

THE EFFECT OF PERCEIVED CHOICE AND IMPORTANCE
ON THE RETENTION OF INFORMATION

Thesis for the Degree of M. A.

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David Kent Kline

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ABSTRACT

THE EFFECT OF PERCEIVED CHOICE AND IMPORTANCE ON THE RETENTION OF INFORMATION

by David Kent Kline

A number of weaknesses in dissonance theory formulations and experiments have recently been pointed out. The purpose of this experiment was to test the validity of some of the basic propositions of dissonance theory under rigorous conditions.

It was hypothesized that subjects committing themselves to a volitional choice of one of two equally attractive but qualitatively dissimilar article titles, would retain more information from the article chosen to be read than would subjects reading the same article without a prior choice. In addition, the effect of choice on retention would be greater for subjects choosing between highly important titles than for subjects choosing between titles of low importance. A final prediction was that differences in retention would disappear after dissonance was reduced.

Each subject was given a large manilla packet containing an instruction sheet and two sealed medium size packets. The two medium size packets contained the same article with different titles, and a small sealed packet in which was a 14 question multiple choice test on the article. Half of the subjects chose between articles of either high importance or

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low importance. The other half of the subjects were assigned to read an article of either high importance or low importance. After reading the chosen or assigned article the subjects indicated their answers to the 14 multiple choice questions on an IBM answer sheet. One week later the subjects took the multiple choice test for the second time. In addition, the subjects rated their perception of the experimental manipulations.

The analysis of variance revealed that the main effect of choice and the interaction between choice and importance were not significant. The main effect of importance and the main effect of test-retest were significant.

The analysis of the scales measuring the subject's perception of the experimental manipulations revealed that the choice should have resulted in the arousal of dissonance. In addition, it was determined that aroused dissonance should have been reduced by the addition of new information. Since no significant results were obtained which supported the dissonance theory predictions, it was assumed that dissonance was not aroused. Two possible explanations were offered for the null finding: reinforcement theory and the lack of qualitative dissimilarity in the choice alternatives.

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THE EFFECT OF PERCEIVED CHOICE AND IMPORTANCE ON THE
RETENTION OF INFORMATION

By

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BACKGROUND

A simple and heuristic attempt to explain the relation between cognition and overt behavior is Festinger's "Theory of Cognitive Dissonance" (1957). Festinger defines a cognition, or cognitive element, as any knowledge, opinion or belief that a person may possess about his self, his behavior or his environment. Some examples of cognitive elements are: a person's knowledge that he likes to smoke, a person's belief that he should have good health, and a person's knowledge that scientific evidence indicates that smoking has a relation to some types of cancer. An analysis of these cognitive elements reveals that some elements involve value judgments (e.g., good health is desirable). Other cognitive elements contain an affective relation (e.g., a person likes to smoke). On the other hand, a cognitive element may have neither a value judgment nor an affective relation, but only a factual component (e.g., smoking has a relation to some types of cancer). The one thing that all these cognitive elements have in common is that they are general propositions about what a person does, believes, feels, or knows. These general propositions, or cognitive elements, may be irrelevant to each other, or some relevant relation may exist between them. This relevant relation may be one of dissonance or consonance. A dissonant relation is one in which "the obverse of one element would follow from

the other" (Festinger, 1957). In order to understand the exact nature of the dissonant relationship, the terms obverse and follow from will be further defined.

According to Festinger the obverse¹ of an element is that which is not the element. In other words, the negation of the element x is not- x . For example, the negation of the knowledge that smoking has a relation to some types of cancer is that smoking does not have a relation to some types of cancer. With the assumption that a person desires good health, the cognitive element which would logically "follow from" the knowledge that a person likes smoking is that smoking does not have a relation to some types of cancer. The knowledge that smoking is related to some types of cancer, therefore, is dissonant with the knowledge that one likes smoking.

It is the meaning of the term "follow from" which specifies the process by which dissonance arises. Four different interpretations of "follow from" are discussed below.

¹The term obverse, as it is used in logic, does not imply the contradictory relationship between two propositions which Festinger implies in his use of the term. Searles (1956) in "Logic and Scientific Methods" defines obversion as "a form of immediate inference in which the quality of the proposition is changed from affirmative to negative or from negative to affirmative, and the predicate of the original proposition is contradicted". According to this definition the obverse of the proposition "All A is B" is "No A is non-B". There is nothing contradictory between these two propositions since they are both stating the same fact. The proposition "No A is B", however, would be contradictory to "All A is B". This is the type of relationship between two propositions which Festinger calls obverse. The relationship between the propositions "All A is B" and "No A is B" is better defined by the terms negation or contradiction. In this paper we will use the term negation to specify this relationship.

First, dissonance could arise due to a logical inconsistency. In the smoking example given above, Festinger would say that the person's belief that smoking is not related to some forms of cancer logically followed from the knowledge that the person liked to smoke. The knowledge that smoking is related to some forms of cancer, therefore, is logically inconsistent with the knowledge that the person liked to smoke.

Second, dissonance may arise due to cultural mores. In America, the knowledge that one has more than one wife is dissonant with the knowledge of cultural mores against polygamy. However, in a different culture dissonance may not occur between these cognitive elements.

Third, dissonance could arise because a specific opinion is included, by definition, in a more general opinion. If a person is a Catholic but attends a protestant church there probably is dissonance between these two elements of knowledge. This dissonance arises because the concept of Catholic usually carries with it the opinion that one should attend the Catholic church.

Fourth, dissonance may arise due to past experience. People learn to expect the occurrence of certain events because of their systematic happening. For example, if a person threw a ball up into the air and it did not return to earth, dissonance would probably occur. There would be a dissonant relation between knowing that the ball had been thrown up into the air, and knowing, through past experience, that the ball should, but did not, return to earth.

An examination of all the above examples of dissonance situations reveals that each specification of the occurrence of dissonance rests on some implicit assumption about related cognitive elements. Dissonance in the smoking situation depended on the person desiring good health. In the polygamous situation dissonance was dependent on the premise that the individual accepts the cultural mores of his society. The dissonant situation for the Catholic assumes that the person desires to obey the directives of the Catholic church or that there is a Catholic church in the area in which the person lives. Finally, the occurrence of dissonance in the case of throwing the ball up into the air assumes that no extraneous factors, such as the ball getting stuck in a tree, entered into the situation. In this connection, Festinger points out that a person's needs, goals, and beliefs are important factors in determining whether or not two cognitive elements are dissonant.

The definition of consonance is quite easy to state once dissonance has been defined. A relation of consonance between a pair of cognitive elements exists when either cognitive element in a pair does follow from the other element. For example, the knowledge that one does not smoke is consonant with the fact that smoking is related to some forms of cancer, and the converse relation is also consonant.

If neither a certain cognitive element nor its negation follows from another cognitive element in a pair,

then the relation between these elements is irrelevant. For example, a person's knowledge that he is a man is irrelevant to the knowledge that the sky is blue.

Festinger proposes three hypotheses based on the concepts defined above.

1. The existence of dissonance is psychologically uncomfortable and will motivate the individual to attempt to reduce dissonance and achieve consonance.
2. In states of dissonance the individual will actively avoid situations and information which would probably increase dissonance.
3. The strength of the pressure to reduce dissonance in the individual is a function of the magnitude of the dissonance.

The following paragraphs will attempt to examine these hypotheses and their implications more fully. First, the variables which determine the magnitude of dissonance will be discussed. Second, an analysis will be made of the different methods available to the individual for the reduction of dissonance. Third, the conditions will be reviewed in which a person will attempt to avoid situations increasing dissonance. Fourth, the implications of dissonance theory for choice behavior will be examined.

Magnitude of dissonance. The magnitude of aroused dissonance is not the same for all dissonant relations. In some conditions the amount of dissonance may be very large,

while in other situations an almost imperceptible amount of dissonance may be aroused. Differences in the magnitude of dissonance are determined by the importance of the cognitive elements in a dissonant relation and the proportion of dissonant to consonant cognitive elements. An analysis of these two determinants of the magnitude of dissonance is presented below.

Festinger states that the greater the importance of the two cognitive elements in a dissonant relation, the greater the magnitude of the dissonance. No specific theoretical or operational definition of importance is given by Festinger, but he does imply that he means--of value or consequence to a person. For example, most middle class Americans, who value security and money, would find a choice between which house to buy to be of greater importance than a choice between which brand of cigarettes to buy. Some of the cognitive elements associated with buying a house might be: a house must suit the needs of all the family, a house must provide shelter and security for years to come, and a house is one of the largest investments a family makes. These cognitive elements are generally of more consequence and value to a person than such cognitive elements as: a cigarette may provide temporary enjoyment for one person, a pack of cigarettes is a minor investment, and a pack of cigarettes may last for a day.

In order to test the validity of the importance hypotheses a number of experiments manipulating importance have

been performed. Four of these experiments are described below.

Cohen, Brehm and Latané (1959) told subjects they were going to participate in a two person betting card game. The subjects were informed that the probability for winning was not the same for each of the two players and, therefore, each subject could choose the side on which he would play. The subjects were then divided into two groups. Subjects in the high importance condition were told that their name, choice of side, and amount of winnings would be published in the undergraduate newspaper. The subjects in the low importance condition did not have to reveal their name nor were they told that their choices or amount of winnings would be published. The high importance manipulation was empirically verified by keeping count of the subjects who made written calculations before choosing the side on which they would play. The expectation was that the more important the situation was for the individual the greater the amount of written calculations he would make to aid him in choosing. The results indicated that the subjects in the high importance condition made significantly more written calculations than the subjects in the low importance group. Before starting the experiment, each subject was told he could change sides once during the course of the game but only after paying a penalty. Thirty hands were dealt in a game and after the twelfth hand play was stopped. Dissonance was expected to occur between a person's choice of sides and

the amount of his present winnings or losses. The subjects that had been winning or had hardly lost any money, experienced little or no dissonance. The participants that lost a small amount of money were in a dissonant state but still expected to win. However, when a large amount of money had been lost, the persons experienced quite a bit of dissonance but did not expect to win. Next, a graph was presented to each subject showing the probabilities of winning for each side. In all cases close examination of the graph revealed to a subject that the side he had chosen would probably lose. The experimenter recorded the amount of time each subject spent looking at the graph.

The experimental hypothesis was that the dissonant subjects in the public condition would spend more time inspecting the graph than the dissonant subjects in the private condition. The data support this hypothesis for the small loss group at the 10 percent level of significance, and for the large loss subjects at the 5 percent significance level.

Mills, Aronson and Robinson (1959) asked college students to choose whether they wanted to take an objective or an essay examination in their psychology course. The choice was to produce dissonance which would result in the subjects showing a preference for information that supported their decision. The importance of the choice was experimentally varied by making the exam worth 70 percent or 5 percent of the student's grade for the course. In order to empirically validate the fact that a difference in importance was created,

each subject rated, on a six point scale, how difficult it was to make the decision. The difference in difficulty between importance conditions was significant at beyond the .02 level. After each subject had indicated his exam choice, a list of six article titles was distributed to each participant. The list consisted of three titles about objective tests and three titles about essay exams. The titles contained positive information about the two types of exams for half the subjects. Negative information relating to the exams was in the titles presented to the other half of the subjects. The subjects were asked to rank the six titles in terms of how much they would prefer to read articles corresponding to the titles. The mean rank for the positive article titles was different in the right direction from the expected mean rank beyond the .001 level of significance. However, no significant effects were obtained for either the importance manipulation or the avoidance of negative article titles.

Rosen (1961) repeated the experiment just described with a modification in the procedure. The use of the words "objective" and "essay" in the article titles was counter-balanced between two lists. Each list contained three fictitious pro-objective article titles and three fictitious pro-essay article titles. In addition, one of the six titles showed the advantage of essay over objective exams, while another showed the converse. Importance was varied and empirically verified in the same fashion as in the Mills, et al.

experiment. The results failed to reveal a significant difference in the importance manipulation. Rosen suggested that the high importance condition may have been trivial since only one-third of the subjects in this condition scored in that half of the scale which indicated it was quite difficult to make the decision. The resultant article ranks showed a significant preference for selecting supporting articles. No preference was revealed for avoiding dissonant information.

A fourth experiment on dissonant behavior which investigated the importance variable was conducted by Deutsch, Krauss and Rosenau (1962). The subjects began by rating six different kinds of jam on two nine point bipolar scales. One scale was a measure of the over-all quality of each jam as compared with other jams the subject had used. The second scale was an evaluation of the flavor of the jams. A female experimenter was then introduced to the subjects as an expert on "food selection factors", who was going to conduct a panel interview on "reasons behind food preferences". At this point the subjects were given the importance manipulation. The high importance group received a message stressing the relationship between peoples' ability to judge subtle differences in the quality of foods and their creative judgment ability. Creative judgment ability was suggested to be related to leadership aptitude, executive potential, and artistic judgment. The low importance condition did not receive the importance creating message. Next, the experimenter selected two jams that on the over-all rating had

received equivalent scale values. If possible, the jams selected had rating values near the middle of the scale. The experimental subjects then chose one of these two jams to take home with them. Finally, all subjects rerated the six jams on the two rating scales. The control group only rated the six jams twice.

The experimenters proposed that post-decision dissonance would result in a greater change in the rating values in the high importance condition than in the low importance condition. The results revealed a significant difference in the amount of rating change between the two importance conditions for the flavor rating scale.

One other experiment that obtained greater dissonance effects for the higher importance condition was Zimbardo's (1960) experiment on communication discrepancy. Importance was defined as the individual's concern with the consequences of his action.

Importance does seem to have an effect on the magnitude of dissonance in some situations. The failure to obtain significant results in all cases may partially be due to the lack of a specific operational definition of the term.

In determining the magnitude of dissonance it is necessary to look at the relationship between all relevant cognitive elements as well as to analyze the importance of two relevant elements. Given the fact that all relevant cognitive elements are equal in importance, Festinger states that the magnitude of dissonance is a function of the

proportion of relevant cognitive elements that are dissonant with a given cognitive element.

Brehm (1956) investigated the ratio of dissonant to consonant cognitive elements using a group of college students. The subjects were asked to rate the desirability of eight different consumer articles (e.g., a toaster, a painting, etc.). Each subject was told to judge the desirability of the objects in terms of the objects' attractiveness, quality and the subject's need for the object. The experimenter selected two of the rated products and had the subjects in the experimental condition choose one of them. After the subjects in the experimental condition had chosen the article they desired, each subject rerated the eight consumer articles. In the control condition the subjects rated the articles twice without making a choice. In the high dissonance condition the two articles were nearly equal in attractiveness. In the low dissonance condition, the two articles were quite different in attractiveness. It was expected that the less the discrepancy in attractiveness between consumer articles, the more cognitive elements that were dissonant with the high attractive article and, therefore, the greater the proportion of dissonant to consonant cognitive elements. The hypothesis was that the greater the proportion of dissonant elements the larger the magnitude of the dissonance. Dissonance could be reduced by increasing the desirability of the chosen article and decreasing the desirability of the unchosen article. In addition, the ratio

of dissonant to consonant cognitive elements could be reduced by the addition of consonant elements about the chosen alternative and the unchosen alternatives. Half of the subjects in each dissonance condition, therefore, read a research article, which listed good and bad points about four of the consumer products, including the two products involved in the previous choice. The other half of the subjects read research reports about four non-choice products. The former group was called the information condition and the latter group the no information condition.

The results indicated that the more equally attractive choice condition produced a greater enhancement of the chosen article and a greater devaluation of the unchosen article. This effect was significant, at the .05 level, for only those subjects reading the research article which included information about the chosen product. The expectation that there would be greater dissonance reduction in the information condition than in the no information condition was not supported.

