reduction. A higher post-rating score for the chosen battery or a lower post-rating score for the rejected batteries, or both, indicated dissonance reduction.

Although the findings in three of the four conditions were in the direction predicted, none were statistically significant. However, with respect to information level and dissonance, Holloway draws the following conclusion without presenting substantial supportive evidence: "Consumers who obtain adequate information probably will have less dissonance than those who buy without sufficient information."

Murray sought the relationship between evidence and the degree of belief in the correctness of one's choice. He separated

the investigation into two parts. In the first, subjects were presented with ten statements from each of ten different situations and were asked to rank the statements according to their judged strength as evidence. Some of these scaled statements were then used as evidence in the second part. Here, a different group of subjects is presented with background information on a situation of which they were required to make a dichotomous judgment and then were given evidence about that situation. Afterwards, they were again required to make a judgment. Murray found that the degree of belief was strengthened by evidence; that is, strong evidence increased the degree of belief in one's judgment.

In the Cangelosi, et al. study the hypothesis that increased quantities of information results in a more rational choice was tested. In this investigation ten groups with ten subjects in each group were placed in a binary choice situation in which each subject was asked to predict an event-series of checks and pluses. Subjects were given differing amounts of two types of information -- general instructions and specific probabilities of the outcome of events. Although the study did not statistically support the hypothesis, there was a positive relationship between the receipt of information and the rationality of the choice.

The evidence from these studies does not conclusively establish the relationship between pre-decision information and post-decision dissonance. They do suggest, however, that more information may provide more certainty in one's choice (less dissonance).

### Personality and Dissonance

The study hypothesizes an inverse relationship between self-confidence and post-decision dissonance; that is, post-decision dissonance decreases as self-confidence increases. This section summarizes the results of three experiments relating self-confidence to dissonance. They were conducted by Bell,<sup>4</sup> Canon,<sup>5</sup> and Cox and Bauer.<sup>6</sup>

Gerald Bell was interested in the effects of self-confidence, persuasibility, and quality of service on post-decision dissonance. The experiment was conducted in a large western United States urban area among 234 respondents who had just purchased new automobiles (one to eight days after purchase). Bell measured dissonance by evaluating responses to questions that would reveal the respondent's feelings about his purchase. Such questions as, "Would most people expect to get the same kind of deal you got?" were asked.

Persuasibility was defined by first asking the respondent to what extent the salesman influenced his purchase, and secondly, by asking the salesman to rate the customer on the ease of persuading him to buy. Perceived quality of service was measured by asking a respondent such questions as what condition his car was in upon delivery and what plans were made for future service. Self-confidence was measured using the items originated by Day and Hamblin.<sup>7</sup>

The findings from this study demonstrated that a relationship existed between self-confidence, persuasibility and dis-

sonance. Subjects who scored high on self-confidence and who were not easily persuaded experienced little or no dissonance.

Bell concluded, ". . . the type of personality an individual brings to the dealership and the experience he has while purchasing his new car determines the extent of his dissatisfaction (with his purchase)."

In the Canon study, self-confidence was experimentally created by telling one-half of the subjects that their solutions to the assigned problems were incorrect although most of the others answered correctly (low self-confidence). The other half of the subjects were told that their solutions were correct and most of the others' were incorrect (high self-confidence).

Subjects were then told they would have to support their solutions by writing a short essay or rebutting a series of probing questions and were given the opportunity to rate their preference for reading additional articles of both a consonant and dissonant nature.

Canon found that the high self-confidence group preferred to read articles of a dissonant nature to provide support for their position while low self-confidence subjects preferred to read consonant articles.

Donald Cox and Raymond Bauer sought to determine the relationship between self-confidence and persuasibility in women. These investigators asked a sample of women to select one of two brands

of nylon stockings. They were then exposed to persuasions for one of the brands and finally asked to re-evaluate the stockings.

It was found that women of high and low self-confidence were least persuasable, while those of moderate self-confidence were most persuasable.

The experimenters concluded that high self-confidence people are difficult to persuade because of experience in making acceptable decisions and low self-confidence people were also difficult to persuade because their lack of self-confidence caused them to react defensively against influence attempts. On the other hand, moderate self-confidence people were neither secure with their own judgment nor highly defensive and thus most persuasable.

The findings presented in this section demonstrate a relationship between self-confidence and dissonance. This is not to say, however, that self-confidence is the only personality characteristic that may relate to dissonance. Fillenbaum,<sup>8</sup> in his study, sought a relationship between dogmatism (closemindedness) and dissonance. After administering the Dogmatism scale to all subjects, some were forced to undergo an unpleasant initiation to gain acceptance by a group while others were spared this unpleasant experience. Fillenbaum demonstrated a positive correlation between dogmatism and dissonance. Very dogmatic subjects showed a higher liking for the group to which it was difficult to be

accepted than the low dogmatic subjects.

### Attitude Change and Dissonance

This section presents the findings from four experiments relating attitude change and dissonance.

Jack Brehm<sup>9</sup> conducted a study in which he asked subjects to rate the attractiveness of a product after having inspected it. After being allowed to choose two of the products rated, subjects were then given reports stating good and bad characteristics of all the products inspected. In a subsequent rating, the chosen products scored significantly higher than on the previous rating.

Brehm's findings were substantiated in a more recent study by Losciuto and Perloff.<sup>10</sup> Their study found that individuals choosing between products subsequently rated the chosen product as more desirable and the unchosen product less desirable.

Knox and Inkster<sup>11</sup> conducted an interesting experiment related to this topic at a race track. Sixty-two \$2-Win bettors rated the chance that the horse they selected would win the fourth-coming race prior to placing their bet. Seventy-two other bettors provided similar ratings immediately after making a \$2-Win bet. Pre-bet subjects gave the horse they selected a "fair chance to win" on the average while post-bet subjects gave the horse they selected a "good chance to win" rating on the average. Thus, committing oneself to a decision increases the rating of the chosen alternative.

In a study conducted among army reservists, E. E. Smith<sup>12</sup> created a survival situation in which he encouraged the reservists to eat grasshoppers after they responded to questions about their liking for grasshoppers. This encouragement took two forms. The first was in a relaxed and friendly manner, and in the second the reservists were ordered to eat the grasshoppers. After eating the grasshoppers the subjects again responded to questions about their liking for grasshoppers.

The findings supported the hypothesis that the group exposed to the harsh order would find their behavior to be more discrepant with their attitude and would thus modify their attitude to conform with their behavior.

The evidence presented in this section would lead one to conclude that attitudes towards the chosen alternative become more favorable after the selection than before. Somewhat contradictory findings, however, were reported by Stephenson.<sup>13</sup> Recent automobile buyers were the subjects in his experiment and the hypothesis was that a favorable attitude towards the future economic outlook would be consistent with a major expenditure. He expected to find individuals who just made a major purchase optimistic about future economic conditions. The results of the study failed to substantiate this expectation.

### Dissonance Reduction

In this section, findings from studies relating to three principal modes of dissonance reduction-seeking additional

information, seeking social support and rationalization, are discussed.

In the first, Ehrlich, et al<sup>14</sup> interviewed 125 male residents from the Minneapolis area. Sixty-five purchased a new car four to six weeks prior to the interview, and the remaining sixty respondents owned cars that were at least three years old. The experimenters asked each subject to respond to a series of questions concerned with his advertising readership habits. The experimenters then asked each subject to recall recent automobile advertisements that impressed him. Finally, each respondent was presented with large plain envelopes bearing the names of popular automobile makes and was asked to choose two after being told that each contained new automobile advertisements that he was to evaluate. Based on the findings the authors conclude:

. . . New car owners read advertisements of their own car more often than cars they considered but did not buy and other cars not involved in the choice. These selective tendencies in readership were much less pronounced among old car owners. This finding supports the theoretical derivation that persons in general seek out consonant or supporting information after an important decision in an attempt to reduce dissonance resulting from it.

Jecker<sup>15</sup> conducted an experiment using male freshmen at Stanford University. Three experimental conditions were run. In one, subjects were given the opportunity to examine information before making a decision. In another, the same opportunity was provided after the subject had made a definite, binding decision. In the third, the opportunity to look at the information was

provided after a decision that had uncertain consequences had been made. The data point to the conclusion that subjects selectively expose themselves to supportive information as a post-decision dissonance-reducing process. No selectivity occurs in the pre-decision period nor in the post-decision period where the outcome is uncertain.

In another experiment Judson Mills<sup>16</sup> asked college women to rank different products according to their desirability, to make a choice between two of them, and then to rate their interest in reading ads for each of the products. The investigators manipulated certainty by allowing some of the women to choose between products they ranked about equal in desirability and others to choose between products they ranked very differently. The results provided evidence that interest in consonant (supportive) information following a choice is greater, the less the certainty about the correctness of the choice.

From the evidence presented in the above studies one would conclude that supportive information is sought as a means of reducing dissonance. However, contradictory results were reported by James Engel.<sup>17</sup> In his study, post-decision readership was analyzed by interviewing two groups of matched samples (matched as to social class, age and income). One group was composed of people who bought new Chevrolets within a one-month period and the other group consisted of not-new Chevrolet owners.

All respondents were interviewed within a three-day period

after an advertisement featuring the competitive superiority of the new Chevrolet appeared in the local newspapers. Readership of the ads was measured along four dimensions: not sure, noted, read some (less than one-half of the contents), and read most (most than one-half the contents). Engel concluded that there is no statistically significant difference between recent owners and prior owners with respect to post-decision advertising readership.

Perhaps the seemingly disparate findings of Engel's study can be reconciled with the others by examining the results of a study by Lowe Steiner.<sup>18</sup> In this experiment twenty-eight female subjects were to select a man for a blind date under one of four conditions: reversible decision with consequences, reversible decision without consequences, irreversible decision with consequences and irreversible decision without consequences. Subjects were also given the opportunity to obtain additional information about their choices.

This investigation failed to support the contention that people have a general preference for consonant information after making a choice decision. The findings indicate that the consequences of a decision determine the kind of information exposed to. Persons who believe their decision will have no important consequences are significantly more inclined to favor consonant information (or less inclined to seek dissonant information) than are persons who believe that their decisions will have important consequences.

The investigators concluded:

People prefer to receive whatever kinds of information that will be most useful to them and the utility of a specific type of information depends in part upon the reversibility and consequences of the decision they have made.

The evidence presented to support the conclusion that individuals reduce dissonance by seeking social support and by attempting to convince others of their beliefs, is of a lesser level of rigor than previously presented findings. It is derived from a case study conducted by Festinger, et al<sup>19</sup> among a group of people who believed the world was to come to an end on a specific date. Through the automatic writings of their leader they believed salvation for the group would come in the form of a space ship at the time of doom. When the day passed with little more than a few lightning bolts and thunder claps (disconfirmation of belief), dissonance set in. An analysis of the subsequent behavior and movements of the group led Festinger to conclude that social support, that is, being close to fellow believers, and the willingness to convince others of their beliefs, were instrumental in reducing dissonance.

The employment of rationalizations to reduce or eliminate dissonance was the object of two studies concerned with cigarette smoking and the cancer scare.

In the first, Kassirjian and Cohen<sup>20</sup> investigated the reactions to the Surgeon General's report on smoking and health.

The experimenters conducted the study in conjunction with a U.C.L.A. class marketing-research project which included a total sample of 496 people. The sample was about equally divided as to sex and as to cigarette smokers. The results indicated that the more a person smoked, the less he believed the cancer-cigarette linkage. In addition, such rationalizations as denial, distortion, misperceiving, dissociating oneself from responsibility over the decision, and minimizing the health hazard, were employed to reduce dissonance.

In a later experiment conducted by Johnson<sup>21</sup> four separate groups of smokers and non-smokers were asked to react to statements concerning the cigarette-cancer link. The study revealed that the typical smoker endorsed a larger number of dissonance-reducing ideas than non-smokers. In addition, both smokers announcing intentions to stop smoking, and ex-smokers, endorsed a nearly equal number of rationalizations as non-smokers. Thus, Johnson concludes that the dissonance of smokers may be reduced either by the smoker's belief that he will discontinue smoking in the near future (a rationalization in itself) or by the endorsement of rationalizations which soften the impact of evidence suggesting that smoking is a health hazard.

### Summary

In this chapter, the findings of twenty experiments which sought to test derivations from cognitive dissonance theory were reviewed. This presentation was for the purpose of establishing

the theoretical basis for the research hypotheses of this dissertation. The following conclusions can be drawn from such a survey:

1. A positive relationship exists between the amount of information one obtains prior to making a choice, the rationality of that choice, the degree of belief in one's judgment, and the certainty in one's choice.

2. Self-confidence is one personality factor that is related to post-decision certainty and persuasability. The higher the self-confidence level the more certain one is of his choice and the less persuasable one is. There is some support for the fact that low self-confidence individuals are also certain of their choice, but for different reasons than are high self-confidence individuals.

3. Although contradictory evidence exists, there is some support for the fact that an individual will modify his attitude to conform with his behavior when the two are discrepant and his attitude towards the selected alternative will become more favorable after the selection than before.

4. Dissonance reduction is the result of external and internal processes. Externally, the individual seeks additional information or social support as a means of reducing dissonance. Internally, the individual employs rationalizations to achieve dissonance reduction.

## CHAPTER II FOOTNOTES

<sup>1</sup>Robert Holloway, "An Experiment on Consumer Dissonance," Journal of Marketing, 31 (January, 1967), pp. 39-43.

<sup>2</sup>Frank Murray, "Judgment of Evidence," American Journal of Psychology, 81 (1968), pp. 319-333.

<sup>3</sup>V. Cangelosi, D. Robinson, and L. Schkade, "Information and Rational Choice," Journal of Communications, 18 (June, 1968), pp. 131-143.

<sup>4</sup>Gerald Bell, "The Automobile Buyer After the Purchase," Journal of Marketing, 31 (July, 1967), pp. 12-16.

<sup>5</sup>Lance Canon, "Self-Confidence and Selective Exposure to Information," in Conflict, Decision and Dissonance, ed. by Leon Festinger (Stanford, Calif.: Stanford University Press, 1964), pp. 83-95.

<sup>6</sup>Donald Cox, and Raymond Bauer, "Self-Confidence and Persuasibility in Women," Public Opinion Quarterly, 28 (Fall, 1964) pp. 453-466.

<sup>7</sup>Robert Day, and Robert Hamblin, "The Relation Between Group Members Self-Confidence and Punitive Styles of Persuasion," The American Journal of Sociology, 69 (March, 1964), pp. 499-511.

<sup>8</sup>Samuel Fillenbaum, "Dogmatism and Individual Differences in Reduction of Dissonance," Psychological Reports, 14 (February, 1964), pp. 47-50.

<sup>9</sup>Brehm, "Post-Decision Changes in the Desirability of Alternatives," pp. 384-389.

<sup>10</sup>Loscuito, and Perloff, "Influence of Product Preference on Dissonance Reduction," pp. 286-290.

<sup>11</sup>Knox, and Inkster, "Post-Decision Dissonance at Post Time," pp. 319-323.

<sup>12</sup>E. E. Smith, "The Power of Dissonance Techniques to Change Attitudes," Public Opinion Quarterly, 25 (1961), pp. 626-639.

<sup>13</sup>P. R. Stephenson, "Post Purchase Economic Attitude Change: A Dissonance Analysis," (unpublished Ph.D. dissertation, Department of Economics, Ohio State University, 1967).

<sup>14</sup>D. Ehrlich et al, "Post-Decision Exposure to Relevant Information," Journal of Abnormal and Social Psychology, 54 (January, 1957), pp. 98-102.

<sup>15</sup>J. D. Jecker, "Selective Exposure to New Information," in Conflict, Decision and Dissonance, ed. by Leon Festinger, pp. 21-30.

<sup>16</sup>Judson Mills, "The Effects of Certainty About a Decision Upon Post-Decision Exposure to Consonant and Dissonant Information," Journal of Personality and Social Psychology, 2 (1965), pp. 749-752.

<sup>17</sup>James Engel, "Are Automobile Purchasers Dissonant Consumers," Journal of Marketing, 27 (April, 1963), pp. 55-58.

<sup>18</sup>R. Lowe, and I. Steiner, "Some Effects of the Reversibility and Consequences of Decisions on Post-Decision Information Preferences," Journal of Personality and Social Psychology, 6 (1969), pp. 172-179.

<sup>19</sup>Leon Festinger, H. Riecken, and S. Schackter, When Prophecy Fails, (Minneapolis: University of Minnesota Press, 1956).

