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JEFFREY L. CRAWFORD

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72-9175

CRAWFORD, Jeffrey L., 1946-  
AN EXPERIMENTAL ANALYSIS OF PREDECISIONAL  
INFORMATION SEEKING IN A SOCIAL INFLUENCE  
SITUATION.

University of New Hampshire, Ph.D., 1972  
Psychology, social

University Microfilms, A XEROX Company, Ann Arbor, Michigan

AN EXPERIMENTAL ANALYSIS OF  
PREDECISIONAL INFORMATION SEEKING IN  
A SOCIAL INFLUENCE SITUATION

by

JEFFREY L. CRAWFORD

B. A., Hofstra University, 1967

A DISSERTATION

Submitted to the University of New Hampshire

In Partial Fulfillment of

The Requirements for the Degree of


Doctor of Philosophy

Graduate School

Department of Psychology


February, 1972

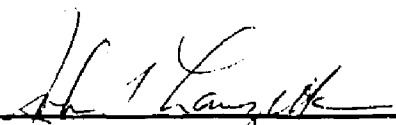
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\_\_\_\_\_  
Thesis director, Gordon A. Haaland, Assoc. Prof. of  
Psychology

  
\_\_\_\_\_  
Daniel C. Williams, Asst. Prof. of Psychology

  
\_\_\_\_\_  
Gregory J. Bertsch, Asst. Prof. of Psychology

  
\_\_\_\_\_  
Murray A. Straus, Prof. of Sociology

  
\_\_\_\_\_  
John T. Lanzetta, Prof. of Psychology

  
\_\_\_\_\_  
Date

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## ACKNOWLEDGMENTS

The author is grateful to Dr. Gordon A. Haaland, chairman of the dissertation committee, advisor, teacher, and provocateur for his untiring efforts in guiding my graduate education.

The author is also indebted to Dr. Daniel C. Williams, Dr. Gregory J. Bertsch, Dr. Murray A. Straus, and Dr. John T. Lanzetta for serving on this committee and cogently criticizing and guiding this dissertation.

Finally, I wish to express my deepest gratitude to Ellen, my wife, to whom this dissertation is dedicated, for her indefatigable enthusiasm, countenance, and understanding.

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## ABSTRACT

### AN EXPERIMENTAL ANALYSIS OF PREDECISIONAL INFORMATION SEEKING IN A SOCIAL INFLUENCE SITUATION

by

JEFFREY L. CRAWFORD

The present experiment examined the instigation and maintenance of predecisional information-seeking behavior in a social influence situation. By seeking information from other individuals prior to choosing among the available response alternatives, the decision-maker voluntarily placed himself in a position to be influenced. This investigation focused upon the conditions in which the decision-maker postponed the final decision and sought information about the response alternatives from other individuals.

The experiment was a 2 x 3 x 2 x 5 repeated measures factorial design. There were two levels of event probability (equiprobable, non-equiprobable), three group feedback conditions (30%, 60%, 90% correct), and two levels of reward-cost problem structure (cost for information = 5¢, reward for correct choice = 10¢; cost = 15¢, reward = 30¢). The five-

level factor was blocks of ten trials and constitutes the repeated-measures variable.

One hundred forty-four male and female subjects participated in a three-choice probability learning task for 150 trials. The first 50 trials were non-information-seeking trials and functioned to shape subjects' response strength. During these trials, subjects were rewarded 10¢/30¢ for each correct response with no penalty for an incorrect response. One hundred information-seeking trials followed. Subjects could seek the responses of two other individuals prior to making a final choice. During these trials there was a cost for seeking information. An individual who sought information and then made an incorrect response lost the amount spent for seeking information. An individual who sought information and chose correctly won 10¢/30¢ and the amount ventured for seeking information. The major dependent variable was the number of information-seeking responses emitted during the last 50 information-seeking trials (trial blocks 6 - 10).

The results indicated that (a) subjects instigated information seeking sooner and more often when exposed to an equiprobable event sequence during the 50 non-information-seeking trials, (b) event sequence and group reinforcement interacted to determine the maintenance of the information-seeking response. Specifically, information-seeking was

linearly related to group feedback variables with the greatest increase in the trend occurring under equiprobable event sequence conditions. Subjects sought more information under equiprobable event conditions at 60 and 90 per cent correct group reinforcement than under non-equiprobable event conditions. There was no difference in search behavior between subjects exposed to the differential event sequence conditions when the group members are correct 30 per cent of the information-seeking trials. (c) A reward-cost x trials interaction suggested that reward associated with a correct choice and not the expected value of an information-seeking response controls search behavior.

The results were discussed in terms of an uncertainty-reduction formulation and an instrumental conditioning model. Both appear to account for the research findings and an experiment was suggested to differentiate between the two positions. Second, predecisional information-seeking behavior was included into a decision-making-reinforcement approach to the social influence process.

General implications for further research centered around the effects that social psychological variables may have in modifying information-seeking behavior, the necessity to include predecisional information seeking into models of conformity and attitude change, the need to clarify the con-

struct of importance and the role played by cost factors during the acquisition of the information-seeking response.

## INTRODUCTION

One of the most ubiquitous responses of human organisms is information seeking. Whenever an individual asks a question, reads a newspaper or looks at an advertisement, he is seeking information.

In most cases information is sought to aid future decisions. In other cases, the decision-maker seeks information to reinforce decisions already made (Festinger, 1957). In any case, the human organism seeks information.

Advertisers and political candidates are quite sensitive to the fact that people seek information. As a result, the manipulators of the mass media focus upon the presentation of information with the ultimate purpose of influencing the decision-maker's behavior. Information transmission ranges from billboards on highways, saturation television campaigns, to the infamous "hidden persuaders" (Packard, 1957). The content of the transmission is contingent upon many factors including the type of audience that the transmitter attempts to influence, funds available for the information transmission, and the type of product being sold.

The function of these campaigns is to sell the product, whether a bar of soap, an automobile, or a presidential

candidate. As a result, the major function of information transmission is to instigate information seeking on the part of the decision-maker which hopefully leads to product purchase.

For a relatively unimportant decision, such as which soap to purchase, the decision-maker may purchase the soap, use it, and based upon the information obtained from the product itself, decide upon future use. When the decisions are not very important, when the consequences of the decision do not have profound effects upon the decision-maker's future behavior, the predecisional processes may be rather simple.

For more important decisions, the predecisional processes may be more complex. These decisions usually involve long-range consequences which may affect the decision-maker's behavior for a long period of time. Due to the effects of the more important decisions, the decision-maker is concerned with making the best possible decision.

The analysis of the predecisional processes involved with important decisions can become quite complicated. Although the structure of low and high importance decisions are quite similar, the behavior engaged by the decision-maker prior to making the final decision varies as a function of importance. Since the consequences of behavioral acts are powerful variables governing behavior and decision impor-



tance reflects the potential consequences to the decision-maker, differential behavior can be expected when individuals confront low or high importance decisions.

The problem facing the decision analyst focuses upon where to begin in the decision-making process. Consider the individual contemplating the purchase of an automobile. Based upon certain past experiences, the decision-maker narrows his alternatives to the set of new automobiles within the price range of \$3000 to \$3500. Of all the cars within this class the decision-maker excludes some based upon styling preference, gas mileage and so forth. Assume that the decision-maker narrows his alternatives to three automobiles and the three are equally attractive. Now he faces a choice dilemma. Which of the three should he purchase?

At this point in the decision-making process, the decision-maker can respond in one of three fashions. He can make his final decision and choose one of the alternatives. Secondly, he may postpone the final choice and gather additional information. Thirdly, the decision-maker may decide to maintain the status quo and not purchase the automobile.

Decision theory states that when an individual cannot order the response alternatives ( $E_1 = E_2 = E_3$ ), the final decision cannot or will not be made. Rather, the decision-maker postpones final action and seeks information.

To return to the example, information seeking and decision making are inextricably intertwined. At some point in the decision-making process, the decision-maker decided to buy a car. This decision might have been based upon the information transmitted by his present automobile. The fact that the car did not have the "get up and go" it once had, frequent oil consumption and so forth are examples of information that may have initiated decision-making processes. Based upon this information, the decision-maker, in order to confirm his implicit hypothesis, may consult a mechanic, a competent source of information and influence. The decision-maker, in an attempt to order his response alternatives, placed himself in a position to be influenced. Any response that the decision-maker now makes is a response to influence since the behavior occurs as a reaction to a norm sent by the influencer. He can respond in three ways: to purchase the automobile suggested; postpone the final purchase and gather more information about the alternatives; or maintain the status quo. The resultant response to influence depends upon situational variables, including the characteristics of the decision-maker (self-confidence), nature of the information received, and the importance of the decision. These four variables plus the characteristics of the response alternatives (number and strength) are the key to under-

standing the social decision-making process.

Instigation and Maintenance of

Information-Seeking Behavior

Information seeking is initiated by the decision-maker when the elements within the set of response alternatives cannot be ordered and the decision is important. The nature of the information received has important effects upon the decision-making process. The evaluation (processing) of the information received varies as a function of the source of information, the decision-maker's own perceived probability of making a correct response and the actual content value of the information. Information transmitted by a high status individual to a decision-maker lacking in sufficient knowledge to evaluate the objective nature of the information transmitted may be evaluated as highly credible even though the information received is of no help in solving the decision-maker's dilemma.

Conversely, the same message, transmitted by a low status individual may be evaluated negatively. Advertisers and political candidates, in particular, are well aware of this phenomenon. The image of the product or candidates is what is important. For many of these groups, "it is not what you say, but who and how it is said."

In any event, the decision-making process is a dynamic process where individuals are constantly making decisions, gathering new information, revising previous decisions, and the process continues. The task for the social decision analyst involves the specification of the conditions in which an individual instigates predecisional information search, from whom information is sought, the effects of the information received and the interaction of this feedback with source and person characteristics upon future search behavior and the conditions in which the decision-maker decides he has enough information to make the final decision.

### Theoretical Approaches to Information Seeking

#### Uncertainty Reduction

Berlyne (1958, 1960) indicates that information-seeking behavior is functionally related to the degree of conflict-induced arousal. The greater the uncertainty, the more information search results. Theoretically, conflict instigates uncertainty in the organism. Uncertainty functions as a secondary drive. The primary method of reducing uncertainty is information acquisition.

According to Berlyne (1960) the degree of conflict varies with: (a) the nearness in strength of the competing

response tendencies; (b) the absolute strength of the competing response tendencies; and (c) the number of response alternatives.

The properties of the competing response tendencies determine the degree of conflict variable ( $C$ ).  $C$  is a function of the strengths ( $R_1 \dots R_n$ ) associated with each of the responses in the set of competing responses ( $E_1 \dots E_n$ ). The properties of  $R_i$  and the relationship to  $C$  are:

- 1)  $C$  is a symmetric and continuous function of ( $R_1 \dots R_n$ );
- 2)  $C \geq 0$ ;
- 3) If  $n = 1$ ,  $C = 0$ ;
- 4)  $C$  reaches an absolute maximum when the competing response strengths are equal ( $R_1 = R_2 = R_n$ );
- 5)  $C$  increases as the number of  $E$ 's increase;
- 6) If each  $R_i$  is multiplied by a constant,  $k > 1$ ,  $C$  increases.

Berlyne (1960) proposes that the probability of response occurrence ( $P_i$ ) measures response strength ( $R_i$ ). Given this assumption, for  $R_i$  to be transferred into a probability function, the transformation must comply with the following conditions:

- 1)  $0 \leq P \leq 1$ ;

$$2) \quad \sum_{i=1}^n p_i = 1$$

$$3) \quad \text{If } R_1 = R_2 = R_n, \text{ then } p_1 = p_2 \dots p_n$$

4) If one E increases with the others held constant, then the corresponding p increases and the other p's decrease.

The information theory formula (Shannon & Weaver, 1949) for entropy or uncertainty ( $-\sum_i p_i \log_2 p_i$ ) satisfied the first five requirements for degree of conflict, but not the sixth. The sixth requirement refers to the height of the goal gradient (Miller, 1944) and reflects the importance of the choice. Berlyne (1960) suggests that the absolute strengths of the competing responses ( $\sum E$ ) combine in a multiplicative fashion with uncertainty. The degree of conflict function is then expressed in the formula,  $C = \sum E \times H$ .

Lanzetta (1967, 1970), employing Berlyne's assumptions, developed a comprehensive theoretical position relating uncertainty and importance to information-seeking behavior. Lanzetta (1967) assumed choice situations involve response conflict and the conflict is a function of the multiplicative relationship between uncertainty and importance. Second, uncertainty above some specific levels is aversive to the organism. This aversive state instigates a class of response that has, in the past, reduced uncertainty and allowed for an ordering of the response alternatives. Infor-

mation seeking is one of the behaviors in the decision-maker's repertoire that has a past history of conflict or uncertainty reduction (Jones & Gerard, 1967; Lanzetta, 1967).