A somewhat different approach to testing the effect of the ratio of dissonant to consonant cognitive elements on the magnitude of dissonance was made by Brehm and Cohen (1959b). The main premise was that the magnitude of dissonance is a function of what one has to give up compared to what one obtains. Sixth grade students were asked to indicate their liking for 16 toys. The subjects then chose

the toy they liked the best. Half of the subjects chose between toys with similar qualities (e.g., sets of table games or metal craft sets). The other half of the subjects chose between toys with dissimilar qualities (e.g., swimming fins and a model of a ship). As can be seen in the examples, the similarity - dissimilarity dimension is defined in terms of the use made of the toys. Each of these conditions was further subdivided into two groups. One sub-group chose between two toys. The other sub-group chose between four toys. The hypothesis was two-fold. First, the less the similarity (i.e., the more attributes not held in common) of the toys involved in the choice the larger the number of cognitive elements that can be dissonant with the chosen alternative and, therefore, the greater the dissonance. Second, the greater the number of toys involved in a choice the larger the number of cognitive elements that can be dissonant with the chosen toy and, therefore, the greater the dissonance. The magnitude of dissonance was expected to be reflected in an enhancement of liking for the chosen toy and a devaluation of liking for the unchosen toys.

The results revealed that beyond the .01 level of significance there was a greater change in liking scores, in the expected direction, for the subjects choosing between dissimilar toys, as compared to the subjects choosing between similar alternatives. The predicted difference in liking scores for the two groups choosing between different numbers

of alternatives was significant at the .02 level. Brehm and Cohen, however, point out that the latter difference could have been due to an extraneous factor. The difference in initial liking for the chosen toy and most liked unchosen toy was not equated for the two and four alternative conditions. There was a difference in the equality of attractiveness, therefore, for the two and the four alternative groups.

Empirical evidence has been given to demonstrate the effects of importance and the proportion of dissonant to consonant cognitive elements on the magnitude of dissonance. Rarely does one of these variables affect the strength of dissonance independently of the other variable. Festinger proposed, therefore, that the total magnitude of dissonance is a product of the importance of the relevant cognitive elements and the ratio of dissonant to consonant cognitions. In other words, dissonance increases as the number and/or the importance of dissonant cognitive elements increases in proportion to the number and/or importance of consonant cognitive elements.

Reduction of Dissonance. One of the basic propositions of dissonance theory is that the greater the magnitude of the dissonance the more intense the pressure to reduce dissonance. As the pressure to reduce dissonance becomes greater the individual is "motivated" to find a way to reduce dissonance. Festinger states two basic propositions for the reduction of dissonance.

1. The individual can reduce his dissonance by decreasing the importance of all relevant cognitive elements.
2. The individual can reduce his dissonance by decreasing the proportion and/or the importance of the dissonant cognitive elements (Festinger, 1957, p. 264).

It can be seen in these two propositions that the reduction of dissonance involves manipulating the variables which increase the magnitude of dissonance.

There are three methods by which the individual can implement the above two propositions in order to reduce dissonance; change the behavioral cognitive element, change the environmental cognitive element, or add new cognitive elements.

First, the individual can reduce his dissonance by changing the behavioral cognitive element. For example, an individual may have a behavioral cognitive element corresponding to his desire to fly an airplane on a certain day. The environmental cognitive element, however, may correspond to the fact that the weather that day is very bad. In this situation dissonance probably exists between these two knowledges. The individual may reduce his dissonance by deciding that the flight he wanted to make was not very important after all, and therefore, he will not fly. The above illustration is an example of reducing dissonance by decreasing the importance of the behavioral cognitive element.

In most experiments designed to test this reduction method the change in the behavioral cognitive element is reflected in a revaluation of the choice alternatives. This revaluation usually involves a change in both the importance and proportion of dissonant elements. For example, Brehm's (1956) experiment on the change in desirability of consumer articles resulted in an enhancement of the chosen product and a devaluation of the unchosen article. The devaluation of the unchosen product can partially be attributed to a decrease in importance, while the enlarged discrepancy between the chosen and unchosen product can be interpreted as resulting in a smaller proportion of dissonant elements. This same method of dissonance reduction is illustrated in the experiments, previously cited, by Brehm and Cohen (1959b) and Deutsch, et al. (1962).

If a person has sufficient control over his environment he may, secondly, reduce dissonance by changing the environmental cognitive element. In the illustration of the person wanting to fly when the weather was bad, this would have meant changing the weather to acceptable conditions for flying. Due to man's lack of control over his physical environment he rarely can change the reality corresponding to the environmental cognitive element. However, in some cases man can ignore the physical reality in order to reduce dissonance. Even though changes in the physical environment are difficult to make, changes in the social environment are often possible. The person who thinks of himself as a great

tennis player but continually loses may surround himself with poor tennis players that praise his skill. The addition of friends in agreement with a person's self concept would reduce the proportion of dissonant cognitions by adding consonant elements.

A third technique for reducing dissonance is the adding of new consonant cognitive elements. In the gambling experiment by Cohen, et al. (1959) most subjects in the high importance condition attempted to reduce dissonance by seeking consonant information from a probability graph. The acquisition of cognitive elements consonant with the subject's choice was expected to reduce the proportion of dissonant elements. Subjects in the public condition also could have tried to reduce dissonance by adding the belief that few people would see their names in the undergraduate newspaper; thereby reducing the importance of the choice.

Ehrlich, Guttman, Schönbach, and Mills (1957) predicted that, as a result of the dissonance aroused by the decision to buy a car, new car owners would read more ads about the car they had just purchased than ads about other cars.

In addition, it was predicted that after a decision, new car owners would read more ads about the car they owned than would be read by old car owners about their cars. Sixty-five males who had purchased a new automobile in the past four to six weeks and 60 adult males who had owned their cars for three or more years were interviewed. The

experimenter found out, prior to the interview, what magazines and newspapers each subject read regularly and brought these to the interview. The subjects were asked, at the interview, to indicate which automobile ads they had noticed and read in the selected magazines and newspapers. Finally, the interviewer asked the subject which makes of car he had seriously considered before making his purchase. The results indicated that new car owners read more ads about the automobiles they purchased than ads about other cars. The difference was significant beyond the .01 level. In addition, beyond the .01 level of significance, a greater proportion of new car owners, than old car owners, read ads about the car they purchased.

Jecker (Festinger, 1964) paid subjects to participate in a competitive war game involving strategy and tactics. Each subject played in a group of three people; the other two players being confederates of the experimenter. Each subject in the group was given a test measuring the relationship between personality factors and problem solving. The two confederate "subjects" left the room, supposedly to take the test, but did not return. From this point on in the experiment two different treatment conditions were implemented.

Half of the subjects were instructed to choose one of the other "subjects" as their partner (choice condition). The other half of the subjects indicated which one of the other "subjects" they would like to play with but were told

that their choice was subject to agreement by the person chosen (uncertain condition). It was possible, therefore, in the latter condition that the subject would not get his choice of partners. The subject then viewed 6 slides containing the alleged description of the problem solving behavior of each confederate. Three of the slides contained information indicating good ability in problem solving and three of the slides contained information indicating poor problem solving ability. The experimenter recorded the amount of time a subject spent viewing the slides. Finally, a test was administered to measure the subjects' retention of the descriptive information on the slides.

Dissonance was expected to be reduced by adding consonant cognitive elements from the slides. The hypothesis was that the choice subjects would spend more time viewing the slides than the uncertain subjects. This hypothesis was based on Festinger's revised proposition that dissonance is the result of making a choice of consequence (this concept is more fully explained in the next section of this chapter).

An analysis of the data revealed that the choice subjects spent significantly ($p=.05$) more time viewing the slides than the uncertain subjects. In addition, the results showed that the choice subjects retained a greater amount of supporting information than the uncertain subjects. The mean difference test was significant at the .05 level.

A study by Adams (1961) contributes a different kind of information relative to reducing dissonance by adding

cognitive elements. Mothers of first grade students were interviewed on the subject of hereditary versus environmental factors in child development. The mothers were asked to indicate which of the two factors had the greater influence on child development. The experimenter then requested the subjects to listen to an 18 minute tape recorded talk by an alledged expert. For the experimental group the talk favored either the heredity or environment concept; which ever was contrary to the mothers' expressed opinion. In the control group the talk was in agreement with the mothers' expressed opinion. Subjects were then told that they could hear further discussions on either hereditary or environmental approaches at the university the following week. Since both topics were scheduled for the same evening the mothers were asked to indicate if they would like to attend one of the sessions and, if so, which one? At the conclusion of the interview the subjects were asked to again scale their opinion on the subject of child development.

Adams proposed two hypotheses derived from dissonance theory. First, a person exposed to an authoritative communication expressing a contrary opinion, on an important subject, is more likely to seek information than a person exposed to a compatible communication. The expectation was that being exposed to an opposing point of view on an important subject creates dissonance by increasing the proportion of dissonant to consonant cognitive elements.

This dissonance can be reduced by adding cognitive elements which are consonant with one's opinion. A comparison of the subjects in the experimental condition, as opposed to the control condition, revealed a preference for hearing further discussion in the experimental group. The difference was significant of the .02 level. Adams concludes that under conditions of free choice, subjects attempt to reduce dissonance by seeking information.

Adams' second hypothesis was that a person experiencing dissonance as a result of exposure to a contrary communication seeks information agreeing with his opinion. This hypothesis was not supported by the data.

The experiment by Brehm (1956), reported earlier, does not lend support to the hypothesis that dissonance can be reduced by adding cognitive elements. After subjects had chosen between consumer products they were asked to read a research article containing favorable and unfavorable information about the chosen product. The results indicated that the reading of the information did not facilitate the reduction of dissonance. This outcome may have been due to offsetting effects of reading both favorable and unfavorable information.

The previous paragraphs have discussed and shown three different ways for reducing dissonance. In order to empirically test the propositions of dissonance theory, however, it is necessary to be able to predict which method of

dissonance reduction will be used in a given situation. If an individual wants to reduce dissonance by changing a cognitive element Festinger predicts that the cognitive element which is most likely to change is the one with the least resistance to change. One way of finding out the resistance to change of a cognitive element is to analyze the determinants of the resistance. Festinger proposes two determinants of the resistance to change of a cognitive element. First, the more new dissonance that will be produced by a change in a given element the greater the resistance to change of that element. New dissonance is determined by the proportion of present cognitive elements that will be dissonant with the changed or modified cognitive element.

The second determinant of the resistance to change of a cognitive element is the responsiveness of a cognitive element to reality and the difficulty of changing that reality. The less control the individual has over his environment and the more veridical the cognitive element is in representing reality the harder it is to change the cognitive element.

The individual may want to reduce dissonance by adding new cognitive elements instead of changing old elements. There are mainly two factors which determine the probability of using this method of dissonance reduction. First, the more new dissonance which will be produced by the

new information the less likely it is that the subject will add that new information. Second, if the new information is not available to the subject then the subject can not make use of the information. If the new information is consonant information and readily available to the subject it is most likely that he will reduce his dissonance by adding cognitive elements.

The previous illustration of the pilot who wants to fly might help to clarify the problem of determining which method of dissonance reduction to use. In this illustration dissonance exists between the pilots desire to fly and the fact that the weather is very bad. Dissonance could be reduced by changing the weather to acceptable conditions for flying. The pilot, however, probably is unable to change this environmental cognitive element. Another means of reducing the dissonance would be for the pilot to change the behavioral cognition and decide not to go flying. It could be, however, that the flight is imperative and the pilot must make it if at all possible. The pilot then might contact the control tower and add the cognition that the storm is localized and that he can fly above it. The addition of this new cognition would then reduce the dissonance between flying and the bad condition of the weather.

It is also possible to use more than one method of dissonance reduction in a certain situation. Steiner and Johnson (1964) studied the effect of using two different types of dissonance reduction methods. These researchers

suggested that dissonance is aroused when a person's belief is contradicted by the expressed judgments of other people. It was stated that this dissonance could be reduced in four ways: conforming to the opinion of the other person(s), rejecting the credibility of the other person(s) to make such a judgment, underrecalling (repressing) the disagreements, or minimizing the importance of the topics about which there was disagreement. Steiner and Johnson proposed to force subjects to use two of these reduction methods--conformity and rejection. The expectation was that if conformity and rejection are additive then the subjects should make less use of the other two methods of reduction than if conformity and rejection are not additive. Subjects were told they would participate as a member of a two person group. The second member of the group was a confederate of the experimenters. The subjects were to verbally answer 32 questions, but they were not to respond until after the confederate had answered the question. The acceptance-rejection condition was split into two groups. Half of the subjects were given a set to accept the confederate by being told the confederate was a good student and would be an asset to the subject in the experiment. The other half of the subjects were given a set to reject the confederate by telling them the confederate was a poor student and would not be of much help to them in the experiment. Each of these two groups was further split into conformity-non-conformity groups. The subjects in the conformity group were

told to respond to eight questions with answers similar to the confederate responses, and to give the best possible answer to the remaining 24 questions. The non-conformity subjects were to give eight answers disagreeing with the confederates responses, and give the best possible answer to the other 24 questions. The confederate always gave the same answers to the 32 questions. Consequently, the subjects in the four conditions should have found themselves in disagreement (dissonance) with the confederate approximately half of the time. The hypothesis was that the reject-conform subjects would use both rejection and conformity to reduce dissonance and thereby make the least use of the other reduction methods. The accept-nonconform subjects could use neither rejection or conformity to reduce dissonance and, therefore, should make the greatest use of the other reduction methods. The reject-nonconform and accept-conform groups could each make use of one method of reduction and should use the other methods to an intermediate degree. The results supported these hypotheses at the .001 level of significance.

It has been shown that dissonance can be reduced by one method or a combination of reduction methods. In order to predict the use of a single method of dissonance reduction the individual must control the use of all methods except one. If this is not done one cannot be sure dissonance was reduced in only one manner.

Avoidance of Dissonance. The second basic theoretical hypothesis proposed by Festinger was that persons in a state of dissonance will actively avoid situations and information that would likely increase dissonance. This hypothesis has received the least experimental support of the dissonance theory hypotheses.

In the previously cited experiments by Mills, et al. (1959), and by Rosen (1961), subjects indicated their preference for reading articles about types of exams by ranking the article titles. The results of both experiments indicated that the titles containing information dissonant with a subject's choice were not avoided. Other experiments not revealing a tendency for dissonant persons to avoid dissonance increasing situations are those by Adams (1961), and Ehrlich, et al. (1957).

A non-significant trend supporting the avoidance hypothesis is revealed in the gambling experiment of Cohen, et al. (1959). The subjects experiencing dissonance from large losings showed a tendency to spend less time viewing the probability graph. The experimenters interpreted this behavior as the avoidance of information in the probability graph that would confirm the fact that the subject was losing.

A recent experiment by Mills (1965) does lend some support to the avoidance hypothesis. Subjects ranked their preference for ten different consumer products. The experimenter then asked the subjects to choose one of two of the products to keep. Next, the subjects rated their interest

for reading ads about each of the ten products. In order to remove differences in interest due to unequal initial desirability for the products, the experimenters adjusted the interest ratings by linear regression. A linear regression was calculated separately for each subjects' interest ratings for the eight products not involved in the choice. Predicted interest ratings were then calculated for the chosen and rejected products using these regression equations. On the basis of this statistical procedure Mills was able to show a significant ($p .01$) avoidance of dissonant information.

Theoretical implications for choice behavior.

Festinger concludes, from his definition of dissonance, that making a choice or a decision results in dissonance. This dissonance arises between the knowledge of having made a choice and the positive attributes of the unchosen alternative and/or the negative attributes of the chosen alternative. The individual who has just purchased a car has a cognitive element corresponding to the fact that he chose that car in preference to a number of other automobiles. The cognitive elements which follow from this choice are the positive attributes of the chosen car and the negative attributes of the unchosen car(s). The cognitive elements which are the negation of the consonant elements just described and, therefore, are dissonant with the choice, are the negative attributes of the chosen car and the positive attributes of the unchosen car(s).

As previously stated, the magnitude of dissonance is a function of importance and the ratio of dissonant to consonant cognitions. In choice situations the effect of the ratio of dissonant cognitive elements on the magnitude of dissonance is manifested in two different manners. First, the more equal in attractiveness are the alternatives in a choice situation, the greater is the number of positive attributes in the unchosen alternatives. According to Festinger's hypothesis, therefore, the more equally attractive are the alternatives in a choice situation, the greater is the dissonance resulting from a choice. Brehm (1956) tested this hypothesis in the experiment previously cited, by having subjects choose between two different consumer products. In one condition the two products were approximately equal in attractiveness; in the second condition the two products were unequal in attractiveness. The results indicated a significantly greater amount of dissonance reduction after choosing between approximately equally attractive products.

