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AMBIGUITY AS A MEDIATOR OF CHOICE SHIFT PROCESSES

By

Jerold Leon Hale

A DISSERTATION

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ABSTRACT

AMBIGUITY AS A MEDIATOR OF CHOICE SHIFT PROCESSES

By

Jerold Leon Hale

An ambiguity mediated theory of the choice shift process is presented in this research. The theory posits that both social comparisons and persuasive argumentation produce choice shifts. Ambiguity is thought to mediate the relative influence of each process. Specifically, social comparisons were hypothesized to have a greater impact on choice shifts as ambiguity increased, while cognitively generated arguments were predicted to have a greater impact on decisions as ambiguity decreased. Two experiments were conducted to test the assumptions of the theory.

The first experiment employed a nondiscussion format and manipulated normative response, ambiguity, and choice dilemma item type. In conditions where no normative response information was provided, ambiguity produced more moderate choices. Since social comparisons were not possible in those normative conditions, that finding was consistent with the ambiguity mediated model. Furthermore, the magnitude of the normative response effect increased as ambiguity increased. The magnitude of the item effect, however, decreased as ambiguity increased. Normative response effects were taken as evidence for social comparisons, while item effects were taken as support for

cognitively generated arguments. These results then, were consistent with predictions made by the theory.

The second experiment used the traditional choice shift discussion paradigm and manipulated ambiguity and choice dilemma item type. In high ambiguity conditions, initial individual responses were less polar than responses in low ambiguity conditions. Since social comparisons were not possible for initial decisions, that finding supports the hypothesized influence of ambiguity. Choice shifts in group decisions were found only in low ambiguity conditions. In those conditions post group decision individual choices converged toward the group choice, indicating persuasive processes. Additionally, in self reports of factors influencing individual choice shifts, normative response was found to exert greater influence in high versus low ambiguity conditions. For both high and low ambiguity conditions, strong correlations were found between the extremity of initial choices and the magnitude of the choice shift.

In summary, considerable support for an ambiguity mediated model of choice shift processes was found across two experiments.

Accepted by the faculty of the Department of Communication,
College of Communication Arts, Michigan State University, in partial
fulfillment of the requirements for the Doctor of Philosophy degree.

Director of Dissertation

Dedicated to my mother,
and to the memory of my father.

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CHAPTER I

REVIEW OF LITERATURE

Introduction

Few events generate more research in the social sciences than the counterintuitive research finding. A counterintuitive finding generates additional research to determine if the phenomenon can be consistently observed, both within the same research paradigm, and across paradigms. Stoner's (1961) research on group decision-making is a good example. He found that group decisions were more risky than the average prediscussion decision made by individual group members. That research was counterintuitive in light of previous research on conformity. The conformity research showed that individuals tended to converge toward the group mode in making subsequent decisions (Asch, 1951; Crutchfield, 1955; Sherif, 1935). The quantity of research generated by Stoner's finding of increased risk taking led Dion, Baron, and Miller (1970) to conclude that the biggest surge of research on group processes focused on group decisions toward risk.

Risky Shifts, Cautious Shifts, and Polarization

That group decisions are more risky than the average decision made by individual group members has been consistently demonstrated

(see Cartwright, 1971; Clark, 1971; Dion, Baron, & Miller, 1970). That phenomenon was dubbed a risky shift. Occasional irregularities in the risky shift have been observed. Some research has found that groups exhibit a cautious shift. A cautious shift occurs when the group decision is more cautious than the average decision made by individual group members (Clark, Crockett, & Archer, 1971; Fraser, Gouge, & Billig, 1971; McCauley, Stitt, Woods, & Lipton, 1973; Rabow, Fowler, Bradford, Hofeller, & Shibuya, 1966; Zajonc, Wolosin, Wolosin, & Sherman, 1968). Consistently, and across a number of research paradigms, group decisions have been more polarized than the mean individual decision previously made by group members (i.e., more risky or more cautious). Polarity shifts have been found in studies involving risk taking, social attitudes, jury decisions, ethical decisions, and other contexts.