<sup>20</sup>H. Kassarian, and J. Cohen, "Cognitive Dissonance and Consumer Behavior: Reactions to the Surgeon General's Report on Smoking and Health," California Management Review, 8 (Fall, 1965), pp. 55-64.

<sup>21</sup>Ronald Johnson, "Smoking and the Reduction of Cognitive Dissonance," Journal of Personality and Social Psychology, 9 (1968) pp. 260-265.

## CHAPTER III

### RESEARCH DESIGN

#### Basic Design

The research for this study may be classified as a factorial experimental design in which the two major independent variables, self-confidence and information level, can be diagrammed as follows:

Self-Confidence

		High	Moderate	Low
<u>Information Level</u>	High	S <sub>s</sub>	S <sub>s</sub>	S <sub>s</sub>
	Low	S <sub>s</sub>	S <sub>s</sub>	S <sub>s</sub>

S<sub>s</sub> = Subjects

The experimental procedure was employed to afford this investigator some degree of control over the major experimental variables and to provide the opportunity to measure their individual and combined effects on post-transactional dissonance within a simulated market situation. Once their effects can be determined in a laboratory-like situation the next step would be to extend the procedure to the real world.

#### Sample Selection

Subjects for this study included undergraduate and graduate students from Fairfield University and the University of Bridgeport,

both in Connecticut. Cooperation and assistance was obtained from one faculty member of the business department of each university and the students of these faculty members constituted a major portion of the sample. In order to obtain a greater female representation in the sample the cooperation of a women's dormitory adviser from each university was obtained. She was instrumental in providing a meeting place, posting announcements and encouraging the women to attend and complete the study.

Students were not given any monetary incentive for their participation. Instead, their cooperation was obtained by informing them of the academic and research nature of the study and the importance of their participation to its successful completion. In addition, and perhaps of more interest to them, subjects were told after the first interview that a raffle would take place at the end of the experiment and they would have a chance to win one of the five eight-track cartridge tape players valued at \$100.00 that were to be given away.

In all, a total of 217 students participated in the study, 110 women and 107 men. Students' class representation included 85 freshmen, 70 sophomores, 41 juniors, 16 seniors and 5 graduate students.

#### Interview Procedure

Because of the number of subjects participating and the multi-phased nature of the experiment, all interviews were conducted on a group basis with this investigator supervising. The

male dominated sample was interviewed during class time while the women were interviewed in the evening in the dormitory lounges. The daytime interview sessions were spread over three meetings because of the fifty-minute time limitation of each class, while in the evening only two meetings were necessary. Approximately two hours was spent with each subject.

The experiment was divided into three phases, each of which will be discussed.

#### Phase I

In this phase, the author administered Scale D, Booklet 1A and 1B of the Edwards Personality Inventory to each subject (see Appendix A). On the basis of the resulting scores subjects were assigned to high, moderate and low self-confidence groups. This scale measures the extent to which a person is self-confident, that is, the degree to which

He likes to work on a project where he has full responsibility for getting it done; has confidence in his ability to get things done; is not afraid to tackle unfamiliar assignments; has no difficulty in deciding things by himself; is sure of his opinions; makes decisions quickly.<sup>1</sup>

In this scale, the mode of response is a direct true or false answer to a series of thirty-six statements. The subject is asked to view himself objectively by responding to these statements about himself as though he were an impartial observer.

In order to obtain honest responses about themselves, subjects were told, "This questionnaire is designed to obtain a measure of some of your attitudes for the purpose of determining how typical college students respond to such questions. There are no right or

wrong answers. . . . Do not identify yourself in any way but place the code number given to you in the appropriate space."

The actual numerical score for each subject is obtained by adding the number of "correct" responses (those that correspond to the way a self-confident person would answer) for each of Booklet 1A and 1B and computing the average score of the two booklets. Since eighteen statements appear in each booklet, the score for any one subject would range from 0 (extremely lacking in self-confidence) to 18 (highly self-confident).

The average score for all subjects was 10.94. Average scores by sex did not differ significantly (11.0 for males and 10.8 for females). These data are summarized in Table 1 below.

Table 1

Average Scores for Subjects on the  
Edwards Personality Inventory  
(Form 1A and 1B)

	<u>Total</u>	<u>Male</u>	<u>Female</u>
Mean	10.94	11.0	10.8
Standard Deviation	3.44	3.48	3.40
Number of Subjects	217	107	110

The assignment of subjects into self-confidence categories was accomplished by arraying the subjects according to the scores obtained from lowest to highest. The sample was then divided into thirds and the range of scores that corresponded to each third became the score boundaries for the high, moderate and low self-confidence groups. Thus, a subject with a score from 0 to 9 was

placed in the low self-confidence group, a subject with a score of 9.5 to 12.5 was placed in the moderate self-confidence group and a score of 13 and over placed a subject into the high self-confidence group. This procedure yielded sixty-seven high, eighty-three moderate and sixty-seven low self-confident subjects. The author settled upon this method of allocating subjects to groups after determining that the scores were not normally distributed (using Geary's test of normality<sup>2</sup>) which prevented allocation based on Z score conversions. For this sample, the distribution of scores was skewed to the right, toward the high self-confidence pole.

Scale D of the Edwards Personality Inventory was selected as a means of measuring self-confidence for two reasons. First, it is a direct measure of this personality trait. The kind of trait being measured, according to the description presented above, is the personality variable this investigator wishes to isolate and focus on. Secondly, the scale has been widely used and well documented. Scores and score distributions are available for a variety of sample groups.

## Phase II

In this phase, subjects were asked to make a brand choice from among five brands of eight-track tape players -- Craig, Decca, Lear Jet, Lloyds and Music Master. (See Appendix B for Phase II questionnaire.) After first responding to a series of questions designed to elicit their ownership, awareness and interest in

eight-track tape players, and before making their brand selection, approximately one-half of the men and women were given an information packet containing a high level of information about each brand (descriptive plus technical data -- Exhibit IB), while the other half was given a low level of information about each brand (descriptive data only -- Exhibit IIB). In addition, each information packet contained a list of criteria for judging the acceptability of these units (Exhibit IIIB).

The "low-level" of information is defined as providing the amount of information about each brand that would be contained in a typical magazine advertisement. The "high-level" information, on the other hand, provides all of the information the manufacturers made available to the dealer carrying his brand and thus, that could be made available to the consumer.

The author sought to gain involvement in the selection process and commitment to the brand chosen -- to simulate an actual purchase -- by telling subjects that the intent of this study was to determine how well the college population uses product information to make a brand choice among several alternatives. The challenge, so the subjects were told, was to select the one brand among the five that Stereo magazine rated the best in a recent article. The brand information and rating criteria provided were to be used for this purpose. Furthermore, each subject selecting the "best" unit was to have a chance to win it in a drawing at the conclusion of the experiment. Actually, no such rating by Stereo magazine had taken place. However, five participants did win an

eight-track tape player (the manufacturers of each brand generously donated one to the study) in a drawing in which each participant had an equal chance to win.

After subjects made their brand selection, they responded to a series of questions designed to provide a measure of the degree of satisfaction with their choice (the perceived dissonance measure -- see Table 2 on the following page). Also, their attitude towards each brand was obtained by asking them to rate each using a ten-point rating scale with 1 = the worst product and 10 = the best. The mean rating was used as a measure of subjects' attitude towards each brand.

#### A Note on the Measurement of Dissonance -- the Perceived Dissonance Scale

One fact stood out very dramatically from the experimental research reviewed for this dissertation -- there is no universally accepted method for measuring dissonance. Research in which attempts have been made to use dissonance theory to understand consumer behavior have usually relied on predictions from the theory to measure the occurrence of dissonance. Indeed, as Chapanis and Chapanis<sup>3</sup> and Oshikawa<sup>4</sup> have pointed out, one of the principal methodological shortcomings of experimental research on cognitive dissonance has been the manipulation of the experimental design so as to insure outcomes predicted by the theory and then to use these outcomes as measurements of dissonance occurrence.

The experiments by Holloway and Jecker reported earlier are good illustrations of using predictions from the theory to measure

Table 2The Perceived Dissonance Scale

1. There is no doubt in my mind that I made the right choice

There is considerable doubt in my mind that I made the right choice

1. Strongly Agree 2. Moderately Agree 3. Slightly Agree 4. Neutral 5. Slightly Agree 6. Moderately Agree 7. Strongly Agree

2. I am satisfied with the selection I made

I am not satisfied with the selection I made

1. Strongly Agree 2. Moderately Agree 3. Slightly Agree 4. Neutral 5. Slightly Agree 6. Moderately Agree 7. Strongly Agree

3. I am sure that the selection I made was the correct one

I am not sure that the selection I made was the correct one

1. Strongly Agree 2. Moderately Agree 3. Slightly Agree 4. Neutral 5. Slightly Agree 6. Moderately Agree 7. Strongly Agree

4. I would buy the brand I selected

I would not buy the brand I selected

1. Strongly Agree 2. Moderately Agree 3. Slightly Agree 4. Neutral 5. Slightly Agree 6. Moderately Agree 7. Strongly Agree

dissonance occurrence. The reader will recall that in Holloway's experiment, subjects rated twelve brands of automobile batteries prior to and after making a choice. Dissonance theory would predict a more favorable attitude towards the chosen alternative and a less favorable attitude toward the rejected alternatives. This is precisely how Holloway measured dissonance reduction. He claims that those subjects who gave a higher post-rating to the chosen battery or a lower post-rating to the rejected batteries or both, experienced dissonance reduction.

Selective exposure to post-decision information was the subject of the Jecker study. Dissonance theory would predict that exposure to post-decision information is selective with subjects favoring consonant information over information that was dissonant. As in the Holloway experiment, Jecker used this prediction to measure dissonance. Exposure to consonant information after a choice was used as a measure of dissonance reduction.

Recently several attempts have been made to directly measure dissonance by simply asking subjects questions concerning how much doubt or uncertainty they have about a choice they have just made. This method was used by Bell in his study among automobile purchasers reported earlier and by Shelby Hunt<sup>5</sup> in his study among appliance purchasers. In both these studies, perceived dissonance was measured by a seven-point scale numbered for each question in such a way that the higher the number, the higher the dissonance. Mean perceived dissonance was then defined as the mean score of the subject's responses to these questions.

In this study the author measured dissonance by asking each subject four questions -- the perceived dissonance scale -- each containing two bi-polar statements. The extent of subjects' agreement with each statement was scaled from one to seven (one = strong agreement with the low dissonance statement and seven = strong agreement with the high dissonance statement). The mean scale score on these four questions then became his dissonance measure (see Table 2). The intent of this scale is to measure directly the extent to which a subject is certain of his choice. This technique is almost identical to that used by Hunt and Bell, modified only to suit the particular product used in this experiment. Although the scale has not been extensively used, and its validity as a dissonance measuring device unproven beyond doubt, the questions have demonstrated their value in quantifying post-decision doubt among respondents. In addition to Bell and Hunt, this author had the opportunity to test the perceived dissonance scale by means of a pilot study conducted among seventy of his own undergraduate students in a manner similar to that of the final experiment. Here again, these questions were able to measure uncertainty with one's choice.

Milton Rokeach expressed the rationale behind this direct approach when he stated in a recent article that:

We can measure such states of dissonance and self-satisfaction in any experiment simply by asking the subject how he feels about what he may have said or done in a given situation. It might be objected that such a question really tests the subject's general self-esteem; self-confident persons would probably report satisfaction with their behavior, while a person with low self-esteem would probably report chronic dissatisfaction with his achievement, no matter how acceptable that achievement might be in some objective sense . . . it is also true that self-confident persons are not always satisfied with what they do and say in certain situations, and conversely, that persons of low self-confidence are not always dissatisfied with what they do or say.<sup>6</sup>

### Phase III

This investigator returned to reinterview the subjects four to eight days after the initial brand selection. This interval was selected so that the time between initial choice and callback would be consistent with other studies, principally the Engel, Bell and Hunt investigations. Although these investigators did not give the rationale behind using such a time span, this author felt it important to remain consistent with previous studies for purposes of comparing results. At the time of this final interview, subjects were told to recall any activities engaged in relating to eight-track tape players since their brand selection. Direct questioning of respondents (see Table 3 on the following page) into the kinds of additional information exposed to provided a means of establishing the extent to which personal vs. non-personal information was sought. In addition, the perceived dissonance scale was again administered to obtain an after measure of satisfaction with their choice and the ratings for each brand were obtained to get an after measure of attitudes towards the brands. Finally, subjects were given the opportunity to switch their selection to another brand. (See Appendix C for entire Phase III questionnaire.)

The experiment outlined above was pretested among seventy of this investigator's own undergraduate students. These students were identical in age, socio-economic background, and interests to the subjects in the final experiment. The results of this pretest are not included in this dissertation since the pretest was used as a means of refining the data collection procedure.

Table 3Additional Information Seeking  
Questions Asked of Subjects

1. Did you again read the literature provided?
2. Did you read any advertisements about eight-track tape players?
3. Did you read any other literature about eight-track tape players?
4. Did you recommend the brand you selected to anyone?
5. Did you discuss eight-track tape players with others?
6. Did you speak to a retail salesman about eight-track tape players?

Statistical Procedures for Testing Hypotheses

This section summarizes the statistical procedures employed and relates them to the major hypotheses of this study. A detailed discussion of each procedure with references is given in Appendix D.

Hypothesis 1.--The lesser the degree of individual self-confidence and the lower the level of pre-decision information about the alternatives from which to choose decreases, the greater the magnitude of post-decision dissonance.

Here, the dependent variable is dissonance as measured by the perceived dissonance scale administered immediately after the initial brand selection (Phase II), and the independent variables are information level and self-confidence. Information was measured at two levels and self-confidence was measured at three, resulting in a 3 x 2 factorial design, consisting of six experimental cells. The cells and the number of subjects in each are given below.

		<u>Self-Confidence</u>		
		High	Moderate	Low
<u>Information</u>	High	$S_s = 32$	$S_s = 47$	$S_s = 30$
	Low	$S_s = 35$	$S_s = 36$	$S_s = 37$

The two-factor analysis of variance technique was employed to determine whether differences in dissonance can be attributed to the self-confidence factor, the information factor, or by their effect in combination.

In order to determine whether differences in dissonance are related to the sex of the respondent, either alone or in combination with information or self-confidence, two additional analysis of variance procedures were undertaken. The first resulted in a 2 x 2 analysis of variance as follows:

		<u>Sex</u>	
		Male	Female
<u>Information</u>	High	$S_s = 53$	$S_s = 56$
	Low	$S_s = 54$	$S_s = 54$

The second resulted in a 3 x 2 analysis of variance as follows:

		<u>Self-Confidence</u>		
		High	Moderate	Low
<u>Sex</u>	Male	$S_s = 36$	$S_s = 38$	$S_s = 33$
	Female	$S_s = 31$	$S_s = 45$	$S_s = 34$

The parametric assumptions of the analysis of variance are not substantially violated since the sample size is large (217) and the fewest number of subjects in any cell is 30. However, since the cell sizes are unequal a two-factor analysis of variance by means of the unweighted means technique had to be employed.

A multiple regression analysis was then conducted to establish the relative importance of each variable in explaining dissonance. The output of this analysis is a regression equation,  $Y = a + \sum b_i x_i$ , relating each independent variable (x) to the dependent variable (Y), an indication of the direction of the relationship (b), and a coefficient of multiple correlation (r) providing a measure of association between the dependent and the set of independent variables. The squared value of this correlation coefficient ( $r^2$ ), called the coefficient of determination, provides a measure of the ratio of explained variation to the total variation in the dependent variable. In this study the coefficient of determination indicates the extent to which the variation in dissonance is explained by the major independent variables, self-confidence and information, and by sex.

Hypothesis 2.--Dissonance reduction is related to the amount of additional information sought. Individuals who are most active in seeking additional post-decision information will experience the greatest decrease in dissonance.

An analysis of the responses to the first six questions of the Phase III questionnaire (see Table 3) provided the opportunity to determine whether dissonance reduction was in any way related to the seeking out of additional information. These questions asked subjects whether they read the information provided them, whether they read additional information about eight-track tape players, or whether they spoke to anyone about these units.

Initial comparisons were done on a group basis and it there-

fore became necessary to establish which group(s) experienced a significant reduction in dissonance. Once this was done it was possible to compare their responses on these six questions to the group(s) that did not experience a significant reduction in dissonance.