Lanzetta (1970) extended this theoretical position and proposed that response uncertainty controls information-seeking behavior and not the desire for reward (Lanzetta & Driscoll, 1966; Lanzetta & Kanareff, 1962). Numerous research findings seem to support this thesis.

Hawkins & Lanzetta (1965) found that as the number of response alternatives increased, search behavior increased. In this study the subject guessed which of a number of lights on a display panel was the "pay-off" light. On any given trial the number of lights varied from 2 through 10 (1-4 bits). Importance was manipulated by varying the expected gain. For low importance decisions, the expected gain for a correct response was 5 cents while high importance decisions involved a 10 cent gain. An information-seeking response reduced the number of response alternatives and the pay-off in half thus holding expected gain constant. The results indicated a linear relationship between uncertainty (number of response alternatives) and information search. Second, uncertainty and importance combined in an additive fashion rather than in the predicted multiplicative way.

Driscoll, Tognoli & Lanzetta (1966) indicated that as

the objective uncertainty of the stimulus increased (induced by task ambiguity), individual ratings of subjective uncertainty increased. Information search was positively related to subjective uncertainty. Subjective uncertainty was hypothesized to serve as a motivational linkage between response conflict and information-seeking behavior. This corroborated the results obtained by Driscoll and Lanzetta (1965).

The hypothesis that uncertainty reduction, per se, is the reinforcement for information seeking received support by Lanzetta & Driscoll (1966). In this experiment, information search was overtly non-instrumental, i.e., the information received has no effect upon the modification of outcomes. Subjects had the choice of acquiring information about which of two equally likely outcomes would result. There were three outcome combinations: shock--no shock, reward--no reward, and shock--reward. The results indicated that subjects seek information given the opportunity with no differences between the three outcome conditions but above chance level. Lanzetta and Driscoll conclude that information about uncertain but unavoidable outcomes is sought. Thus, outcomes do not modify search behavior, but rather a "need to know" is responsible for search.

Driscoll, Lanzetta & McMichael (1967) attempted to



define the relationship between outcome uncertainty, intensity, and delay upon predecisional search behavior. Outcome uncertainty primarily determined search behavior. Outcome delay or intensity failed to affect search. The conclusion drawn from this study proposed that search behavior is relatively insensitive to changes in outcome conditions.

Lanzetta & Driscoll (1968) further investigated the relationship of uncertainty and importance and predecisional search behavior. The results indicated that search increased with uncertainty while importance heightened information seeking in an additive fashion by not interacting with uncertainty. Whereas Berlyne's hypothesis predicts a multiplicative relationship between uncertainty and importance, the data indicate otherwise (Hawkins & Lanzetta, 1965; Lanzetta & Driscoll, 1968; Sieber & Lanzetta, 1964).

To summarize, the uncertainty reduction position of information-seeking behavior holds that predecisional information search is initiated by uncertainty. Uncertainty functions as a drive with uncertainty reduction functioning as the reward for search. As Lanzetta (1970) states, "...uncertainty and uncertainty reduction per se provide the motivation and reinforcement for the instigation and maintenance of information acquisition behavior (p. 9)." Thus, uncertainty and not the desire for reward is the prime

factor for instigation and maintenance of predecisional search behavior.

### Instrumental Conditioning and Expected Value

An instrumental conditioning model of predecisional information-seeking behavior views search as a behavior pattern instrumental to making the best decision. The best decision may include receiving a monetary pay-off (such as information concerning in which stock to invest), making a correct choice (is the answer A or B?), or receiving social approval from others (if I behave this way, will the group accept me?).

Information seeking is governed by the outcomes contingent upon such a response. The probability of making the best decision prior to an information-seeking response is the major determinant of search initiation. The increase in the probability of making the best decision after a search pattern determines the maintenance of information seeking over time. Sources of information (influence) instrumental to choosing correctly will continue to be consulted in the future while non-functional (non-instrumental) sources will cease to be consulted. Thus, information is sought in order to make the best decision. The decision-maker prefers information that is highly instrumental in increasing the

probability of choosing correctly to information that is low on this dimension.

The instrumental conditioning model for predecisional search behavior incorporates decision importance and its effects with the construct of expected value. When the outcomes of a potential decision can be quantified, as in the case of monetary values, the expected value of a decision results by multiplying each possible cash outcome by its probability and summing these products over all possible outcomes. For small cash values, the expected value is an accurate guide to decision-making (Edwards & Slovic, 1965; Raiffa, 1968). The reward-cost structure and the probability of making a correct choice define decision importance. As long as the expected value of the decision after seeking information ( $EV_a$ ) is greater than the expected value of the decision prior ( $EV_b$ ) to a search response, information will be sought. The absolute difference between  $EV_a$  and  $EV_b$  determines the amount of information seeking.

An interesting question arises concerning information seeking when the decision-maker has the opportunity to purchase "perfect information". Perfect information is information that, if sought, orders the response alternatives with certainty by eliminating all but one alternative. If an ordering of the response alternatives or uncertainty reduction is the goal of information-seeking behavior, as the

uncertainty reduction suggests, then this information should continue to be sought even if  $EV_a < EV_b$ . This position is highly tenuous. The expected value hypothesis predicts search to attenuate when  $EV_a < EV_b$ . This position is elaborated in the next section.

Social Influence, Information Seeking and  
Decision Making: A Theoretical Framework

A decision-maker has two potential sources of information. One source of information is other individuals where the decision-maker receives information about the nature of reality in an indirect fashion. The individual faced with a choice among response alternatives may seek out the responses of others before making the final choice. In this case, the decision-maker places himself in a position to be influenced. The response of the decision-maker, once an information-seeking response occurs, to either make the final choice or to seek further information, is now a response to influence.

The second source of information is the response alternatives. The decision-maker, faced with a choice between two automobiles, may, for example, decide to test drive both cars. The final decision as to which alternative to purchase is based upon the information received from the

product itself: acceleration, design, smoothness of the ride, etc.

Decisions are based upon both types of information. The decision-maker's final choice concerning product purchase may be a function of the information received from other individuals and the information obtained directly from the choice alternatives. Figure 1 represents the social decision-making process.

Sources of Influence. The sources of influence are categories of stimulus variables affecting the social influence process. Although originally conceptualized by Deutsch and Gerard (1955), these two categories (normative and informational) are not collectively exhaustive. Recently, Haaland (1969) and Crawford (1970) expanded these categories and delineated five sources of influence. The major assumption of this categorization is that in the social influence situation all of these sources are present. Second, the elements contained within the sources intersect and interact with person variables to determine pre-decisional information-seeking behavior and responses to influence.

Type I influence refers to group characteristics. The information contained within this source of influence focuses upon the nature of the group as a source of information. The characteristics of the individual group members

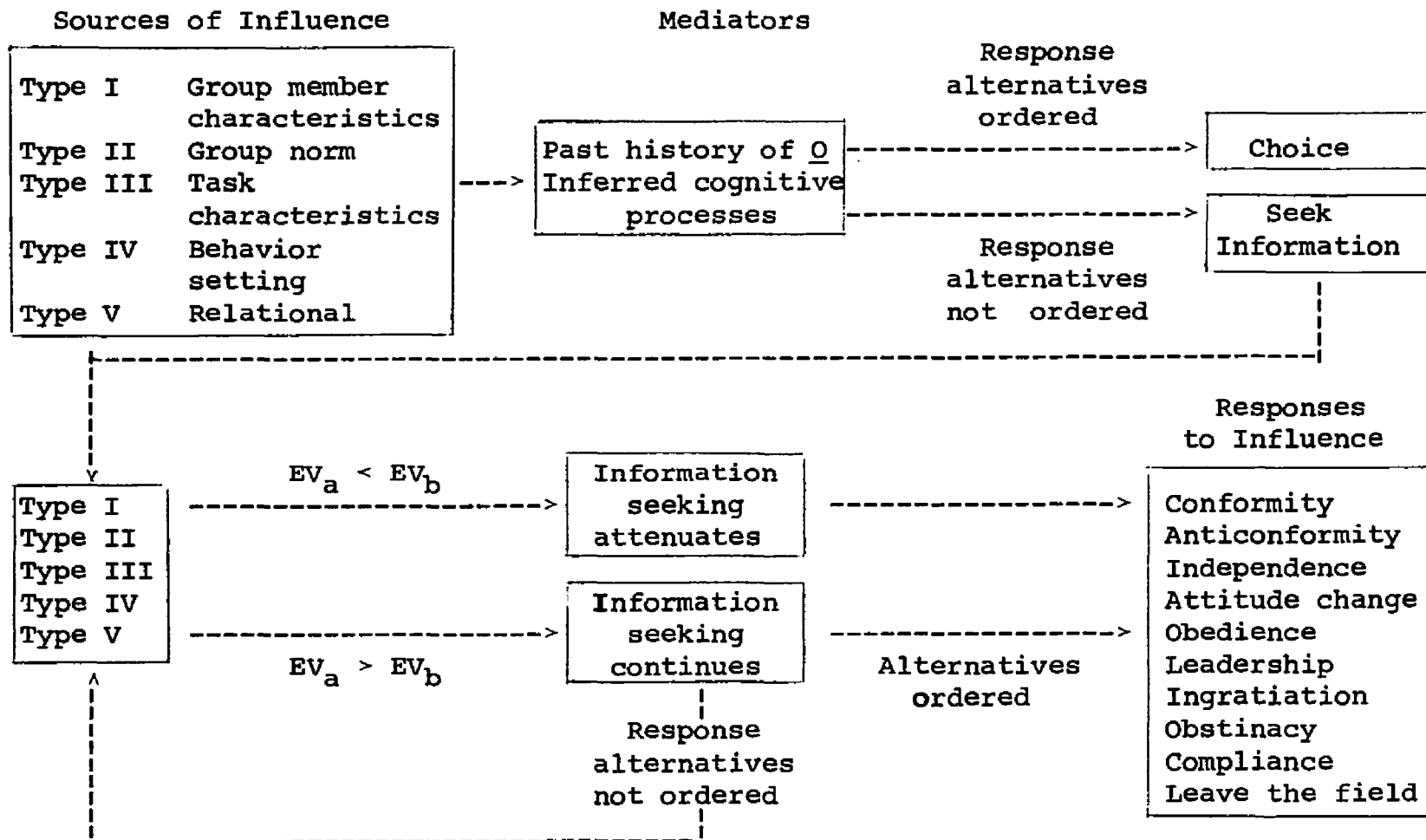


Figure 1

Schematic Representation of a Decision-making Approach to Social Influence

(member relevant information) such as intelligence, competence, and trustworthiness affect from whom in the group the decision-maker may consult. Group characteristics (group relevant information) such as group attractiveness, past history or the potential reinforcing properties of the group determine which groups the decision-maker employs for sources of information. Relevant research includes much of the work on impression formation (Anderson, 1965; Rosenberg & Gerdon, 1968) and reference groups (Siegel & Siegel, 1957).

Type II source of influence focuses on the norm or information that the group members or groups convey to the decision-maker about the situation. Most social influence research concentrates upon this norm, since without it there would not be influence. The norm conveyed may be unanimous (correct or incorrect) or split (Allen & Levine, 1969; Asch, 1956; Crawford, 1970; Sherif, 1935), and differential responses to influence result.

One aspect of Type II influence neglected by social psychological research pertains to the accuracy of the information received. In most social influence experiments, and conformity in particular, the group members presented the subject with information that seemingly contradicted his veridical perceptions. The individual then made a decision to trust his veridical perceptions or accept the group response. The decision-maker (subject) was never made aware

of the accuracy of the group, i.e., was the group actually correct. Seemingly, the reinforcement value of the norm plays a very important part in determining future responses to influence.

A second problem arising from the traditional approach to social influence results when the decision-maker is depicted as a static organism passively waiting to be influenced. Although this approach generated many interesting research findings, the social influence process is a more complex process. When decision-makers cannot order the available response alternatives, rather than wait for others to approach them and suggest "do A or do B", the decision-maker may ask the opinions of others. In this case, the decision-maker voluntarily places himself in a position where he responds to influence. This is accomplished by predecisional information seeking from other individuals.

Type III source of influence is the information contained in the task. The resulting judgment is a discriminative response made by the decision-maker in the absence of social influence.

The task characteristics are directly related to the instigation of predecisional search since these variables affect the ordering of the response alternatives. The task situation can best be conceptualized as a problem of choice.



The choice may be of three types. In one case, the choice involves which of n alternatives is the correct alternative. The student engaged in a multiple choice examination confronts this sort of choice dilemma. When the response alternatives cannot be ordered over a large series of questions, the test is difficult. This type of situation may lead to information seeking, namely cheating.

The second form of choice behavior results when the decision-maker faces a choice among several response alternatives concerning purchase. Again, the task is a problem of choice. The more equally attractive the alternatives, the more difficult the choice, hence the more probably search will occur.