A second factor influencing the ratio of dissonant to consonant cognitive elements is cognitive overlap. The amount of cognitive overlap between two alternatives is the proportion of common cognitive elements which they share. The more elements shared by two alternatives the fewer the number of dissonant elements that can exist. Festinger proposes that with the attractiveness and importance of two

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alternatives held constant, the greater the amount of cognitive overlap between two alternatives the less the magnitude of dissonance. For example, choosing between a Ford with bucket seats and the same Ford without bucket seats would probably not create as much dissonance as choosing between a Ford and a Chevrolet. In this example the two Fords have many cognitive elements in common and, therefore, a large amount of cognitive overlap exists.

Brehm and Cohen (1959b), in an experiment previously cited, tested the cognitive overlap hypothesis by having sixth grade students choose between qualitatively dissimilar or qualitatively similar toys. The subjects choosing between dissimilar toys showed a significantly greater amount of dissonance reduction than the subjects choosing between similar toys.

Four methods are available by which the individual can reduce the dissonance resulting from a choice. First, the individual can change or revoke his choice. Using this method, the person who has recently purchased a new car can reduce his dissonance by deciding he doesn't want the car and, therefore, returning the automobile. The person might then decide to buy a different car or he may not buy a new car at all.

A second means of reducing post-choice dissonance is by changing the attractiveness of the choice alternatives. Changes in attractiveness usually take the form of a re-valuation of the cognitive elements relevant to a choice.

This revaluation could be a change in the desirability of the choice objects, or a change in the liking for the choice alternatives. The experiments of Brehm (1956), Brehm and Cohen (1959b), and Deutsch, et al. (1962) overtly measured this revaluation by having subjects scale the attractiveness of alternatives before and after a choice between the alternatives. The pre-post difference in the ratings was taken as an indicator of the change in attractiveness. Significant changes in attractiveness were obtained in all three of the above mentioned experiments.

A third method by which the individual can reduce post-choice dissonance is to decrease the importance of the relevant cognitive elements. In the Deutsch, et al. (1962) experiment the high important subjects could have decided that creative judgment ability was not an ability which they desired to possess. This reduction in the importance of the "self-involving" message would have reduced any dissonance aroused after hearing the message.

The final method for reducing post-choice dissonance is to add new cognitive elements. The persons experiencing dissonance after the purchase of a new car in the Ehrlich, et al., (1957) experiment reduced their dissonance by reading advertisements relevant to their choice. Mills, et al. (1959) and Rosen (1961) reported that after individuals chose between two types of exams they preferred to read articles consonant with the exam chosen. Adams (1961) concluded that persons experiencing dissonance, subsequent to

making a voluntary choice, attempt to reduce their dissonance by seeking information.

The first section of this chapter has attempted to review the basic postulates and implications of Festinger's original dissonance theory formulation. In addition, relevant evidence has been presented which both lends support and fails to support these notions. The next section of this chapter will discuss the modifications to dissonance theory that have been proposed as a result of this evidence.

Modifications in dissonance theory

The large amount of research that has tested dissonance theory has pointed out ambiguities in certain theoretical formulations. These ambiguities center around the lack of explicit specification of the conditions under which dissonance occurs and increases. For the most part, Brehm and Cohen (1962) have examined these uncertainties and have suggested possible solutions. The three formulations in question are: the definition of dissonance, the manner in which importance affects the magnitude of dissonance, and the role of commitment and volition in post-choice dissonance arousal.

Definition of dissonance. Festinger's original definition of dissonance is an all-or-nothing proposition. Either a cognitive element is the negation of another cognitive element or it is not the negation of that element.

There is no variation in the degree to which a cognitive element is in a state of negation; it is a discrete classification. Brehm and Cohen, however, state that some of the variables involved in a dissonant relationship have a continuous distribution. In the gambling experiment by Cohen, et al. (1959) for example, dissonance was declared to exist between the person's choice of sides and the loss of money. A person could lose varying amounts of money, however, and according to the original definition of dissonance there is no way to determine at what point this loss is great enough to become dissonant (i.e., the negation of not losing money). The experimenters' assumed that possibly no dissonance existed for those individuals who lost only a very small amount of money. Dissonance, instead, occurred when the person's losses were still somewhat small but significant. There is no way in which this assumption could have been made on the basis of the original definition of dissonance.

In order to account for the existence of continuously distributed variables Brehm and Cohen propose a redefinition of dissonance. Dissonance is defined to exist when any variation from one cognitive element, in the direction or the negation¹ of that element, follows from another cognitive element. According to this definition, the subjects in the gambling experiment acquired some dissonance at the moment they lost any money.

¹Brehm and Cohen, following Festinger, use the logically incorrect term obverse instead of negation.

Importance. As previously stated, Festinger did not explain what he meant by the importance of cognitive elements. The assumption was made by this writer that an important cognitive element was one which was of value or consequence to an individual.

In the previous discussion of the manner in which importance affects the magnitude of dissonance four experiments were described. The experiments by Cohen, et al. (1959) and Deutsch, et al. (1962) reported a significantly greater amount of dissonance reduction in the higher importance conditions. Mills, et al. (1959) experiment and the replication by Rosen (1961), however, found no difference in dissonance reduction between the importance conditions. Brehm and Cohen (1962) suggest that the operational definition of importance in the Mills, et al. (1959) and Rosen (1961) experiments accounts for their failure to achieve significant results. The explanation given by Brehm and Cohen is that exams may be commonplace to the student and, therefore, even if they make up a large proportion of the students' grade they will not be perceived as highly important. There is still the problem in these experiments, however, of why the two importance conditions were statistically different on the overt measure of importance. A possible explanation is that since importance was measured by the difficulty subjects had in choosing between exams, it was not an uncontaminated measure of importance. Importance undoubtedly contributes to difficulty but difficulty in

choosing could also be due to equal attractiveness or failure to understand the purpose of the choice. The other two experiments manipulating importance operationally defined the term in a different manner. Cohen, et al. (1959) induced high importance by publicly announcing a subject's name and his winnings or losses. The low important condition did not have this information made public. Deutsch, et al. (1962) presented their high important subjects with a message indicating they had creative judgment ability if they could make subtle distinctions in the quality and flavor of food. This message was not read to the low importance subjects. Both of these experiments obtained significant differences in dissonance reduction between importance conditions. These two experiments differed from the previous experiments in that they used importance in a self-involving manner. The public announcement of winnings and the suggestion of having or not having creative judgment ability both reflect on the competence of the individual.

In accordance with the results obtained in the Deutsch, et al. (1962) and the Cohen, et al. (1959) experiments, Brehm and Cohen state that in order for importance to influence the magnitude of dissonance it must manipulate cognitive elements which are related to the individual's self-esteem or self-concept.

Commitment and volition. The act of making a choice was previously stated to almost inevitably result in dissonance. In the experiment by Jecker (Festinger, 1964)

an exception to this prediction was reported. The participants whose choice of a partner was subject to the approval of the person chosen did not reveal any arousal of dissonance. This result was interpreted by the experimenter as indicating that dissonance is not aroused by a choice which has no immediate consequence. The subjects who were told they would participate in the experiment with the partner they chose did experience dissonance.

In the Deutsch, et al. (1962), Brehm (1956), and Brehm and Cohen (1959b) experiments the subjects were told they could keep the chosen article. The choices in these experiments, therefore, had definite consequences for the individual and thereby specified the choice at a given point in time. Significant results were obtained in all of these experiments.

This specification of a choice that has definite consequences is what Brehm and Cohen (1962) call commitment. They state that it is commitment which specifies the dissonant relation and thereby arouses dissonance. A person is committed when he

has decided to do or not do a certain thing, when he has chosen one (or more) alternatives and thereby rejected one (or more) alternatives, when he actively engages in a given behavior or has engaged in a given behavior. Any one or a combination of these behaviors can be considered a commitment. (Brehm and Cohen, 1962, p. 7)

Another aspect of commitment might be that the more difficult it is to revoke a choice the greater the commitment to that choice. With this assumption the prediction is that the

greater the commitment to a choice the larger the magnitude of the aroused dissonance.

In order to demonstrate the necessity of commitment to the arousal of dissonance Brehm and Leventhal (Brehm and Cohen, 1962) conducted an experiment varying the degree of commitment. Subjects sat in front of a black curtain with one of their hands extended under the curtain. The experimenter was on the other side of the curtain and told the subjects he was going to place 15 different weights in their hands and they were to assign a value to each weight. In addition, after assigning a value the subjects were to predict the average value of the series of 15 weights. In actuality, the subject was only presented with 11 weights, but it was necessary for him to believe he would make judgments for more than 11 weights. A five dollar gift certificate was offered as a prize for achieving a certain level of accuracy in the prediction of the average weight of the series. In order to anchor the subjects' judgments the values 50 and 30 were assigned, respectively, to the first two weights. The discrepancy in grams between any two weights was over four times as large between the tenth and eleventh weights as between any other two weights. Half of the subjects followed the procedure described above. The commitment variable was inserted for the rest of the subjects between the judgment for the tenth and eleventh weight. The commitment subjects were told, after assigning a value to the tenth weight, that this next estimate of the average

weight of the 15 weights was the crucial prediction which would determine whether or not they won the five dollar prize. After making this estimate the subjects lifted the discrepant eleventh weight and assigned a value to it. Finally, the subjects again predicted the average weight for the series of 15 weights. The subjects were then told that there were only 11 weights instead of 15 and, therefore, the experiment was completed. Dissonance was expected to be aroused by the large discrepancy of the eleventh weight. The distortion in the prediction of the average weight of the series after lifting the eleventh weight was interpreted as a sign of dissonance reduction. The results indicate a significant ($p=.05$) distortion in the prediction of the average for the high commitment condition but not for the low commitment condition. Brehm and Cohen interpret this result as an indication of the necessity of commitment for the arousal of dissonance.

Finally, Brehm and Cohen point out two main benefits from the use of commitment to arouse dissonance. First, commitment provides the specific act of consequence at a given point in time with which cognitive elements are dissonant or consonant. This allows the experimenter to predict the relevant cognitive elements in a choice situation. The second benefit of commitment is that it increases the resistance to change of the cognitive elements associated with the committed behavior. This greater resistance to change of the committed behavior allows a more accurate prediction of the means of dissonance reduction by reducing the field of possible reduction methods.

According to the above discussion, whenever a person commits himself to a specific choice, dissonance should be aroused. Brehm and Cohen (1959a), however, conducted a choice experiment with commitment and found no evidence of dissonance reduction in one condition.

In this experiment subjects committed themselves to participating in a boring, tedious task. None of the experimental subjects received payment but each subject was told that the other subjects received either one dollar or ten dollars for participating in the experiment. The subjects were told that a random procedure was used for selecting the subjects who would be paid and they were not selected. The expectation was that the larger the deprivation in payment the greater the dissonance. The amount of freedom each subject had in determining whether or not he would participate in the experiment was varied by telling some subjects they could leave with approval. The rest of the participants were not given an opportunity to leave. The degree of freedom was measured by assessing each subject's perception of how difficult it would be to get out of participation. The measure of dissonance reduction was the degree of satisfaction with the boring task. The results showed that with low freedom the greater the deprivation in payment the less the satisfaction. The subjects perceiving high freedom of movement, however, revealed greater satisfaction with an increase in deprivation of payment. Brehm and Cohen (1962) interpreted this result as an indication

that even with commitment dissonance will occur only to the extent the subject perceives himself to have prior freedom of choice.

The name given to this concept, by Brehm and Cohen, is volition. Volition is defined as "the extent to which a person feels that he controls his own behavior (including responses, emotions, motivations, etc.)". (Brehm and Cohen, 1962, p. 201).

From the above discussion it would seem that volition, in addition to commitment, specifies certain conditions for the arousal of dissonance. In addition, volition affects the magnitude of dissonance.

Consider, for example, a two-alternative choice situation. As the two alternatives become more nearly equal in attractiveness, the proportion of cognitions dissonant with choice of the more attractive alternative increases, and, hence, the magnitude of dissonance should increase. But the same would be true of the degree of volition, since, as the choice alternatives become more nearly equal in attractiveness, the individual must become more concerned with which alternative he will choose. When one alternative is clearly more attractive than the other, the degree of volition would ordinarily be low, since the individual would select the attractive alternative without much consideration. The fact that he could choose the less attractive alternative would be of little consequence. In general, then, the degree of volition will frequently be positively correlated with the ratio of dissonant to consonant cognitions. (Brehm and Cohen, 1962, p. 203).

Both volition and commitment appear to be important variables in determining the arousal and magnitude of dissonance. Brehm and Cohen have attempted to clarify the

interaction between these two concepts. These authors state that

Two kinds of assumptions may be necessary; one concerning commitment, the other concerning volition. The interpretation of each study requires that a commitment be identified in order for there to be a clear case of dissonant cognitions. Once a commitment is identified, and assuming the existence of one or more important cognitions discrepant with that commitment, the degree of volition will control the magnitude of dissonance, at least in part. Where the degree of volition is low, the magnitude of dissonance will necessarily be small. Where the degree of volition is high, the magnitude of dissonance will be large and will vary as a function of other factors such as the general importance of the relevant cognitive elements, and the ratio of dissonant to consonant elements. (Brehm and Cohen, 1962, p. 218)

Festinger (1964), in a re-assessment of dissonance theory, admits that the evidence makes clear that dissonance is not the inevitable result of almost all choices. The commitment proposal of Brehm and Cohen is accepted by Festinger and he states that a person must be committed to a choice in order for it to produce dissonance. The modifications to dissonance theory suggested by Brehm and Cohen alter some of the basic formulations of dissonance theory. At this point, therefore, a restatement of the modified formulations of dissonance seems called for.

1. Dissonance exists when any variation in a cognitive element in the direction of being the negation of that element follows from another cognitive element.

2. The existence of dissonance is psychologically uncomfortable and will motivate the individual to attempt to reduce dissonance and achieve consonance.
3. The strength of the pressures to reduce dissonance is a function of the magnitude of the dissonance.
4. In order for importance to affect the magnitude of dissonance it must manipulate cognitive elements which are related to an individual's self-esteem or self-concept.
5. The magnitude of dissonance increases as the number and/or importance of dissonant cognitive elements increase in proportion to the number and/or importance of consonant cognitive elements.
6. The total magnitude of dissonance is, in addition, proportional to the amount of volition a person perceives himself to have in a given situation.
7. The individual can reduce his dissonance by decreasing the importance of all relevant cognitive elements and/or by decreasing the proportion of dissonant cognitive elements.
8. Commitment to a volitional choice results in dissonance.

Criticisms of dissonance theory

Dissonance theory has been accepted by a large number of people as a valid explanation of certain kinds of

behavior. In addition, a good deal of research has been generated by the theory. However, a closer look at the evidence seems to be warranted. In the following sections the theoretical formulations of dissonance theory will be examined and then an analysis will be made of the methodological procedures used in many dissonance theory experiments.

Theoretical criticisms. Festinger's definition of a cognitive element as being a knowledge, opinion, or belief is as abstract as the concept it is attempting to define. The components of a cognitive element still are not known. In an analysis of Festinger's definition of cognitive elements, Asch (1957) questions Festinger's assertion that cognitive elements are independent of any affect. Especially since Festinger states that almost every dissonant situation involves some assumption about a person's needs, desire, values, etc. In an attempt to account for the affectual component it was previously suggested that cognitive elements seemed to be general propositions about what a person does, believes, feels, or knows. There is still a need, however, for an operational definition which explicitly specifies the components of a cognitive element.