The Wilcoxon signed-ranks test was the statistical procedure employed to determine whether the change in dissonance from Phase II to Phase III was a significant one for any of the six groups in the factorial design. This non-parametric test utilizes the direction and magnitude of the differences in mean perceived dissonance for each individual within each group. A method is provided for establishing whether this difference is greater than a theoretical expectation that the sum of plus and minus differences equal zero. A non-parametric test was used because the distribution of changes in dissonance could not be assumed to be normal. In addition, since each group constituted an independent sample the number of subjects was too few to justify a parametric test.

The second procedure employed to test this hypothesis was a comparison of responses to these six questions between individuals who reduced their dissonance and all other individuals, by total and by sex. The data is reported in terms of the proportion of individuals in each group indicating a "yes" or "no" response to each of these questions. A test for the significant difference between two proportions was conducted for each question to determine whether any significant differences exist in exposure to any particular type of additional information.

Finally, another multiple regression analysis was undertaken to determine the relative importance of a response to each of these questions, by total and by sex, to the change in dissonance.

Hypothesis 3.--Dissonance reduction will be accompanied by a more favorable attitude towards the chosen alternative. Conversely, the failure to reduce one's dissonance or an increase in dissonance will be accompanied by a less favorable attitude towards the chosen alternative.

The statistical procedure employed to test this hypothesis was the Chi-square test. The Chi-square test of the independence type enables one "to test whether a significant difference exists between an observed number of objects or responses falling into each category and an expected number based on the null hypothesis."<sup>8</sup> The six categories of responses for this study can be placed on a 3 x 3 contingency table as follows:

		<u>Change in Dissonance</u>		
		Increase	No Change	Decrease
<u>Change in Attitude</u>	Increase	$S_s$	$S_s$	$S_s$
	No Change	$S_s$	$S_s$	$S_s$
	Decrease	$S_s$	$S_s$	$S_s$

$S_s$  = Number of subjects in each response category

Thus, the actual number of subjects falling into each category is

compared to the expected number to determine whether a significant relationship exists.

Hypothesis 4.--Brand switching results from a failure to reduce one's dissonance level. Individuals who switch brands are those with high post-decision dissonance and who are not able to resolve this dissonance.

The Mann-Whitney U test was the statistical procedure employed to test the hypothesized relationship between dissonance and brand switching. This non-parametric test enabled the author to establish whether the difference in mean perceived dissonance from Phase II to Phase III for brand switchers was significantly different from that of subjects who did not change brand choices. Again, a non-parametric test was employed because of the nature of the distribution of the change in dissonance scores and the smallness of the sample size (twenty-seven switchers).

## CHAPTER III FOOTNOTES

<sup>1</sup>Allen Edwards, Edwards Personality Inventory, (Chicago, Ill.: Science Research Associates, 1967), p. 7.

<sup>2</sup>Ralph D'Agostino, "Simple Compact Portable Test of Normality: Geary's Test Revisited," Psychological Bulletin, 74 (February, 1970), pp. 138-140.

<sup>3</sup>N.P. Chapanis, and A.Chapanis, "Cognitive Dissonance: Five Years Later," Psychological Bulletin, 61 (1964), pp. 1-22.

<sup>4</sup>Sadaomi Oshikawa, "The Theory of Cognitive Dissonance and Experimental Research," Journal of Marketing Research, 5 (November, 1968), pp. 429-430.

<sup>5</sup>Shelby Hunt, "Post-Transaction Communications and Dissonance Reduction," Journal of Marketing, 34 (July, 1970), pp. 46-51.

<sup>6</sup>Milton Rokeach, "Persuasion That Persists," Psychology Today, September, 1971, p. 69.

<sup>7</sup>B.J. Winer, Statistical Principles in Experimental Designs, (New York: McGraw-Hill Book Co., 1962), p. 141.

<sup>8</sup>Sidney Siegel, Nonparametric Statistics, (New York: McGraw-Hill Book Co., 1956), p. 43.

## CHAPTER IV

### EVALUATION OF RESEARCH FINDINGS

#### Introduction

In this chapter the findings from the experiment described previously are presented and evaluated in terms of their implications for marketing practice. First, background data on the subject sample including ownership, interest in, and knowledge about eight-track tape players is developed.

The remainder of the chapter presents and evaluates the experimental findings as they relate to the four principal hypotheses of this dissertation:

1. Self-confidence, information and cognitive dissonance
2. Dissonance reduction
3. Attitude change and dissonance
4. Dissonance and brand switching

#### Background Findings

Ownership of eight-track tape players among the college population is low, with 205 or 95% of the subjects saying they did not own such a unit. Awareness of these units is quite high, however, with 188 or 87% being able to mention at least one brand of eight-track tape player. The brands most frequently mentioned were Panasonic, RCA, Craig and Lear Jet. Other brands mentioned were Fisher, Scott and Automatic Radio.

Subjects were then asked how knowledgeable they were about each brand they mentioned on a verbal rating scale where 4 = very knowledgeable, 3 = somewhat knowledgeable, 2 = a little bit knowledgeable and 1 = not at all knowledgeable. On the average, knowledge about each brand was between "somewhat" and "a little bit" knowledgeable. The principal sources of knowledge about each brand mentioned were advertisements, friends and relatives, magazine articles and retail salesmen.

A measure of subjects' interest in purchasing an eight-track tape player was obtained by having subjects indicate their purchase interest on a verbal rating scale where 4 = very much interested, 3 = somewhat interested, 2 = a little bit interested, and 1 = not at all interested. On the average, purchase interest in eight-track tape players was between "a little bit interested" and "somewhat interested". Table 4 below summarizes these background findings.

Table 4

Summary of Background Findings

	<u>Total</u>	<u>Male</u>	<u>Female</u>
<u>Ownership of Eight-Track Tape Players</u>			
Yes	5.5%	8.4%	2.7%
No	94.5	91.6	97.3
<u>Purchase Interest in Eight-Track Tape Players</u>			
Very much interested	14.2	13.1	15.2
Somewhat interested	33.3	32.7	33.9
A little bit interested	26.9	27.1	26.8
Not at all interested	25.6	27.1	24.1

### Self-Confidence, Information and Dissonance

Hypothesis 1.--As the degree of individual self-confidence and the level of pre-decision information decreases, the magnitude of post-decision dissonance will increase. This effect is not hypothesized as being continuous but only over the range of time being considered.

The findings relating to this hypothesis are first reported below for the total sample, then differences by sex are examined.

Of the six experimental groups, the high self-confidence - high information group, as hypothesized, experienced the lowest level of post-decision doubt (mean perceived dissonance of 3.05 - see Table 5 on the following page). Then, as either the degree of self-confidence or information level decreases, dissonance, again as hypothesized, increases. The only exception is the low information - low self-confidence group (see Table 5 and Figure I). This group, expected to experience the highest level of dissonance, actually experienced the least dissonance of the low information groups (3.46). The inconsistency of this finding may be explained in part by the results of the Cox and Bauer study reported earlier. In that study, the reader will recall, the investigators found subjects of low, as well as high self-confidence the least persuasible. The authors attributed this lack of persuasibility among the low self-confident subjects to their defensive reactions. They concluded that low self-confident people react defensively against attempts to influence their choice. Their lack of self-confidence causes a reaction that compels them to stick to their choice regardless of

Table 5

Mean Perceived Dissonance  
For Each Study Group  
By Total and By Sex

<u>Group</u>	<u>Dissonance Score<sup>a</sup></u>		
	<u>Total</u>	<u>Male</u>	<u>Female</u>
High information - high self-confidence	3.05	2.84	3.43
High information - moderate self-confidence	3.27	3.06	3.38
High information - low self-confidence	3.62	3.43	3.80
Low information - high self-confidence	3.73	3.98	3.54
Low information - moderate self-confidence	3.86	3.95	3.72
Low information - low self-confidence	3.46	3.00	3.89

<sup>a</sup> Score obtain from Perceived Dissonance Scale (See Table 2 for scale details.)

Summary of Two Factor Analysis of  
Variance for Total Sample

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>Degrees of Freedom</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Information	6.379	1	6.379	4.556	.05
Self-confidence	1.0632	2	.5316	.378	n.s.
Self-confidence x Information	8.506	2	4.253	3.026	.05
Error	296.54	211	1.4054		
Total	312.4882	2.6			

\* See Appendix D for details of statistical procedure.

Figure I  
Graphic Presentation of Table 5  
For Total Sample

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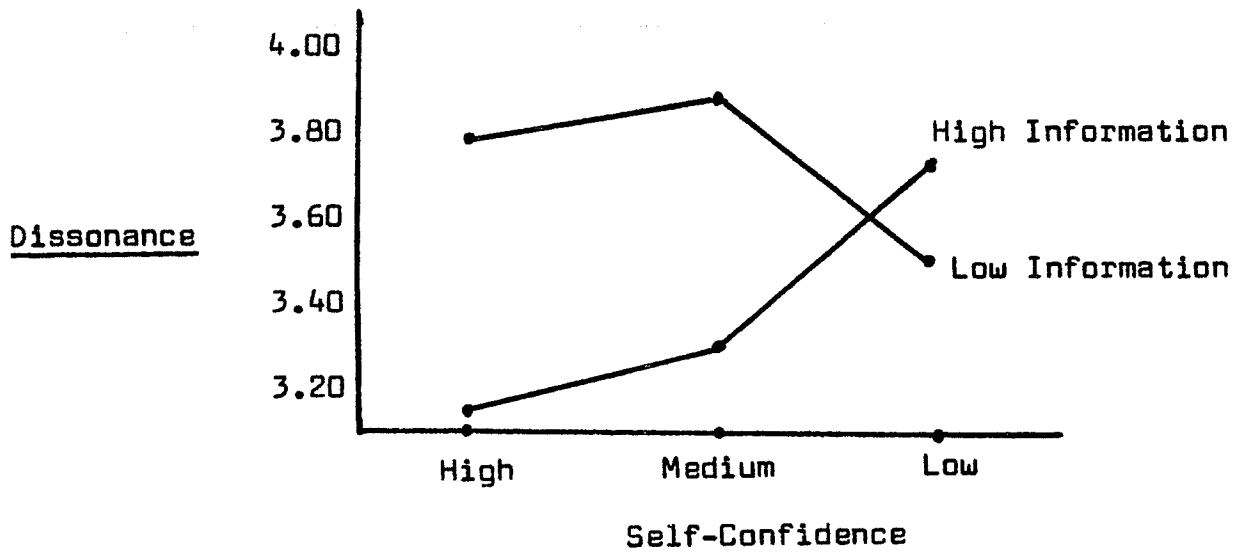
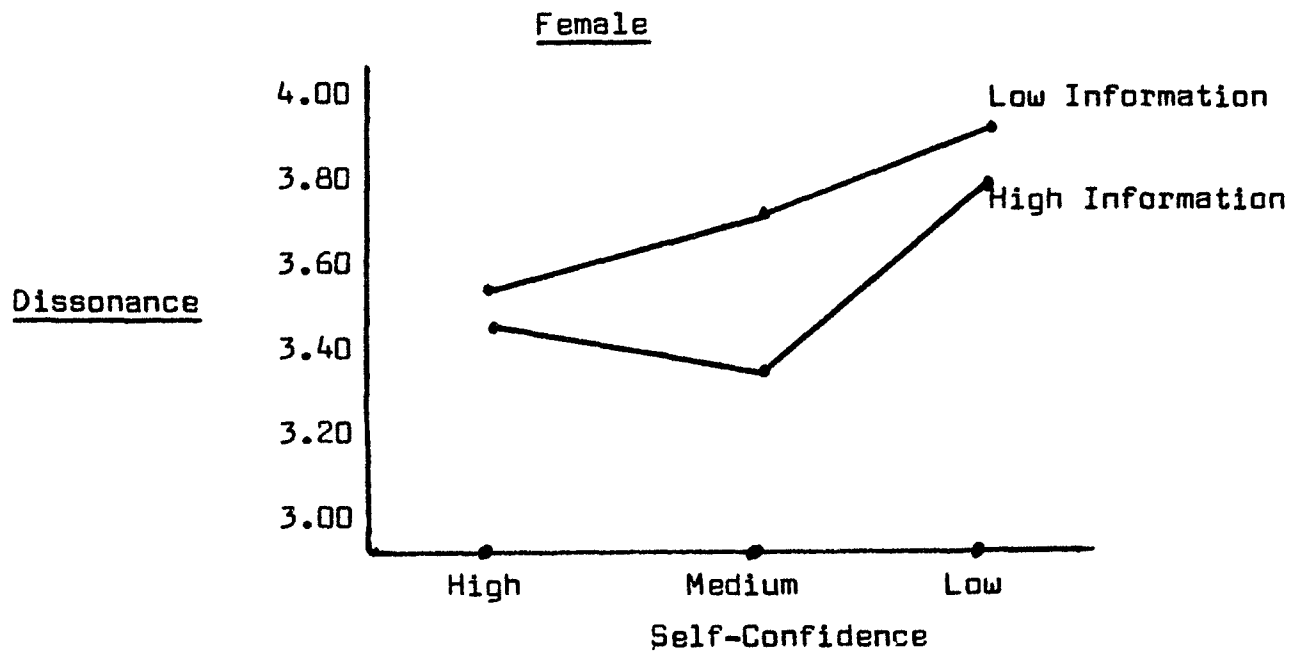
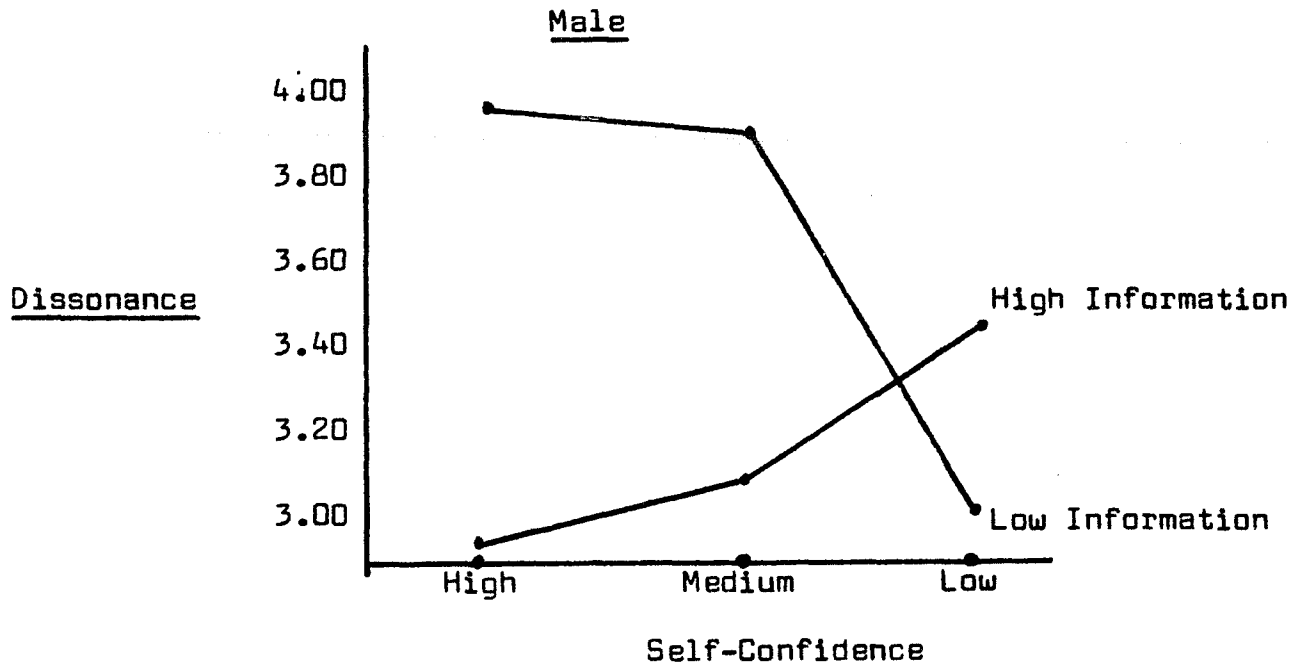


Figure II

Graphic Presentation of Table 5  
By Sex



what second thoughts they might have about its correctness.

The Cox and Bauer findings should also apply to the other low self-confidence group in this study -- the low self-confidence - high information group. This group, however, recorded a relatively high level of post-decision dissonance (3.62) -- the highest of the three high information groups. One might speculate that a large amount of information about each of five brands of tape players overwhelmed this group. The combination of low self-confidence and high information perhaps became both confounding and confusing, and resulted in greater doubts about their selections.