Third, the decision-maker may face a task in which he must predict which event will occur, from a set of possible events. This is the type of choice President Kennedy confronted during the Cuban missile crisis. Essentially, President Kennedy's choice concerned which of the several responses available to Khrushchev would result based upon Kennedy's response to the influx of Soviet missiles into Cuba. The more unpredictable, i.e., equiprobable event occurrence, the more search behavior.

In all three examples, the task involves a discriminative response. If the task allows for an ordering of

the response alternatives, the decision is not a difficult one and a choice results. As the response alternatives are less discernable, the more difficult the decision, the higher the probability the decision-maker postpones a final choice and places himself in a position to be influenced.

Type IV influence relates the effects of environmental differences to behavior (Barker, 1963). The behavior setting, the tough, visible features of the ecological environment, plays an important role in controlling behavior (Barker & Wright, 1955; Goffman, 1963; Rausch, Dettmann & Taylor, 1959, 1960). Different behavior can be expected from the same individuals as a function of variable behavior settings (Jordan, 1963).

Type V source of influence involves the relationship of the individual to the other group members. For example, behavior of an individual varies depending upon whether he is cooperating or competing with other group members (Deutsch, 1949), his status position within the group status hierarchy (Kelly, 1955), or his power (French, Morrison & Levinger, 1960). The effects of this relational influence extends to information-seeking behavior. Kelley (1951) demonstrated that communication flows from low to high status persons. Alkere, Collum, Kaswan and Love (1968) found status differences affect the type of information conveyed, with high

status individuals receiving more accurate information than low status individuals when the source of information comes from low status persons. Secondly, high status persons criticize (Kelley, 1951) or ask clarifying questions of low status persons (Alkere, et.al., 1968) more so than do low status individuals. Deutsch (1960) found individuals given a cooperative induction cooperate more than individuals given an individualistic or competitive orientation in a prisoner's dilemma game. When these subjects were given the opportunity to communicate, cooperation increased for individualistically-oriented subjects but not for those with a competitive orientation. Since cooperation-oriented subjects exhibited a high degree of cooperation prior to communication opportunity, the net increase in cooperation was negligible. Crawford (1970) demonstrated that individuals given a cooperative orientation sought the opinions of their group members significantly more than individuals given a competitive orientation.

The relational orientation suggests conditions in which decision-makers place themselves in a position where they must respond to influence. This same source also affects responses to influence. Conformity behavior increases when individuals are cooperatively related to the group members (Berkowitz, 1957; Crawford & Haaland, in press;

Deutsch & Gerard, 1955; Thibaut & Strickland, 1956) than when competitively oriented.

Type V source of influence may play an extremely important part in determining from whom the decision-maker seeks information. However, the interaction of Type V influence with the other sources of influence should delineate the precise stimulus conditions in which the decision-maker voluntarily places himself in a position to be influenced and the resulting responses to this influence.

Mediators. Responses to influence are not affected by stimulus variables alone. Personality variables interact with the sources of influence to affect the social influence process. For example, a positive relationship between need for approval and conformity has been found by Becker & Carol (1962), Crowne & Liverant (1963), Marlow & Crowne (1961), and Strickland & Crowne (1962). Females conform more than males (Allen & Crutchfield, 1963; Endler, 1966; Hollander, Julian & Haaland, 1965), while conformity is inversely related to age (Berenda, 1950; Luchins & Luchins, 1955).

Neither a comprehensive nor conclusive statement can be offered relating personality variables to responses to influence. The research literature contains many experimental studies verifying personality relationships to

conformity (Barron, 1953; Crutchfield, 1955; Tuddenham, 1957). Yet, there are as many studies reporting little or no relationship (Goldberg, 1954; Endler, 1961; Hollander, 1960; Hollander & Willis, 1967).

As a result of the research equivocality, investigations in the area of social influence shifted from a personality analysis, i.e., conformity as a trait, to an investigation of the conditions manipulated experimentally and their interaction with personality constructs. This concern for delineating these interactions is referred to as a process approach.

The relevant constructs employed in a process approach are mediating variables specific to the situation, i.e., those that arise as a function of situational manipulation. Constructs such as learned dependence (Haaland, 1967) or task confidence (Julian, Regula & Hollander, 1967) are theoretical mediators of conformity. These specific mediators differ from the traditional personality variables in that they are tied to the situation and override the more stable behavior patterns known as "personality".

The implications stemming from a process approach to social influence logically extends to the predecisional processes involved in social influence. Sieber and Lanzetta (1964) found conceptually abstract subjects seek

considerably more information than conceptually concrete subjects in a slide identification task. However, conceptual structure interacted with response uncertainty. Uncertainty increased the search behavior for complex subjects while conceptually concrete individuals were not affected by uncertainty.

One of the more important factors governing information seeking is the past experience of the decision-maker in processing and utilizing the incoming information.

Sieber and Lanzetta (1966) found training to interact with conceptual structure. Structurally concrete individuals learned to behave like complex subjects following uncertainty training. Complex individuals remained relatively unaffected. Strub (1969) compared individuals trained to deal with probabilistic information with naive decision-makers on a Bayesian decision task. The results indicated that experienced individuals are more efficient and less conservative in their information-seeking techniques than untrained decision-makers.

Personality differences influence the decision-maker's preference for types of information. Schroder and Streufert (1966) demonstrated that conceptually complex individuals preferred information instrumental to uncovering unexplored aspects of the environment. Conceptually simple

subjects preferred information providing feedback upon the consequences of their actions.

The decision-maker's perceived locus of control (Rotter, 1966) affects predecisional information-seeking behavior. Davis and Phares (1967) led subjects to believe they would attempt to influence another individual's attitude about the war in Vietnam. Subjects had the opportunity to seek information about the person they would influence. Information such as intelligence, family background and the person's attitudes was available. Decision-makers with an internal locus of control sought significantly more information than did externally-oriented subjects. Pines and Julian (1969), on the other hand, found that externals seek more information than internals. The task consisted of identifying a photograph presented tachistoscopically. The subject could seek information directly from the task by presenting the slide to himself as many times as he wished. The measure of information seeking was the number of self-presentations.

Although these results seem paradoxical, the two studies involved different types of information. Davis and Phares (1967) focused upon information contained within Type I source of influence while Pines and Julian (1969) examined information from Type III influence. The expanded

sources of influence may be an extremely useful construction for classifying the type of information available for individuals to seek.

Other studies investigating the relationship between personality and search indicate that non-dogmatic persons delay or reserve judgment and seek information when available for a word completion task, a concept identification task and a line judgment task (Long and Ziller, 1965). Driscoll, Lanzetta & McMichael (1967) found no significant relationship between rigidity (Rokeach, 1960) and search behavior.

The proposed experiment emphasizes the situational nature of information-seeking behavior. Information search is a behavior, or set of behaviors governed in accordance with the demands of the situation. The factors mediating predecisional search are tied to the situation. The process approach to information seeking may result in a functional approach to obviating any statement concerning types of personalities as seekers or non-seekers.

Response Dimension. Once a decision-maker places himself in a position to be influenced by seeking information, his response becomes a response to influence.

Willis (1965) delineated four basic responses to influence in a conformity situation: conformity, anti-conformity, independence and variability.



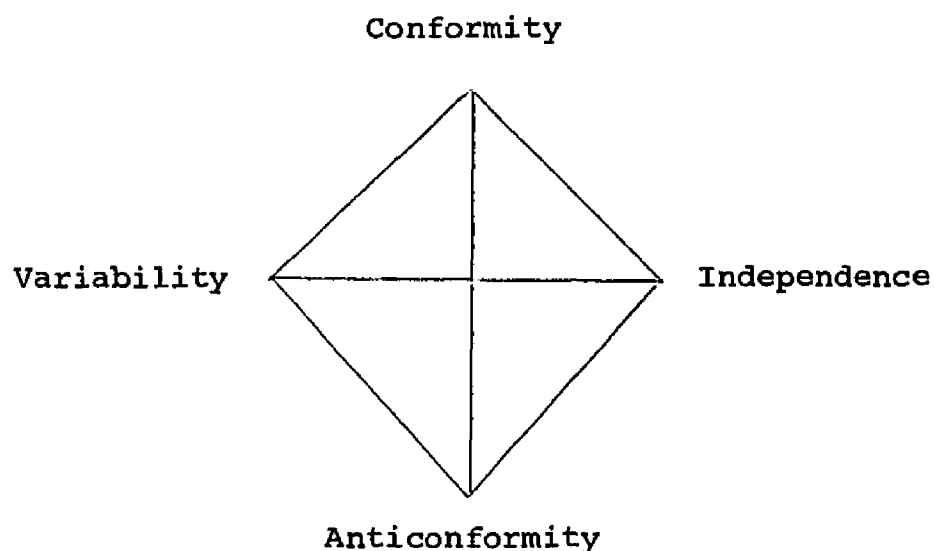
Conformity refers to behavior on the part of the decision-maker instrumental to fulfilling the normative expectations of the influencing agent(s). Learned dependence theoretically mediates conformity since the decision-maker must acknowledge the behavior of the influencing agent(s) prior to responding.

Anticonformity is a response to influence similarly mediated by dependence. The decision-maker acknowledges the norm (Type II influence) sent by the influencing agent and responds counter to their behavioral indicators.

Independent behavior results when the decision-maker responds in accordance with his veridical perceptions (Type III influence) regardless of the norm sent by the agents of influence (Type II). The decision-maker assigns zero weight to Type II influence. According to Willis (1965), the decision-maker evaluates Type II influence in terms of the appropriateness of this norm as a guide to behavior. The decision-maker, however, resists Type II influence attempts and allows Type III influence to guide his behavior.

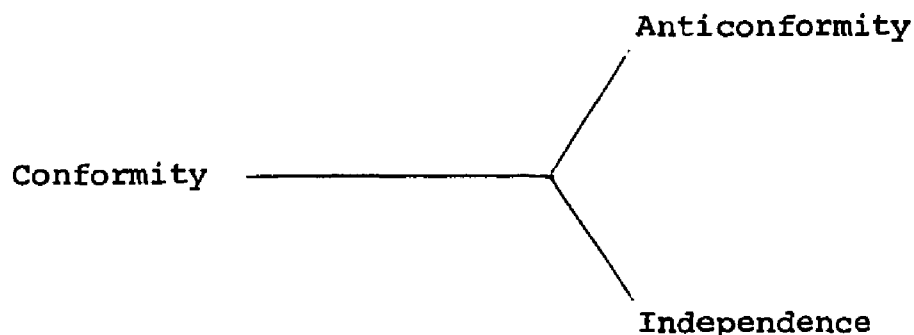
Variability refers to complete indecision by the decision-maker. As soon as a response occurs in one direction, it is recinded and a response in the other direction occurs. The form of behavior is reminiscent of Brehm's

(1966) reactance theory. Each response involves a loss of freedom and given the opportunity causes the decision-maker to reverse his responses. The process continues until situational constraints such as time limit the behavior. Willis suggests, indirectly, that uncertainty mediates variability since this mode of response refers to complete indecision. Willis conceptualizes variable behavior as a form of independence. The response of the decision-maker is contingent upon his previous response and not on the information sent by the influencing agent. Variable behavior exemplified pure response conflict. The diamond model of Willis is represented below:



Recently, Stricker, Messick and Jackson (1970a) challenged the diamond model proposed by Willis (1965). Rather than view responses to influence as two dimensional, Stricker, et.al. (1970) represented the response dimension of the

social influence process as distinct, yet bipolar dimensions. One dimension consisted of conformity and independence and the other of conformity and anticonformity. The model of Stricker, et.al. (1970) is presented below:



In this model, conformity competes with anticonformity and independence. At present the issue has not been resolved despite the exchange between Willis (1970) and Stricker, Messick & Jackson (1970b).

The dilemma can be resolved by specifying the sources of influence controlling the responses. By focusing upon the stimulus aspects of behavioral control, mediators such as dependence, uncertainty or intentions become obsolete (McGinnes, 1970; McGinnes & Forster, 1971).

Since conformity and anticonformity must occur as a response to group sent or individually sought information, these modes of behavior are under the control of Type II influence. Independent behaviors are responses under the control of Type III influence. These relationships can

be clarified by including predecisional information seeking to the response in dimension of social influence.

An individual faced with a choice between n alternatives can respond in one of two ways: seek further information or make a final choice. If the Type II information-seeking alternative is chosen, three responses are now available, based on the information received: to seek further information, conform, or not conform.

The best way for a decision-maker to remain independent is not to seek information from others. When Type II influence does not occur, Type III influence controls the response of the decision-maker and the resulting behavior is labeled independent.

This formulation emphasizes behavior over time as the sole manner of separating conformity, independence and anticonformity. An isolated response cannot be labeled conformity, independence or anticonformity, since agreement or disagreement to group sent information on any one trial may be a function of Type II or III influence. Type III influence may initiate Type II search. If Type II search proves inadequate for the decision-maker, search ceases and Type III influence takes over as the controlling agent. Similarly, the nature of Type II information determines if this source of influence is to be abandoned. In

some cases, the decision-maker may stop seeking Type II information and instigate Type III search only to return to Type II search.