A second criticism of dissonance theory formulations pertains to the number of elements which are involved in a dissonant relation. Festinger states that dissonance is the result of an inconsistency between two cognitive elements. It would be very convenient if, in reality, dissonance was the product of the relationship between only

two cognitions. Experimentation on dissonance theory would be much less equivocal if dissonance could be controlled by the manipulation of just two cognitive elements. Chapanis and Chapanis (1964) point out, however, that it is almost impossible to reduce all the relevant variables in a complex social situation to two cognitive elements. The best examples of the fact that dissonance is not just an isolated relationship between two elements are the experiments cited in support of dissonance theory. In the Festinger (1957) and Cohen, et al. (1959) gambling experiment, dissonance was not just the result of an inconsistency between a person's choice and the amount of his losses. Other related cognitive elements were the importance of the person's choices and the amount of negative information the person perceived in the probability graph. Brehm and Cohen (1959b) asserted that dissonance was the result of the inconsistency between the choice of a toy and the negative attributes of that chosen toy plus the positive attributes of the non-chosen toy. There are more than two cognitive elements in this dissonant relationship. The choice, the different attributes of the chosen toy, and the various attributes of the non-chosen toy form a cluster of relevant cognitive elements. Each toy is not a single cognitive element but a group of elements made up of the different attributes of that toy. Some of the elements correspond to the attractiveness of the toy, some to the physical properties, and others to the possible uses of the toy. The notion of dissonance being the result of

inconsistency between two cognitive elements is parsimonious, but not very useful in explaining behavior in real life situations. It must be realized that dissonant relations involve clusters of cognitive elements and that all of these elements must be controlled and investigated in order to rigorously test dissonance theory.

The third criticism refers to that definition of "follow from" which states that dissonance is aroused by a logical contradiction between two beliefs. As an example, Festinger offers the two beliefs: Man will in the near future reach the moon (A); and Man will not be able to leave the earth's atmosphere (B). Festinger states that the negation of B logically follows from A; therefore, A and B are logically contradictory. Brown (1965) points out that in order for a logical contradiction to exist between two propositions, one proposition must negate the other. In the above example, the negation of A is the belief that Man will not in the near future reach the moon. Proposition B in the above example, therefore, is not the logical contradiction of proposition A. Brown states further that dissonance can never be the result of a logical contradiction. In order for dissonance to be aroused by a logical contradiction, the individual would have to believe a certain proposition and, also, the negation of that proposition. People usually do not hold contradictory beliefs. Brown's conclusion is that dissonance theory does not deal with logical inconsistency,

but instead, psychological expectancy. The reason that propositions A and B, in Festinger's example, are usually dissonant, is people expect that the only way to reach the moon is to leave the earth's atmosphere. As Brown suggests, maybe a way could be found to bring the moon within the atmosphere of the earth, in which case dissonance would not occur between the two beliefs in the above example. The relation between propositions that results in the arousal of dissonance, therefore, is not a matter of logical contradiction but of psychological expectation.

A fourth criticism refers to Festinger's failure to adequately define what he means by the attractiveness of choice alternatives. The experiments testing dissonance theory usually define the term as either the desirability of an object or the liking for an object. For example, Brehm (1956) had subjects rate the attractiveness of consumer products on the basis of the objects' desirability. Brehm and Cohen (1959b) asked subjects to rate their liking for 16 different toys as a measure of attractiveness. There may be little difference in the actual process being measured in these two experiments. Desirability and liking may only refer to different facets of the same process. Desirability is a property of the object and liking is a property of the perceiver, but both terms may refer to a process of evaluating a given perception. In any case, these two terms seem to specify what Festinger means by attractiveness.

In relation to the effect of attractiveness on the magnitude of dissonance, Festinger differentiates between attractiveness and importance. This would seem to be a necessary distinction since in some cases the two variables do differentially effect behavior. A person may make a relatively unimportant choice between two attractive alternatives. For example, a man may choose to buy one of two attractive ties. Conversely, a person may make a relatively important choice between two unattractive alternatives. For example, an individual may be quite sick and have to choose between having an operation or staying in bed a month.

Just as one can think of ways in which attractiveness and importance are uncorrelated, so can examples be given of situations in which the two variables are correlated. The man trying to select a tie may suddenly see two of the prettiest ties he has ever seen. The act of making a choice is then very likely to become more important for this man. In the case of the sick person, the patient might be told that he is going to die unless he has an operation or is confined to bed for a month. This situation has undoubtedly become very important to the individual and it is very likely that the operation and the confinement to bed are considerably more attractive to the individual.

It would seem that even though there is some difference between attractiveness and importance there is also some common variance accounted for by the two variables. As mentioned above, attractiveness seems to refer to some

evaluative process. This evaluative process may be the process which is common to both attractiveness and importance. Osgood, Suci, and Tannenbaum (1957) in their development of the semantic differential state that the important-unimportant dimension has a factor loading of .38 on the evaluative factor. Even though Festinger distinguishes between attractiveness and importance the two terms appear to both be a part of an evaluation process. To the extent that importance differs from attractiveness, importance would seem to refer to the consequence, utility, or salience of the relevant variables in a given situation. This distinction between attractiveness and importance is only theoretical, however, and in order to apply it to dissonance theory research some operational distinction must be made. Deutsch's et al. (1962) experiment operationally distinguishes between the effects of attractiveness and importance. Subjects rated the attractiveness of six jam spreads. Two approximately equally rated jams were selected from which the subjects chose one spread to take with them. Half of the subjects were then presented with a self-involving message to induce high importance. The other half of the subjects did not receive the self-involving message. The subjects then re-rated the six jam spreads. Post-choice dissonance was reduced by changing the attractiveness of the two choice alternatives. The results showed a significantly greater change in attractiveness in the high importance condition than in the low importance condition. The

important message seems to have introduced some new variable into the situation which resulted in a greater change in attractiveness. This new variable had to be something other than attractiveness, since the article read to the subjects referred to the individual's abilities and not the choice objects. There does seem to be a dimension in which attractiveness and importance separately influence behavior. The fact should always be taken into account, however, that there is also a dimension in which changes in attractiveness covary with changes in importance.

Another criticism related to the manipulation of importance is that Festinger does not distinguish between the importance of the choice objects, the importance of the choice itself, and the importance of the cognitive elements. All three of these factors would seem to affect the magnitude of dissonance. Festinger refers only to the importance of the cognitive elements. Of course, it can be argued that the importance of the cognitive elements includes the other two factors. That is to say, the importance of the choice itself is determined by the importance of the choice objects and in turn the importance of the choice objects is determined by the importance of the cognitive elements. Whatever the case, in order to have an unequivocal definition of importance, these three factors of importance should be either differentiated or integrated.

It was previously stated that the magnitude of dissonance was a product of the importance of the cognitive

elements and the proportion of dissonant to consonant elements. The problem with this concept is that there is no way to operationalize it and thereby determine the total magnitude of dissonance (Brown, 1965). In order to accomplish this task one would have to be able to assess the number of relevant cognitive elements in a situation and the relative importance of each cognitive element. Since no instrument is available that can assess all the relevant elements in a given situation the total magnitude of dissonance is not definable. This is not to say, however, that the gross relation between dissonant and consonant elements is not discernable, nor that gross changes in magnitude can not be measured.

Another criticism is that commitment has been established as a necessary ingredient for the arousal of dissonance but a specific operational definition is not available. The present definitions of the term states that commitment is the act of making a choice or engaging in a given behavior, or an act of definite consequence specified at a given point in time. These definitions do not show commitment to be much other than choice. Commitment is used in dissonance theory experiments as a variable separate from choice and, therefore, an explicit operational definition of commitment is needed in order to fully understand its function in a dissonance situation (Deutsch and Krauss, 1965).

Deutsch and Krauss (1965) criticize dissonance theory on the basis that even with the benefit of commitment it is

still difficult to specify the method of dissonance reduction. In order to solve this problem the factors which determine which method of reduction will be used in a given situation must be explicitly defined. This means examining individual differences in the use of different methods of dissonance reduction. In addition, some way must be devised for determining the resistance to change of cognitive elements or of the amount of new dissonance created by adding cognitions. Very little experimentation has been performed which investigates these factors.

A final criticism of dissonance reduction refers to some of the measures used to assess attempts to reduce dissonance by adding cognitive elements. The previously described experiments frequently attempted to measure the addition of cognitive elements by recording the time spent reading the new information or by having subjects indicate their relative preference for different material. Cohen, et al. (1959) in their gambling experiment measured dissonance reduction by recording the amount of time subjects spent reading a probability graph. Mills, et al. (1959) and Rosen (1961) had their subjects rank their preference for a group of articles titles about types of exams. Even though significant differences between groups were obtained in these experiments neither time of reading or indication of preference is a direct indication of dissonance reduction. Both of these measures are secondary indicators of the reduction of dissonance.

The time spent reading relevant information does not necessarily indicate the person was trying to reduce dissonance. Instead, differences in reading time may have been due to differential interest in the material or differential difficulty in understanding the information. In addition, it is very difficult to empirically determine the exact amount of time an individual actually spends reading a piece of information. The person may have been distracted part of the time or he may not overtly indicate exactly when he is finished reading the material.

The use of a person's indication of his preference for information is also, under most conditions, a poor measurement of dissonance reduction. If a person overtly indicates that he would prefer to read a certain type of information, but does not believe that he will have to read the information, it cannot be assumed that his preferences and his behavior coincide. There is no commitment to action in just the indication of preference. The person must believe that his choice in stating a preference leads to some behavioral consequence.

The fact that dissonance has been aroused in a situation is usually inferred from the occurrence of attempts to reduce dissonance. It is difficult to determine whether or not dissonance has been produced if the measure of dissonance arousal is not directly related to dissonance variables. If any understanding is to be obtained of the process by which dissonance is aroused and reduced primary measures

of reduction must be used instead of ambiguous secondary indicators.

There are other dissonance theory phenomena, which are important to an understanding of the dissonance process, that are ambiguously defined or not defined at all. First, very little investigation has been made of when dissonance occurs after a choice, or what extinction process it follows. Second, Maccoby and Maccoby (1961) raise the question of individual differences in tolerance for dissonance. Some people may be able to endure larger amounts of dissonance than others. Under certain circumstances people may seek out dissonance. All of these ambiguities raise questions about dissonance theory which must be investigated in order for the theory to remain useful.

Methodological Criticisms. The research reported by Festinger (1957) to support his original formulations was criticized by Asch (1958) for three general weaknesses.

First, there are some studies which yield positive results for the theory but these results are not consistently positive. In addition, even though the trends in the data are statistically significant they are generally weak.

Second, there is a lack of adequate control of psychological factors that could account for the results as well as dissonance theory. This criticism applies to some of the studies which provide the strongest confirmation for dissonance theory. Third, there is not a uniform base for the studies supporting dissonance theory. For example, a

lot of information is provided relevant to the effect of dissonance on smoking behavior, seeking of information and choice behavior. The problem is that most of the information comes from different sources of investigation, i.e., different experimental designs or methods. Asch says that what is needed is the intense study of one type of dissonant behavior using a uniform method of experimentation.

The research that has been performed from 1957 through 1961 to investigate dissonance theory has been evaluated by Chapanis and Chapanis (1964). Two general criticisms of dissonance theory research are offered by these investigators. First, the experimental manipulations in dissonance theory research are so confounded that it is difficult at times to determine what variables produced the changes in the dependent variable. Second, some of the methods used in analyzing the data are highly suspect. A review of these two criticisms as they pertain to the experiments previously described is given below.

Two experiments which Chapanis and Chapanis cite for confounding the variables, beyond the point of clear interpretation, are the gambling experiment by Festinger (1957) and the modification of that experiment by Cohen, et al. (1959). Three weaknesses are pointed out in these experiments. First, Chapanis and Chapanis state that these experimenters confounded their dissonance formulations. Dissonance was stated to have been aroused, in the winners

of the game, between their choice of sides and the information in the probability graph which said they were eventually going to lose. For the losers, dissonance was postulated to be the result of the inconsistency between the person's choice and the fact that he was losing money. Dissonance, therefore, could be the result of an inconsistency between choice and information of an inconsistency between choice and amount of losings. It is possible, therefore, that the two sources of dissonance were additive and that dissonance was increased for the subject who was losing when he acquired the information telling him he was going to lose more. In this experiment no attempt was made to separate out the two different causes of dissonance arousal and consequently it is not possible to determine the exact cause of dissonance.

The second weakness which Chapanis and Chapanis discuss is that the results were not consistent or unequivocal. Dissonance for both the winners and losers was reflected in the amount of time spent viewing the graph. The results showed that the winners spent a moderate amount of time viewing the graph; the small losers viewed the graph the longest time; the moderate losers avoided the graph; and the biggest losers viewed the graph for a moderate amount of time. These results were interpreted as supporting dissonance theory. Chapanis and Chapanis point out that the results are not consistent with each other and that the opposite pattern of results for the losers could also have been interpreted as support for dissonance theory.

The third and most important criticism is that the results can be explained by pre-decision behavior as well as by post-decision behavior. The subjects were told that they could change sides before the probability graph was given to them. The time spent viewing the graph, therefore, may have been an indicator of the subjects attempt to obtain information to help him make a choice and not an indicator of dissonance reduction. Festinger and Cohen, et al., did not attempt to control this predecision behavior.

Silverman (1964), in response to the Chapanis' criticisms of the gambling experiment states that the behavior of the losers was predicted by the hypotheses; and to that extent the results are relevant. In addition, Silverman says that the explanation for dissonance in the winners was made ex post facto. This explanation, therefore, was a proposal for further research and not a hypothesis of expected behavior. In the final analysis, however, Silverman concedes that the study should be partially replicated with dissonance resulting only from the choice and the amount of losings.

Three recommendations are made by Chapanis and Chapanis for reducing the confounding of variables in future experiments. First, the experimental manipulations should be simplified. This could be accomplished by using fewer variables and more rigorous controls in experiments. The second recommendation is that more control groups be used in order to clarify the interrelationships of the experimental

manipulations. Third, more importance should be given to the subjects perception of the experimental variables and situation.

Chapanis and Chapanis offered two criticisms of the techniques used in analyzing data obtained in dissonance theory experiments. First, the rejection of a large proportion of subjects after the data is analyzed is a frequent occurrence in dissonance theory experiments.

Brehm and Cohen (1959b) discarded 65 percent of the subjects in their study of the attractiveness of choice alternatives (toys). The reasons given were as follows. Some subjects liked the chosen toy too much for their to be any significant increase in liking. Other subjects failed to rate one toy higher enough than any other toy so that its choice could be expected. In addition, subjects were discarded as "unreliable" when they failed to choose the toy initially marked as most liked. Chapanis and Chapanis point out that discarding "unreliable" subjects falsely reduces the error variance and changes the means in such a way as to enhance the difference in attractiveness. In other words, rejecting "unreliable" subjects produced the hypothesized effects. Brehm (1956) discarded 35 percent of his subjects for similar reasons to Brehm and Cohen's (1959b).

Another experiment discarding a large number of subjects is Ehrlich, et al. (1957). The criticism of this experiment is that subjects were thrown out at so many levels

of analysis that it is impossible to determine what the final data means. Fifty percent of the old car owners, in the category of "cars considered," were discarded because either no advertisements for their car preferences appeared, or they did not name any cars as "seriously considered." One-third of all the subjects in the experiment were thrown out because they did not notice the advertisements which did appear. Finally, those subjects were discarded who did not notice at least one advertisement in each car category, or who read an equal percentage of advertisements in each category. Up to 82 percent of this original sample was thrown out at different levels of analysis. Chapanis and Chapanis state that this biased the results to the extent that they are indeterminable.

In defense of the rejection of subjects Silverman (1964) says that subjects were not discarded in these experiments on the basis of the dependent variable. Instead, the subjects analyzed were preselected by a criterion which enabled the hypothesis to be tested. However, even if preselection of subjects by a criterion is a widely used procedure, it surely does not add to the validity of the results. Silverman does agree that in the Brehm and Cohen (1959b) experiment the rejection of "unreliable" subjects could have accounted for the results.