Research Paradigms for the Polarity Shift

The dominant research paradigm for investigating the polarity shift has included the use of choice dilemmas (Wallach, Kogan, & Bem, 1962). Choice dilemmas include hypothetical situations in which the central character must choose between mutually exclusive courses of action. One course of action is more rewarding than the other, but also less likely to occur. Subjects are asked to indicate the lowest probability for the risky alternative being successful that they would accept before recommending it to the central character. Subjects are then assigned to groups and asked to reach consensus on the choice dilemmas. The polarity shift is measured by a difference score between the mean individual decision and the group consensus.

Other judgmental tasks, also involving risk taking, have produced polarity shifts. For example, gambling tasks have been employed. Zajonc and his associates (Zajonc, Wolosin, Wolosin, & Sherman, 1968, 1969) asked subjects to estimate which of two lights would illuminate on any given trial in an experiment. The subjects were told that one light had a high probability of illumination, while the other had a lower probability of illumination. Subjects were given a monetary reward for a correct guess. The light with the lower probability of illumination had a larger payoff. Variations of the gambling task were employed by Teger and Pruitt (1967). They manipulated the betting stakes, and also the probability of success. Polarization was observed in both experimental paradigms.

Polarity shifts have also been demonstrated on problem solving tasks in which subjects were asked to choose between differing levels of problem difficulty, knowing that they would be asked questions at the chosen difficulty level. The problems were from a standardized national test and ranged in difficulty from a 10 percent rate of failure to 90 percent failure. Subjects were asked to choose difficulty levels individually and then to reach group consensus. The group consensus favored increased risk taking, i.e., increased problem difficulty (Wallach, Kogan, & Bem, 1964).

Polarization has also been found in tasks not related to risk taking. There is ample evidence, for example, that polarity shifts occur in both real and simulated jury decisions (Main & Walker, 1973; Myers & Kaplan, 1974; Walker & Main, 1973). For example, Myers and

Kaplan manipulated the evidence in a jury trial so that the defendant appeared to be either guilty or innocent. They found that group discussion polarized guilt-innocence judgments toward the position favored in the initial distribution of responses.

When attitude objects have elicited a dominant response, i.e., predominantly positive or negative, group discussion has produced polarization effects. Moscovici and Zavalloni (1969) found that group attitudes toward Charles DeGaulle and Americans were more polarized after discussion. Doise found attitude polarization when comparing group decisions about the quality of an architecture school with the mean individual decision of group members. Myers and Bishop (1971) found a similar phenomenon regarding attitudes toward a family member. Johnson and Andrews (1971) found polarization on a series of eight social issues ranging from attitudes toward drug laws to racial attitudes.

Other research has investigated polarization tendencies in person perception. Andrews and Johnson (1971) had subjects evaluate a hypothetical faculty member after manipulating the available information about the person. Groups were more positive than individual group members when positive information about the faculty member was provided, and less favorable when the available information was more negative. Myers (1975) presented subjects with descriptions of hypothetical faculty members. The descriptions addressed the faculty member's teaching, publication record, and record of community service. The information presented was either favorable or unfavorable. First,

subjects individually evaluated each faculty member. The subject's attitude was assessed and subject's distributed pay raises to the faculty as they deemed appropriate. Subsequently, groups were asked to reach consensus on the pay raises and on the attitude measures. When presented favorable information, the group decisions were polarized in a favorable direction. When the information presented was unfavorable, so was the resulting attitude polarization toward the faculty members.

Finally, polarity shifts were found in the study of ethical decisions. Alker and Kogan (1968) assigned subjects to five member groups. The subjects were asked to make six ethical decisions. For example, in one situation, the subject was asked to imagine that he/she was riding in a speeding car which was being driven by a friend. The car accidentally strikes a pedestrian. The friend's attorney tells the subject that the severity of the friend's punishment will depend upon whether the subject tells the truth in court. The subject was asked how justified he/she would feel in lying. After making individual judgments on the ethical dilemmas, group consensus was reached. The group consensus was significantly less ethical than the mean decision made by individual group members. Myers, Schreiber, and Viel (1974) found similar results when they compared individual and group decisions of convicts on a question of whether an older appearing minor should attempt to order an alcoholic beverage. The group shifted significantly toward the illegal alternative.

Cumulatively, these results suggest polarization in group decisions is a robust phenomenon. The effect has been demonstrated

across a number of research paradigms. But why are group decisions more polar? At least six explanations have been posited. The weight of accumulated research has been more kind to some explanations than to others. Some of the explanations lack parsimony. That is, they can explain shifts in one direction, e.g., risky shifts, but not in both directions. Others can explain polarization in either direction (for the dominant research paradigm, risky or caution shifts).