In summary, to demonstrate conformity or anticonformity, Type II influence must be shown to be controlling the decision-maker's responses. To demonstrate independent behavior, Type III source of influence must be delineated as controlling the responses of the decision-maker.

Various other forms of responses to influence have been delineated. Compliance (Kelman, 1961), internalization and imitation (Bandura, 1962; Kelman, 1961), attitude change (Kiesler, Collins, & Miller, 1969), obedience (Milgram, 1965), and ingratiation (Jones, 1965) are all responses to influence. Behaviorally, the modes of response conceptualized by the present approach subsume these constructs. Leadership behavior which is a response to influence is an example of independent behavior, as is leaving the field and some forms of obstinacy (Bauer, 1964). Attitude change in accordance to reference or membership group norms exemplifies conformity.

The present approach to social influence adds information-seeking behavior as a possible response to social influence. The decision-maker, faced with a choice among several courses of action has the option of postponing the

final decision to gather additional information. The decision-maker can respond in the absence of social influence or by seeking information, respond to influence.

When information seeking becomes part of the social influence process, search behavior and responses to influence are no longer independent. In order to respond to influence, the individual must first seek the responses of the other individuals (Type II influence). Once the information is sent to the decision-maker, a response to influence must result. The response may be one of the four alternatives postulated by Willis, or, in addition, an information-seeking response. In this case, once the group sends the norm, the decision-maker may decide that the information received was not instrumental to an ordering of the response alternatives and seek further information. The process continues until the decision-maker can order the response alternatives. Once a decision-maker places himself in a position to be influenced by others, the resulting response or series of responses are responses to influence.

Consequently, the social influence process represents a dynamic decision-making process. The interaction of the sources of influence and person variables determines the conditions in which the decision-maker places himself

in a position to be influenced, from whom information is sought, and the course of search behavior over time. This ongoing, dynamic process is an essential characteristic of behavior and must be incorporated into any theoretical framework involving social influence.

#### Theoretical Status of Conformity and Information Seeking

In the present framework, responses to influence are actions instrumental to the attainment of some goal. Homans (1961), Jones (1964), and Walker & Heyns (1962) view responses to influence in a similar vein. The goal varies from the presentation of oneself in a favorable manner to obtain rewards from others (Jones, 1964), to avoiding sanctions (Milgram, 1965), verifying beliefs (Festinger, 1954) or social approval (Homans, 1961; Nord, 1968). Conformity is thus viewed as an instrumental response, maintained by the consequences of the behavior.

Information seeking is similarly viewed as an instrumental response. Information resulting in an ordering of the response alternatives will be sought only when search modifies the decision-maker's outcomes. If search behavior is instrumental to gaining access to social influence (Type II information), the variables affecting

responses to influence should affect information seeking in the same manner. This hypothesis has been confirmed by Crawford and Haaland (1971).

#### Statement of the Problem

The present experiment focuses upon the relationships between Type II information, Type III information, and the reward-cost structure of the choice problem as determinants of future information-seeking behavior.

Since individuals typically seek information from other persons, this behavior is viewed as part of the social influence process. The task for the social decision theorist is to delineate the conditions in which a decision-maker postpones a final choice and seeks information. When an information-seeking response occurs, the decision-maker voluntarily places himself in a position to be influenced by others. The probability of making a correct decision alone and decision importance are seen as the instigators of predecisional search behavior. The nature of the information received determines if the sources(s) of information and influence continue to be consulted.

The uncertainty reduction position (Berlyne, 1960; Lanzetta, 1967, 1970) argues that as long as the decision-maker is in a state of response conflict (uncertainty), in-



formation search persists. Information search is not viewed as a response instrumental to receiving a pay-off. Rather, an ordering of the response alternatives is the reinforcement for search. Information that is non-instrumental in the modification of outcomes continues to be sought (Lanzetta & Driscoll, 1966) as long as the decision-maker operates in a state of uncertainty.

The present approach views information search as a response that is instrumental to modifying outcomes. The decision-maker initiates search when individual efforts are not effective in ordering the response alternatives or making a correct decision. In this case, the decision-maker seeks information in order to be correct or modify potential outcomes. Sources of information that increase the probability of the decision-maker making a correct choice will continue to be consulted in future choice situations. The decision-maker discontinues search from sources of information who do not aid in choosing correctly. Thus, the instrumental value of the information received plays a major role in the maintenance of search behavior.

The theoretical status of the relationship between response conflict and decision importance is not clear. Berlyne (1960) predicts a multiplicative relation (conflict and importance interact) while research indicates an addi-

tive relationship (Hawkins & Lanzetta, 1965; Lanzetta & Driscoll, 1968; Sieber & Lanzetta, 1964). Hawkins and Lanzetta (1965) and Sieber and Lanzetta (1965) found that as importance increases search decreases. Lanzetta and Driscoll (1968) found predecisional information seeking to increase as importance increases.

The conflict between theory and research may be resolved if the difference in the expected value of the decision before and after an information-seeking response is utilized as the best guide to search behavior. Information that increases the expected value of the decision will be sought while information not instrumental to increasing the expected value of the decision will not be sought.

The expected value of a decision is obtained by multiplying the probability of making a correct choice by the outcome for choosing correctly and adding to it the probability of choosing incorrectly the outcome of an incorrect decision. The structure of the problem is represented by the equation:  $EV = P_C O_C + P_I O_I$ , where  $P_C$  and  $P_I$  are the probabilities of choosing correctly and incorrectly respectively, and  $O_C$  and  $O_I$  are the respective outcomes associated with a correct and incorrect choice.

The construct of expected value takes into account

the probability of success (response conflict) and importance (reward-cost structure) of the decision. The relationship between conflict and importance (whether multiplicative or additive) depends upon the joint values of  $P_C$  and  $P_I$  and  $O_C$  and  $O_I$ . The maintenance of search behavior is contingent upon the relationship of the expected value of the decision before seeking information ( $EV_b$ ) to the expected value of the decision after predecisional search ( $EV_a$ ). If  $EV_a > EV_b$ , search increases. When  $EV_a < EV_b$ , search decreases. The magnitude of search behavior should vary with the discrepancy between  $EV_a$  and  $EV_b$ . As  $EV_a$  increases from  $EV_b$ , the amount of search increases. The smaller the discrepancy between  $EV_a$  and  $EV_b$ , the smaller the magnitude of search. When  $EV_a < EV_b$ , search decreases.

#### The Experiment

This experiment will test these hypotheses by examining response conflict, importance and reinforcement value in a 2 x 2 x 3 x 5 factorial design.

There are two levels of response conflict, two levels of importance, and three levels of the reinforcement values of the information received. The 5-level factor is blocks of 10 trials.

Response conflict or the probability of choosing

correctly before seeking information is manipulated through the use of the probability learning paradigm. The subject faces a three-choice probability learning task. The task of the subject is to guess which of three lights will extinguish first. Each individual receives one of two probabilistic sequences. Event occurrence is either equiprobable ( $E_1 = E_2 = E_3$ ) or non-equiprobable ( $E_1 > E_2 = E_3$ ).

When event occurrence is equiprobable, the probability of the decision-maker choosing correctly in the absence of social influence is .33. Non-equiprobable event occurrence (.8, .1, .1) results in a  $P_C$  of .66 of choosing correctly on each trial in the absence of social influence ( $.8(.8) + .1(1) + .1(.1) = .66$ ).

Decision importance is varied by manipulating the reward for choosing correctly and the cost of an information-seeking response. In one condition the reward for choosing correctly is 10¢ while the cost for seeking the response of others prior to making a final decision is 5¢. Thus, an individual who decides to respond in the absence of influence can win 10¢ and lose nothing. The expected value of this decision is represented as  $EV = P_C 10¢ + P_C 00¢$ . The decision-maker who decides to seek information prior to a final decision must pay 5¢. A correct decision yields a reward of 10¢ plus the 5¢ ventured. An incorrect decision

results in the loss of the cost of information, in this case, 5¢. The expected value of the decision after seeking information is:  $P_C(.10) + P_I(-.05)$ .

The second importance condition involves a potential 30¢ gain for a correct choice and a 15¢ cost per information-seeking response.

The expected value of the decision prior to seeking information given the two probabilistic event sequences and the two importance conditions is represented in Table 1.

Table 1

Expected Value of Decision  
Prior to Information Search ( $EV_b$ )

		Probability of Success	
		.33	.66
Reward for	10¢	.033¢	.066¢
Correct Choice	30¢	.099¢	.198¢

There are three levels of information feedback. For one group, the information received leads to a correct response 30% of the time. That is, for every ten information responses, the influencing agents are correct on three of those trials. A second group of subjects receives 60% correct feedback while a third group receives 90% correct feedback. When the subject seeks information, the

group members always respond unanimously. The expected value of an information-seeking response, calculated by substituting .3, .6 or .9 for  $P_C$  and  $(1-P_C)$  for  $P_I$ , and utilizing the two reward-cost levels is represented in Table 2.

Table 2

Expected Value of An Information-Seeking Response ( $EV_a$ )

		Probability of Information Leading to a Correct Response		
		.3	.6	.9
Reward-Cost	10¢ -5¢	-.005¢	.04¢	.085¢
Structure	30¢ -15¢	-.015¢	.12¢	.255¢

The net gain in expected value of an information-seeking response is calculated by subtracting  $EV_b$  from  $EV_a$ . These figures are shown in Tables 3 and 4.

Table 3

Net Gain in Expected Value of the Decision After Seeking Information when  $P_C = .33$

		Probability of Information Leading to a Correct Response		
		.3	.6	.9
Reward-Cost	10¢, -5¢	-.038	.007	.052
Structure	30%, -15¢	-.114	.021	.156

Table 4

Net Gain in Expected Value of the Decision  
After Seeking Information when  $P_C = .66$

		Probability of Information Leading to a Correct Response		
		.3	.6	.9
Reward-Cost	10¢, -5¢	-.071	-.026	.019
Structure	30¢, -15¢	-.213	-.078	.057

The hypotheses derived from these theoretical considerations are:

1. Response strength (uncertainty) and reward-cost structure (importance) will combine to determine the instigation of search behavior. Specifically, the decision-maker instigates search when the elements within the set of response alternatives cannot be ordered and the decision is important.

2. The difference between  $EV_a$  and  $EV_b$  predicts the maintenance of information seeking. When  $EV_a - EV_b$  is positive, information seeking will occur. The larger the positive difference, the greater the amount of information seeking. When  $EV_a - EV_b$  is negative, search attenuates. The larger the negative difference, the less information seeking. These hypotheses reflect an interaction between initial probability of success, reward-cost structure

(importance) and the nature of the information received.



## METHOD

Design

The experiment is a 2 x 3 x 2 x 5 factorial design with repeated measures on the 5-level factor. There are two levels of event occurrence ( $E_1 = E_2 = E_3$ ;  $E_1 > E_2 > E_3$ ), 3 information feedback conditions (30%, 60%, 90% correct) and 2 levels of importance (cost for information = 5¢, reward for correct choice = 10¢; cost = 15¢, reward = 30¢). The 5-level factor is blocks of 10 trials. Table 5 is a schematic representation of the experimental design.

Table 5

## Experimental Design

Factor	Level	Condition	Factor D
			Blocks of 10 Trials
A (Event Occurrence)	a <sub>1</sub>	.34, .33, .33	
	a <sub>2</sub>	.80, .10, .10	
B (Reward-Cost Structure)	b <sub>1</sub>	10¢, -5¢	
	b <sub>2</sub>	30¢, -15¢	
C (Group Probability of Success)	c <sub>1</sub>	.30	
	c <sub>2</sub>	.60	
	c <sub>3</sub>	.90	

### Task

The task is a three-choice probability learning task. The subject is to predict which of three events is to occur on each trial. After the subject makes his predictive response, the actual event is shown. The events are randomly ordered within blocks of 10 trials.

The probability learning paradigm serves as a convenient paradigm for explicating the relationship between information seeking and probabilistic choice behavior. This paradigm meets Berlyne's assumptions (1960) concerning response strengths and probabilities of occurrence.

Probability learning theory indicates that the average number of  $R_n$  responses of an individual are equal to the proportions of  $E_n$  events that occur over those trials. This is called the probability matching theorem (Estes, 1964).

In a three-choice probability learning task, response strength is equivalent to the objective event sequence. Response conflict is maximum when  $E_1 = E_2 = E_3$ , yielding  $R_1 = R_2 = R_3$ .

Since probability matching typifies the performance of individuals in a probability learning task, the probability of making a correct choice on any given trial is

represented by the following equation:  $R_1E_1 + R_2E_2 + \dots + R_nE_n$ . Using an event sequence of  $E_1 = .8$ ,  $E_2 = .1$ ,  $E_3 = .1$ , and assuming matching behavior, the probability of a subject making a correct choice on trial  $n = .8(8) + .1(1) + .1(1) = .66$ .