The second criticism of the technique used in analyzing the data is that some studies are inadequately designed and analyzed. In many studies no control groups, or an

insufficient number of control groups, were used. Without an adequate number of control groups it is impossible to obtain an unequivocal interpretation of the differences between conditions. In the Shrlach, et al., experiment no control group was used to determine the effect of reading car advertisements before making a decision. The Mills, et al. (1959) and Rosen (1961) experiments did not use a control group in which persons' only scaled their desirability for the articles but made no choice.

Another weakness in design is that an overall test of significance is frequently not used. The use of a series of t tests without a prior overall significance test many times leads to a higher level of significance than is justified. In addition, without an overall significance test it is quite difficult to determine if a significant interaction occurred. Two of the previously cited studies not using an overall test of significance are Brehm and Cohen (1959a) and Mills, et al. (1959).

The Chapanises' final general criticism of the dissonance theory research is that many times non-significant trends are reported and interpreted as support for the theory. For example, Adams (1961) interprets a .06 level of significance as support for his hypotheses. In the same manner, Cohen, et al. state that support was obtained for one of their hypotheses at the .10 probability level.

Most of the main propositions of dissonance theory have been shown to have theoretical weaknesses and

insufficiently clear experimental support. Further investigation of the dissonance theory formulations under rigorous conditions seems to be required.

Problem

The purpose of this study was to experimentally test some of the formulations of dissonance theory under rigorous conditions. In doing this it was hoped that reliable data could be obtained about the propositions of dissonance theory.

Two basic propositions of dissonance theory were tested in this experiment.

1. The existence of dissonance is psychologically uncomfortable and will motivate a person to attempt to reduce dissonance and achieve consonance.
2. The greater the magnitude of the dissonance the greater will be the pressure to reduce dissonance.

As a test of these two postulates persons were asked to choose between two alternatives in order to arouse dissonance. The magnitude of the dissonance was manipulated by varying the importance of the choice.

Choice. The act of making a choice is proposed to be dissonant with the positive attributes of the rejected alternative(s) and the negative attributes of the chosen alternatives. Some of the positive attributes of the rejected alternative(s), however, must be qualitatively dissimilar from the attributes of the accepted alternative.

If the attributes of the two alternatives are quite similar, i.e., cognitive overlap exists, then the chooser is not rejecting much in selecting either of the two alternatives. If the chooser does not have to give up much of anything then there are few cognitive elements that can be dissonant.

In order for dissonance to be aroused the individual must make a volitional choice to which he is committed. The individual must believe that the choice he makes will affect his subsequent behavior and that he had freedom in making that choice.

Dissonance should be aroused, therefore, only when an individual commits himself to a volitional choice between two qualitatively dissimilar alternatives.

Magnitude of dissonance. When a person perceives himself to have a large amount of volition in a choice situation the magnitude of the dissonance is a product of the ratio of dissonant to consonant cognitive elements and the importance of these elements. The proportion of dissonant cognitive elements in each member of a group of individuals can be held constant by controlling two variables. First, the choice must be between equally attractive alternatives, i.e., the alternatives must be equally desirable and equally liked. Second, all people must choose between alternatives which are equally dissimilar in content. With these two variables held constant the magnitude of the dissonance would be the result of variations in the degree to which the individuals perceived the situation as involving factors of

importance for them. The more important these factors the greater the resulting dissonance. As previously pointed out, attractiveness and importance are correlated. Variations in importance, therefore, will produce some change in the attractiveness of the alternatives. These changes will equally affect both choice alternatives, however, and consequently the two choice alternatives will still be equally attractive.

Reduction of dissonance. One way in which the individual can attempt to reduce the dissonance resulting from a choice is for him to revoke or change his choice. If the individual has publicly committed himself to a choice, however, it becomes very difficult for him to revoke or change that choice. In addition, the environmental condition may make it almost impossible for a person to revoke or change his decision. For example, a car dealer may have a policy that no car can be returned once it has been purchased.

Secondly, the individual could attempt to reduce post-choice dissonance by changing the attractiveness of the choice alternatives. The attractiveness of the choice alternatives can be changed by reducing the desirability of the dissonant cognitive elements, and/or by reducing the liking for the dissonant cognitions. In addition, increasing the desirability of the consonant cognitions and/or increasing the liking for the consonant elements will reduce dissonance through changing the attractiveness of alternatives. These procedures would be very difficult to implement if the

alternatives were initially equally attractive and if the attractiveness was substantial.

A third means by which the individual could attempt to reduce post-choice dissonance is by reducing the importance of the relevant cognitive elements. It would be quite difficult to reduce the importance of these elements, however, if they were initially quite important.

If the above methods of dissonance reduction were made very difficult or impossible to implement in a given situation the person would have to use some other method to reduce dissonance. If immediately after a choice, a person was presented with an article containing information relevant to his choice, he would probably reduce his dissonance by adding the relevant information in the article.

Measures of attempts to reduce dissonance. In previous experiments the attempts to reduce dissonance by adding cognitive elements were usually measured by the time spent reading the information or by an indication of preference for relevant reading material or situations. As was previously pointed out (p. 51), these measurements are only ambiguous secondary indicators of attempts at dissonance reduction. There should be a measure of attempts at dissonance reduction which is more directly related to the variables manipulated in a dissonance experiment.

In the experiment by Jecker (Festinger, 1964) some subjects were allowed to choose their own partner in a war game while other subjects were told their selection had to be

agreed upon by the person selected. The problem solving abilities of the person not chosen were dissonant with the subjects' choice of the other person. In addition, the attributes of the chosen partner which were detrimental to problem solving were dissonant with the choice of that partner. The measure of attempted dissonance reduction was the number of items of information retained by the subjects about their partner's problem solving ability. The results indicated that the subjects' making a choice retained a greater amount of information about their partners than the subjects whose selection was not assured of having any consequence. This is a measure of an attempt at dissonance reduction which is directly related to dissonance variables. When the subject experiencing dissonance was presented with information about the chosen partner he acquired that information. Once this information was acquired it was accessible to measurement through measuring retention. The more dissonance the person possessed, the more cognitive elements he added to reduce the dissonance and, therefore, the more items of information he retained. It can also be argued that as the dissonance is reduced the acquired information is no longer needed to reduce dissonance and retention is reduced. The differences in retention due to dissonance, therefore, should disappear over time.

In summary, the formal hypotheses of this experiment are:

1. Subjects who have volitionally chose and committed themselves to one of two equally attractive but

qualitatively dissimilar alternatives will retain more of the relevant information to which they are exposed than subjects who are exposed to this same information without having made a prior choice.

2. The effect of choice on the retention of information will be greater when the choice is between alternatives highly important to the individual than when the choice is between alternatives of low importance.
3. There will be no differences in the amount of information retained between subjects making a choice and subjects not making a choice after the dissonance reduction process is complete.

In addition to the above hypotheses this experiment will attempt to overcome the methodological flaws pointed out in the previous chapter. Overt measurements will be made of the subject's perception of the experimental situation. The subjects not making a choice will serve as a control group for the subjects making a choice. Only two independent variables will be manipulated in the experiment. These variables are choice and importance. In the analysis of results no subjects will be rejected after the data is analyzed and the data will be analyzed by an overall test of significance. Finally, an attempt will be made not to draw conclusions beyond the significance of the results.

Method

Subjects

The subjects in this experiment were 148 undergraduate students at Michigan State University. During the Spring term of 1965 these subjects were enrolled in two sections of an advanced general psychology course. The subjects were members of all four college classes, i.e., freshman, sophomore, junior, and senior. Four subjects were discarded because they did not follow the instructions for the experiment. The remaining 144 experimental subjects consisted of 61 males and 83 females.

Design

The design was a 2X2 factorial with a repeated measurement for each subject. The first factor was divided into a choice level and a no-choice level.

The subjects in the choice group were presented with one of two pairs of article titles. The two titles in each pair were equally attractive but qualitatively dissimilar. Each title in a pair was a summary label for an article. The subjects in the choice group were to choose the article they would prefer to read by selecting one of the two article titles in the pair.

The subjects in the no-choice group were presented with the same pairs of article titles as given to the choice

group. The difference between the two groups was that the subjects in the no-choice condition were not allowed to select the article they would read. Instead, the no-choice subjects were told which one of the two articles in a pair to read. The no-choice subjects thus served as the control group for the subjects making a choice between article titles.

The choice and no-choice groups were each further partitioned into a high importance group and a low importance group. The subjects in the high importance condition chose or were assigned to read an article determined to be of high importance to them. An article determined to be of low importance was chosen or assigned to be read by the subjects in the low importance condition. The pair of article titles for the high importance condition was:

1. Premarital sex and legalized abortion.
2. The changing view toward premarital sex.

The pair of article titles for the low importance condition was:

1. Principles of learning and their relation to acquisition.
2. The best way to prepare for a test.

The pre-experiment that was performed in order to select these two pairs of article titles is described in Appendix A.

After the subjects in each of the four conditions had read the chosen or assigned article they were given a

Table 1

Experimental groups into which subjects were partitioned

Dependent Condition	Independent Condition			
	Choice		No-choice	
	High Importance	Low Importance	High Importance	Low Importance
Immediate test	Group 1	Group 2	Group 1	Group 4
Delayed test ¹	Group 1'	Group 2'	Group 3'	Group 4'

¹ Repeated measurement on the same subjects as in the immediate test condition.

multiple-choice test. The test was designed to measure each subjects retention of certain facts contained in each article. One week later the same multiple choice test was readministered to the subjects.

A tabular description of the design of the experiment is given in Table 1.

Construction of the experimental materials

Articles had to be written which would go with the titles selected for each importance category. One article was written for each importance category. The two titles in each importance condition were both given to the article written for that importance condition. By giving both titles to the same article, subjects within each importance condition received identical information no matter which article they chose or were assigned to read. The content of the articles in different importance categories had to

differ but an attempt was made to equate the structure of the two articles. First, the article for the high importance condition was written; then the experimenter wrote the low importance article. The low important article used the same sentence structure, paragraphing, and length as the article of high importance. The only difference between the two articles was the content. The article for each importance category is presented in Appendix E.

In order to measure the amount of information each subject retained from the article read, a multiple choice exam was constructed. The test consisted of 14 questions, each question having 5 or 6 answer alternatives. First, the test for the high importance condition was constructed. The low importance condition test was then constructed using the same structure and number of questions, and the identical order and number of answer alternatives for each question. A copy of the two sets of multiple choice questions is presented in Appendix F.

Procedure

The experimenter presented the same verbal instructions to both sections of the advanced general psychology course. A copy of these verbal instructions is presented in Appendix C. The results for each section were kept separate and were subsequently analyzed for any significant differences between sections.

The subjects were randomly assigned to the four experimental conditions. The subjects in all four conditions

participated in the experiment at the same time. The following method was used in order to simultaneously administer the experiment to all four conditions. Three different sizes of sealable manilla packets were used. Each size packet was able to fit inside the next larger size packet. The largest packet was sealed and contained an instruction sheet, and IBM answer sheet and two sealed medium size packets lettered A and B. Each of the medium size packets contained the article for the importance category to which the subject had been randomly assigned. The article in each packet had a different title. In addition, each of the two medium size packets contained a small packet in which was sealed the appropriate multiple choice questions for the article.

The large packets containing all of the items listed above were shuffled and distributed to the subjects as they entered the classroom. The subjects were first informed that none of the individual results of the experiment would be publicly disclosed. In addition, the subjects were asked not to talk to anyone else during the experiment nor to look at the material in anyone else's packet. The experimenter then asked the subjects to print their name and student number on the outside of the largest packet. The subjects then opened the largest packet and removed its contents. All of the participants were instructed to read the instruction sheet and perform the operations specified on it. First, the instruction sheet informed each subject about the general

purpose of the experiment. In addition on each instruction sheet was listed a pair of article titles. Each article title was preceded by the letter A or B. This letter signified the medium size packet containing the appropriate article. In half of the cases A referred to one of the article titles and in the remaining half of the cases A referred to the other article title. A box was provided in front of each of the letters, A and B, in which the subject could check the article he was going to read. The subjects in the choice condition were instructed to choose which one of the two articles they would prefer to read and indicate their choice by checking the appropriate box. The subjects in the no-choice condition were asked to check the box preceding the letter A if the number on the outside of their largest packet was odd. The packet number was always odd for the no-choice subjects. The instruction sheet is presented in Appendix D.

After all of the subjects had read and performed their instructions, the experimenter asked the participants to return the medium size packet containing the article not chosen, and the instruction sheet to the largest packet. The large packet was placed on the floor beside the subject. The subjects were then asked to raise one of their hands according to which article (A or B) they were going to read.

Next, each subject opened the medium size packet with the letter corresponding to the letter checked on the

instruction sheet and removed the enclosed article. The experimenter instructed the participants not to open the small packet which was inside the same medium size packet. The subjects were given five minutes to read the article.¹ After the subjects had finished reading the article, it was returned to the medium size packet and the small packet containing the questionnaire was removed from the medium size packet. The medium sized packet, now containing only the article, was sealed and returned to the largest packet. The subjects were given six minutes¹ to answer the 14 multiple-choice questions on the article they had just read. The answers to the questions were recorded on an IBM answer sheet. After the subjects had answered all 14 questions they were asked to return all of the material to the largest packet and then seal that packet. Finally, the experimenter informed the subjects that the final stage of the experiment was to be conducted in exactly one week.

One week later the experimenter returned and re-administered the multiple choice test to the subjects. The structure of the delayed test differed from the structure of the immediate test. The order of the questions and the order of the possible answers was shuffled on the delayed test in order to negate any position effects.

¹This time limit was determined by practice trials on comparable subjects outside the experimental class before the administration of the actual experiment.

After the subjects had taken the delayed multiple choice test, they rated themselves on four scales. These four scales were designed to assess the subjects perception of various aspects of the experiment. These rating scales are presented in Appendix G. The four questions asked on the rating scale form are listed below.

1. How much do you like the article you read last week?
2. How difficult to understand was the article you read?
3. How much freedom did you feel you had in the selection of the article read?
4. Have you talked to anyone about the nature or content of this experiment since last week?

Finally, the subjects were thanked for their participation. In addition, the nature and purpose of the experiment was explained to them. The participants were also told that the results of the experiment would eventually be available for their examination.

Results

Scales measuring subjects perception of experimental variables

The three scales which measured the subjects perception of the experimental manipulations were analyzed. The purpose in analyzing these scales was to obtain a quantitative measure for determining the success of the experimental manipulations. Since the scale values were ordinal, a t test was used for determining differences between experimental conditions. No assumptions were made as to the homogeneity of the variance in scale response. The t test used, therefore, had a conservative estimate of the degrees of freedom¹ (Walker and Lev, 1953). Table 2 lists the t values for the three rating scales.

The subjects in the choice group were compared with the subjects in the no-choice group for differences in perceived freedom in choosing the article to be read. The t value in Table 2 reveals that the choice subjects perceived themselves to have significantly more freedom of choice than the no-choice subjects.

¹ The formula for determining the conservative degrees of freedom is: rounded to $\frac{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}{2} - 2$ The resulting value is the nearest integer value.

$$\frac{s_1^2}{n_1(n_1+1)} + \frac{s_2^2}{n_2(n_2+1)}$$

The second rating scale was analyzed to determine if there were any differences between the subjects in the choice and no-choice condition in their liking for the article read. An examination of Table 2 reveals that there was not a difference in perceived liking for the article read between the subjects making a choice and the subjects who did not choose between article titles.

As stated previously, one of the objectives when writing the two different articles was that the articles be the same in all characteristics except topic. One measure of the degree to which the structure of the two articles was the same is the subjects' perceived difficulty in understanding the two articles. Table 2 shows that subjects in the low importance condition perceived themselves to have significantly more difficulty in understanding their article than did the subjects in the high importance condition.

Tests measuring subjects' retention of information

Since the retention scores for the immediate test and the delayed test were obtained from two sections of a class, they were analyzed for differences in response between the two sections. The results of the t tests, shown in Table 3, reveal no significant differences between the responses of the two sections on either of the two tests. The scores of the two groups were pooled for further analysis.