A two-factor analysis of variance was undertaken to assist in determining whether group differences in dissonance can be attributed to the self-confidence factor, the information factor, their effect in combination, or simply due to chance. The results of this statistical procedure (presented in Table 5 and graphically in Figure I) indicates that the experimental groups are not homogenous with respect to dissonance. The information effect and the combined effect of self-confidence and information are significant at the .05 level. Thus, differences among group means can be attributed to the information obtained and the joint effect of information and self-confidence. An examination of Figure II, however, reveals that the interaction effect of self-confidence and information has been generated principally by the combination of low self-confidence and information in males.

Two additional analysis of variance procedures were undertaken to determine whether observed differences in group dissonance were in any way significantly related to the sex of respondents. In

the first, sex and self-confidence level were considered. In the second, sex was considered with information level. In neither analysis did sex, either alone or in combination with information or self-confidence, reach significance at the conventional .05 level (see Tables 6 and 7 and Figures II and III).

Although sex is not found to be a statistically significant factor, an examination of the data does suggest that women tend to be more dissonant than men, especially when given a large amount of information with which to contend. The difference in mean dissonance between men and women at the low information level is .07, while at the high information level the difference is greater, .42. Also, women of low self-confidence are considerably more dissonant than men with similar self-confidence (3.85 vs. 3.20). (See Figures II, III and IV)

To determine the relationship between the dependent variable (dissonance) and the independent variables (self-confidence, information, the combined effect of self-confidence and information and sex) this investigator conducted a multiple regression analysis. The output of this statistical procedure is a multiple correlation coefficient ( $r$ ), which indicates the degree of association between the dependent and independent variables, and the coefficient of multiple determination ( $r^2$ ), which indicates the ratio of associated variation to the total variation in the dependent variable. An analysis of variance for the regression provided the test to determine whether this relationship is significant (i.e., is too great to be attributed to chance). Finally, the relative importance of each independent variable in predicting dissonance

Table 6Mean Perceived Dissonance  
(Sex by Self-Confidence)

<u>Self-Confidence Level</u>	<u>Sex</u>	
	<u>Male</u>	<u>Female</u>
High Self-Confidence	3.32	3.50
Moderate Self-Confidence	3.55	3.49
Low Self-Confidence	3.20	3.85

Summary of Analysis of Variance\*

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>Degrees of Freedom</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Sex	3.531	1	3.531	2.345	n.s.
Self-Confidence	.499	2	.250	.166	n.s.
Sex x Self-Confidence	4.744	2	2.372	1.575	n.s.
Error	317.8	211	1.506		
Total	326.574	216			

\* See Appendix D for detailed statistical procedure

Table 7

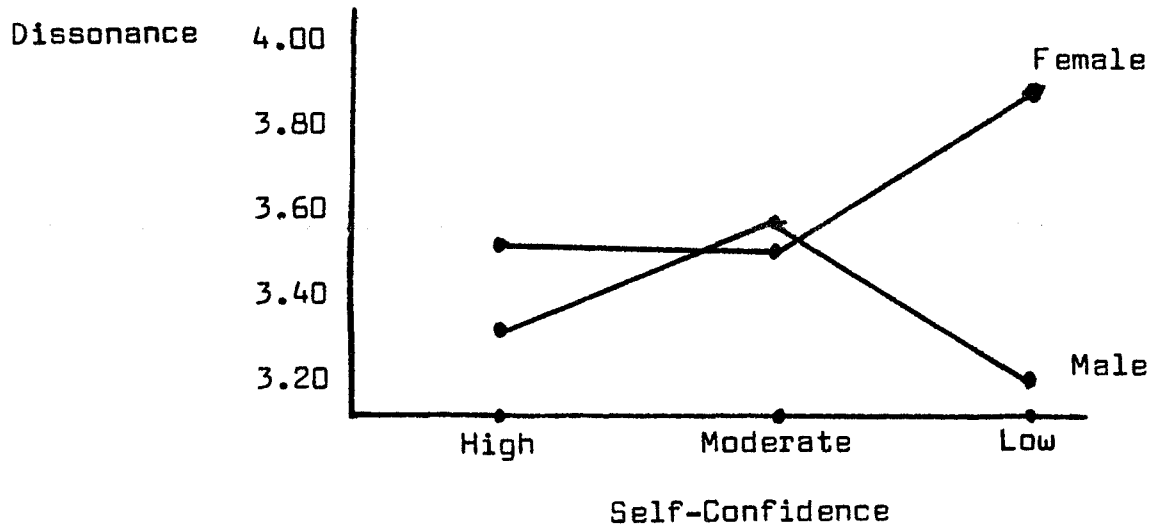
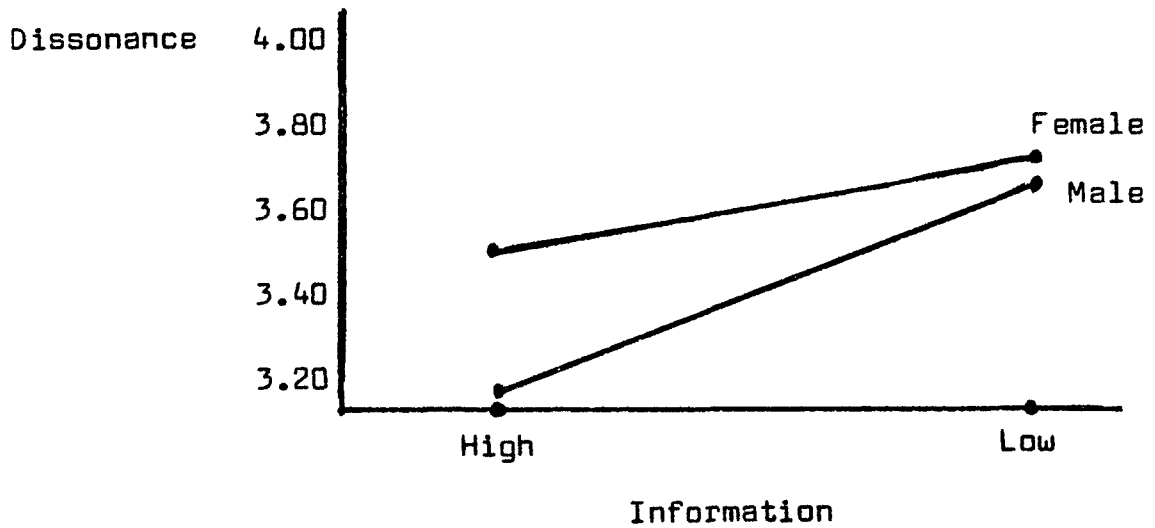
Mean Perceived Dissonance  
(Sex by Information Level)

<u>Information Level</u>	<u>Male</u>	<u>Female</u>
High information	3.08	3.50
Low information	3.64	3.71

Summary of Analysis of Variance\*

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>Degrees of Freedom</u>	<u>Mean Squares</u>	<u>F</u>	<u>p</u>
Information	8.0758	1	8.0758	5.486	.05
Sex	3.252	1	3.252	2.209	n.s.
Information x Sex	1.626	1	1.626	1.105	n.s.
Error	313.47	213	1.472		
Total	326.4238	216			

\* See Appendix D for detailed statistical procedure

Figure IIIGraphic Presentation of Table 6Figure IVGraphic Presentation of Table 7

was obtained by segregating their effect and testing their incremental contribution to  $r^2$  by the F ratio:<sup>1</sup>

$$F = \frac{(r^2_{y.A,B} - r^2_{y.A})/b}{(1 - r^2_{y.A,B})/(n-a-b-1)} \quad \text{where:}$$

$r^2_{y.A,B}$  = the incremented  $r^2$  based on a + b independent variables

$r^2_{y.A}$  = the smaller  $r^2$  based on only a independent variables

a = number of original independent variables

b = number of added independent variables.

Since the order in which the variables enter the analysis affects the outcome, the more significant variables were placed first.

The results of these methods are summarized in Table 8. The multiple correlation coefficient of .233 with  $F = 3.05$  is significant at the .05 level, meaning a greater than chance relationship exists between dissonance and the independent variables. The multiple coefficient of determination of .054 and the incremental contribution to this value of the information variable and the combined effect of information and self-confidence are significant also at the .05 level. The incremental contribution of self-confidence alone and sex are not.

These findings reveal that although only 5.4% of the total variation in dissonance can be explained by self-confidence, information, the combined effect of self-confidence and information and sex, the relationship is too great to be a chance occurrence. With respect to this study, information alone and the combination of information with self-confidence are the more important variables while self-confidence by itself and sex are of lesser importance.

Table 8

Summary of Multiple Regression Analysis  
With F-Ratio Test and Analysis of  
Variance of the Regression\*

Dependent Variable	Independent Variable(s)	Correlation Coefficient (r)	Coefficient of Determination $r^2$	Increment in $r^2$	F	p
Dissonance	A	.056	.0031	.0031		
Dissonance	B	.130	.0169	.0173	3.8	.05
				(A+B over A)		
Dissonance	A,B	.143	.0204	.0035	.77	n.s.
				(A+B over B)		
Dissonance	A, B and C	.223	.0497	.0293	6.5	.05
Dissonance	A, B, C and D	.233	.0543	.0046	1.0	n.s.

Regression Equation:  $Y = 1.73 + .18A + 1.15B - .14C + .17D$

Analysis of Variance for the Regression

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F	p
Attributable to Regression	4	20.127	5.032	3.05	.05
Deviation from Regression	213	351.423	1.65		
Total	217	371.550			

A = Self-Confidence

B = Information

C = Self-Confidence x Information

D = Sex

\* See Appendix D for detailed statistical procedure.

### Evaluation and Implications

It has been demonstrated that a statistically significant relationship exists between dissonance and the independent variables used in this study. Information alone and its combined effect with self-confidence are more powerfully related to dissonance than self-confidence alone, or sex alone. With the exception of one experimental group (low information - low self-confidence) dissonance, as hypothesized, increased as self-confidence and information decreased. Differences in group dissonance can be attributed to the joint effects of information level and self-confidence. Although differences in dissonance due to the sex of respondents was not significant, there is some evidence to suggest that women of equivalent self-confidence are more dissonant than men. Also, women faced with a large amount of information tend to be more dissonant than men with equivalent information.

The implications of these findings for the direct sales situation are of interest. Marketers should attempt, whenever possible, to assess the individual's self-confidence. Obviously this cannot always be done, and when possible, may be difficult to obtain. It may be attempted, however, in the pre-transactional interactions that take place between salesman and buyer. By means of the responses to a series of questions the salesman might be able to determine the prospect's self-confidence level and thus the prospect's dissonance potential.

More importantly, however, is the information made available to consumers. Marketers can affect the quantity and kind of information the potential customer has about his product. One of the main objectives of a firm's promotional strategy should be to inform consumers. Consumers should be provided with as great an amount of information of both a descriptive and technical nature as is feasible. This can be done whenever a consumer responds to the firm's offer for a catalogue, brochure, or booklet, or by providing dealer salesmen with detailed information about one's products. Generally, the more pre-decision information, the more certain one is of his choice. One word of caution. Women may be less able to contend with a lot of information than men, especially if it is technical in nature. For products that are purchased by women a moderate amount of information or less technical information may be in order.

### Dissonance Reduction

Hypothesis 2.--Dissonance reduction is related to the amount of additional information obtained. Individuals who are most active in obtaining additional information will experience the greatest decrease in dissonance.

Each experimental group recorded a net decrease in mean perceived dissonance from the time of the initial decision to the callback interview. As noted earlier, the Wilcoxon signed ranks test was employed to determine which of the experimental groups experienced a significant reduction in dissonance. The details of

this statistical procedure appear in Appendix D and the results are presented in Table 9 on the following page. The low information - moderate self-confidence group was the only one with a significantly lower dissonance level, although the high information - low self-confidence group recorded the largest net change in mean perceived dissonance score. Interestingly, this prior group had the highest level of immediate post-decision dissonance, and although their dissonance was reduced by a significant amount, the dissonance level remained the highest of all the groups. In fact, the relationship among the groups with respect to dissonance scores did not change. The high information - high self-confidence group still had the lowest dissonance of all groups and the low information - low self-confidence group still had the lowest dissonance of the low information groups.

Questions 1 - 6 of the Phase III questionnaire are intended to provide the data to test this hypothesis. These questions ask subjects about the information gathering activities engaged in following their initial choice (see Table 3 and Appendix C). The initial analysis was conducted on a group basis and comparisons made with respect to information gathering activities between the group experiencing the significant decrease in dissonance (low information - moderate self-confidence), the group experiencing the greatest net decrease in dissonance (high information - low self-confidence) and all other groups.

Although no significant differences appear among study groups with respect to information gathering activities, a pattern does

Table 9Results of the Wilcoxon Test For Significant Change in Dissonance

<u>Group</u>	<u>Initial Dissonance Level</u>	<u>Callback Dissonance Level</u>	<u>Difference</u>	<u>T*</u>	<u>Significance</u>
Hi Info - High S-C	3.05	2.91	- .14	94	n.s.
Hi Info- Mod S-C	3.27	3.01	- .26	298	n.s.
Hi Info - Lo S-C	3.62	3.18	- .44	97.5	n.s.
Lo Info - Hi S-C	3.73	3.43	- .30	137	n.s.
Lo Info - Mod S-C	3.86	3.49	- .37	144	.05
Lo Info - Lo S-C	3.46	3.32	- .14	175	n.s.

\* The smaller sum of the liked signed ranks.

emerge. The groups with the significant decrease in dissonance and with the largest net decrease in dissonance appear to be generally more active in obtaining impersonal forms of information (literature, advertisements) and less active in obtaining personal forms of information (discussing with others, talking to salesmen) than the remaining groups.

Although each study group recorded a net decrease in dissonance each contained individuals who also increased their dissonance. Thus, further analysis pursuing this line of inquiry was done on an individual basis with the sex of respondents being considered. Additional information gathering activities were examined for two kinds of subjects -- those who reduced their dissonance and those who did not. The author hoped this approach would clarify some of the tendencies suggested above. An examination of subjects' responses to these questions as summarized in Table 11 reveals that when total respondents are considered, no significant differences appear in information gathering activities. However, when the data are examined by sex of respondent, it becomes clear that men who reduced their dissonance were significantly more active in obtaining impersonal sources of information than women who reduced their dissonance, and directionally more active than men who did not.

The findings with respect to exposure to additional information and dissonance reduction presented above opened one avenue worth pursuing. Not all subjects reduced their dissonance level. Few meaningful differences in additional information gathering

Table 10

Responses to Questions 1-6 of Callback  
Interview For Each Study Group

	<u>High Self-Conf.</u>		<u>Moderate Self-Conf.</u>		<u>Low Self-Conf.</u>	
	<u>Low Info.</u>	<u>High Info.</u>	<u>Low Info.</u>	<u>High Info.</u>	<u>Low Info.</u>	<u>High Info.</u>
<u>Impersonal Information</u>						
<u>Did you again read literature provided?</u>						
Yes	57%	52%	69%	63%	58%	46%
No	43	48	31	37	42	54
<u>Did you read any advertisements for eight-track tape players?</u>						
Yes	36%	34%	16%	19%	15%	21%
No	64	66	84	81	85	79
<u>Did you read any other literature about eight-track tape players?</u>						
Yes	11%	14%	16%	22%	9%	17%
No	89	86	84	78	91	83
<u>Personal Information</u>						
<u>Did you discuss eight-track tape players with others?</u>						
Yes	79%	79%	69%	68%	79%	71%
No	21	21	31	32	21	29
<u>Did you speak to a retail salesman about eight-track tape players?</u>						
Yes	11%	10%	6%	7%	6%	4%
No	89	90	94	93	94	96
<u>Did you recommend the brand you selected to others?</u>						
Yes	18%	14%	16%	12%	15%	8%
No	82	86	84	88	85	92
Base:	(27)	(29)	(32)	(41)	(34)	(24)

Table 11

Responses to Questions 1-6 of Callback  
Interview For Subjects Who Reduced  
Dissonance and All Others

<u>Impersonal Information</u>	<u>Indiv. Who Did Not Reduce Dissonance</u>			<u>Indiv. Who Reduced Dissonance</u>		
	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>
<u>Did you again read literature provided?</u>						
Yes	57%	60%	55%	60%	66%*	47%
No	43	40	45	40	34	53
<u>Did you read any advertisements for eight- track tape players?</u>						
Yes	25%	29%	23%	20%	36%*	15%
No	75	71	77	80	64	85
<u>Did you read any other literature about eight- track tape players?</u>						
Yes	19%	15%	20%	20%	26%*	11%
No	81	85	80	80	76	89
<u>Personal Information</u>						
<u>Did you discuss eight- track tape players with others?</u>						
Yes	76%	73%	78%	72%	81%	71%
No	24	27	22	28	19	29
<u>Did you speak to a retail salesman about eight-track tape players?</u>						
Yes	8%	12%	5%	9%	10%	7%
No	92	88	95	91	90	93
<u>Did you recommend the brand you selected to others?</u>						
Yes	16%	12%	18%	12%	10%	15%
No	84	88	82	88	99	85
Base:	(84)	(41)	(43)	(103)	(53)	(50)

\* Significantly different from Females who reduced dissonance at the .05 level of significance.