### Equipment

#### The Stimulus System

The stimulus is three lights. Subjects anticipate which of the three lights will extinguish first. There is a one-second interval between the time that the first light extinguishes and the offset of the other two lights.

#### The Response System

The response system is a Crutchfield apparatus, modified for communication purposes. The subject sits in front of a panel of 9 lights, arranged in 3 columns of 3 lights. The bottom light in each column represents the subjects' own responses. The other two lights in each column represent the responses of the other group members. Below each column is a response switch. The subject closes the appropriate switch when he makes his response. To the left of the first column of lights is a red button

labeled "Information Button". During the experimental trials, subjects have the opportunity of seeking information from the other group members by pressing the information button. The experimenter is stationed in an adjoining room, monitoring the appropriate information to the subjects requesting information.

### Subjects and Procedure

The subjects are 144 male and female introductory psychology students attending the University of New Hampshire. Subjects are run in same sex triads.

Subjects enter the laboratory and are seated individually in cubicles with the stimulus system in full view. The experimenter then instructs the subjects to put on the headphones which are located above and to the right of the response panel. A set of instructions describing the stimulus and response systems and the nature of the task is presented. This set of instructions makes no reference to information seeking (see Appendix A).

After the taped instructions, 50 probability learning trials ensue, without information seeking from the other group members. The 50 pre-experimental trials are employed to shape the subjects' response strengths according to a prescribed schedule. Subjects receive 30¢ or 10¢ for each

correct response. This contingency establishes  $EV_b$ .

At the completion of the 50 pre-experimental trials, the experimenter instructs the subjects, via tape recorder, to pick up their clipboards and turn the page.

This next page contains the instructions for information seeking (see Appendix B). The instructions emphasize that the light pattern would remain the same. The instructions inform the subjects that they can seek information before they make a final choice. When the experimenter finishes reading the instructions, all questions are answered. There are 100 information-seeking trials.

#### Dependent Variables

Establishment of  $EV_b$ . The number of responses to the more reinforced side during trial block 5 of the non-information-seeking trials is analyzed.

Instigation of Information Seeking. Two dependent variables are employed. The first dependent variable is the trial number on which the first search response occurs. The second dependent variable is the number of information-seeking responses emitted during the first block of information-seeking trials.

Maintenance of Information Seeking. The number of information-seeking responses emitted during trial blocks

6 - 10 is the dependent measure.

## RESULTS

Response Strength: Non-Information-Seeking Trials

The first 50 non-information-seeking trials were employed to establish the  $EV_p$  contingency. During these trials, subjects received 30¢ for a correct guess in the high importance conditions and 10¢ for a correct guess in the low importance condition. There was no penalty for an incorrect response.

Of these 50 trials (5 blocks of ten trials), the number of responses to the more reinforced side during trial block 5 was analyzed. This analysis was performed in order to assure that subjects matched the event sequence. The resulting analysis was a 2 x 2 analysis of variance with two levels of event occurrence (.80, .10; .10, .34, .33, .33) and two reward conditions (10¢, 30¢). Table 6 represents the mean number of responses by subject as a function of event occurrence and reward.

Table 7 represents the summary table for the analysis of variance.

The significant main effect for event occurrence indicated that subjects responded more often to the reinforced

Table 6

Mean Number of Responses to More Reinforced Side

		Event Occurrence		
		.34, .33, .33	.80, .10, .10	
Reward	10¢	3.22	8.39	
	30¢	3.39	8.50	

Table 7

Analysis of Variance Summary Table:  
Responses to the More Reinforced Side

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Event Occurrence (A)	950.69	1	950.69	485.05*
Reward (B)	.69	1	.69	< 1
AB	.04	1	.04	< 1
Error	274.33	140	1.96	

\*  $p < .001$ 

side in the .80, .10, .10 condition than subjects in the .34, .33, .33 condition. Subjects matched the probabilities in the equiprobable event condition and slightly overshot the probabilities in the non-equiprobable condition.

The probability of correct choice ( $P_c$ ) on any one trial for the subjects exposed to the equiprobable event



sequence was .33. For the subjects exposed to the non-equiprobable event sequence,  $P_C = .72$ . As a result, the  $EV_b$  contingency was established.

#### Instigation of Information-Seeking Behavior

Theoretically, information seeking is instigated by the decision-maker when the elements within the set of response alternatives cannot be ordered and the decision is important. In order to test this hypothesis, two analyses of search instigation were performed. The first analysis concerned the trial number on which the first search response occurred. This dependent variable reflected a time measure. The second analysis focused upon the number of search responses emitted during the first information-seeking trial block, and reflected a frequency measure. These two dependent measures reflect converging operations of the uncertainty construct.

Table 8 represents the mean trial number of the first search response as a function of event occurrence and reward.

Table 9 represents the summary of the analysis of variance for this data.

The significant main effect for event occurrence indicated subjects instigated search behavior sooner (trial

Table 8

Mean Trial Number of  
First Search Response

		Event Occurrence	
		.34, .33, .33	.80, .10, .10
Reward	10¢	13.64	23.25
	30¢	19.72	28.77

Table 9

Analysis of Variance Summary Table:  
First Trial to Search

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Event Occurrence (A)	3136.00	1	3136.00	8.20*
Reward (B)	1213.36	1	1213.36	3.17
AB	2.78	1	2.78	< 1
Error	53552.5	140	382.52	

\*  $p < .01$

= 16.68) when the response alternatives were equiprobable than when the response alternatives were not equiprobable (trial = 26.01). Reward (importance) had no significant effect upon the latency of search behavior.

The mean number of search responses as a function

of event probability and reward during trial block 1 is presented in Table 10.

Table 10

Mean Number of Search Responses  
During First Information-Seeking Trial Block

		Event Sequence		
		.34, .33, .33	.80, .10, .10	
Reward	10¢	1.69	.94	
	30¢	1.69	.97	

The analysis of variance for the frequency of response measures is presented in Table 11.

Table 11

Analysis of Variance Summary Table:  
Number of Information-Seeking Responses During  
First Block of Information-Seeking Trials

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Event Occurrence (A)	16.67	1	16.67	4.12*
Reward (B)	.00	1	.00	< 1
AB	.02	1	.02	< 1
Error	565.47	140	4.04	

\*  $p < .05$

The significant main effect for event probability

indicated that subjects exposed to the equiprobable event sequence sought significantly more information during trial block 1 than subjects exposed to the non-equiprobable event sequence. Reward (importance) had no effect upon the frequency measure.

The data from the frequency measure coincided with latency measure. The decision-maker initiated search behavior sooner and more often when the elements within the set of response alternatives could not be ordered. Reward (importance) had no significant effect upon the instigation of information-seeking behavior.

#### Maintenance of Information-Seeking Behavior

The central hypothesis asserted that the maintenance of information-seeking behavior was a function of the interaction between event occurrence ( $P_c$ ), reward-cost structure (importance) and the reinforcement value of the information received. The relationship between  $EV_a$  and  $EV_b$  subsumed the three variables, where  $EV_a$  is the expected value of the decision after predecisional search and  $EV_b$  is the expected value of the decision prior to seeking information. The amount of search behavior was hypothesized to vary with the discrepancy between  $EV_a$  and  $EV_b$ . When  $EV_a - EV_b$  was positive, search increased as the magnitude

of the difference increased. When  $EV_a - EV_b$  was negative, search should attenuate.

The 50 non-information-seeking trials established the  $EV_b$  contingency. The first 50 information-seeking trials (blocks 1 - 5) established the  $EV_a$  contingency. The last 50 information-seeking trials (blocks 6 - 10) were hypothesized to reflect the  $EV_a - EV_b$  contingency. The resulting analysis was a  $2 \times 2 \times 3 \times 5$  analysis of variance with repeated measures on the five-level factor. There were two levels of event probability (.34, .33, .33; .80, .10, .10), two levels of reward-cost structure (10¢, -5¢; 30¢, -15¢), and three levels of group reinforcement (30%, 60%, 90%). The five-level factor represented trial blocks 6 - 10. The summary of the analysis of variance reflecting the  $EV_a - EV_b$  contingency is presented in Table 12.

The results of this analysis indicated significant main effects for event occurrence ( $F = 4.99, p < .05$ ), group reinforcement ( $F = 15.48, p < .001$ ), and a significant event occurrence  $\times$  group reinforcement interaction ( $F = 3.88, p < .05$ ).

The interaction between event occurrence and group reinforcement indicated that interpretation of each factor can only be made with reference to the specific level of

Table 12

Analysis of Variance Summary Table:  
Information-Seeking Responses for Trial Blocks 6 - 10

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
<u>Between Ss</u>				
Event Probability (A)	171.11	1	171.11	4.99**
Reward-Cost (B)	75.40	1	75.40	2.20
Group Reinforcement (C)	1062.00	2	531.00	15.48**
AB	18.37	1	18.37	< 1
AC	265.98	2	132.99	3.88*
BC	23.36	2	11.68	< 1
ABC	26.03	2	13.02	< 1
Error	4528.55	132	34.31	
<u>Within Ss</u>				
Trials (D)	4.52	4	1.13	< 1
A x D	3.53	4	.88	< 1
B x D	16.98	4	4.25	2.85*
C x D	24.38	8	3.05	2.04*
A x B x D	8.58	4	2.14	1.43
A x C x D	18.98	8	2.37	1.59
B x C x D	19.79	8	2.47	1.65
A x B x C x D	19.053	8	2.44	1.63
Error	785.70	528	1.49	

\*  $p < .05$

\*\*  $p < .001$

the other factor. Consequently, the event occurrence x group reinforcement interaction is considered in lieu of the main effects. Table 13 represents the mean number of search responses as a function of event probability and group reinforcement.

Table 13

Event Probability x Group Reinforcement Interaction:  
Mean Number of Information-Seeking Responses

		Group Reinforcement		
		c <sub>1</sub> 30%	c <sub>2</sub> 60%	c <sub>3</sub> 90%
Event	.34, .33, .33 (a <sub>1</sub> )	3.92	11.92	25.96
Occurrence	.80, .10, .10 (a <sub>2</sub> )	5.83	8.21	13.13

A test of simple main effects (Winer, 1962) indicated significant variation in search behavior at both levels of event occurrence. Table 14 represents the summary of this analysis.

In order to determine where the significant variation occurred, a Neuman-Keuls post-hoc test was utilized. At level a<sub>1</sub> (equiprobable event occurrence), all three means were significantly different from one another ( $p < .01$ ). At level a<sub>2</sub> (non-equiprobable event occurrence), search at 90% correct group reinforcement differed significantly

Table 14

Summary Table: Analysis of Simple Main Effects for  
Event Probability x Group Reinforcement Interaction

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
C at a <sub>1</sub>	5976.03	2	2988.01	87.09*
C at a <sub>2</sub>	663.86	2	331.93	9.67*
Within	4528.55	122	34.31	

\*  $p < .001$

from search at 30% or 60% correct group reinforcement ( $p < .01$ ). There was no significant difference in search behavior between 30% or 60% correct reinforcement. Figure 2 graphically represents the event occurrence x group reinforcement interaction.

A test on trends for the simple main effect indicated that a linear component accounted for significant variance across reinforcement conditions.

Table 15 summarizes the results of the trend analysis.