The distribution of the raw scores for the immediate test and the delayed test is given in Table 4. The raw

Table 2

Mean differences between experimental conditions on three rating scales^c

Scale Condition		M	s.d.	df ^e	t ^d
Freedom	Choice	3.03	1.19	67	7.728 ^b
	No-choice	1.55	1.01		
Liking	Choice	4.43	1.20	67	1.851
	No-choice	4.06	1.12		
Difficulty	High Importance	1.34	.54	67	-2.147 ^a
	Low Importance	1.58	.74		

^ap less than .05.

^dtwo-sided t test

^bp less than .001.

^econservative degrees of freedom.

^cN equals 133.

Table 3

Mean difference in test scores for two sections of advanced general psychology course^a

Test	Section 1		Section 2		t ^b
	M	s.d.	M	s.d.	
Immediate test	9.24	1.90	9.10	2.20	.467 ^c
Delayed test	8.16	1.99	7.87	2.29	.801 ^c

^aN equals 144.

^bconservative df equals 67.

^cnon-significant at .05 level.

scores for the immediate test range from 3 through 14 and for the delayed test the range is from 2 through 14. No subject got all of the questions wrong on either of the two tests. Only one subject on each of the two tests got all of the questions correct. The distributions for both tests were somewhat skewed to the left and also platykurtic, however, they did possess some of the characteristics of the normal distribution. Approximately 75 percent of the scores fell within ± 2 standard deviations of the mean.

In order to determine if the distribution of scores possessed enough normal distribution characteristics to use an analysis of variance (AOV) further investigation was made of the means and standard deviations for each experimental condition. These means and standard deviations are presented in Table 5. The means for the eight conditions in Table 5 range from 6.80 to 10.03. The standard deviations range from 1.78 to 2.26 for the eight groups. A study of the relationship between the means and standard deviations does not reveal any significant correlation between these two statistics. The F-max test showed the variances to be homogeneous (Walker and Lev, 1953). The value for F-max was 1.94, which was well under the critical value at the .05 level of significance ($k=8$, $df=36$). Since the variances were homogeneous, and the means and standard deviations were not correlated, and the distribution of scores approached normality, it was determined that the AOV could be used.

Table 4

Raw score distribution for immediate test and delayed test

Raw score	Immediate test		Delayed test	
	f	Cum. f	f	Cum. f
14	1	1	1	1
13	7	8	2	3
12	11	19	7	10
11	21	40	14	24
10	26	66	13	37
9	23	89	25	62
8	23	112	23	90
7	17	129	22	112
6	5	134	14	126
5	6	140	11	137
4	2	142	3	140
3	2	144	3	143
2			1	144
Mean	9.14		8.02	
S.D.	2.14		2.31	

Table 5

Means and standard deviations of number of correct responses on the
multiple choice exam^a

	Choice (A_1)				No choice (A_2)			
	High Importance (B_1)		Low Importance (B_2)		High Importance (B_1)		Low Importance (B_2)	
	M	s.d.	M	s.d.	M	s.d.	M	s.d.
Immediate Test (C_1)	10.03	2.16	8.47	1.87	9.97	1.78	8.08	2.05
Delayed Test (C_2)	9.00	2.01	7.47	2.02	8.80	2.24	6.80	2.26

^a n equals 144. 36 replications per cell.

Table 6

Analysis of variance of the number of correct responses on
the multiple choice exam

Source of variance	df	mean square	F
Choice (A)	1	7.670	1.092
Importance (B)	1	218.753	31.145 ^b
Tests (C)	1	90.003	62.815 ^b
A X B	1	2.920	.416
A X C	1	.781	.545
B X C	1	.031	.022
A X B X C	1	.087	.060
Within error ^a	140	1.433	
Between error	140	7.024	
Total within error	144		
Total between error	143		
Grand Total	287		

^aThe mean square for factors and interactions involving level C are divided by the within error mean square. The other factors and interactions are divided by the between error mean square.

^bp less than .005.

The AOV model used was an AXBXCXSS factorial, with two levels per factor and 36 replications per cell. The results of the AOV are presented in Table 6. Since the immediate test-delayed test condition constituted a repeated measure on the same subjects, the two levels of this factor were not orthogonal. Two different error mean squares, therefore, had to be calculated for determining the F ratios. The within error mean square was used in calculating the F ratio for all main effects and interactions involving the test factor (C). The between error mean square was used in determining the F ratio for all main effects and interactions involving only orthogonal factors (A and B)¹. The mean squares for the main effects and interactions were obtained from an AOV computer program written for the CDC 3600 at Michigan State University (Ruble, et al., 1963).

Inspection of Table 6 reveals that there were two significant main effects. First, there was a significantly greater retention of information in the high importance

¹The two different error mean squares were obtained by separately calculating a CXSS AOV for each of the four orthogonal conditions, i.e., A(1)B(1), A(1)B(2), A(2)B(1), and A(2)B(2). The within error sum of squares was obtained by adding together the sums of squares in each of the four conditions for the interaction between factor C and the replication factor (SS). In order to obtain the within error mean square, this total sum of squares was divided by the sum of the degrees of freedom for the interactions in each condition. The within error sum of squares was subtracted from the total error sum of squares to obtain the between error sum of squares.

group than in the low importance group. Secondly, a significant decrement in retention occurred between the immediate test and the delayed test. Neither of these main effects, however, offer any support for the hypotheses of this experiment.

A significant F ratio for the choice main effect or for any of the interactions would have offered some experimental support for the hypotheses. None of these F ratios were significant, however, nor were their p values close enough to significance to suggest any trends.

Discussion

As was previously stated, dissonance is aroused when a person commits himself to a volitional choice between one of two or more qualitatively dissimilar alternatives. Choice, therefore, is a necessary but not a sufficient condition for the arousal of dissonance. Volition, commitment and a qualitative dissimilarity in the choice alternatives are also required ingredients for the arousal of dissonance. An examination was made of the procedure and results of the experiment in order to determine whether or not each of these three conditions were satisfied. First, the analysis of the subjects perception of how much freedom he had in choosing the article he would read revealed a significantly greater perception of freedom for the choice subjects. This difference was interpreted as indicating that the choice subjects perceived themselves to have a substantially larger amount of volition than the no-choice subjects. Second, in the Cohen, et al. (1959) gambling experiment, which was described earlier, greater dissonance was obtained for the subjects who made a public commitment to their choice than for subjects who made a private commitment. In the experiment described in this paper, therefore, commitment was introduced by having subjects publicly signify their choice of articles by raising one of their hands. Third, although

no empirical validation was obtained for the qualitative dissimilarity between the article titles in a pair, the titles were dissimilar to some degree. Each title in a pair referred to a different topic. The two topics, within each importance condition, were not identical but only related to the same category of information. The content of the two titles in each pair, therefore, was not the same. More will be said about this problem later in this chapter.

The second independent variable to be manipulated was importance. It was previously stated that two factors had to be controlled in order for importance to determine differences in the magnitude of dissonance. First, subjects had to choose between equally attractive alternatives. Second, the two articles titles in each importance condition had to be equally dissimilar in content. In the pre-experiment for selecting the title pairs, each pair of article titles was tested for equal attractiveness. The two pairs of titles used in the experiment proved to be equally attractive in both the ratio by which each title in a pair was selected and in the scaling of the importance of each title. In the actual experiment the subjects in the choice-high importance condition chose each article in the high importance pair 18 times. The choice-low importance subjects, however, split 11 and 25 on the two titles in their pair. The article on "the best way to prepare for a test" was selected over twice as many times as the article on learning. This difference might have been sufficient to

interfere with the arousal of dissonance in this one condition. In the opinion of the experimenter, however, the absence of such interference, if the interference did in fact exist, could not have appreciably modified the obtained results.

The second factor which had to be controlled in order for importance to determine the magnitude of the dissonance was the dissimilarity in content between the two titles in a pair. The dissimilarity between the two titles in a pair had to be equal for each of the two pairs of titles. As previously mentioned, no measure was taken of the degree of qualitative dissimilarity between titles in a pair. As a result, no empirical evidence is available to determine whether or not the titles in each of the two pairs were equally dissimilar. However, even if the two title pairs were not equally dissimilar this discrepancy could not have prevented the arousal of dissonance. The inequality in dissimilarity would instead only have increased the difference between importance conditions, in the magnitude of previously aroused dissonance. For the purposes of the present discussion, therefore, it will be assumed that the two pairs of article titles were equally dissimilar.

The fact that a true difference in importance was created is supported by the results of the pre-experiment and the actual experiment. In the pre-experiment a significant difference was found in the mean importance rank for the

two pairs of article titles. In the actual experiment a significant main effect for importance was obtained in the AOV.

One factor which may have confounded the importance effect was the degree of difficulty the subjects had in understanding the two articles. Even though the articles were similarly structured the analysis of the rating scales showed that the subjects perceived the low importance article to be significantly more difficult to understand. If this difference in difficulty was large enough it may have contributed to the importance main effect. On the other hand, the difference in difficulty of understanding may not have been due to a difference in the construction of the articles but instead to a variation in importance. It seems very plausible, that the subjects reading an article of considerable importance, would find it easier to understand that article than the subjects reading an article of low importance. People usually concentrate and work the hardest on tasks that are the most important to them.

Since all of the required conditions seem to have been satisfied, dissonance theory predicts that the choice subjects would retain more information about the articles they read than the no-choice subjects would retain about their articles. No support was obtained for this hypothesis since the choice main effect in the AOV was not significant. In addition, if the choice between article titles resulted in the arousal of dissonance then dissonance theory would

predict that importance would interact with choice to increase the magnitude of the dissonance. It is possible that a significant choice effect would not be obtained and yet a significant choice and importance interaction would occur. The choice and importance interaction in the AOV, however, was not significant. The previously mentioned non-equal division of choices in the low importance condition would have affected this interaction. However, it seems unlikely that a more equal division of choices would have given any support to the dissonance predictions. The choice-low importance subjects were predicted to retain less information than the no choice-high importance group. Since the high importance groups were virtually equal, an equal choice split in the choice-low importance group would have made little, if any, change in the obtained results.

The conclusion that choice and importance did not interact to produce dissonance rests on the assumption that the subjects would have tried to reduce their dissonance by adding cognitive elements. It is possible that some other means than adding cognitive elements was used to reduce dissonance.

As was previously stated dissonance can be reduced by the individual in four ways. A re-examination of these four methods of dissonance reduction and the precautions taken to control them seems to be called for. First, dissonance could have been reduced by changing or revoking one's choice. An empirical check of whether or not a subject

changed his choice was available. In describing the procedure used in this experiment it was stated that the subjects specified their choice on the instruction sheet. The instruction sheet was then returned to its packet and the packet was placed on the floor beside the subject. The subjects were carefully observed. No subject changed his choice. In addition, the subject could have revoked his choice by refusing to continue to participate in the experiment. There were no subjects who dropped out of the experiment at any point. It was assumed, therefore, that no subjects reduced their dissonance by changing or revoking their choice.

A second method by which the individual could have reduced dissonance was by changing the attractiveness of the choice alternatives. In addition, related to changes in attractiveness is a third method of dissonance reduction. The third method the individual could have used was to reduce the importance of the relevant cognitive elements in a choice situation. As previously pointed out (p. 42), attractiveness and importance are correlated on an evaluative factor. To the extent that attractiveness and importance are correlated, changes in either variable should be measurable by an evaluative scale. A scale which measures a person's perception of how much he likes the chosen alternative would be an evaluative scale of this type. The reduction of post-choice dissonance by either a change in attractiveness or a reduction in importance, therefore,

should be reflected in a difference in the liking of the choice subjects and the no-choice subjects for the chosen article. The analysis of the like scale revealed no significant difference in liking between the choice and no-choice subjects. It would seem that dissonance was not reduced by either changing the attractiveness of the choice alternatives or by reducing the importance of the relevant cognitive elements. It was thus assumed that if dissonance had been aroused it would have been reduced by adding cognitive elements. Since no evidence was obtained which would suggest that any cognitive elements were added it was concluded that dissonance was not aroused.

There was also an attempt in this experiment to apply rigorous methods to the analysis of the data. First, the no-choice condition served as a control group against which the choice subjects could be compared for determining the effect of choice on retention of information. Second, no subjects were thrown out after the data had been analyzed. The four subjects that were discarded were thrown out before the analysis of the data. Third, an overall test of significance (Analysis of Variance) was used to determine if any differences existed between the experimental groups. Finally, no attempt was made to draw conclusions which went beyond the significance of the results. The only interpretation of the results was that dissonance was not aroused in a situation where dissonance theory predicts that it should occur. This result constitutes negative evidence for the

theory. Some possible explanations for this null finding are given below.

First, the failure of the results to support dissonance theory might be explained by a simple reinforcement theory of learning. The act of making a choice between article titles may not have any effect on the retention of information about the chosen title. Instead, the reading of the article which goes with the title may serve as a reinforcement for the subject's public commitment to reading that article. The difference in retention in the high and low importance conditions would be due, under this interpretation, to the greater reward from reading the article which was of more importance and interest to the subject.

Another possible explanation for the failure to obtain findings which support dissonance theory, is that the subjects may not have been presented with a "real" choice. As mentioned earlier, the two article titles may not have been dissimilar enough in content for the subject to be really giving up anything. If the attributes of the rejected alternatives were not qualitatively dissimilar from the attributes of the chosen alternative then the two sets of attributes could not have been in a dissonant relation. Since no empirical validation of the qualitative dissimilarity of the two titles in a pair was obtained there is the possibility that there was not a "real" choice given to the subjects and, therefore, dissonance was not aroused. This seems to be the only possible explanation not specifically

refuted which makes the data consistent with dissonance theory.

The final conclusion must be that no support was obtained for dissonance theory formulations. In addition, neither were any of the propositions of dissonance theory disproved. There is a need which the study does emphasize, however; more rigorous research on dissonance is imperative if the theoretical concepts of dissonance are to be unequivocal and if the theory is to make any real contribution to the understanding of human behavior.

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APPENDIX

Appendix A

Method for selecting the experimental article titles

A pre-experiment was conducted on 26 males and 5 females enrolled in an advanced general psychology course at Michigan State University for the Fall quarter of 1964. In addition, the same pre-experiment was given to 16 males and 7 females enrolled in the same class for the Winter quarter of 1965. The results of these two pre-experiments were combined for selecting the article titles pairs to be used in the actual experiment.

The main objective in conducting the pre-experiment was to find two pairs of article titles which met the following two requirements.

1. The two titles in each pair must be equally attractive and yet qualitatively dissimilar.
2. One pair of article titles must be significantly more important than the other title pair.

In addition, the two titles in a pair were to be titles for the same article. This duplication of articles was necessary in order to control the information each subject received. The article titles in each importance category, therefore, had to be qualitatively different and yet be the title for the same article. It was decided that in order to meet this requirement, the pair of article titles had to be

about similar topics. For the high importance category, therefore, one of the topics was premarital sex and the other topic was abortion. The low important topics were learning theory and testing. Three articles titles were constructed for each of the two topics in each of the two importance categories. These 12 article titles are listed in Table A 1.

Equal attractiveness of article titles in a pair

The first requirement tested was that a pair of article titles had to be equally attractive and yet qualitatively dissimilar. Edwards (1957) states that one method of determining the degree of equality in the attractiveness of items is by having subjects make choices between a series of pairs of the various items. The equality of attractiveness of a pair of items is determined by the ratio of the number of times one item is chosen over the other item. The smaller the ratio, i.e., the more equal the number of times each item is chosen, the more equally attractive the two items in a pair. The significance of this ratio is determined by obtaining the Z score for the ratio value. This method of paired comparison choices was thus selected for initially determining the most equally attractive pairs of article titles.