In the pages that follow the explanations for the polarity shift will be presented. The assumptions for each explanation will be laid out and relevant research will be discussed. The explanations which lack parsimony will be presented prior to the parsimonious explanations.

Diffusion of Responsibility

According to the diffusion of responsibility explanation of the polarity shift, individuals feel anxiety about risk taking because of the negative consequences of failure. The anxiety is thought to inhibit one's willingness to take risks. During group discussion, the anxiety is reduced since no single group member is responsible for the outcome. The anxiety reduction, in turn, enables the individual to take greater risks (Bem, Wallach, & Kogan, 1965; Kogan & Wallach, 1967a; Wallach, Kogan, & Bem, 1964; Wallach, Kogan, & Burt, 1967).

Initially, unanimity was thought to be the necessary and sufficient condition for diffusion of responsibility, and hence, a risky choice shift. However, numerous studies have found a significant risky shift when consensus was not required (Kogan & Wallach, 1967a;

Lamm, 1967; Wallach & Kogan, 1965; Wallach, Kogan, & Burt, 1965).

This led proponents of the diffusion of responsibility explanation to argue that diffusion only took place in groups with high cohesion or emotional bonds. Proponents reasoned that when no such bonds existed, anxiety would not be reduced and no risky shift would occur.

Evidence supporting the diffusion of responsibility explanation is of two types. First, there is some evidence that anxiety is positively related to the magnitude of the choice shift. Kogan and Wallach (1967b) tested groups of individuals rated either high or low in defensiveness and test anxiety. They found that groups composed of test anxious individuals exhibited greater risky shifts than groups of less anxious individuals. The difference, however, was not statistically significant. Wallach, Kogan, and Bem (1964) gave subjects a problem solving task in which rewards were provided for a correct solution to a problem. Subjects could choose the level of problem difficulty. The amount of responsibility shouldered by each individual was manipulated by making subjects decide individually or by group consensus. They found risky shifts only when group decisions were made. When individuals were directly responsible for a decision, cautious shifts occurred. The diffusion of responsibility explanation would predict that result, because no anxiety reduction would have occurred in the individual decision condition.

A second set of research findings offers support for the notion that increased emotional involvement leads to greater choice shifts. Pruitt and Teger (1969) tested that assumption using the betting

paradigm described briefly above. They manipulated both stakes preferences and probability preferences. Stakes preferences are the amounts of money an individual is willing to risk for any likelihood of success. A probability preference is the likelihood of success regardless of the amount of money one is willing to risk. Pruitt and Teger reported that cohesiveness was positively related to risk taking for both stakes preferences and probability preferences. It should be noted, however, that only one of four correlation coefficients (male and female groups by two risk measures) was statistically significant, and the confidence intervals around each of the coefficients was rather large.

Wallach, Kogan, and Burt (1967), using a series of choice dilemmas, found that field dependent groups showed significantly greater risky shifts than field independent groups. Since field dependent people are less aloof interpersonally, that research finding was taken as support for the assumption that increased emotional bonds lead to diffusion of responsibility, since field dependent individuals are more likely to develop emotional bonds than their independent counterparts.

In spite of the evidence presented, support for the diffusion of responsibility explanation of choice shifts has been equivocal at best. Pruitt (1971) summarized five arguments that cast doubt on diffusion of responsibility as an explanatory tool. First, the overwhelming majority of evidence regarding polarized choice shifts involved the use of choice dilemmas which did not involve real outcomes. Since unreal outcomes are involved, the likelihood that the subjects would

feel a deep sense of responsibility for decisions is diminished (see also Lamm, 1967). Even those experiments using problem solving or betting tasks did not involve outcomes with truly serious consequences for failure.

Second, risky shifts have been found in the absence of group participation (Bell & Jamison, 1970; Clark & Crockett, 1971; Lamm, 1967; Myers, 1977; Myers, Bach, & Schreiber, 1974). Using the choice dilemma paradigm, Lamm (1967), for example, had subjects listen to group discussions from another room, or watch and listen to group discussions from behind a two-way mirror. He found that significant risky shifts occurred in both conditions. In this specific study, and the others referenced, the subjects could not diffuse responsibility for the individual decision.