The linear component accounted for 97.5% of the variance in group reinforcement under equiprobable event occurrence conditions ( $p < .001$ ) and 96.1% of the variance under non-equiprobable event conditions ( $p < .01$ ). In summary, as the probability of an information-seeking



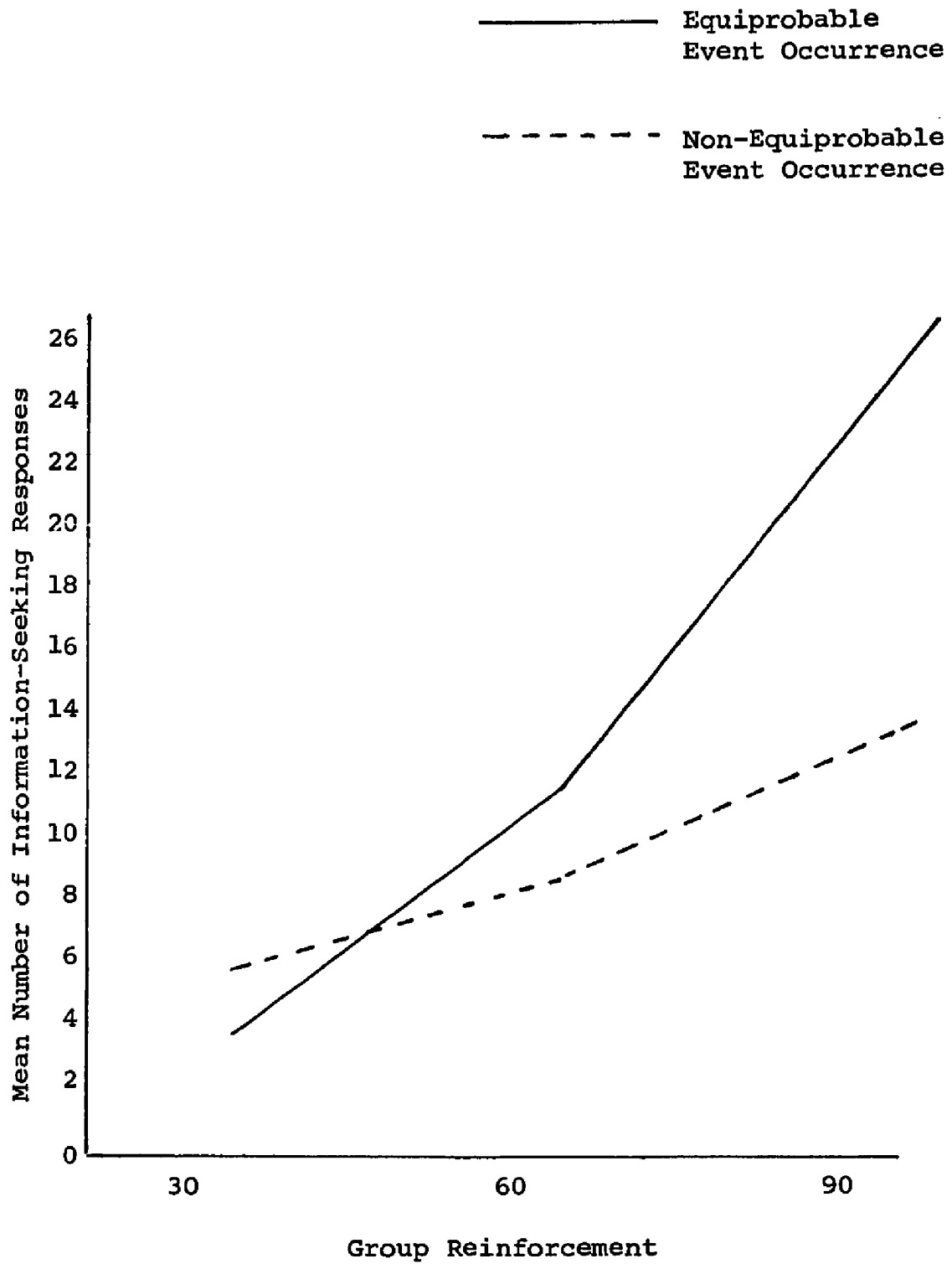


Figure 2

Event Occurrence x Group Reinforcement Interaction

Table 15

Summary Table: Analysis of Trend Component for  
Event Probability x Group Reinforcement Interaction

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
C at a <sub>1</sub>	2	2988.01	
Linear	1	2915.01	84.96*
Quadratic	1	73.00	2.13
C at a <sub>2</sub>	2	331.93	
Linear	1	319.01	9.28*
Quadratic	1	12.92	< 1
Between Ss	132	34.31	

\*  $p < .001$

response leading to reinforcement increases, search behavior increases linearly.

Variation in search as a function of event occurrence at specific levels of group reinforcement were examined.

Table 16 represents the simple main effects analysis.

At 30% correct group reinforcement, there is no difference in information-seeking behavior as a function of event probability. At 60% correct group reinforcement, individuals exposed to an equiprobable event sequence sought significantly more information than subjects in the

Table 16

Summary Table: Analysis of Simple Main Effects for  
Variation in Search Behavior  
at Specific Levels of Group Reinforcement

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A at $c_1$	44.08	1	44.08	1.28
A at $c_2$	165.01	1	165.01	5.27*
A at $c_3$	1976.34	1	1976.34	57.60**
Within	4528.55	132	34.31	

\*  $p < .05$

\*\*  $p < .001$

non-equiprobable event occurrence condition ( $p < .05$ ).

When the group was correct on 90% of the search responses, individuals sought significantly more information when event occurrence was equiprobable than when not equiprobable ( $p < .001$ ).

A significant reward-cost x trials interaction resulted. Table 17 presents the mean number of information-seeking responses as a function of reward-cost and trials, while Figure 3 graphically represents the interaction.

A test of simple main effects indicated significant variation in search behavior across trials (D) for the 30¢, -15¢ ( $b_2$ ) condition. Table 18 presents the summary

table of analysis of simple main effects.

Table 17

Reward-Cost x Trials Interaction:  
Mean Number of Information-Seeking Responses

		Trial Blocks				
		6	7	8	9	10
Reward-Cost	10, -5	2.21	1.99	1.99	1.86	1.82
	30, -15	2.29	2.56	2.89	2.78	2.60

Table 18

Summary Table: Analysis of Simple Main Effects for  
Variation in Search Across Trials  
at Levels of Reward-Cost

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
D at b <sub>1</sub>	6.4	4	1.06	1.07
D at b <sub>2</sub>	15.1	4	3.78	2.53*
Error	785.70	528	1.49	

\*  $p < .05$

Within the 30¢, -15¢ reward-cost condition, only search behavior at trial block 8 was significantly greater from search at trial block 6.

Variation in search behavior as a function of reward-cost structure at specific trial blocks was examined.

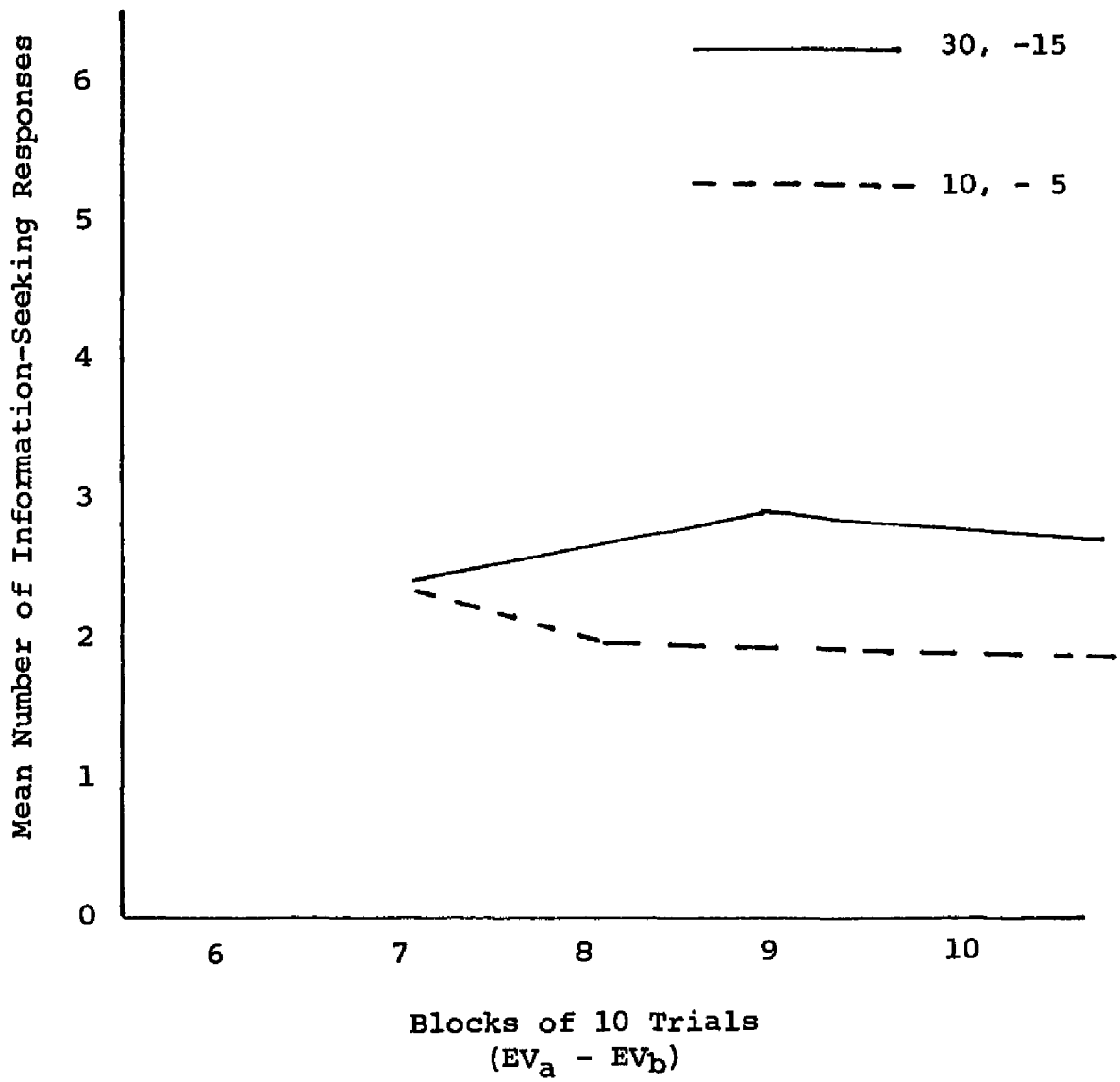


Figure 3  
Reward-Cost x Trials Interaction

Table 19 presents the summary table for the test of simple main effects.

Table 19

Summary Table: Analysis of Simple Main Effects for Variation in Search Across Reward-Cost Conditions at Specific Trial Blocks

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
B at d <sub>6</sub>	.25	1	.25	< 1
B at d <sub>7</sub>	11.68	1	11.68	7.34*
B at d <sub>8</sub>	29.34	1	29.34	19.69*
B at d <sub>9</sub>	29.34	1	29.34	19.69*
B at d <sub>10</sub>	21.78	1	21.78	14.62*
Error	785.70	528	1.49	

\*  $p < .001$

This analysis indicated that subjects in the 30¢, -15¢ condition (high importance) sought significantly more information at trial blocks 8 - 10 than did subjects in the 10¢, -5¢ (low importance) conditions. At trial block 6 there was no difference in search between the two groups as a function of reward-cost structure.

The group reinforcement x trials interaction also proved to be significant. Table 20 presents the mean number of search responses for this interaction, while Figure 4

graphically represents the interaction.

Table 20

Group Reinforcement x Trials Interaction:  
Mean Number of Information-Seeking Responses

		Trial Blocks				
		6	7	8	9	10
Group Reinforcement	30%	.94	1.10	1.19	.85	.79
	60%	2.15	2.21	1.92	1.96	1.83
	90%	3.67	3.50	4.21	4.17	4.00

A test of simple main effects indicated significant variation across trials for the 90% reinforcement condition. Table 21 is the summary table for the analysis of the simple main effects.

Table 21

Summary Table: Analysis of Simple Main Effects for  
Variation in Search Across Trials at  
Specific Levels of Group Reinforcement

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
D at c <sub>1</sub>	5.35	8	1.34	.90
D at c <sub>2</sub>	4.81	8	1.20	.81
D at c <sub>3</sub>	18.74	8	4.69	2.34*
Error	785.70	528	1.49	