Table 12

Summary of Multiple Regression Analysis  
With F-Ratio Test and Analysis of  
Variance for the Regression\*

Dependent Variable	Independent Variable(s)	Correlation Coefficient (r)	Coefficient of Determination (r <sup>2</sup> )	Increment in r <sup>2</sup>	F	p
Change in Dissonance	Exposure to any one form of additional information	.062	.004	.004		
Change in Dissonance	Exposure to a number of sources of additional information	.500	.250	.246	60.00	.01
Change in Dissonance	Impersonal Methods Only	.655	.429	.178	19.03	.01
Change in Dissonance	Personal Methods Only	.660	.436	.186	20.00	.01
Change in Dissonance	All Personal and Impersonal Methods	.677	.458	.022	1.25	n.s.
Change in Dissonance	All methods and sex of subject	.679	.461	.003	.121	n.s.

Analysis of Variance for the Regression

Source of Variation	Degree of Freedom	Sum of Squares	Mean Square	F	p
Attributable to regression	7	103.8	57.5	30.00	.01
Deviation from regression	210	644.6	1.91		
Total	217	747.8			

\* See Appendix D for detailed statistical procedures

activities were noted -- yet the pursuit of additional information was at a relatively high level for all subjects. What is the relationship then between any change in dissonance (either an increase or decrease) and obtaining additional information? A multiple regression analysis was made using the change in dissonance as the dependent variable and responses to the six additional information-seeking questions (see Table 3) dichotomized into dummy variable form of yes/no, as the independent variables to answer this question.

The regression analysis reveals a highly significant relationship ( $r = .680$ ) between changes in dissonance and obtaining additional information. Almost half of the change in dissonance can be related to information gathering activities of subjects ( $r^2 = .46$ ) (see Table 12). Conducting a similar kind of incremental analysis as in the previous section indicates that using more than one source of information contributes more to a change in dissonance than using any one source, either personal or impersonal ( $r^2 = .250$ ). Also, knowing the kind of additional information again makes a significant contribution of  $r^2$  although it makes no difference whether the information is a personal or impersonal source ( $r^2 = .429$  and  $.436$ ). Finally, no significant contribution to  $r^2$  is made when all forms are considered rather than impersonal vs. personal, or when sex of respondent is considered ( $r^2 = .458$  and  $.461$ ).

While the above incremental analysis indicates the contribution of each form of additional information to the change in dissonance, the regression equation itself reveals the direction

of this relationship. This analysis yields a regression equation in the form of:

$$Y = 2.42 - .22A + .71B - 1.18C - .62D + .33E - .19F + .10G$$

Where:

- A = Read literature again
- B = Read additional advertisements
- C = Read additional literature
- D = Recommended brand to others
- E = Discussed product with others
- F = Spoke to retail salesman
- G = Sex of respondent.

Thus, in order of their importance, reading additional literature, recommending the brand selected to others, re-reading the literature provided and talking with a salesman have the effect of reducing dissonance, while reading advertisements and talking with friends or relatives have the effect of increasing dissonance.

### Evaluation and Implications

Rather than being concerned with exposure to consonant vs. dissonant information as a mode of dissonance reduction as previous investigations were, this study sought to relate the level of information obtaining activities to dissonance reduction. Few differences were found with respect to these activities among study groups or between dissonance reducers and non-reducers. Of potentially much greater importance and consequences to the

marketer, however, is the significant relationship found between changes in dissonance and obtaining additional post-decisional information. The relationship found suggests that providing additional information after a purchase may increase as well as decrease dissonance. This finding may call into question the conventional wisdom that guides the marketer's behavior, and is not without other empirical support. A recent study by Shelby Hunt<sup>2</sup> found that appliance buyers who received a telephone call of reassurance from the salesman shortly after making the purchase had a higher dissonance level than buyers who received a letter from the store, and than buyers who received no further communications. Hunt conjectured these findings may be due to the fact that subjects receiving the telephone call may have suspected some ulterior motive on the part of the salesman, the telephone call may have come at an inopportune time, or the telephone call may have been interpreted as a sales device.

The effect of post-decision information on dissonance is still an open question. Apparently certain kinds of information under certain conditions are associated with lower dissonance (in this case and in Hunt's it was predominantly impersonal sources), while others may be associated with higher dissonance. Until this is clarified the marketer best proceed with caution when considering the extent and form of post-decision information to make available to recent buyers.

One further point to consider is the extent to which dissonance reduction is a process internal to the individual.

Attempts at dissonance reduction need not manifest themselves in any overt action. It may be the result of a reconciliation within the individual rather than an identifiable mode of behavior. This implies that marketers can do little to bring about dissonance reduction.

### Attitude Change and Dissonance

Hypothesis 3.--Dissonance reduction will be accompanied by a more favorable attitude towards the chosen alternative.

Attitudes are expected to become more favorable as dissonance decreases and less favorable as dissonance increases. That is to say, if a person is not successful in reducing his dissonance his attitude towards the brand selected should become less favorable, and conversely, if a person is able to reduce his dissonance, his attitude towards the brand selected should become more favorable.

Table 13 presents the findings relating to this hypotheses in a 3 x 3 contingency table. This table shows the number of subjects who increased, decreased, or experienced no change in dissonance (as measured by the perceived dissonance scale) by the number of subjects who increased, decreased or expressed no change in their attitudes towards their chosen brand (as measured by a 10-point rating scale where 1 = the worst product and 10 = the best product).

A comparison was made between the actual frequencies occurring in each cell and the frequencies expected to occur

Table 13

Change in Attitude vs. Change in Dissonance  
and Summary of Chi-Square Test

		<u>Dissonance</u>			Total
		Increased	No Change	Decreased	
Attitude Towards Chosen Brand	Increased	4	1	8	13
	No Change	43	10	72	125
	Decreased	19	7	23	49
	Total	66	18	103	187

Dissonance	Rating	(O) Observed Freq.	(E) Expected Freq.	O-E	(O-E) <sup>2</sup>	$\frac{(O-E)^2}{E}$
Increase	Increase	4	5	-1	1	.20
Increase	No Change	43	44	-1	1	.02
Increase	Decrease	19	17	2	4	.24
No Change	Increase	1	1	0	0	0
No Change	No Change	10	12	-2	4	.33
No Change	Decrease	7	5	2	4	.80
Decrease	Increase	8	7	1	1	.14
Decrease	No Change	72	69	3	9	.13
Decrease	Decrease	23	27	-4	16	.60
		187	187			2.46

$$\chi^2 = 2.46$$

$$d.f. = 4$$

$$c.v. \text{ at } .05 \text{ level of significance} = 9.49$$

n.s.

if the hypothesis were true, using the Chi-square test to determine if these differed significantly (see Appendix D for statistical procedure). The expected frequencies are calculated such that the totals are the same as in the actual observations and the cell frequencies are proportional to the totals. It was found that expected vs. actual frequencies did not differ significantly at the .05 level of significance.

These findings do not support the hypothesis and it must be concluded that the hypothesized relationship between changes in dissonance and one's attitude towards the brand selected could not be found. Subjects' attitudes towards the chosen brand remained unchanged to a great extent, regardless of what happened to perceived dissonance. One hundred and twenty-five or 67% of the subjects participating in Phase III did not change their rating of the brand they chose, while 169 or 90% recorded a change in dissonance.

### Evaluation and Implications

The fact that attitudes towards a brand become more favorable after its selection has been amply demonstrated. The question this study intended to answer was whether these post-purchase attitudes were in any way related to changes in post-purchase dissonance.

The findings of this study indicate that attitudes established as a result of a commitment to a particular brand appear to be enduring. Although 90% of the subjects experienced a change in dissonance level (higher or lower dissonance), 67% did not

change their attitudes towards the chosen brand. There are two possible explanations for such an occurrence. First, the act of buying apparently causes such a strong commitment to the one alternative that immediate post-decision attitudes endure even though the individual may have more or less doubt about the correctness of his choice. Secondly, the time interval between interviews (four to eight days) may have been too brief a period to allow for a change in attitudes. It is this latter explanation that appears to be the most plausible one. Other researchers<sup>3</sup> have found attitudes to persist for about an eight-day period, then change sets in.

Marketers are concerned with consumer attitudes -- their formation, endurance and change. They know that a favorable predisposition towards their brand will increase its chances of being purchased and conversely, an unfavorable predisposition will decrease the chance of purchase. It has been here demonstrated that attitudes, at least within the time period of this study, are lasting. It may be a difficult process to change them.

#### Brand Switching and Dissonance

Hypothesis 4.--Brand switchers are individuals who are unable to reduce their dissonance level.

In this study twenty-seven subjects subsequently changed their brand choice. The mean Phase II (immediate post-selection) dissonance for brand switchers was 3.64 compared to 3.39 for the 159 non-switchers -- not a significant difference. Dissonance for non-switchers subsequently decreased significantly to 2.94

compared with a significant increase to 4.83 for switchers (see Table 14). Also, it appears that women are more likely to switch than men since eighteen of the twenty-seven switchers were women.

The results of a Mann-Whitney U test (see Table 14 and Appendix D for details) indicates that the change in dissonance for switchers is significantly different from that of non-switchers (at the .05 level of significance). Thus, it would appear that brand switchers are individuals who have difficulty in resolving their post-decision doubts.

Table 14

Dissonance of Brand-Switchers  
and Non-Switchers and Summary  
of Mann-Whitney U Test

<u>Subjects<sup>a</sup></u>	<u>Mean Dissonance Phase II</u>	<u>s.d.</u>	<u>Mean Dissonance Phase III</u>	<u>s.d.</u>	<u>Change in Dissonance</u>
Switchers (n = 27)	3.64	1.26	4.83**	1.57	+1.19*
Non-Switchers (n = 159)	3.39	1.30	2.94**	1.24	-.45*

<sup>a</sup> One subject did not answer this question and was dropped from the analysis.

\* (U = 1121 - Z significantly different at .05 level  
( - See Appendix D for an explanation and  
(Z = 3.97 calculation of these values.

\*\*Significantly different from Phase II dissonance at the .05 level of significance using studentized and matched T-Test (See Appendix D).

Evaluation and Implications

Marketers spend millions attempting to build consumer loyalty to their brands. Loyal customers represent the brand's

basic franchise in the marketplace. They represent the foundation upon which greater market share can be built. No wonder marketers react aggressively whenever this franchise appears threatened. These reactions may be misguided. The threat may not be from competitors but from one's own customers. The consumer's inability to reconcile his dissonance after purchasing Brand A may leave him susceptible to the enticements of Brand B.

The findings from this study suggest that brand switching may be related to the inability to reduce dissonance, especially among women. Certainly the marketer has a stake in helping the buyer to lower dissonance. It appears that lower dissonance generates loyal customers. But in light of the previous discussion relating to dissonance reduction, how this can be accomplished in practice is not clear from this study. More study needs to be done before one can recommend the level, kind or even whether post-purchase information should be sent to recent buyers.

## CHAPTER IV FOOTNOTES

<sup>1</sup>Jacob Cohen, "Multiple Regression as a General Data-Analytic System," Psychological Bulletin, 70 (December, 1968), pp. 426-443.

<sup>2</sup>Shelby Hunt, "Post-Transaction Communications and Dissonance Reduction," pp. 46-51.

<sup>3</sup>Thomas Cook et al, "Cognitive, Behavioral and Temporal Effects of Confronting a Belief With its Costly Action Implications," Sociometry, 33 (September, 1970), pp. 358-369.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

#### Summary

The purpose of this dissertation is to relate certain personality and situational variables to the occurrence of post-decision dissonance, and to explore the marketing implications of specific derivations from dissonance theory. This research has investigated the relationship between self-confidence, information and dissonance; obtaining post-decisional information and dissonance reduction; post-decision attitude change and dissonance; and dissonance and brand switching. The following hypotheses were tested:

1. As the degree of self-confidence and the level of pre-decision information decreases, individual dissonance will increase.
2. Dissonance reduction is related to obtaining additional information. Individuals most active in seeking additional post-decision information will experience the greatest decrease in dissonance.
3. Dissonance reduction will be accompanied by a more favorable attitude towards the chosen alternative.
4. Brand switchers are individuals with a high level of dissonance and who are unable to resolve this dissonance.

A factorial experimental design (with information and self-confidence as the two main factors) was employed as a means of testing the above hypotheses. The sample, consisting of 217 undergraduate and graduate students (110 women and 107 men) was divided into six groups -- three levels of self-confidence and two levels of information. Assignment to high, moderate and low self-confidence groups was accomplished by means of subjects' scores on the self-confidence scale of the Edwards Personality Inventory. The investigator controlled the level of information to which each respondent was exposed (high or low).

After subjects made a choice among five brands of eight-track cartridge tape players, they were questioned about the certainty of their choice and their attitude towards each brand. Perceived doubt was used as an indicator of post-decision dissonance and brand ratings on a ten-point rating scale were used as an indicator of attitudes towards each brand.

Perceived dissonance and attitudes towards the brands was again measured among subjects from four to eight days after the initial selection. In addition, the investigator asked a series of questions of each subject to ascertain activities relating to eight-track tape players engaged in in the interim period.

### Conclusions

The findings presented in the previous chapter suggest the following conclusions:

1. There is a significant relationship between self-confi-

dence, information and post-decision dissonance. Differences in group dissonance were in the hypothesized direction (the lower the self-confidence and information level, the higher the dissonance) with the exception of one study group. These differences appear to be related to pre-decision information level primarily and to self-confidence only when considered together with information level.

2. Women become somewhat more dissonant than men when asked to evaluate a large amount of information prior to making a brand choice.

3. Obtaining additional post-decisional information has the potential of causing an increase as well as a decrease in dissonance. Contrary to current acceptable marketing practice, as exemplified by the following recent policy statement of Gerald Zarnow, President of Kodak, when he said, "The customer deserves not only a good product but also the knowledge and information needed to use it properly,"<sup>1</sup> dissonance may actually increase with additional information.

4. The selection of an alternative appears to result in an enduring attitude towards the selection, regardless of changes in dissonance level, at least within the time span of this research. In this study, although nine out of ten subjects experienced a change in dissonance level, two-thirds did not change their attitudes towards the selected alternative.

5. Individuals who switch brands appear to be those who have a relatively high level of post-decision dissonance and who

are unable to reduce their dissonance level.

### Recommendations for Future Research

In the course of an inquiry such as this, many shortcomings come to an author's attention. Every consumer behavior textbook contains a discussion of post-transaction dissonance. Upon reading such a discussion one would come away with the impression that the findings are conclusive and the implications clear. Nothing is further from the truth. No final policy or strategy recommendations can be made based on our current knowledge of consumers' post-transactional processes. Such being the case, the following recommendations are made in the hope that a model of post-transactional behavior may someday evolve:

1. In the final analysis, research in any area is only as good as our ability to measure the phenomenon under investigation. Unless a universally accepted technique for measuring dissonance of the post decision type is developed, the objection will always be raised that a particular experiment measured something other than dissonance.<sup>2</sup> The author recommends immediate efforts to establish an acceptable scale for measuring dissonance. There already has been some experience with the scale used in this study. Perhaps a standardized direct questioning scale, patterned after the Perceived Dissonance Scale should be developed and validated.

2. The author believes this study broke new grounds in two areas. The first was in considering the possible determinants of post-transactional dissonance, and the second was in

relating dissonance to brand switching. Additional research is recommended to attempt to replicate and expand upon these findings. Perhaps there are other personality or situational factors that may help explain dissonance or perhaps the findings of this study can be explained by some other psychological phenomena. Perhaps a link can be found between dissonance and other consumer phenomena, such as perceptions.

3. Attempts should be made to replicate the findings of this study using other kinds of subjects and other kinds of products. The findings will not have universal applications unless replicated under a variety of conditions.

4. Finally, this study was of an experimental nature. Variables were controlled that may not be controllable; variables were manipulated that may not be manipulatable; variables were measured that may defy measurement; and variables unaccounted for may have affected the results. For example, in this study the brand selection process was an attempt to simulate the purchase, which may or may not have generated the same degree of commitment and involvement as does an actual purchase. Further research is recommended under actual buying conditions.