Third, a posttest after discussing irrelevant material, or after the mere passage of time, does not produce significant choice shifts. If the opportunity for emotional ties were present, diffusion of responsibility would suggest that a significant risky shift would occur, even in the absence of relevant conversation. The absence of a risky shift makes the explanation suspect.

Fourth, substantial research indicates that an individual's choice shift is lasting, in one instance up to six weeks after completion of the group discussion (Wallach, Kogan, & Bem, 1962). Bateson (1966) argued that it was unlikely that an effect would have lasted six weeks if diffusion of responsibility had occurred. Instead, he suggested that a regression effect toward the individual's initial

choice should have been evident. His reasoning was that the absence of the group should have led to heightened anxiety over time which, in turn, should have led to the regression effect. However, Bateson's argument does not take true cognitive change into account.

Finally, the diffusion of responsibility explanation is not parsimonious. It can be used to explain choice shifts toward risk but not toward caution.

Diffusion of responsibility is an intuitively appealing explanation for choice shifts toward risk. Most individuals would probably have little trouble recalling behaviors they would not have performed in the absence of participating others. Nevertheless, the available evidence does not lend a great deal of support to this explanation.

Task Familiarization

Bateson (1966) proposed an alternative explanation for the observed choice shifts. He took the position that shifts toward risk were due to familiarization with the task. Group discussion was posited to reduce an individual's uncertainty. The reduced uncertainty was thought to facilitate increased risk taking. Bateson (1966) and Flanders and Thistlethwaite (1967) tested the task familiarization explanation by having some subjects complete choice dilemmas individually and reach group consensus, while others reconsidered the items individually (without discussion), noting arguments for and against each course of action. In both studies, the shifts produced were

statistically significant but did not differ significantly from one another.

Several other attempts to replicate those findings have failed (Bell & Jamison, 1970; Miller & Dion, 1970; Teger & Pruitt, 1967; Teger, Pruitt, St. Jean, & Haaland, 1970). If task familiarization is either a necessary or sufficient explanation for risky shifts, the mass of unsupportive evidence is difficult to explain.

In the absence of disconfirming evidence, task familiarization would still be found wanting as an explanation for the polarity shift. If uncertainty reduction causes increased willingness to take risks, the explanation cannot account for shifts toward caution. The same may be said if the explanation is applied to other research paradigms. That is, it can explain shifts in one direction but not in both.

Leadership

The leadership explanation proposes that choice shifts occur because individuals with extreme attitudes are more influential during group discussions (Collins & Guetzkow, 1964; Marquis, 1962). When it was thought that only risky shifts occurred, the argument was made that risky individuals were the most influential during group discussions. Dion, Baron, and Miller (1970) pointed out that for the leadership explanation of risky shifts to be true, two types of evidence were needed. First, one would have to indicate that group risk taking involved persuasive processes. Second, support for the leadership explanation would have to include evidence that high risk takers inherently were more persuasive during group discussion.

That group discussions involve persuasive processes is no longer disputed. A number of studies have shown that when a research design is used where subjects complete choice dilemmas individually, then reach consensus, and finally complete the items individually again, the variance of opinions decreases after the second individual polling (Boster, Mayer, Hunter, Hale, 1980; Boster, Fryrear, Mongeau, & Hunter, 1982; Flanders & Thistlethwaite, 1967; Teger & Pruitt, 1967; Wallach & Kogan, 1965; Wallach, Kogan, & Bem, 1962). Recall that in the Wallach et al. research, the decreased variance was still present after six weeks. If polarization were only a conformity effect, decreased variance in opinions might not be expected at all, and probably would not last for long periods of time.

With regard to the second necessary vein of evidence, that opinion extremity and persuasiveness are positively related, Teger and Pruitt (1967) found that the size of the risky shift and convergence of posttest opinions were significantly and positively related. The larger the polarity shift, the more extreme at least one initial opinion would have been. So greater persuasiveness by the extreme member can be inferred (Cartwright, 1971). Several researchers have reported that initial opinion extremity was significantly related to persuasiveness as judged by subjects in posttest evaluations (Brown, 1965; Doise, 1969; Flanders & Thistlethwaite, 1967; Rabow, Fowler, Bradford, Hofeller, & Shibuya, 1966; Wallach, Kogan, & Bem, 1962; Wallach, Kogan, & Burt, 1965).