\* p < .05

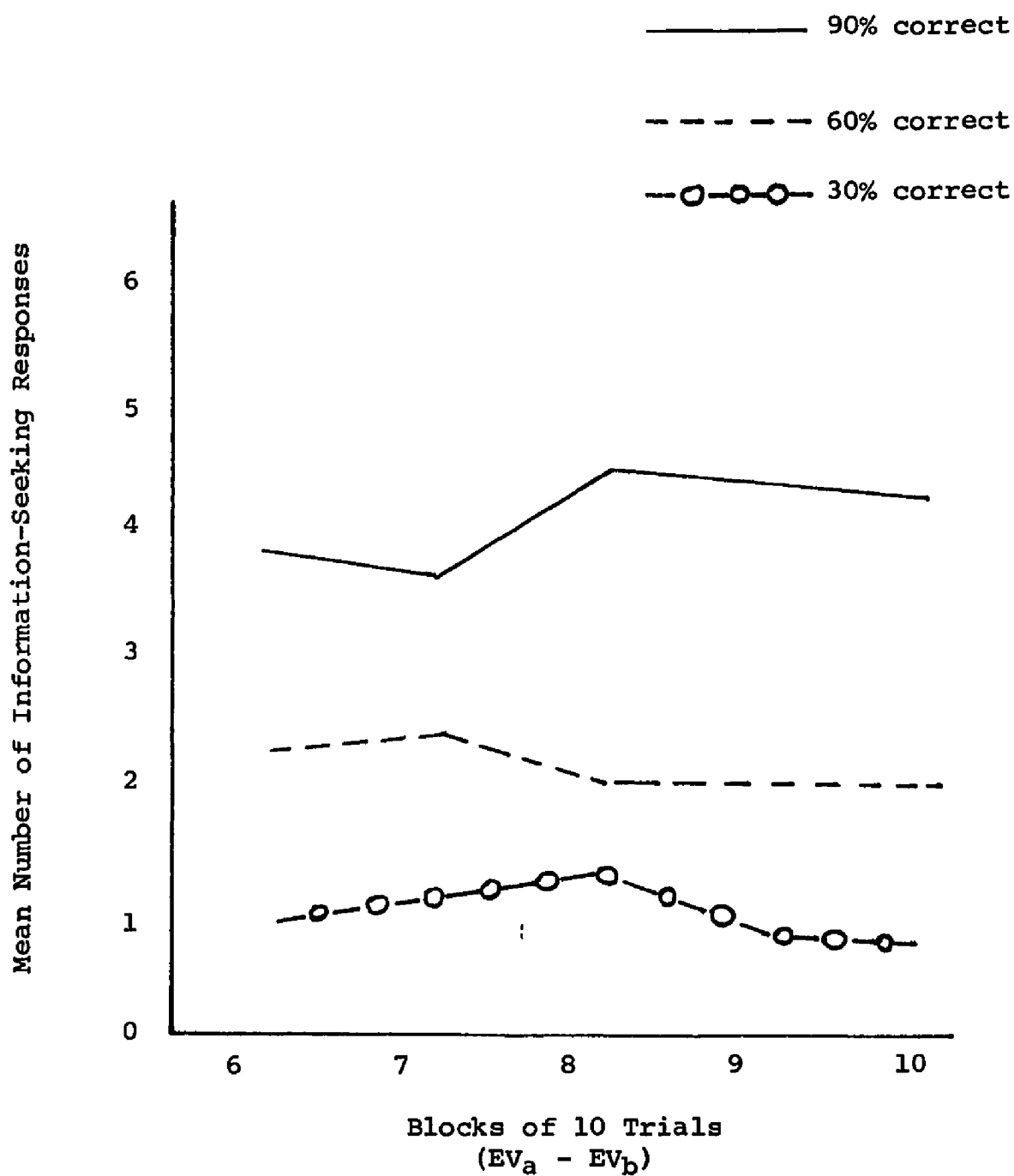


Figure 4

Group Reinforcement x Trials Interaction



A Neuman-Keuls procedure indicated that search at trial blocks 8 and 9 differed significantly from search at trial block 7 ( $p < .05$ ).

A test of simple main effects indicated significant variation in search as a function of group reinforcement at specific trial blocks. Table 22 is the summary table for this analysis.

Table 22

Summary Table: Analysis of Simple Main Effects for Variation in Search Across Group Reinforcement Conditions at Specific Trial Blocks

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
C at d <sub>6</sub>	179.54	8	22.44	15.06*
C at d <sub>7</sub>	138.04	8	17.26	11.58*
C at d <sub>8</sub>	238.54	8	29.82	20.01*
C at d <sub>9</sub>	237.10	8	29.64	19.89*
C at d <sub>10</sub>	257.17	8	32.15	21.58*
Error	785.70	528	1.49	

\*  $p < .001$

The results of this analysis indicated that there was significant variation in search behavior at each trial block. A Neuman-Keuls test indicated that at each trial block search under 90% correct group reinforcement was

significantly greater than search at 60% or 30% correct group reinforcement ( $p < .001$ ). Search at 60% group reinforcement was significantly greater than search at 30% group reinforcement ( $p < .001$ ) at all trial blocks.

## DISCUSSION

The present experiment investigated some of the variables responsible for the instigation and maintenance of information-seeking behavior in a social influence situation. By including an information-seeking alternative in the social influence process, the traditional influence paradigm was expanded.

The traditional influence paradigm placed the decision-maker in an uncertain situation by producing response conflict between Type II (group-sent information) and Type III influence (task information). In this paradigm the group exerted influence regardless of the decision-maker's behavior.

The present research paradigm included an information-seeking alternative in the decision-maker's behavior repertoire. The decision-maker now had the option of responding in the absence of social influence pressure. By seeking information from other individuals, he placed himself in a position to be influenced and then made a decision to accept or reject the influence.

When an information-seeking alternative is included into the influence situation, the social influence process

becomes a dynamic decision-making process. An examination of influence as a decision-making process focuses attention on aspects frequently ignored in the study of social influence, such as the predecisional processes. Second, a more accurate representation of the social influence process results since individuals place themselves in a position to be influenced by seeking information rather than having influence pressures merely presented to them.

The findings of this research indicated that information-seeking behavior (a) is initiated sooner and more often when the events within the set of response alternatives cannot be ordered, (b) is maintained when the information received is instrumental to making a correct response with, (c) reward and not expected value as the major variable controlling search behavior.

#### Response Strength: The $EV_b$ Contingency

The probability learning paradigm was utilized in order to meet Berlyne's (1960) assumptions concerning probability of response occurrence and response strength. Response strength is inferred from a frequency of response measure. Probability learning theory states that the average number of responses ( $R_n$ ) of an individual are equal to the proportion of events ( $E_n$ ) occurring over trials.

Estes (1964) refers to this phenomenon as the probability matching theorem.

The  $EV_b$  contingency was calculated by assuming that subjects would match the event probabilities. Subjects exposed to the equiprobable event sequence did match the event probabilities during the final block of non-search trials (mean number of responses to the more reinforced side was 3.3). Subjects in the non-equiprobable event condition overshoot the event probabilities (8.45 responses to more reinforced side). Although the difference between the observed and predicted response proportions is not great for subjects in the .80, .10, .10 condition, in a corrected  $EV_b$  contingency is calculated. Assuming that subjects distributed their response proportions evenly between the two other response alternatives, the revised  $P_C = .845(8.45) + .078(.78) + .078(.78) = .72$ .

The  $EV_a - EV_b$  contingency table was calculated with  $P_C = .66$ . However, when  $P_C = .72$ , the  $EV_a - EV_b$  contingency must be revised. Table 23 represents the revised  $EV_a - EV_b$  contingency. This correction is necessary for a later discussion of the importance x trials interaction during the maintenance of search analysis.

Table 23

Net Gain in Expected Value of a Decision After  
Seeking Information when  $P_C = .72$

		Probability of Information Leading to a Correct Response		
		.30	.60	.90
Reward-Cost	10¢, -5¢	-.077	-.032	.013
Structure	30¢, -15¢	.231	-.096	.039

#### Instigation of Information-Seeking Behavior

The hypothesis that uncertainty and importance combine either multiplicatively (Berlyne, 1960, 1962) or in an additive manner (Lanzetta & Driscoll, 1968) to determine search behavior was not confirmed. The data indicate that the characteristics of the response alternatives, whether equal or not equal in strength, are the major preconditions necessary for a search response to be instigated. This finding, that the decision-maker instigates a search response when the elements within the set of response alternatives cannot be ordered is consistent, whether the dependent variable is the trial number on which the first search response occurs or the number of search responses emitted during the first block of information-seeking trials. In the present paradigm, uncertainty is a necessary condition

for the decision-maker to voluntarily place himself in a position to be influenced. Although this experiment is not concerned with the subsequent responses to influence, there is data to indicate that individuals who do seek information from others in a social influence situation are influenced by the information received (Crawford & Haaland, 1971).

The finding that uncertainty, per se, and not uncertainty in combination with decision importance motivates information-seeking behavior adds to the already confusing theoretical and empirical literature. Berlyne (1960, 1962) and Lanzetta (1967) predict a multiplicative relationship, where the effects of importance are enhanced as uncertainty increases.

The empirical findings demonstrate that uncertainty and importance combine in an additive manner to increase search (Lanzetta & Driscoll, 1968) or to decrease search (Hawkins & Lanzetta, 1965; Sieber & Lanzetta, 1964). Added to these data is the present finding of no relationship between uncertainty and importance.

Examination of the importance manipulations in previous experiments gives some insight as to the reason for the confused relationship between importance and uncertainty. Importance has been manipulated by differential

pay-off schedules (Hawkins & Lanzetta, 1965; Lanzetta & Kanareff, 1962), instructions (Sieber & Lanzetta, 1964), and by instructions and pay-off (Lanzetta & Driscoll, 1968). The dissimilarity of these manipulations across experiments may account for the discrepant findings.

Sieber and Lanzetta (1964) told individuals that they were pilot subjects testing equipment (low importance), participating in a decision-making study (medium importance) or participating in a decision-making experiment designed to relate personality variables, intelligence and grade point average to effective decision-making (high importance). A curvilinear relationship between uncertainty and importance resulted, with the least amount of search occurring under high importance conditions. As Sieber and Lanzetta suggest, perhaps a norm not to search was transmitted to the subjects in the high importance condition. Furthermore, the equivalence of three importance manipulations is questionable. Is the medium importance condition less important than the high importance condition? How much less?

Lanzetta and Driscoll (1968) similarly used non-equivalent techniques for inducing importance. Two high importance manipulations were employed (possible gain or possible loss) and one low importance condition. High importance-gain instructions involved a 10¢ reward for each



correct response while high importance loss instruction emphasized that the task discriminated between inferior and superior decision-makers (ego threat). Low importance instructions emphasized individual differences in decision-making. High importance instructions enhanced search. The problem of the equivalence of both importance manipulations, money and ego threat is called into question. Second, it is possible that subjects perceive the loss condition as ego enhancing rather than threatening. As a result, any statement concerning loss is still tentative.

Hawkins and Lanzetta (1965), using differential pay-off functions as indicants of importance found an inverse relationship between importance and frequency of search. The pay-off function for high importance conditions was twice that of the low importance conditions. Yet subjects sought more information when the low pay-off function was operating.

In the present experiment, the pay-off schedule for the high importance manipulation was three times the low importance conditions. According to the data presented by Hawkins and Lanzetta (1965), an inverse relationship between search and importance should occur. Since money has been effective in influencing search behavior by decreasing search (Hawkins & Lanzetta, 1965), or increasing

search (Lanzetta & Driscoll, 1968; Lanzetta & Kanareff, 1962), the differences in the pay-off schedules may account for the conflicting results.

Lanzetta and Driscoll (1968) paid individuals 10¢ for each correct decision. There was no cost for an information-seeking response, hence no risk of loss. This high importance manipulation increased the frequency of information-seeking responses. In the Hawkins and Lanzetta (1965) experiment, an information-seeking response increased the probability of making a correct response but at the same time reduced the pay-off, thus holding expected value constant. Thus, although subjects could not lose money from their accumulation, there was a cost for search behavior. Consequently, search decreased under these high importance conditions. Lanzetta and Kanareff (1962) found that the lower the cost-reward schedule, the greater the frequency of search, even when the expected value of a search response was held constant across conditions. In this experiment, the cost was subtracted from the subjects' accumulated earnings.

In the present experiment, subjects had the option of investing money to make money. A cost was incurred if the subject sought information and then made an incorrect response without seeking information. It is quite possible

that some subjects focus on the cost of an information-seeking response while others attend to the reward aspects, thus cancelling out the effects of reward-cost structure.

The dissimilarity of both the importance and cost-reward manipulations is most likely responsible for the discrepant findings relating uncertainty, importance and information-seeking behavior. Further research in the areas of scaling instructional sets as to the degree of importance and the role of cost factors in search is necessary.

The data indicate that information-seeking behavior occurs when the decision-maker cannot order the response alternatives, i.e., when he is uncertain. Theoretically, previous experience with equiprobable event occurrence leads to competing responses (conflict) and induces uncertainty.

The traditional conformity paradigm places the decision-maker in an uncertain situation by producing response conflict between task information (Type III influence) and group-sent information (Type II influence). The resulting response to influence (conformity, anticonformity, independence) depends upon the relative strengths of the competing alternatives. With an information-seeking response added to the response alternatives of the decision-maker, the conceptualization of the influence process is expanded. Whereas the traditional influence paradigm forced the decision-maker to respond to the task, the present ex-

periment demonstrates that given the opportunity, an individual will postpone a final choice and instigate search behavior in an attempt to order the response alternatives.

The process of influence can then be conceptualized as a dynamic decision-making process. The social decision analyst must specify the conditions in which an individual postpones a final choice and instigates search behavior, from whom the information is sought and how the interaction of social psychological variables with information characteristics affects the maintenance of information-seeking behavior.

#### Maintenance of Information-Seeking Behavior

The major hypothesis of this research asserted that the maintenance of information-seeking behavior was related to the magnitude of the  $EV_a - EV_b$  difference. This would have resulted in an event occurrence ( $P_c$ ) x reward-cost (importance) x group reinforcement interaction. The failure of the importance variable to interact with  $P_c$  and group reinforcement indicates that the expected value difference contingency is not the major variable controlling search behavior. Rather,  $P_c$  and group reinforcement (the nature of the information received) interact to determine its maintenance.

The results of the  $P_c \times$  group reinforcement interaction indicate that the probability of an information-seeking response occurring is linearly related to the probability that a search response leads to a correct choice. In the present experiment, the decision-maker gains access to normative information prior to making a final decision by seeking information. Sources of information (in this case, the source is Type II) that increase the probability of the decision-maker choosing correctly continue to be consulted in future choice situations while sources of influence not instrumental in better decision making cease to be employed.