## CHAPTER V FOOTNOTES

<sup>1</sup>"How Kodak Will Exploit its New Instamatic," Business Week, March 18, 1972, p. 46.

<sup>2</sup>Sadaomi Oshikawa, "The Measurement of Cognitive Dissonance: Some Experimental Findings," Journal of Marketing, 36 (January, 1972), pp. 64-67.

APPENDIX A

PHASE I QUESTIONNAIRE

Dear Participant:

You are about to respond to a three-part questionnaire as the first of a three-phase marketing research study on some aspects of consumer behavior. The questionnaire is designed to obtain a measure of some of your attitudes for the purpose of determining how typical college students score on such questions. There are no right or wrong answers. Please answer honestly so that the subsequent phases of the research project can be completed successfully. Do not identify yourself in any way but place the code number given to you in the appropriate space for each part. Read the directions carefully before turning to the questions.

Thank you for your cooperation.

## PART I

## DIRECTIONS

This inventory contains a number of statements that other people may or may not use in describing you. None of the statements are about your religious or political beliefs or your health. Every statement in the inventory is a statement that some person has used at one time or another in describing another person. Presumably, anyone who has observed you over a long period of time would be in a position to judge which of the statements in this inventory accurately describe you. Since not all people are alike, the description your friends would give of you would not be exactly the same as the description they would give of someone else.

Assume, for example, that those persons who know you best were asked to mark each statement True or False to indicate whether they believe the statement does or does not accurately describe you. The answer that most of these people would give is considered to be the "correct" or "right" answer to each statement and thus would provide the most accurate description of you as others see you.

It would of course be possible, although perhaps difficult, to ask several individuals who know you well to answer each statement True or False about you. Instead of this, you are asked to indicate how you believe they would describe you. Your task, in other words, is to predict how people who know you well would mark each statement if they were asked to describe you. Consider the following statement:

He is good at explaining things to others.

If you believe that people who know you well would say that this statement accurately describes you, then you should mark it True on your answer sheet. If you believe they would say that this statement does not accurately describe you, then you should mark it False. However, if you are in doubt about how other people would mark a given statement in describing you, put a question mark between the True and False on the answer sheet like this T ? F. Then mark the statement True or False according to your best guess. Be sure to mark each statement True or False even though you have added a question mark to indicate that you are in doubt about the answer.

To mark your answers, make an X over either the True or False. If you wish to change an answer DO NOT ERASE. Instead, draw a circle around the answer you wish to change, like this. (X)  
Then mark your new answer in the regular way with an X.

While there is no time limit for taking this inventory, it is best to work as rapidly as possible. Be certain to mark each statement True or False even though you may also have written in a question mark.

If you are satisfied that you know how to proceed, turn the page and begin.

- T F 1. He likes to work on a project where he has full responsibility for getting it done.
- T F 2. He gets upset if he has four or five things requiring his attention at the same time.
- T F 3. He is willing to accept the responsibility of making the plans for something that has to be done.
- T F 4. He is the sort of person others like to have with them in time of trouble.
- T F 5. He has confidence in his ability to get things done.
- T F 6. He is not sure of his opinions.
- T F 7. He dislikes being forced to make a decision on the spur of the moment.
- T F 8. He has the ability to make sound judgments.
- T F 9. He hates to work under pressure.
- T F 10. He has difficulty making an important decision without help from others.
- T F 11. He does not resent having to assume responsibility for the actions of others.
- T F 12. He is seldom nervous when faced with a new situation.
- T F 13. He shows considerable initiative in accepting responsibility.
- T F 14. He is sure of himself in most situations.
- T F 15. He is able to see the broader implications of a problem.
- T F 16. He is self-confident in whatever he does.
- T F 17. He makes up his mind quickly about things.
- T F 18. He thinks most things out for himself.
- T F 19. He is not afraid to assume responsibility for getting a job done.
- T F 20. He is inclined to be overly concerned with the minor details of a problem.

- T F 21. He is willing to accept the responsibility for a group decision.
- T F 22. He makes others feel they can have confidence in his decisions.
- T F 23. He has confidence in himself.
- T F 24. He has difficulty making up his mind about important issues.
- T F 25. He dislikes being hurried about anything.
- T F 26. He is able to make sound decisions quickly.
- T F 27. He is undependable when working under pressure.
- T F 28. He becomes anxious whenever he finds out that there is more than one answer to a question.
- T F 29. He is one of the first to volunteer for a difficult assignment.
- T F 30. He feels quite secure in a situation he has never experienced before.
- T F 31. He is able to plan work for others.
- T F 32. He is confident that he will be able to face any crisis in his life without undue stress and strain.
- T F 33. He is not afraid to tackle unfamiliar assignments.
- T F 34. He believes that he has the ability to be successful in anything he undertakes.
- T F 35. He does very well when he has to do something in a hurry.
- T F 36. He has no difficulty deciding things by himself.

APPENDIX B

PHASE II QUESTIONNAIRE

## Phase 2

Dear Participant:

This study is being conducted with the cooperation of a leading manufacturer of stereo equipment. We are interested in obtaining your opinions about home eight-track cartridge tape players. We would like to determine how well the college student uses information in making a brand selection. Specifically, how "smart" a buyer are you compared to other population groups.

In this phase of the study you will be given information about five brands of home eight-track cartridge tape players and a list of criteria Stereo magazine used to judge these units. The objective is to see if you can determine, using the information provided, which of these units Stereo rated the best. In appreciation of your cooperation two things will happen to those of you who select the unit Stereo rated the best. First, your code number will be placed in a lottery. From this lottery a drawing will be held at the end of this study and two units will be given away. Second, you will be able to participate in a consumer evaluation panel for the purpose of periodic testing of new stereo equipment prior to its introduction on the market.

Remember, this is not a guessing game so choose wisely since the chances are good that you may soon own a \$100 eight-track cartridge tape player with speakers. Please turn the page and begin.

Thank you.

## Part I

Each of you have been provided with an envelope marked "Information Kit." Before opening it please answer the following questions.

1. What is your sex? Male \_\_\_\_\_ Female \_\_\_\_\_
2. What year are you in? Freshman \_\_\_\_\_ Junior \_\_\_\_\_  
Sophomore \_\_\_\_\_ Senior \_\_\_\_\_
3. Do you currently own a home eight-track cartridge tape player?  
Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, what brand do you own? \_\_\_\_\_

4. How interested are you in purchasing a home eight-track cartridge tape player? Would you say you are: (Check one)

Very much interested in buying one \_\_\_\_\_

Somewhat interested in buying one \_\_\_\_\_

A little bit interested in buying one \_\_\_\_\_

Not at all interested in buying one \_\_\_\_\_

5. Please record your responses to question 5a-c in the recording grid below. Be sure to record your responses under the appropriate column.

- a. What brands of home eight-track cartridge tape players can you think of? (Record responses under column headed "5a" below.)

- b. For each brand mentioned in (a) indicate, using the following code, how knowledgeable you are about each. (Place responses under "4b".)

1 = Very knowledgeable

2 = Somewhat knowledgeable

3 = A little bit knowledgeable

4 = Not very knowledgeable

- c. In the column headed "c" below indicate the sources of your information for each brand listed in (a). Using the following code record as many as apply for each brand in order of their importance:

1 = Advertisements

2 = Retail salesmen

3 = Friends or relatives

4 = Catalogue material

5 = Magazine articles

6 = Other (specify)

Recording Grid For Question 5a-c

	<u>Brands Can Think of</u>	<u>Amount of Knowledge</u>	<u>Sources of Knowledge</u>
Brand 1	_____	_____	_____
Brand 2	_____	_____	_____
Brand 3	_____	_____	_____
Brand 4	_____	_____	_____
Brand 5	_____	_____	_____

## Part II

You may now open the envelope marked "Information Kit." It contains descriptive information about each of the five brands Stereo magazine rated and the criteria used in the ratings. Read the material carefully since we are trying to determine how "smart" a buyer you, the college population, are. Remember, if you select the unit Stereo rated the best there is a good chance you may win it in the drawing. (After you have decided indicate your selection in Q. 6)

6. I think Stereo magazine rated

(Check one)

Lloyd's \_\_\_\_\_

Music Master \_\_\_\_\_

Lear-Jet \_\_\_\_\_

Craig \_\_\_\_\_

Decca \_\_\_\_\_

The Best.

7. We would like to get your overall opinion of the brands you just read about. The ratings are from 1 to 10 and should be based on what you just read about each brand. A rating of 10 is the highest you can rate a brand while a rating of 1 is the lowest you can rate each brand. The ratings of 2 to 9 represent a range of opinion about the brands somewhere in between. The higher the number you rate the brand the closer you rate it to "The Best", while the lower you rate the brand, the closer it is to being "The Worst".



Each question has two statements. We want you to first determine which of the two statements you agree with. For example, if you agree with the statement on the right, you will want to place an "X" in one of the three spaces to the right of the neutral space, depending upon the extent of your agreement with the statement. If you very much agree with the statement "I had enough time to make the right choice", you would then place your "X" in the space over the words "Very Much Agree" to the right of the neutral space.

On the other hand, if you "Moderately" agree with the statement "I needed more time to make the right choice", you would then place an "X" over the words "Moderately Agree" to the left of the neutral space. If you don't agree with either of the two statements, then place an "X" in the center space over "Neutral".

Please put an "X" in only one space per question. However, be sure to answer every question.

- |  |   |
|--|---|
| 8. I would like to have additional information about the brand I selected. | I would not like to have additional information about the brand I selected. |
|--|---|

:	:	:	:	:	:	:
Very	Moderately	Slightly	Neutral	Slightly	Moderately	Very
Much	Agree	Agree		Agree	Agree	Much
Agree						Agree

- |   |  |
|---|--|
| 9. I would like to have more information about the brands I did not select. | I would not like to have more information about the brands I did not select. |
|---|--|

:	:	:	:	:	:	:
Very	Moderately	Slightly	Neutral	Slightly	Moderately	Very
Much	Agree	Agree		Agree	Agree	Much
Agree						Agree

- |   |   |
|---|---|
| 10. The information I got was adequate enough to make the choice. | The information I got was not enough to make the proper choice. |
|---|---|

:	:	:	:	:	:	:
Very	Moderately	Slightly	Neutral	Slightly	Moderately	Very
Much	Agree	Agree		Agree	Agree	Much
Agree						Agree

11. There is no doubt in my mind that I made the right choice.

There is considerable doubt in my mind that I made the right choice.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Agree Agree Agree Much  
 Agree Agree Agree Agree Agree Agree

12. If a friend or relative was going to buy an eight-track tape player I would not recommend the one I chose.

If a friend or relative was going to buy an eight-track tape player I would recommend the one I chose.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Agree Agree Agree Much  
 Agree Agree Agree Agree Agree Agree

13. I needed more time to make the proper choice.

I had enough time to make the proper choice.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Agree Agree Agree Much  
 Agree Agree Agree Agree Agree Agree

14. I am not satisfied with the selection I made.

I am satisfied with the selection I made.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Agree Agree Agree Much  
 Agree Agree Agree Agree Agree Agree

15. I would like to inform my friends and relatives of my selection.

I would not like to inform my friends and relatives of my selection.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Agree Agree Agree Much  
 Agree Agree Agree Agree Agree Agree

16. I am not sure that the brand I selected was the best of the alternatives.

I am sure that the brand I selected was the best of the alternatives.

: Very : Moderately : Slightly : Neutral : Slightly : Moderately : Very :  
 Much Agree Agree Neutral Agree Agree Much Agree  
 Agree

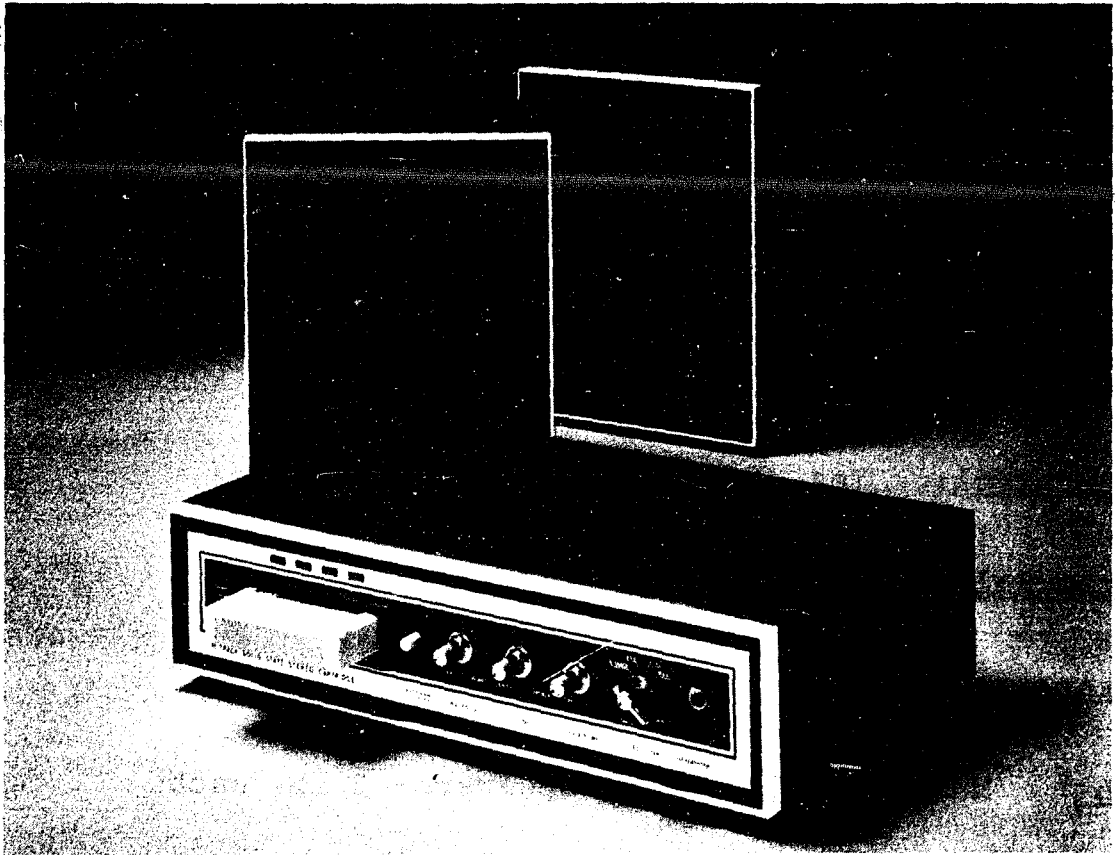
17. If I were going to buy a stereo unit I would buy the brand I selected.

If I were going to buy a stereo unit I would not buy the brand I selected.

: Very : Moderately : Slightly : Neutral : Slightly : Moderately : Very :  
 Much Agree Agree Neutral Agree Agree Much Agree  
 Agree

## EXHIBIT 1B

## 8-Track Stereo

**RS-810S****HANDSOME 8-TRACK STEREO CARTRIDGE TAPE PLAYER**

*The Music Master 8's* distinguished walnut cabinetry and handsome design make it a fine addition to any room. Its superb performance as an 8-track stereo cartridge tape player makes it a proud addition to the high fidelity system of those who demand top quality music reproduction. Or you can hook up your record player and other components and drive them all with a big 16 watts of peak music power. Push button channel selector and illuminated channel indicators make for effortless, precise operation. Never any rewinding or threading to interrupt your listening pleasure. *The Music Master 8* has a separate balance control and features a separate, continuous tone control, permitting you to exact a perfect bass-treble balance for the sound most pleasing to your ear. Equipped with a headphone jack for private stereo listening. Solid-state engineered for years of dependable, trouble-free service.