Since the two items in a pair of article titles had to be qualitatively dissimilar as well as equally attractive, it was decided that one title in a pair should be on one of

Table A 1

Article titles constructed for different importance categories

Title Categories	Article Titles
High Importance	
Premarital sex	1. The changing view toward premarital sex. 2. Is sexual intercourse before marriage all right? 3. Premarital sex and the moral revolution on American campuses.
Abortion	4. Should we allow legalized abortion. 5. Premarital sex and legalized abortion. 6. The hazards of legalized abortion.
Low Importance	
Testing	7. What type of exam is the best? 8. The best way to prepare for a test. 9. Are tests a valid means of measuring what one knows?
Learning theory	10. What learning theory has to say about testing. 11. Principles of learning and their relation to acquisition. 12. Testing and its relation to ability and performance.

the topics in an importance category and the remaining title in that pair should be on the second topic in that importance category. For example, one title would be about premarital sex and the other title would refer to abortion.

It was only necessary, therefore, to combine the three article titles for one topic in an importance category with each of the three article titles on the other topic in the same importance category. This method of constructing pairs of article titles resulted in nine pairs for each importance category, or a total of 18 article title pairs. These 18 pairs of article titles and the method used for obtaining a subjects choice for each pair is shown in Appendix B, Section 1. The Z scores for the 18 different combinations of article titles are given in Table A 2.

An examination of Table A 2 reveals that the Z values for all 18 pairs of article titles fell within 1.96 units of the normal curve. Only those eight title pairs with a Z value between .000 and $\pm .200$, however, were used for further analysis. Four of the eight acceptable title pairs were from the high importance category. The other four title pairs were from the low importance category.

Difference in importance of article titles

The second method used in selecting the appropriate title pairs had to do with the importance of the article titles. Each subjects perception of the relative importance, to himself, of each article title was obtained by having the subject rate the 12 article titles. The 12 titles

were rated on a seven point scale which ranged from "very unimportant" to "very important". The method used to obtain each subjects rating of the importance of each article titles is fully described in Appendix B, Section 2.

Difference in importance within a pair of article titles. The analysis of the difference in importance within title pairs was performed in order to assure the equal attractiveness of the alternatives in a pair of article titles. The eight article titles accepted as being equally attractive were tested for differences in importance within each pair of titles. A correlated t test (Walker and Lev, 1953) was used to determine if there were any differences in importance. The t values for these eight title pairs are

Table A 2

Z scores for paired comparison choices between 18 pairs of article titles^a

(Z score represents the proportion of times the column title is picked over the row title)

Article Title Number	Article Title Number					
	1	2	3	7	8	9
4	.179	-.319	.319			
5	-.136	-.513	.179			
6	.674	.000	.513			
10				-.465	-.090	.565
11				.179	.090	.513
12				-.990	-.732	-.090

^aN equals 54.

presented in Table A 3. An analysis of these t values reveals no significant differences in importance, at the 5 percent level of significance, between any pair of article titles. Article titles in eight pairs, therefore, qualified as being not significantly different in attractiveness.

Table A 3

Correlated t values for differences in importance within eight article title pairs^a

(Two-sided t values based on first title number in pair minus second title number in pair)

Title Pairs	t values
High importance	
1 & 4	.638 ^c
3 & 5	.239 ^c
5 & 1	-.175 ^c
Low Importance	
7 & 11	-1.026 ^b
8 & 11	.547 ^c
10 & 8	-1.268 ^b
12 & 9	.339 ^c

^a p greater than .05.

^b p greater than .10.

^c p greater than .50.

^d N equals 50.

Differences in importance between pairs of article titles. The final requirement for the selection of two pairs of article titles was that one of the two pairs had to be about a topic of significantly more importance than the topic of the other pair or titles. The final two pairs of article titles would have to come from the eight title pairs satisfying the equal attractiveness tests. The objective at this point, therefore, was to compare the four pairs of article titles in each importance category with each other and determine which pairs, if any, were significantly different in importance. In order to determine the difference in importance between title pairs the importance rating values for the two titles in a pair were added together. A correlated t test was then used to determine the difference between the summed importance ratings for each title pair. An analysis of the t values in Table A 4 reveals that there are 11 combinations of article titles pairs which are different in importance at the .05 level of significance. In one case the difference in importance is in the wrong direction. After examining the t values in this table it was decided that further consideration would be given only to those combinations of title pairs with a p value less than .01. From these remaining seven combinations of title pairs the final two pairs of article titles were randomly selected. The two chosen title pairs are listed below.

Table A 4

Correlated t values for differences in importance between article pairs^a

(Two-sided t values based on column variable minus row variable)

Low Importance Title Pairs	High Importance Title Pairs			
	1 & 4	3 & 5	5 & 1	7 & 2
7 & 11	4.64 ^c	3.90 ^c	4.64 ^c	2.16 ^a
8 & 11	3.15 ^b	2.48 ^a	3.07 ^b	.80
10 & 8	3.05 ^b	2.25 ^a	2.75 ^b	1.08
12 & 9	-.37	-.70	-.29	-2.21 ^a

^a_p is less than .05.

^b_p is less than .01.

^c_p is less than .001.

^a_N equals 47.

The title pair chosen for the high importance condition was:

1. Premarital sex and legalized abortion.
2. The changing view toward premarital sex.

The title pair chosen for the low importance condition was:

1. Principles of learning and their relation to acquisition.
2. The best way to prepare for a test.

Appendix B

Measurement devices for pre-experiment

Section 1. Paired comparison form for measuring article title attractiveness.

Below are listed titles of articles on various topics. The titles are grouped in pairs, the same title is paired with other titles but the same two titles are never paired more than once.

Please indicate for each of the eighteen (18) different title pairs which article you would prefer to read. Base your decision on the titles alone.

Indicate your choice for each pair by putting an "X" in the box preceding the title you prefer.

E.g., if you prefer to read an article entitled "The Lone Ranger Rides Again" instead of "Here Comes Mickey Mouse", you would indicate your preference as shown below.

☒ The Lone Ranger Rides Again

☐ Here Comes Mickey Mouse

Now choose one from each of the following pairs.

1. ☐ Is sexual intercourse before marriage all right?
☐ Pre-marital sex and legalized abortion.
2. ☐ Should we allow legalized abortion?
☐ The changing view toward pre-marital sex.
3. ☐ Pre-marital sex and the moral revolution on American campuses.
☐ The hazards of legalized abortion.
4. ☐ Should we allow legalized abortion?
☐ Is sexual intercourse before marriage all right?
5. ☐ Are tests a valid means of measuring what one knows?
☐ Principles of learning and their relation to acquisition.

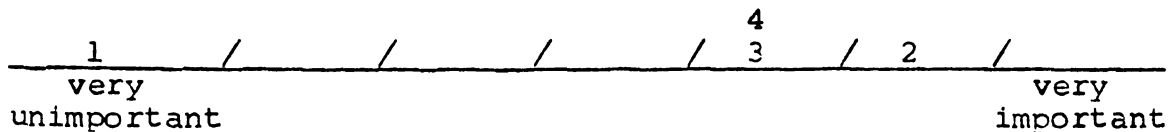
6. ☐ Is sexual intercourse before marriage all right?
☐ The hazards of legalized abortion.
7. ☐ Principles of learning and their relation to acquisition.
☐ The best way to study for a test.
8. ☐ What type of exam is the best?
☐ Principles of learning and their relation to acquisition.
9. ☐ Should we allow legalized abortion?
☐ Pre-marital sex and the moral revolution on American campuses.
10. ☐ Testing and its relation to ability and performance.
☐ The best way to study for a test.
11. ☐ What type of exam is the best?
☐ What learning theory has to say about testing.
12. ☐ What learning theory has to say about testing.
☐ Are tests a valid means of measuring what one knows?
13. ☐ The best way to prepare for a test.
☐ What learning theory has to say about testing.
14. ☐ Testing and its relation to ability and performance.
☐ What type of exam is the best?
15. ☐ Pre-marital sex and the moral revolution on American campuses.
☐ Pre-marital sex and legalized abortion.
16. ☐ The hazards of legalized abortion.
☐ The changing view toward pre-marital sex.
17. ☐ The changing view toward pre-marital sex.
☐ Pre-marital sex and legalized abortion.
18. ☐ Are tests a valid means of measuring what one knows?
☐ Testing and its relation to ability and performance.

Section 2. Importance ranking form.

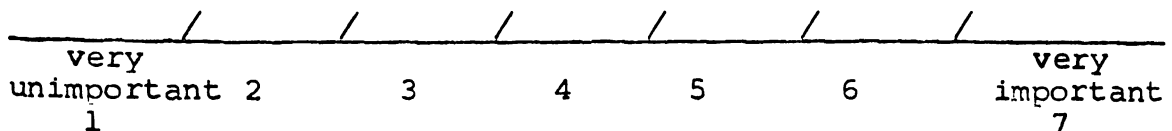
Titles such as we have been considering are of varying degrees of significance or importance to different people. Some things may be very important to you, others not so important. Please try to evaluate the following titles according to the degree of importance they hold for you. Remember the decision is to be made on the basis of its importance for you and not its importance for others or society as a whole.

For the final step in this survey we have listed twelve (12) article titles below. Please indicate the degree of importance of each title by placing its number at the position on the scale which best represents its importance for you. If two (2) titles are of equal importance both may be placed between the same two vertical lines on the scale.

E.g., if title number two (2) is quite important for you and title one (1) is very unimportant while titles three (3) and four (4) are equally fairly important you might indicate this as shown below.



Now place each title number on the following scale.



1. What learning theory has to say about testing.
2. Pre-marital sex and the moral revolution on American campuses.
3. The best way to prepare for a test.
4. The hazards of legalized abortion.
5. Pre-marital sex and legalized abortion.
6. The changing view toward pre-marital sex.
7. What type of exam is the best?
8. Should we allow legalized abortion?
9. Is sexual intercourse before marriage all right?
10. Testing and its relation to ability and performance.
11. Are tests a valid means of measuring what one knows?
12. Principles of learning and their relation to acquisition.

Appendix C

Verbal instructions for the experiment

1. All information in this experiment is private and will not be disclosed by name.
2. Print in large letters your Name and Student Number--on the outside of your envelope--in the upper left hand corner.
3. These packets contain various information. All of them, however, do not have the same contents. Therefore, please do not look at anyone else's information at any time during this experiment or talk to those around you. If you do you will destroy the validity of the experiment.
4. Open the large packet. Inside you should find:
 - (1) An instruction sheet
 - (2) An IBM answer sheet
 - (3) Two medium size packets labeled A and B in the upper left hand corner. In the upper right hand corner is the general packet number which is also on the outside of your main packet.
5. Fill in the information on the IBM sheet.
 - (1) Read the instruction sheet. When you have finished reading it and have completed what it asks you to do please raise your hand.
 - (2) Do not open either packet A or B until I instruct you to do so.
 - (3) Go ahead and read.
 - (4) Are there any questions about the instructions?
6. Commitment and reading of article.
 - (1) Return to the main large packet the instruction sheet and the envelope that has the letter (either A or B) on it which you did not check on the instruction sheet. You are never to open this packet for this experiment. Place the large envelope on the floor beside you.
 - (2) How many checked the box for article A? (Raise hand)
How many checked the box for article B? (Raise hand)

- (3) Now open the packet which has the letter (either A or B) on it that you did check on the instruction sheet. Be careful and do not destroy the packet. It should open easily. Remove only the loose article. Leave the small envelope in the packet. Do not turn the title page of the article until I instruct you to.
- (4) Does anyone have a title on the cover sheet other than the one they checked on the instruction sheet? If so, raise your hand and I will come and give you the right article.
- (5) You have five minutes to read the article. Use all of the time to become familiar with its contents.

Remember - do not look at your neighbor's information.

Go ahead and read. (time them)

- 7. Now, take the article - put it back in the packet it came from. At the same time remove the smallest packet which was previously left in the envelope. Now lick and reseal the medium sized packet and return it to the large envelope.

Also, obtain the IBM answering sheet from the large packet.

8.

- (1) Open the small packet. Do not destroy it. Remove the questionnaire from it but do not start reading it.
- (2) Put the small packet in the large envelope.
- (3) Now, place the large packet on the floor. Only the questionnaire and IBM answer sheet should remain on your desk.

9.

- (1) Read the instructions and then answer the questions by indicating the correct answer on the IBM answer sheet.
- (2) Answer the questions on the basis of the information read in the article and not what you believe to be true.
- (3) Raise your hand when completed.

- 10. Put the answer sheet and questionnaire back in the large packet you put on the floor. Do not fold the IBM answer sheet.

- 11. Close the main packet and clasp it shut.

12. Pass your packet to the left.
13. Please do not talk to anyone inside or outside of the class about the nature or content of this experiment. This is very important-for there is a second part to this experiment next week and conversation about the experiment will destroy its purpose and validity.
14. Thank you.

Appendix D

Packet instruction forms

Section 1. Choice--high importance form.

INSTRUCTIONS

1. The purpose of this experiment is to examine the relation between attitudes and the retention of information.
2. You have two packets or smaller envelopes labeled A and B. Each contains an article on a given subject. You are to choose from the pair below which article you would prefer to read and indicate this choice by checking the box preceding that article title and packet letter.

Packet

Title

☐ A

"The Changing View Toward Pre-Martial Sex"

☐ B

"Pre-Marital Sex and Legalized Abortion"

3. Do not open the chosen packet until instructed to do so by the experimenter. You will then have five minutes to read the article.

Section 2. No-choice--high importance form.INSTRUCTIONS

1. The purpose of this experiment is to examine the relation between attitudes and the retention of information.
2. You have two packets or smaller envelopes labeled A and B. Each contains an article on a given subject. You are to choose from the pair below which article you would prefer to read and indicate this choice by checking the box preceding that article title and packet letter.

PacketTitle☐ A

"The best Way to Prepare for a Test"

☐ B"Principles of Learning and Their
Relation to Acquisition"

3. Do not open the chosen packet until instructed to do so by the experimenter. You will then have five minutes to read the article.

Section 3. Choice--low importance form.INSTRUCTIONS

1. The purpose of this experiment is to examine the relation between attitudes and the retention of information.
2. You have two packets or smaller envelopes labeled A and B. Each contains an article on a given subject. Please check the number on the outside of the large envelope.
 - a) If it is an odd number (i.e., 1,3,5,7,etc.), you are to read the article in the packet labeled A.
 - b) If it is an even number (i.e., 2,4,6,8,etc.), you are to read the article in the packet labeled B.

Before you continue please check the box below preceding the appropriate letter and title (determined above) to indicate which article you will read.

<u>Packet</u>	<u>Title</u>
☐ A	"Pre-Marital Sex and Legalized Abortion"
☐ B	"The Changing View Toward Pre-Marital Sex"

3. Do not open the selected packet until instructed to do so by the experimenter. You will then have five minutes to read the article.

Section 4. No-choice--low importance form.INSTRUCTIONS

1. The purpose of this experiment is to examine the relation between attitudes and the retention of information.
2. You have two packets or smaller envelopes labeled A and B. Each contains an article on a given subject. Please check the number on the outside of the large envelope.
 - a) If it is an odd number (i.e., 1,3,5,7,etc.), you are to read the article in the packet labeled A.
 - b) If it is an even number (i.e., 2,4,6,8,etc.), you are to read the article in the packet labeled B.

Before you continue please check the box below preceding the appropriate letter and title (determined above) to indicate which article you will read.

PacketTitle☐ A

"Principles of Learning and Their
Relation to Acquisition"

☐ B

"The Best Way to Prepare for a Test"

3. Do not open the selected packet until instructed to do so by the experimenter. You will then have five minutes to read the article.

Appendix E

Articles

Section 1. High-importance article.

Sexual ethics is a widely talked about subject today, especially among college students. It is not the intent of this article to solve this problem nor to present a new point of view but rather to survey some information about this topic.

First, what truth is there in the report of a significant increase in the past few decades in the frequency of pre-marital sex relations? A recent article in Look magazine states that in a series of studies done between 1915 and 1959 the frequency of pre-marital sex experience in males varied between 32% and 73%. For women the range was from 7% to 57%. Kinsey's data on the American female reveals that of women born before 1900 only 10% had pre-marital relations, while 30% or more of the women born in the 1920's and later reported having sexual relations before marriage. A study made in 1963 on the "Sexual Behavior of the Human Female" states that 20% of college women have pre-marital sex relations before graduation. In addition, Graham Blaine, Jr. in the January, 1964 issue of the Ladies Home Journal reported that more than 50% of college women have pre-marital intercourse.