The magnitude of search, while affected by the nature of the information received, is also functionally related to the characteristics of the response alternatives. Search is enhanced when event occurrence is equiprobable. Thus, an individual faced with a choice among competing response alternatives, with a low probability of choosing correctly on any one trial prior to seeking information (high uncertainty) is more likely to seek information when this response alternative is available than individuals for whom the response alternatives can be ordered (low uncertain conditions). When the information received is clearly not instrumental to an ordering of the response

alternatives, search behavior is extremely low. Thus, when  $P_C = .33$  and the probability of a search response leading to a correct choice was .30, subjects virtually stopped seeking information (3.92 search responses over 50 trials). Likewise, when  $P_C = .72$  and the probability of search leading to a correct choice was .30 or .60, search was low (5.83 and 8.21 information-seeking responses/50 trials, respectively). Thus, information is sought from the source of influence when the consequences of this behavior result in an increase in  $P_C$ .

The nature of the reinforcement for the search response is still unclear. Information that increases the decision-maker's  $P_C$  may be uncertainty reducing. The information does, however, lead to a monetary reward. Thus, uncertainty reduction or the desire for reward may be the reinforcement for search behavior. The present experiment does not allow for the separation of these possible motivations. The fact that information-seeking is greater when event occurrence is equiprobable than not equiprobable under 60% and 90% group reinforcement conditions can be handled adequately by both the uncertainty reduction and instrumental conditioning models.

The uncertainty reduction position (Lanzetta, 1963, 1967, 1970) postulates that the decision-maker experiences

more uncertainty when response strength is equiprobable than when the response alternatives can be ordered. Group reinforcement at 90% is more uncertainty reducing than 60% group reinforcement, especially under equiprobable event conditions, hence search continues. At 30% correct group reinforcement, the information received is not instrumental for reducing uncertainty and as a result, search is virtually non-existent.

When event occurrence is non-equiprobable, the only information that is effective in reducing uncertainty is 90% group reinforcement. However, since 90% correct group reinforcement reduces more uncertainty when event occurrence is equiprobable, it would be expected that search would be higher under equiprobable event conditions. This, in fact, did occur. The conclusion, from an uncertainty reduction position, is simply that search increases as the uncertainty reducing properties of the information received increases.

The instrumental conditioning model would reach the same conclusion as the uncertainty reduction position, but would postulate the desire for reward as the major motivator. Under equiprobable event conditions, 90% correct reinforcement increases the decision-maker's chance of receiving a reward approximately 2.7 times. Thus,  $P_C$  increases from .33 to .90. Similarly, the increase in  $P_C$

under 60% correct group reinforcement is from .33 to .60, thus increasing the probability of obtaining a reward approximately twice.

When event occurrence is not equiprobable ( $P_C = .72$ ), only 90% correct group reinforcement increases the probability of the decision-maker receiving a reward. Yet, the net increase is much smaller (.18) than when event occurrence is equiprobable. Thus, search should be higher when  $P_C = .33$ . In conclusion, the instrumental conditioning model predicts that information seeking increases as the information received increases the probability of the information leading to a reward increases.

Either position is tenable at present. It may be possible to separate these positions by experiment, where in one case the reinforcement for search is only uncertainty reduction, per se, while in another case the reinforcement for search is a reward. In the present research paradigm, event occurrence, group reinforcement and reward could be manipulated in a 2 x 3 x 2 design, with 2 levels of event occurrence (equiprobable, not equiprobable), group reinforcement (30%, 60%, 90%) and reward for search (a correct response wins 5¢, a correct response reduces uncertainty). Since the present paradigm demonstrates that the expected value of the search response is not an important variable



in maintaining search behavior, a main effect for reward-no reward may aid in clarifying which motive is operating.

Some evidence that reward controls search behavior comes from the importance x trials interaction. The data from this interaction indicate that subjects in the high importance conditions sought significantly more information at trial blocks 7 - 10 than subjects in the low importance conditions. The question arises as to whether it is the expected value of a search response or the desire for a reward that is controlling the search response. Table 3 represents the  $EV_a - EV_b$  contingency for subjects under equiprobable event conditions while Table 21 represents the revised  $EV_a - EV_b$  contingency for subjects in the non-equiprobable event condition. By combining these tables so that the cell entries indicate the  $EV_a - EV_b$  contingency for importance, regardless of the initial  $P_C$ , Table 24 is derived. The cell entries are the combined  $EV_a - EV_b$  values. By summing across group reinforcement conditions, the combined expected value for an information-seeking response for low and high importance conditions results. For the low importance condition, the combined expected value of a search response is  $-.075$ , while for high importance conditions the combined expected value is  $-.225$ . Since the expected values are negative, a low level of search is

Table 24

Combined  $EV_a - EV_b$  Contingencies  
for Reward-Cost and Group Feedback

		.3	.6	.9	
10,	-5	-.115	-.025	.065	-.075
30,	-15	-.345	-.075	.195	-.225

expected. However, if the expected value is controlling information search, it would be expected that subjects in the low importance conditions should be seeking more information than subjects in the high importance since the expected value is less negative. The data indicate that just the opposite is the case. This finding lends support to the hypothesis that reward was the important factor maintaining search behavior. Consequently, a simpler model of search behavior is necessary. Individuals do not employ an averaging rule for rewards and costs. Rather, subjects seemingly attend to the reward aspects of the decision problem. Cost factors may play a significant role in the instigation of search behavior (Lanzetta & Kanareff, 1962) while reward maintains the search response once emitted.

The significant group reinforcement x trials interaction indicates that the slight increase in search behavior from trial block 7 to 8 contributed enough variance to

make the interaction significant. Although statistically significant, the finding does not appear to be psychologically meaningful, except to indicate that within-subjects variability was small.

The results of this experiment indicate that the decision-maker instigates information-seeking behavior under uncertain conditions. Sources of information that increase the decision-maker's probability of making the correct response or reduce uncertainty continue to be used in future decision-making situations. In other words, the reinforcement value of the information received is a powerful variable in maintaining information-seeking behavior.

When placed in the context of social influence processes, the reinforcement for search behavior may be altered. Rather than uncertainty reduction or correct decision making, information seeking may be viewed as instrumental to maintaining group cohesiveness, attainment of leadership and so forth. For example, if uniformity of opinion is seen as an instrumental response for cohesiveness or group goal attainment, and information seeking is instrumental for gaining access to the opinions of others, search behavior should result.

The point to be made is that reinforcers arise in social situations that may not be present in the typical

decision-making paradigm. The task for the social decision analyst is to specify the social reinforcers operating in influence situations and to relate information seeking, decision making and social behavior.

### Future Research Implications

Five areas stand out as suggesting further research.

1. By modifying the traditional conformity paradigm to permit the individual to voluntarily place himself in a position to be influenced, important theoretical and empirical questions arise concerning responses to influence. Are individuals who seek influence more susceptible to the influence attempts than individuals who are presented influence passively? While the traditional influence paradigm places an individual in a position of response conflict between Type II and Type III sources of influence, the present paradigm allows the individual to decide whether to respond in the absence of Type II influence or to seek influence. The hypothesis is that individuals who voluntarily place themselves in a position to be influenced by seeking information from others are more likely to conform to influence than individuals who have no choice concerning whether Type II influence is present or absent.

2. The communication aspects of the social influence

process have been neglected by social psychologists. Current research in the area of information seeking relates information search to task complexity and response conflict, neglecting social psychological variables. The interaction of social psychological variables with task variables may influence information-seeking behavior. For example, Crawford and Haaland (1971) found that differential motivational orientations (cooperative or competitive) override task variables (uncertainty) to determine information-seeking behavior.

The social psychological variables that may influence predecisional search behavior can be found in the sources of influence. Are some sources of influence more salient than others in determining search behavior? Do the variables that affect information search from Type III source of influence affect Type II search in the same manner?

The present experiment focused upon the information-seeking aspects of the communication process in a social influence situation. The communication process must be expanded to include information-sending and information-blocking processes. Do the variables that affect information seeking influence information sending and blocking behavior similarly? The hypothesis is that seeking, sending and blocking are instrumental responses. The reinforcement for

these responses may vary across situations. However, holding reinforcement constant, these three modes of response should be influenced by the same variables.

3. The present social influence paradigm suggests that information-seeking must be included in any formulation of attitude formation and change. Contemporary attitude paradigms closely follow the traditional conformity paradigm. A communicator presents a communication (influence) to a passive individual or group of individuals. The subsequent response, usually a check mark on a Likert-type scale, is the response to influence.

The attitude formation-change paradigm views the decision-maker as a rather passive organism waiting to be influenced. The point to be stressed here is that the formation and change of attitudes is a dynamic decision-making process. Individuals actively engage in information-seeking behavior, whether it is reading a newspaper or magazine, watching television or asking friends to help them understand an issue.

The interesting question becomes not whether a credible communicator or an expert can change attitudes but rather, will an individual seek an expert's opinion rather than the opinion of a friend? Are normative or informational characteristics or both salient in determining

the subsequent response? Which sources of influence does the decision-maker perceive as most uncertainty reducing? Which reference and/or membership groups does the individual use to help in the formation of attitudes? These are just some of the questions that are now raised when information seeking is incorporated into the attitude formation-change paradigm.

4. The construct of importance needs further clarification. Specifically, what makes an important decision important?

The current research employs ego threat, money, attractiveness or unattractiveness of alternatives and other manipulations to enhance decision importance. However, the operational definition of the construct is vague. Is an important decision one that has possibilities of increasing future response alternatives, restricting future behavior, or both. Do the variables that affect decisions restricting behavior have the same effect upon decisions whose consequences may increase future response alternatives?

The present experiment indicates that expected value does not play the most important role in maintaining search behavior. Rather, search increases as the probability of the information received increases the probability of the decision-maker choosing correctly. Utilizing the

three types of decisions suggested, an experiment can be constructed to assess if information-seeking responses under conditions of gain only (increase response alternatives), loss only (decrease future alternatives), or gain-loss (information may increase or constrain future response alternatives) under differential levels of group reinforcement are affected similarly. Essentially, the experiment is a 3 x 3 factorial design with three levels of group reinforcement (30%, 60%, 90% correct), three importance conditions (win 10¢ for each correct response, with no cost for information seeking; lose 10¢ for each incorrect response with no cost for seeking information; and win 10¢ for each correct response plus a cost of 10¢ for seeking information). It is expected that search would increase linearly with the reinforcement value of the information received. The interesting question focuses upon the amount of search at specific levels of group reinforcement. Will subjects who stand to gain money seek more information than subjects who seek to avoid a loss? What effect does having to invest money in order to gain rewards have upon search frequency?

5. The data on the first trial to search tentatively suggest that cost factors may play an important role during the acquisition of the information-seeking response. The



reward-cost x trials interaction suggests that reward maintains search behavior. Combining these two findings suggests that decision-makers attend to cost factors more than reward factors during the early stages of information acquisition, but as search continues, reward factors become increasingly salient. This hypothesis is simpler than the expected value hypothesis which is in effect, an averaging model of information processing. Further research is necessary to investigate this hypothesis.

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## APPENDIX A

This is an experiment in problem solving. In front of you are three lights which are not yet lighted. The task is quite simple. All three lights will light up and remain on for about ten (10) seconds. Your task is to guess which one of the three lights will go off first before it actually extinguishes.

A trial begins when the three lights light up. If you think that the right light will go off first, flip the right switch on the panel in front of you. If you think that the middle light will extinguish first, flip the middle switch on your panel. If you think that the left light will be the first light to go off, flip the left switch on your panel.

Please leave your switch on until all three lights are off. This indicates that the trial is over. When the three lights are off, close your switch. This then indicates that you are ready for the next trial. Please close your switch gently since they are fragile and may break easily.

For each correct guess that you make, you will win 10, 30 cents. The individual who makes the most number of

correct guesses will be allowed to keep his winnings. I must warn you that there is a pattern to the light sequence.

The experiment is about to begin. Please return your clipboard to its place. Please leave your headphones on, as there will be further instructions later on.

## APPENDIX B

During this phase of the experiment you will be allowed to communicate with one another by seeking information. Before you make your guess you may want information concerning how the other two individuals have responded. If you want this information, press the red button labeled Information Button. The responses of the other group members will then appear on your panel.

As in the first part of the experiment, for each correct guess that you make, you will win 10, 30 cents. There is, however, a cost for seeking information. An information-seeking response costs 5, 15 cents. If you seek information and make an incorrect guess you lose the amount spent for seeking information. Thus, if you seek information and make a correct guess you win 10, 30 cents and lose nothing. If you seek information and then guess incorrectly you lose 5, 15 cents.

It is important to remember that the light pattern that you were exposed to during the first part of the experiment is still operating!

We are now ready to begin. Please return your clipboard to its place. Please leave your headphones on as



there will be further instructions later on.