## EXHIBIT IB (Continued)

Description: 8-track AC stereo cartridge tape player with speakers

Color: Walnut wood

Power Sources: AC 120V

Frequency Response: 50-12,000 Hz

Peak Music Power: 16w

Operation: Slide-in

Tape Speed: 3 3/4 ips

Tone Control: Yes

Program Selector: Yes

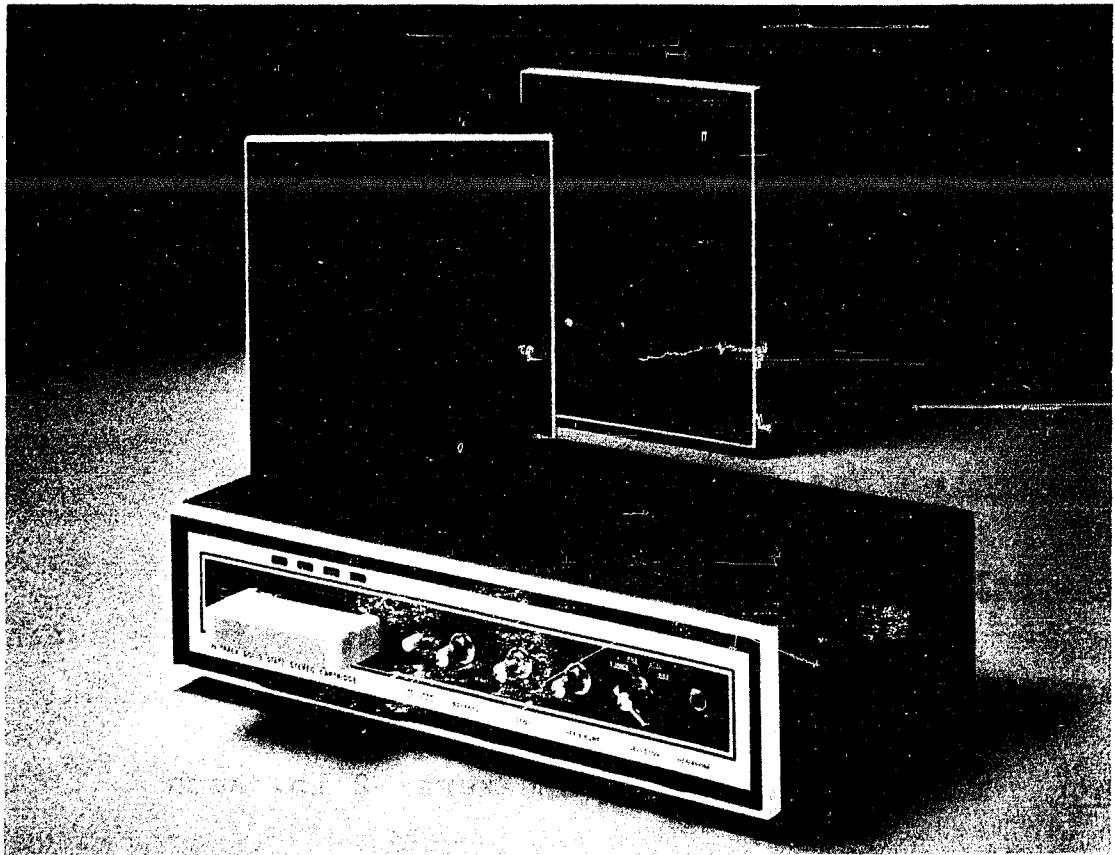
Speaker: Two 6½"

Weight: Main- 13½ lb. Speakers- 2 lb. each

Dimensions: Main- 16½"W x 4"H x 9"D  
Speakers- 8½"W x 11½"H x 5½"D

<u>Terminals:</u>	Input- Aux 2	Output- Line 2
	Phono 4	Ext. Sp. 2
	Ceramic 2	Headphone 1
	Mag. 2	

## EXHIBIT IIB

**8-Track Stereo**
**RS-810S**  
**HANDSOME 8-TRACK STEREO CARTRIDGE TAPE PLAYER**

*The Music Master 8's* distinguished walnut cabinetry and handsome design make it a fine addition to any room. Its superb performance as an 8-track stereo cartridge tape player makes it a proud addition to the high fidelity system of those who demand top quality music reproduction. Or you can hook up your record player and other components and drive them all with a big 16 watts of peak music power. Push button channel selector and illuminated channel indicators make for effortless, precise operation. Never any rewinding or threading to interrupt your listening pleasure. *The Music Master 8* has a separate balance control and features a separate, continuous tone control, permitting you to exact a perfect-bass-treble balance for the sound most pleasing to your ear. Equipped with a headphone jack for private stereo listening. Solid-state engineered for years of dependable, trouble-free service.

## EXHIBIT IIIB

Criteria Stereo used to rate tape players

1. Good music reproduction requires the ability to reproduce a wide range of frequencies and that the player reproduce the frequencies within its range smoothly. In general, the lower the tape speed the more restricted the frequency range.
2. The highest and lowest frequency measurements are a good guide to tone quality, the primary ratings factor. For units of this sort, rich, full bass would require response down to about 100 hertz (Hz), while treble response should be in the 8,000 to 10,000 Hz area.
3. Lack of flutter is also an important characteristic in a tape player. Flutter is a wavering in speed that shows up in music by making its pitch unsteady.
4. Controls should be accessible and easy to use.
5. Size of speakers is an important determinant of the quality of the sound reproduced.
6. Accessories available such as head phones or a tape counter that indicates where you are on the tape.

APPENDIX C

PHASE III QUESTIONNAIRE

## Phase 3

Dear Participant:

In this final phase of the research study we are interested in the kinds of activities you engaged in since making your brand selection. Think for a moment about any activity relating to eight-track cartridge tape players that you may have engaged in, then answer the questions that follow.

Thank you.

## PART I

1. a. Did you again read the literature provided you in the "Information Kit"?

Yes \_\_\_\_\_ (Ans. b then c)      No \_\_\_\_\_ (Ans. b)

- b. If yes, why?    If no, why not?

- c. If yes to "1a", what would you say about the amount of time and the number of times you read the literature for the brand you selected versus the brands you did not select? Would you say: (Check one)

1. I read more about the brand I selected \_\_\_\_\_

2. I read more about the brands I did not select \_\_\_\_\_

3. I read the information about equally for each \_\_\_\_\_

2. Since our last meeting, what would you say about your reading of advertisements for eight-track tape players? Would you say: (Check one)

a. I read more ads for the brand I selected \_\_\_\_\_

b. I read more ads for the brands I did not select \_\_\_\_\_

c. I read the same number of ads for each \_\_\_\_\_

d. I did not read any ads for tape players \_\_\_\_\_

3. Since our last meeting, did you read any other literature about eight-track tape players?

Yes \_\_\_\_\_      No \_\_\_\_\_ (Go to Q. 4)

- a. If yes, was it for the brands you did not select?

Yes \_\_\_\_\_      No \_\_\_\_\_

- b. If yes, was it for the brand you selected?

Yes \_\_\_\_\_      No \_\_\_\_\_

- c. If yes, what type of literature?

4. Since our last meeting did you recommend the brand you selected to anyone who was interested in buying an eight-track unit?

Yes \_\_\_\_\_ (Ans. b) No \_\_\_\_\_

b. If yes, to how many people? \_\_\_\_\_

5. Since our last meeting, what would you say about the extent to which you discussed eight-track tape players to others? Would you say (Check one)

a. I discussed more about the brand I selected \_\_\_\_\_

b. I discussed more about the brands I did not select \_\_\_\_\_

c. I discussed each equally \_\_\_\_\_

d. I did not discuss eight-track tape players with anyone \_\_\_\_\_

6. Since our last meeting, did you speak to a retail salesman about eight-track tape players?

Yes \_\_\_\_\_ No \_\_\_\_\_

PART II

Now that you have had some time to think about your choice, please answer the following questions about how you personally feel about your selection. You will, as before, be presented with two statements. Place an "X" over the word that best describes the extent of your agreement with the statements.

7. I would still like to have more information about the brand I selected.

I now have enough information about the brand I selected.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :

Very Much Agree    Moderately Agree    Slightly Agree    Neutral    Slightly Agree    Moderately Agree    Very Much Agree

8. I would still like to have more information about the brands I did not select.

I now have enough information about the brands I did not select.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :

Very Much Agree    Moderately Agree    Slightly Agree    Neutral    Slightly Agree    Moderately Agree    Very Much Agree

9. There is no doubt in my mind that I made the right choice.

There is still considerable doubt in my mind that I made the right choice.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Neutral Agree Agree Agree Much  
 Agree

10. I am satisfied with the selection I made.

I am not satisfied with the selection I made.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Neutral Agree Agree Agree Much  
 Agree

11. If a friend or relative were going to buy an eight-track tape player I would recommend the brand I chose.

If a friend or relative were going to buy an eight-track tape player I would not recommend the brand I chose.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Neutral Agree Agree Agree Much  
 Agree

12. I am sure that the brand I selected was the best of the alternatives.

I am not sure that the brand I selected was the best of the alternatives.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Neutral Agree Agree Agree Much  
 Agree

13. If I were going to buy an eight-track tape unit I would buy the brand I selected.

If I were going to buy an eight-track tape unit I would not buy the brand I selected.

: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ :  
 Very Moderately Slightly Neutral Slightly Moderately Very  
 Much Agree Agree Neutral Agree Agree Agree Much  
 Agree

## PART III

We would again like to get your overall opinion of the brands you considered. The ratings are again from 1 to 10 and should be based on everything you know about each brand. A rating of 10 is the highest you can rate the brand, while a rating of 1 is the lowest you can rate each brand. The ratings of 2 to 9 represent a range of opinion about the brands somewhere in between. The higher the number you rate the brand the closer you rate it to the "Best", while the lower the number you rate the brand the closer it is to being the "Worst".

14. Considering everything about Lloyd's, what rating would you give it? (Circle one)

<u>The Worst</u>					<u>The Best</u>				
1	2	3	4	5	6	7	8	9	10

15. Considering everything about Music Master, what rating would you give it? (Circle One)

<u>The Worst</u>					<u>The Best</u>				
1	2	3	4	5	6	7	8	9	10

16. Considering everything about Lear Jet, what rating would you give it? (Circle one)

<u>The Worst</u>					<u>The Best</u>				
1	2	3	4	5	6	7	8	9	10

17. Considering everything about Craig, what rating would you give it? (Circle one)

<u>The Worst</u>					<u>The Best</u>				
1	2	3	4	5	6	7	8	9	10

18. Considering everything about Decca, what rating would you give it? (Circle one)

<u>The Worst</u>					<u>The Best</u>				
1	2	3	4	5	6	7	8	9	10

19. O.K., if you would like to change your mind and make another selection indicate your new choice here.

Me new selection is \_\_\_\_\_

20. a. Would you say that the activities you engaged in relating to eight-track tape players since your brand selection would have been the same if you did not participate in this experiment?

Yes \_\_\_\_\_

No \_\_\_\_\_

- b. If yes, Why? If no, Why Not?

APPENDIX D  
STATISTICAL PROCEDURES

Analysis of Variance for Unequal Cell Size  
by the Method of Unweighted Means<sup>+</sup>

To determine whether differences in cell means can be attributed to a main effect and/or a joint effect.

(General Procedure)

	$b_1$	$b_2$	$b_3$
$a_1$	$\overline{AB}_{11}$	$\overline{AB}_{12}$	$\overline{AB}_{13}$
$a_2$	$\overline{AB}_{21}$	$\overline{AB}_{22}$	$\overline{AB}_{23}$

$$\bar{A}_1 = \frac{\sum_j \overline{AB}_{1j}}{q} \qquad \bar{B}_1 = \frac{\sum_i \overline{AB}_{i1}}{p}$$

$$\bar{G} = \frac{\sum_i \bar{A}_i}{p} = \frac{\sum_j \bar{B}_j}{q} = \frac{\sum \sum \overline{AB}_{ij}}{pq}$$

$$\bar{n}_h = \frac{pq}{\sum \sum (1/n_{ij})}$$

$$SS_w \text{ cells} = \sum \sum SS_{ij}$$

$$SS_a = \bar{n}_h q \sum (\bar{A}_i - \bar{G})^2$$

$$SS_b = \bar{n}_h p \sum (\bar{B}_j - \bar{G})^2$$

$$SS_{ab} = \bar{n}_h \sum (\overline{AB}_{ij} - \bar{A}_i - \bar{B}_j + \bar{G})^2$$

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<sup>+</sup>This procedure is to be used instead of the least squares method when the unequal cells is a random occurrence rather than as a result of the experimental procedure. See B. J. Winer, Statistical Principles in Experimental Designs. New York: McGraw-Hill Book Co., 1962.

Self-Confidence X Information  
Self-Confidence (b)

		(b <sub>1</sub> ) High	(b <sub>2</sub> ) Moderate	(b <sub>3</sub> ) Low
<b>Information (a)</b>				
High (a <sub>1</sub> )	n	32	47	30
	∑ X	97.5	153.50	110.4
	∑ X <sup>2</sup>	322.71	567.07	435.71
	SS	25.64	65.75	29.44
	X̄	3.05	3.27	3.62
Low (a <sub>2</sub> )	n	35	36	37
	∑ X	130.50	138.75	128
	∑ X <sup>2</sup>	544.52	584.4	510.95
	SS	57.94	49.63	68.14
	X̄	3.73	3.86	3.46

$$\bar{G} = \frac{(9.94 + 11.05)^2}{6} = 73.43$$

$$\bar{A}_1 = \frac{(9.94^2 + 11.05^2)}{3} = 73.62$$

$$\bar{B}_1 = \frac{(6.78^2 + 7.13^2 + 7.08^2)}{2} = 73.46$$

$$\bar{AB} = (3.05^2 + 3.27^2 + 3.62^2 + 3.73^2 + 3.86^2 + 3.46^2) = 73.88$$

$$\bar{n}_h = \frac{6}{.0313 + .0333 + .0215 + .0286 + .0278 + .0270} = 35.44$$

$$SS_a = 35.44(73.62 - 73.44) = 6.379$$

$$SS_b = 35.44(73.46 - 73.43) = 1.0632$$

$$SS_{ab} = 35.44(74.88 - 73.62 - 73.46 + 73.44) = 8.506$$

$$SS_w \text{ cells} = 25.64 + 65.75 + 29.44 + 57.94 + 49.63 + 68.14 = 296.54$$

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	p
A	6.379	1	6.379	4.556	.05
B	1.0632	2	.5316	.378	n.s.
AB	8.506	2	4.253	3.026	.05
Within Cells	296.54	211	1.4054		
Total	314.4882	216			

Self-Confidence X Sex  
Self-Confidence (b)

Sex (c)		High (b <sub>1</sub> )	Moderate (b <sub>2</sub> )	Low (b <sub>3</sub> )
Male (c <sub>1</sub> )	$\sum X$	36	38	33
	$\sum X^2$	119.5	135	105.5
	SS	449.83	533.35	381.21
	$\bar{X}$	53.16	53.72	43.93
		3.32	3.55	3.20
Female (c <sub>2</sub> )	$\sum X$	31	45	34
	$\sum X^2$	108.5	157.25	131
	SS	417.4	618.13	565.45
	$\bar{X}$	37.65	68.63	60.71
		3.50	3.49	3.85

$$\bar{G} = \frac{(10.07 + 10.84)^2}{6} = 72.871$$

$$\bar{C}_1 = \frac{(10.07^2 + 10.84^2)}{3} = 72.97$$

$$\bar{B}_1 = \frac{(6.82^2 + 7.04^2 + 7.05^2)}{2} = 72.885$$

$$\bar{CB} = (3.32^2 + 3.55^2 + 3.20^2 + 3.50^2 + 3.49^2 + 3.85^2) = 73.118$$

$$\bar{n}_h = \frac{6}{.0278 + .0263 + .0303 + .0322 + .0222 + .0294} = 35.67$$

$$SS_c = 35.67(72.97 - 72.871) = 3.531$$

$$SS_b = 35.67(72.885 - 72.871) = .499$$

$$SS_{cb} = 35.67(73.118 - 72.97 - 72.885 + 72.871) = 4.744$$

$$SS_w \text{ cells} = 53.16 + 53.72 + 43.93 + 37.65 + 68.63 + 60.71 = 317.8$$

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	p
C	3.531	1	3.531	2.345	n.s.
B	.499	2	.250	.166	n.s.
CB	4.744	2	1.372	.911	n.s.
Within Cells	317.8	211	1.506		
Total	326.574	216			

## Sex X Information

Information (a)		Sex (c)	
		Male (c <sub>1</sub> )	Female (c <sub>2</sub> )
High a <sub>1</sub>	n	53	56
	$\sum X_2$	163.25	196.25
	$\sum X$	542.28	783.22
	SS	39.44	95.47
	$\bar{X}$	3.08	3.50
Low a <sub>2</sub>	n	54	54
	$\sum X_2$	196.75	200.5
	$\sum X$	822.11	817.76
	SS	105.25	73.31
	$\bar{X}$	3.64	3.71

$$\bar{G} = \frac{(6.58 + 7.35)^2}{4} = 48.511$$

$$\bar{A} = \frac{(6.58^2 + 7.35^2)}{2} = 48.660$$

$$\bar{C}_1 = \frac{(6.72^2 + 7.21^2)}{2} = 48.571$$

$$\bar{AC} = (3.08^2 + 3.50^2 + 3.64^2 + 3.71^2) = 48.75$$

$$\bar{n}_h = \frac{4}{.0189 + .0179 + .0185 + .0185} = 54.20$$

$$SS_a = 54.20(48.660 - 48.511) = 8.0758$$

$$SS_c = 54.20(48.571 - 48.511) = 3.252$$

$$SS_{ac} = 54.20(48.75 - 48.660 - 48.571 + 48.511) = 1.626$$

$$SS_w \text{ Cells} = 39.44 + 95.47 + 105.25 + 73.31 = 313.47$$

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	p
A	8.0758	1	8.0758	5.486	.05
C	3.252	1	3.252	2.209	n.s.
AC	1.626	1	1.626	1.105	n.s.
Within Cells	313.47	213			
Total	326.4238	216			