Kelley and Thibaut (1968) argued that correlations between initial extremity and perceived persuasiveness could have been due to an inference made after the fact, and were not necessarily a reflection of the decision-making process. Some credence for their argument has emerged from the available body of research. Wallach, Kogan, and Burt (1968) composed groups of members with diverse opinions regarding risk and caution on a series of choice dilemmas. Subjects completed a series of risk neutral hypothetical situations, by indicating the course of action they would follow. After completing the items individually, group consensus was reached. Wallach and his associates reasoned that if risky individuals were more persuasive discussing items related to risk or caution, they should also be more persuasive discussing risk neutral items. They found a small but statistically significant relationship between riskiness and persuasiveness for female subjects but not for groups of male subjects.

Hoyt and Stoner (1968) composed groups of individuals with very similar initial scores on choice dilemmas. They hypothesized that, if the leadership explanation were correct, no choice shifts would occur. Risky choice shifts did occur on many of the items they tested. They also compared the results obtained to results from two previous studies which used groups composed of heterogeneous individuals in terms of riskiness (Stoner, 1961; Wallach, Kogan, & Bem, 1962). They found that the magnitude of the obtained risky shifts did not differ significantly. While the results of this research appear to disconfirm the leadership explanation, they should be viewed with a certain amount

of caution. The homogeneity manipulation compared summed scores across a number of choice dilemmas. The analyses, on the other hand, looked for risky shifts on individual items as opposed to a shift on a summed series of items. Within individual items there was considerable within-group heterogeneity.

This version of the leadership explanation, i.e., risky individuals are more persuasive than others, also lacks parsimony. It can be used to explain risky shifts (though the supporting evidence is not compelling), but cannot explain cautious shifts. A more recent formulation of the explanation does not suffer from that shortcoming. It has been argued that individual group members with more extreme opinions may be more confident about their opinion. Furthermore, increased confidence leads those individuals to be more assertive, and hence, more persuasive during group discussions (Burnstein, 1969; Pruitt, 1971).

Research regarding the modified leadership explanation is equivocal. Clausen (1965) used a problem-solving task identical to that used by Wallach, Kogan, and Bem (1964) where subjects chose college board exam questions of varying degrees of difficulty. She measured the amount of risk that each subject was willing to take and that subject's confidence in the decision toward risk. Both Burnstein (1969) and Pruitt (1971) argue that Clausen's results supported the leadership explanation. To be sure, it was minimal support at best. The question categories included antonyms, mathematics, analogies, spatial relations, and sentence completion. The sample included male

and female subjects and the correlation coefficients are reported according to gender. For male subjects the correlations between risk and confidence ranged from .069 to .452, and for female subjects the range was .005 to .772. Significance levels are not reported and neither are specific sample sizes for each gender. If one assumed that the study employed equal numbers of male and female subjects, any correlation coefficient above .138 would be statistically significant at $p < .05$. Making that assumption, one-half of the correlations were not significant. Another half were, but two correlation coefficients were of extremely small magnitude. If confidence were a useful explanation of choice shifts, one would expect a greater number of significant relationships. Furthermore, the relatively weak correlation coefficients would tend to indicate that there are probably better predictors.

In a second portion of the experiment, Clausen (1965) formed three-person groups which consisted of a high risk member and two low risk members. The confidence levels in one's decisions were manipulated so that the high risk member had either high or low confidence and the low risk members had high or low confidence. The decision type was also manipulated so that half of the sample reached consensus after completing the items individually, while the other half completed the items twice without discussion. The leadership explanation predicted a three-way interaction. In conditions where consensus was required, the explanation would predict that high risk confident group members interacting with low risk, low confident members

would produce a risky choice shift. On the other hand, in conditions where low risk members were confident and high risk members were not, a cautious shift would be predicted. The predicted risky shift was found, but the predicted cautious shift was not.

More supportive evidence is offered in a study conducted by Burnstein and Katz (1971). They had subjects perform a reaction time test in which the subject's success was manipulated. Seven time intervals for completing a task were employed, and subjects were led to believe that their success ranged from 90 percent in the longest interval to 5 percent in the shortest interval. After a series of trials, subjects were told that they would win monetary rewards for success in their next 20 trials. The amount of money won would be in inverse proportion to the time interval chosen by the subject. They found that confidence was positively and significantly related to risk taking. That this increased confidence translates into increased influence during group discussions was not demonstrated.