On the other hand some sources suggest that the alteration in sexual behavior has been an increase in petting and non-intercourse love-making rather than in pre-marital intercourse. Ira Reiss in the article "Sex Behavior in Our Culture" suggests that in this generation there is actually more restraint and uncertainty in pre-marital sexual behavior because the sex role of the single person is not well defined and is sometimes conflicting for the individual, while the topic of sex receives increasing publicity and attention.

Whatever the modification in sexual ethics, let us examine the factors which may have contributed to this transformation. One suggestion is that the increased emphasis in American society on the equality of the sexes, resulting in the female becoming competitive with the male, has caused a transition in the sexual code. The old code was that the girl was expected to be restrained and resist the boy's advances. There was a single standard for women, petting-with-affection, i.e., pre-marital sexual relations were not justifiable. Only petting was allowed. However, for the male there was a double standard, i.e., pre-marital intercourse is all right for one party (the boy) but not for the person they date (the girl). Men wanted their girls to be both sexually active and pure. The equalitarian position, however, forces the women into a more active sex role in which the result is a code of permissiveness-with-affection.

Under this standard pre-marital sex is justifiable as long as the two people involved are in love, "going steady", engaged, or in some way affectionately related.

A second suggestion, which might partially account for the transition is the technical development in the efficiency and safeness of contraceptives. One of the main deterrents to pre-marital intercourse, especially for the woman, is the fear of pregnancy. However, with the high probability of prevention due to the advent of birth control pills and similar devices this deterrent has lost its force and opened the way for more free sex behavior.

Even with the acclaimed efficiency of contraceptives some people assert that there has been an increase in the abortion rate due to increased pre-marital intercourse. Whether this increase is due to overconfidence in contraceptives or ignorance about contraceptives is not clear.

In 1964, the Science News Letter reported that in the U.S. there were from 200,000 to 1,200,000 abortions annually. In 1957, 260 of these resulted in death to the mother. This abortion rate was stated as being significantly greater than the rate during the past few decades.

These requests for abortion, however, were reported to have come equally from married and unmarried women. Also, one source suggests that the upper class person is more willing to resort to abortion, while the lower class individual seems to prefer unwed motherhood.

Presently, in the U.S., 46 states permit abortions to save the life of the mother and three states to preserve the mother's health. All states allow therapeutic abortions when a psychiatrist believes the mother may commit suicide rather than have the baby. A report in the Science News Letter states that abortions are no longer very dangerous when performed by a licensed M.D. who uses sterile procedures. It goes on further to say that 90% of the abortions today are done by these M.D.'s. The problem is with the remaining 10% who try self-induced or non-medical abortion.

In conclusion, a comparison of sexual behavior for different countries shows that France does not permit abortions or contraceptives, while Japan allows both; yet both countries have approximately the same abortion rate.

We have not tried to present a solution to either of these problems in this short discourse, but rather to present some ideas on the subject for consideration. Nonetheless, if any conclusion may have come from this investigation it is that we are not sure exactly what is the nature or magnitude of a transition in the sexual ethic.

Section 2. Low importance article.

Learning is a subject of common interest to the college student. It is not the intent of this article to fully discuss this topic nor to present a new point of view but rather to survey some information about the subject of "how to learn."

First, has there been a significant increase in the past few decades in the number of people using organized methods of study? A recent article in Look magazine states that in a series of studies done between 1915 and 1959 the number of persons making use of organized study methods varied between 32% and 73% for males. For women the range was from 7% to 57%. Ladd's data on study habits reveals that for persons born before 1900 only 10% used organized learning methods in their studies, while 30% or more of those persons born in the 1920's and later applied these concepts when studying. A study made in 1963 on the "Methods of Study of Today's College Students" states that 20% of college students have some organized method they use in studying. In addition, George Blaine, in the January, 1964, issue of Reader's Digest reported that 50% of college students use a personally organized study procedure.

On the other hand, some sources suggest that the change in study habits has been an increase of interest in learning and a better education rather than an increasing application of organized study habits to learning. Ira Reiss in the article "Study Behavior in Our Society" suggests that

in this generation there is actually more ambivalence and uncertainty about study behavior because the role of the "good" student is not well defined and is sometimes conflicting for the individual, while the emphasis on obtaining more education and high grades is steadily increasing.

Whatever the modification in study behavior, let us examine the factors which may have contributed to this transformation. One suggestion is that the increasing influence of findings in the area of psychology of learning has caused a transition in study habits. At this point we shall examine some of the more important findings in this area.

First, the college student must be motivated. A primary source of his motivation for studying is the goals he sets. Another term for goal is "level of aspiration." The level of aspiration can have varying effects on the individual. If it is set so high that the person cannot attain the goal, he may become depressed. On the other hand, if the goal is so low that it takes no effort to reach it, there is little reinforcement for achieving the goal and little motivation to try again. Also, an individual may have a double standard of goal behavior. One goal is set very high and is the object a person strives to attain; the other is set not so high and is the level he actually expects to reach.

It has been claimed that there has been a significant elevation in the level at which students are setting their

goals. Whether this is due to an increased emphasis on educational achievement or an increased application of psychological learning principles is not clear.

An important principle of study behavior is the superiority of distributed over massed practice. In 1964, Munn reported that those persons who took periodic short rests at specified intervals during study not only learned the material 12% faster but retained it 26% longer.

The principle of retroactive inhibition suggests the importance of scheduling when we study certain subjects. The greater the degree of similarity between the original subject and the subject studied at a later time the more the latter subject inhibits the retention of the original material. This suggests, for example, that a person should not study French and Spanish one right after the other. Instead, he should follow a foreign language with math or a similar subject.

An important technique to make use of in learning is recitation. In learning studies it was found that those subjects who spent 80% of their study time in recitation learned significantly faster than those spending less time in recitation (e.g., 20%, 40%, or 60%). In addition, a report by Morgan and Deese states that a group trained with recitation retained 75% of what was learned while the non-recitation group retained only 16%.

A second major fact which may have contributed to the transformation in study behavior mentioned above may be

the increasing emphasis in our society on more and better education. However, the extent to which this may have influenced study behavior is difficult to determine.

In conclusion, a comparison of study habits for different countries shows that England's students are more organized in their study habits than United States students.

We have not tried to present a complete analysis of this subject in this short discourse, but rather to present some ideas on the subject for consideration. Nonetheless, if any conclusion may have come from this investigation it is that we are not sure exactly what is the nature or magnitude of a transition in study behavior.

Appendix F

Multiple choice questionnaires

Section 1. High importance questionnaire.

INSTRUCTIONS

Below are 14 multiple-choice questions on the article you read. Select the alternative which best answers the question. Indicate your choice on the answer sheet by filling in the box underneath the number corresponding to the number of the alternative chosen for each question. You must answer every question.

1. A double standard of sexual behavior means:
 - 1) both petting and pre-marital intercourse are allowable means of love making
 - 2) Pre-marital intercourse is all right for one person but not for the person's boy (or girl) friend
 - 3) the girl should be restrained and the boy make the advances
 - 4) both 1 and 2
 - 5) none of the above
2. The code of permissiveness-with-affection means
 - 1) any type of affection, including pre-marital sex, is permissible for a boy and girl
 - 2) pre-marital intercourse is justifiable as long as both parties are agreeable prior to the act
 - 3) pre-marital intercourse is all right provided the couple are in love, "going steady", engaged, or affectionately related
 - 4) all of the above
 - 5) none of the above
3. This article suggests that the transformation, if any, in the sexual ethic may be due to
 - 1) an increased emphasis on the equality of the sexes
 - 2) technical improvement in birth control devices
 - 3) the double standard
 - 4) the code of permissiveness-with-affection
 - 5) both 1 and 2

4. The percentage of abortions done in the U.S. by licensed MD's is
 - 1) 90%
 - 2) 46%
 - 3) 43%
 - 4) 10%
 - 5) 3%
5. According to this article, in the U.S. the requests for abortions
 - 1) come more from the upper class person than the lower class person
 - 2) come equally from married and unmarried women
 - 3) come more from the lower class than the upper class person
 - 4) come more from unmarried than married women
 - 5) both 1 and 2
 - 6) both 3 & 4 (indicate this choice by marking the boxes for both alternative 3 & 4)
6. The abortion rate in the U.S. is
 - 1) declining
 - 2) about 200,000 to 1,200,000 annually
 - 3) staying at about the same rate
 - 4) about 26,000 annually
 - 5) none of the above
7. Reiss in his article on "Sex Behavior in our Culture" suggests that the restraint and uncertainty of a single person today about pre-marital sex behavior is due to
 - 1) a failure to adequately define his sex role
 - 2) a conflict between possible sex roles
 - 3) increasing publicity and attention to the topic of sex
 - 4) all of the above
 - 5) none of the above
8. The present abortion laws in the U.S. reveal that
 - 1) all states allow abortion to save the mother's life
 - 2) 43 states allow abortion to preserve the mother's health
 - 3) 3 states allow therapeutic abortions if recommended by a psychiatrist
 - 4) 46 states allow abortions to save the mother's life
 - 5) none of the above
9. The conclusion reached by the author of this article was:
 - 1) Pre-marital sex is now more widely accepted in the U.S. than before

- 2) Abortions have increased due to more frequent pre-marital sex
 - 3) We are not sure how much or in what way sexual ethics have changed
 - 4) We should allow abortions under most conditions in the U.S.
 - 5) both 1 and 2
10. This article suggests that if increased pre-marital intercourse is resulting in a climbing abortion rate it is due to
- 1) over confidence in contraceptives
 - 2) ignorance about contraceptives
 - 3) lack of contraceptives
 - 4) incorrect information about contraceptives
 - 5) it is not clear what the cause is
11. This article states that one of the main deterrents to pre-marital intercourse is the
- 1) fear of pregnancy
 - 2) latent, gradual response of the female to love making
 - 3) strong moral character of our youth
 - 4) conflict between sex roles
 - 5) both 1 and 2
12. According to this article, which of the following countries permits both abortions and contraceptives?
- 1) France
 - 2) England
 - 3) Italy
 - 4) Japan
 - 5) Russia
13. Kinsey reported in his study on sex behavior that the frequency of pre-marital relations
- 1) varied between 32% and 73% for the American male
 - 2) varied between 7% and 67% for the American female
 - 3) varied from 10% for those women born before 1900 to 30% or more for those born in 1920 and later
 - 4) was around 20% for the American female
 - 5) both 1 and 2
14. Studies made on college women reported that the frequency of pre-marital intercourse was
- 1) 20%
 - 2) 50%
 - 3) between 7% and 57%
 - 4) all of the above
 - 5) both 1 and 2

Section 2. Low importance questionnaire.INSTRUCTIONS

Below are 14 multiple-choice questions on the article you read. Select the alternative which best answers the question. Indicate your choice on the answer sheet by filling in the box underneath the number corresponding to the number of the alternative chosen for each question. You must answer every question.

1. A double standard of goal behavior means:
 - 1) motivation and purpose are essential to effective study.
 - 2) one goal is the level of achievement the individual strives to attain; a lower goal is the level he actually expects to reach.
 - 3) a person has a certain goal in studying but a different one for education
 - 4) both 1 and 2
 - 5) none of the above
2. The term "level of aspiration" refers to:
 - 1) the level actually achieved by the person relative to the level he was striving to reach
 - 2) the level of depression or reinforcement as a result of whether the goal was attained or not
 - 3) the goal which an individual sets for himself
 - 4) all of the above
 - 5) none of the above
3. This article suggests that the transformation, if any, in study behavior may be due to:
 - 1) an increasing influence of findings in the area of psychology of learning
 - 2) an increasing emphasis in our society on more and better education
 - 3) the double standard
 - 4) level of aspiration
 - 5) both 1 and 2
4. How much more did the recitation group retain in comparison to the non-recitation group in the Morgan and Deese study:
 - 1) 75% to 16%
 - 2) 80% to 16%
 - 3) 60% to 20%
 - 4) 80% to 20%
 - 5) 60% to 16%

5. According to this article, the principle of retroactive inhibition states that:
 - 1) the greater the similarity between the original subject and the subject studied afterwards the more retroactive inhibition
 - 2) study of French should be followed by study of math or a similar subject
 - 3) the greater the similarity between the original subject and the subject studied afterwards the less retroactive inhibition
 - 4) study of French should be followed by study of Spanish or another foreign language
 - 5) both 1 and 2
 - 6) both 3 & 4 (indicate this choice by marking boxes for both alternatives 3 & 4).
6. A study comparing the effects of massed and distributed practice revealed that:
 - 1) there is no significant difference in the two methods
 - 2) those who used distributed practice learned the material 12% faster and retained it 26% longer
 - 3) the massed practice group performed better than those using distributed practice
 - 4) those who used distributed practice learned the material 26% faster and retained it 12% longer
 - 5) none of the above
7. Riess in his article "Study Behavior in Our Society" suggests that the ambivalence and uncertainty of the college student about study behavior is due to:
 - 1) a failure to adequately define the "good" student's role.
 - 2) a conflict between possible "good" student roles
 - 3) increasing emphasis on obtaining more education and high grades
 - 4) all of the above
 - 5) none of the above
8. Studies on the effect of recitation on learning show that:
 - 1) those students spending 75% of their study time in recitation, learned significantly faster than those spending less time.
 - 2) those students spending 60% of their study time in recitation learned significantly faster than those spending 20% or 40%
 - 3) those students spending 90% of their study time in recitation learned significantly faster than those spending 60%, 40% or 20%

- 4) those students spending 80% of their study time in recitation learned significantly faster than those spending less time.
 - 5) none of the above
9. The conclusion reached by the author of this article was:
- 1) learning principles are more widely used in the U.S. than before
 - 2) there has been a change in study behavior due to an increased emphasis on education
 - 3) we are not sure how much or in what way study behavior has changed
 - 4) we should put more emphasis on the use of learning principles in studying
 - 5) both 1 and 2
10. This article suggests that if an elevation is occurring in the level at which students are setting their goals it is due to:
- 1) an increased emphasis on educational achievement
 - 2) an increased application of psychological learning principles
 - 3) too much emphasis on doing better than the next person
 - 4) too much information about the importance of goals
 - 5) it is not clear what the cause is
11. This article states that a primary source of motivation for the college student is:
- 1) the goals he sets
 - 2) the desire to achieve
 - 3) the strong competitive nature of our education system
 - 4) conflict between "good" student roles
 - 5) both 1 and 2
12. According to this article, which of the following countries' students are the most organized in their study habits?
- 1) France
 - 2) United States
 - 3) Italy
 - 4) England
 - 5) Russia
13. Ladd reported in his analysis of study habits that the number of people using organized learning methods:
- 1) varied between 32% and 73% for males
 - 2) varied between 7% and 67% for females

- 3) varied from 10% for those persons born before 1900 to 30% or more for those born in 1920 and later.
 - 4) was around 20% for college students
 - 5) both 1 and 2
14. Studies made on college students reported that the frequency of using organized methods in studying was:
- 1) 20%
 - 2) 50%
 - 3) between 7% and 57%
 - 4) all of the above
 - 5) both 1 and 2

Appendix G

Rating scales of subjects' perception of experimental manipulations

Put a check mark in the space above the term(s) which best describes your answer to each of the following questions.

e.g. If your response to the question "How do you feel today?" is "Very well", you would indicate it as below.

Very bad	Quite bad	Somewhat bad	Somewhat well	Quite well	Very well
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1. How much do you like the article you read last week?

Disliked a lot	Disliked somewhat	Disliked a little	Liked a little	Liked somewhat	Liked a lot
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2. How difficult to understand was the article you read?

/	/	/	/	/	/
Not at all	A little	Somewhat	quite	Very	
difficult	difficult	difficult	difficult	difficult	

3. How much freedom did you feel you had in the selection of the article read?

No freedom	A little freedom	Some freedom	Quite a lot of freedom	very much freedom
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4. Have you talked to anyone about the nature or content of this experiment since last week?

Yes No

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