F-Ratio Test for a Significant Increment  
in  $r^2$  Due to the Addition of an  
Independent Variable<sup>†</sup>

Depen. Var.	Indepen. Var.(s)	(r)	$r^2$	Increment in $r^2$	F	p
Diss.	A	.056	.0031			
Diss.	B	.130	.0169	.0173	3.8	.05
				(AB over A)		
Diss.	A,B	.143	.0204	.0035	.76	n.s.
				(AB over B)		
Diss.	A,B,&C	.223	.0497	.0293	6.5	.05
Diss.	A,B,C&D	.233	.0543	.0543	1.0	n.s.

d.f. = b and (n - a - b - 1)

a = the number of original variables

b = the number of added variables

The Effect of Self-Confidence (A)

$$\frac{(.0204 - .0169)/1}{(1 - .0204)/(217 - 1 - 1 - 1)} = .77 \quad \text{d.f.} = 1,214 \quad \text{n.s.}$$

The Effect of Information (B)

$$\frac{(.0204 - .0031)/1}{(1 - .0204)/(217 - 1 - 1 - 1)} = 3.8 \quad \text{d.f.} = 1,214 \quad p = .05$$

The Effect of Information X Self-Confidence (C)

$$\frac{(.0497 - .0204)/1}{(1 - .0497)/(217 - 2 - 1 - 1)} = 6.5 \quad \text{d.f.} = 1,213 \quad p = .05$$

The Effect of Sex (D)

$$\frac{(.0543 - .0497)/1}{(1 - .0543) - (217 - 3 - 1 - 1)} = 1.0 \quad \text{d.f.} = 1,212 \quad \text{n.s.}$$

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<sup>†</sup>Cohen, Jacob. "Multiple Regression as a General Data-Analytic System." Psychological Bulletin, 70 (December, 1968)

Summary of Multiple Regression Analysis  
With F-Ratio Test

Depen. Var.	Indepen. Var.(s)	(r)	r <sup>2</sup>	Increment in r <sup>2</sup>	F	p
Δ in Diss.	Any Method	.062	.004			
Δ in Diss.	Comb. of Methods	.500	.250	.246	60	.01
Δ in Diss.	Impersonal Methods	.655	.429	.178	19.03	.01
Δ in Diss.	Personal Methods	.660	.436	.007	.65	n.s.
Δ in Diss.	All Methods	.677	.458	.022	1.25	n.s.
Δ in Diss.	All 6 Methods and sex of subj.	.679	.461	.003	.121	n.s.

The Effect of a Number of Methods Over Any Method

$$\frac{(.250 - .004)/1}{(1 - .250)/(187 - 1 - 1 - 1)} = 60 \quad \text{d.f.} = 1,184 \quad p = .01$$

The Effect of Impersonal Methods Over A Number of Methods

$$\frac{(.429 - .250)/3}{(1 - .429)/(187 - 1 - 3 - 1)} = 19.03 \quad \text{d.f.} = 3,182 \quad p = .01$$

The Effect of Personal Methods Over A Number of Methods

$$\frac{(.436 - .250)/3}{(1 - .436)/(187 - 1 - 3 - 1)} = 20 \quad \text{d.f.} = 3,182 \quad p = .01$$

Personal (Q 1, 2 and 3) vs. Impersonal Methods Q 4, 5, and 6)

$$\frac{(.436 - .429)/3}{(1 - .436)/(187 - 3 - 3 - 1)} = .65 \quad \text{d.f.} = 3,180 \quad \text{n.s.}$$

The Effect of All Methods (Personal and Impersonal)

$$\frac{(.458 - .436)/6}{(1 - .458)/(187 - 3 - 6 - 1)} = 1.25 \quad \text{d.f.} = 6,177 \quad \text{n.s.}$$

The Effect of Sex

$$\frac{(.461 - .458)/1}{(1 - .461)/(187 - 6 - 1 - 1)} = .12 \quad \text{d.f.} = 1,179 \quad \text{n.s.}$$

The Wilcoxon Matched Pairs<sup>+</sup>  
Signed-Ranks Test

The Wilcoxon Signed-Ranks Test considers both the direction and the magnitude of the differences within pairs to determine whether these differences are significant or merely chance occurrences.

Procedure

1. Determine the difference score ( $d_i$ ) for any matched pair, representing the difference between the pair's scores under the two treatments.
2. Rank the differences ( $d_i$ 's) without regard to sign; give the rank of 1 to the smallest  $d_i$ , the rank of 2 to the next smallest, etc.
3. To each rank affix the sign of the difference. Indicate which ranks arose from negative  $d_i$ 's and which arose from positive  $d_i$ 's.
4. Where no difference between the two treatments is observed for that pair ( $d = 0$ ), the pair is dropped from the analysis.
5. The same rank is assigned to two or more  $d$ 's of the same size. The rank assigned is the average of the ranks which would have been assigned if the  $d$ 's had differed slightly.

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<sup>+</sup>Siegel, Sidney. Nonparametric Statistics For The Behavioral Sciences. McGraw Hill (New York) 1956.

6. When N (the number of pairs) is larger than 25 the sum of the smaller of the like-signed ranks (T) is practically normally distributed and thus can be converted to the unit normal distribution using the formula:

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

7. The probability associated with the occurrence of any value of  $\pm 1.96$  or greater is .05 for a two tailed test.

a. High Information - High Self-Confidence

The sum of the smaller of the like-signed ranks

$$(T) = 94 \quad N = 24$$

$$Z = \frac{94 - \frac{24(24+1)}{4}}{\sqrt{\frac{24(24+1)(48+1)}{24}}}$$

$$Z = 1.60 \quad \text{n.s.}$$

b. High Information - Moderate Self-Confidence

$$T = 298$$

$$N = 38$$

$$Z = \frac{298 - \frac{38(38+1)}{4}}{\sqrt{\frac{38(38+1)(77)}{24}}}$$

$$Z = 1.05 \quad \text{n.s.}$$

c. High Information - Low Self-Confidence

T = 97.5

N = 23

$$Z = \frac{97.5 - \frac{23(23+1)}{4}}{\sqrt{\frac{23(23+1)(47)}{24}}}$$

Z = 1.23 n.s.

d. Low Information - High Self-Confidence

T = 137

N = 26

$$Z = \frac{137 - \frac{26(26+1)}{4}}{\sqrt{\frac{26(26+1)(53)}{24}}}$$

Z = .98 n.s.

e. Low Information - Moderate Self-Confidence

T = 144

N = 31

$$Z = \frac{144 - \frac{31(31+1)}{4}}{\sqrt{\frac{31(31+1)(63)}{24}}}$$

Z = 2.03 s.d.

f. Low Information - Low Self-Confidence

T = 175

N = 28

$$Z = \frac{175 - \frac{28(28+1)}{4}}{\sqrt{\frac{28(28+1)(57)}{24}}}$$

Z = .63 n.s.

Mann-Whitney U-Test<sup>+</sup>

The Mann-Whitney U Test is a nonparametric test to determine the probability that two independent samples, which may be of unequal size, come from identical populations.

Procedure

1. Let  $n_1$  = the number of cases in the smaller of two independent groups and  $n_2$  = the number of cases in the larger. Combine the scores of the two groups and rank these in order of increasing size.

2. The value of U is given by the number of times that a score in the group with  $n_2$  cases precedes a score in the group with  $n_1$  cases in the ranking, or by the formula:

$$U = n_1 n_2 + \frac{n_1(n_1 + 1) - R_1}{2}$$

where R = sum of the ranks assigned to group whose sample size is  $n_1$ .

3. The method for determining the significance of U depends on the size of  $n_1$ . If  $n_1$  is over 20, as in this case, then U approaches the normal distribution and the formula, including correction for ties is shown on the following page:

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<sup>+</sup>Siegel, Sidney. Nonparametric Statistics. New York: McGraw-Hill Book Co., 1956

$$Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\left(\frac{n_1 n_2}{N(N-1)}\right) \left(\frac{N^3 - N}{12} - \sum T\right)}}$$

Where:  $N = n_1 + n_2$

$T = \frac{t^3 - t}{12}$  (where  $t$  is the number of observations tied for a given rank)

$\sum T$  is found by summing the  $T$ 's over all groups of tied observations.

Brand switchers =  $n_1 = 27$

Non-switchers =  $n_2 = 159$

$N = n_1 + n_2 = 186$

$R_1 = 3550$

$\sum T = 2399$

$U = 27(159) + \frac{27(28)}{2} - 3550$

$U = 1121$

$$Z = \frac{1121 - \frac{27(159)}{2}}{\sqrt{\left(\frac{27(159)}{186(185)}\right) \left(\frac{186^3 - 186}{12} - 2399\right)}}$$

$Z = 3.97$  s.d. at .00005

### Chi-Square Test of Independence of Classification<sup>†</sup>

To test whether a significant difference exists between an observed number of objects or responses falling in each category and an expected number based on the null hypotheses.

#### Procedure

1. The null hypothesis may be tested by

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

Where  $O_i$  = observed number of cases in the  $i^{\text{th}}$  category

$E$  = expected number of cases in the  $i^{\text{th}}$  category under  $H_0$

$$\sum_{i=1}^k$$

directs one to sum over all (k) categories

2. Roughly speaking, the larger the  $\chi^2$  is the more likely it is that the observed frequencies did not come from the population on which the null hypothesis is based.

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<sup>†</sup>Seigel, Sidney. Nonparametric Statistics. New York: McGraw-Hill Book Co., 1956

Dissonance	Rating	Obser. Freq.	Exp. Freq.	O-E	(O-E) <sup>2</sup>	$\frac{(O-E)^2}{E}$
Increase	Increase	4	5	-1	1	.20
Increase	No Change	43	44	-1	1	.02
Increase	Decrease	19	17	2	4	.24
No Change	Increase	1	1	0	0	0
No Change	No Change	10	12	-2	4	.33
No Change	Decrease	7	5	2	4	.80
Decrease	Increase	8	7	1	1	.14
Decrease	No Change	72	69	3	9	.13
Decrease	Decrease	<u>23</u>	<u>27</u>	-4	16	<u>.60</u>
		187	187			2.46

$$\chi^2 = 2.46$$

$$\text{d.f.} = 4$$

c.v. at .05 level of significance = 9.49

n.s.

Test for the Significant Difference  
Between Two Sample Percentages<sup>†</sup>

$$z = \frac{p_1 - p_2}{S_{p_1 - p_2}}$$

$$S_{p_1 - p_2} = \sqrt{\hat{p}(100-p) \left( \frac{n_1 + n_2}{n_1 n_2} \right)}$$

$$\hat{p} = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2}$$

Where:

$p_1$  = The sample percentage of the first sample

$p_2$  = The sample percentage of the second sample

$S_{p_1 - p_2}$  = The estimated standard error of the difference between two sample percentages.

$\hat{p}$  = The combined percentage of two samples.

$n_1$  = The size of the first sample.

$n_2$  = The size of the second sample

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<sup>†</sup>Richmond, Samuel. Statistical Analysis. 2nd ed. New York: The Ronald Press Co., 1964.

Percentage of Males and Females Who Reduced Dissonance  
As A Result Of Reading Additional Literature

	Males	Females
Reading Literature Provided	66%*	47%
Reading Advertisements	36*	15
Reading Other Literature	26*	11
Base:	(53)	(50)

Source: See Table 11

\* Significantly different at the .05 confidence level.

Reading Literature Provided

$$Z = \frac{66-47}{\frac{8.67}{\sqrt{2}}} = \frac{19}{8.67} = 2.19 \quad \text{s.d. at .05}$$

$$\hat{p} = \frac{53(66) + 50(47)}{53 + 50} = 56.8$$

$$S_{p_1 - p_2} = 56.8(100-66) \left( \frac{50 + 53}{50(53)} \right) = 8.67$$

Reading Advertisements

$$Z = \frac{36-15}{\frac{8.01}{\sqrt{2}}} = \frac{21}{8.01} = 2.62 \quad \text{s.d. at .05 level}$$

$$\hat{p} = \frac{53(36) + 50(15)}{53 + 50} = 25.8$$

$$S_{p_1 - p_2} = 25.8(100-36) \left( \frac{50 + 53}{50(53)} \right) = 8.01$$

Reading Other Literature

$$Z = \frac{26-11}{\frac{7.34}{\sqrt{2}}} = \frac{15}{7.34} = 2.04 \quad \text{s.d. at .05 level.}$$

$$\hat{p} = \frac{53(26) + 50(11)}{53 + 50} = 18.7$$

$$S_{p_1 - p_2} = 18.7(100-26) \left( \frac{53 + 50}{53(50)} \right) = 7.34$$

Studentized T Test for the Significant Difference  
Between Two Independent Sample Means<sup>+</sup>

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_D}$$

$$S_D = \hat{S} \sqrt{\frac{n_1 + n_2}{n_1 n_2}}$$

$$\hat{S} = \sqrt{\frac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2 - 2}}$$

Where:

$\bar{X}_1$  = The arithmetic mean of the first sample

$\bar{X}_2$  = The arithmetic mean of the second sample

$S_D$  = The estimated standard error of the difference between two sample arithmetic means

$\hat{S}$  = The estimated standard deviation of a population

$S$  = The standard deviation of the sample

$n$  = The sample size

Studentized T Test for the Significant Difference  
Between Two Related Sample Means\*

$$t = \frac{\bar{X}_d - 0}{S_{\bar{x}}}$$

$$S_{\bar{x}} = \frac{S}{\sqrt{n}}$$

Where:

$\bar{X}_d$  = The average difference between the related samples

$S_{\bar{x}}$  = The standard error of the difference between the related samples

$S$  = The standard deviation of the difference between the related samples

$n$  = The number of pairs

<sup>+</sup>Richmond, Samuel. Statistical Analysis. 2nd ed. New York: The Ronald Press Co., 1964

\*Bruning, James and Kinty, B. L. Computational Handbook of Statistics. Glenview, Ill.: Scott, Foresman and Co., 1968.

Dissonance of Brand-Switchers  
and Non-Switchers for  
Phases II and III

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Subjects	Mean Dissonance Phase II	s.d.	Mean Dissonance Phase III	s.d.
Switchers (n = 27)	3.64	1.26	4.83	1.57
Non-Switchers (n = 159)	3.39	1.30	2.94	1.24

Switchers vs. Non-Switchers - Phase II (Independent Sample Means)

$$t = \frac{3.64 - 3.39}{.591} = .42 \quad \text{d.f.} = 184 \quad \text{n.s.}$$

$$\hat{S} = \sqrt{\frac{27(1.59)^2 + 159(1.69)^2}{27 + 159 - 2}} = 2.84$$

$$S_D = 2.84 \sqrt{\frac{27 + 159}{(27)(159)}} = .591$$

Switchers vs. Non-Switchers - Phase III (Independent Sample Means)

$$t = \frac{4.83 - 2.94}{.352} = 5.37 \quad \text{d.f.} = 184 \quad p = .01$$

$$\hat{S} = \sqrt{\frac{27(1.57)^2 + 159(1.24)^2}{27 + 159 - 2}} = 1.69$$

$$S_D = 1.69 \sqrt{\frac{27 + 159}{27(159)}} = .352$$

Switchers - Phase II vs. Phase III (Related Sample Means)

$$t = \frac{1 - 0}{.38} = \frac{1}{.38} = 2.63 \quad \text{d.f.} = 26 \quad p = .05$$

$$S_{\bar{x}} = \frac{1.97}{\sqrt{27}} = .38$$

Non-Switchers - Phase II vs. Phase III (Related Sample Means)

$$t = \frac{-.434 - 0}{.09} = \frac{.434}{.09} = 4.82 \quad \text{d.f.} = 158 \quad p = .01$$

$$S_{\bar{x}} = \frac{1.08}{\sqrt{159}} = .09$$

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