The revised leadership explanation, like diffusion of responsibility, is intuitively appealing. The evidence supporting the explanation is scant and equivocal.

The three explanations discussed above, with the exception of the revised leadership explanation, lacked parsimony. Each could explain shifts in a single direction, but could not explain the more general phenomenon of choice polarization. Three additional explanations have been formulated. Those explanations can explain choice shifts in either direction from the mean individual decision. The

parsimonious explanations: social comparisons, informational influence, and social decision schemes, will be reviewed and explicated in the pages that follow.

Social Comparison Processes

There have been several variations of what may be classified as social comparison explanations of the polarity shift. Pruitt (1971) discusses the nuances of each variation in detail. Despite some differences, each of the social comparison explanations has four common characteristics. First, each suggests that mere exposure to the choices of others is a necessary and sufficient condition for choice shifts. Second, the explanations assume that the typical group member is motivated to equal or exceed the average group member on positively valued dimensions which are addressed by the stimulus. So, for example, if the stimulus were a choice dilemma which consistently produced a risky shift, the typical group member would want to equal or exceed the mean amount of risk displayed by group members. Third, group members erroneously assume that they equal or exceed (in the valued direction) the average group member in their initial response. Finally, mere exposure to the initial choices of other group members indicates to the typical group member that he/she incorrectly estimated the normative response. A polarity shift occurs because group members adjust their responses so that they are more extreme in the positively valued direction (Myers & Lamm, 1976; Lamm & Myers, 1978; Laughlin & Early, 1982; Pruitt, 1971).

Three types of evidence have been produced to support social comparison explanations of the polarity shift. First, there is evidence indicating that individuals underestimate the group norm. In that research subjects were asked to make three judgments. They were asked to indicate their own response to choice dilemmas, followed by the response they felt the average other person would make (group norm), and the response they viewed as ideal. Consistently, when judgments were made in the order listed above, the subject's own response was more extreme than the estimated group norm, and more moderate than the ideal response (Baron, Roper, & Baron, 1974; Burnstein & Katz, 1971; Castore, Goodrich, & Peterson, 1970; Castore & Roberts, 1972; Fergusson & Vidmar, 1971; Fraser, 1971; Lamm, Schaub, & Trommsdorff, 1971; Lamm, Trommsdorff, & Rost-Schaub, 1972; Levinger & Schneider, 1969; McCauley, Kogan, & Teger, 1971; Myers & Bishop, 1971; Myers, Wong, & Murdoch, 1971; Schroeder, 1973; Wallach & Wing, 1968). Furthermore, once subjects have underestimated the group norm, there is evidence indicating that they will revise their estimates of the group norm to a position which is a more accurate representation (Fergusson & Vidmar, 1971; Myers, Bach, & Schreiber, 1974; Myers, Wong, & Murdoch, 1971).

There is an interesting anomaly to the research findings on estimates of self, other, and ideal responses. That is, the reported relationships between the three estimates are only found when the subject's own response is estimated before the other two responses (McCauley, Kogan, & Teger, 1971; Myers, 1974). The impact of this order effect upon the veracity of the social comparison explanation

is unclear. Without instructions to do so, will subjects make the three hypothesized judgments? Even more to the point, will judgments be made in order of one's own judgment, a normative judgment, and an ideal judgment?

Given the tendency to make one's own position more extreme than the estimated group norm and less extreme than the ideal, the discrepancy between those various judgments should predict polarity shifts. The greater the discrepancy between one's own response and the estimated group norm, the more likely one is to suffer disconfirmation regarding the true group norm. When this disconfirmation occurs, the individual should be more likely to engage in a choice shift. But in correlational studies, discrepancy scores have not been useful predictors of the polarity shift (Lamm, Schaub, & Trommsdorff, 1971; Myers, Wong, & Murdoch, 1971). Experiments designed to test the predictive ability of discrepancy scores have met with greater success. Clark, Crockett, and Archer (1971) composed groups according to the discrepancy between one's own response and their estimation of the average other's response. They found increased risky shifts with larger discrepancies. Research by Lamm and his associates have provided partially supportive results. In one study (Lamm, Schaub, & Trommsdorff, 1971) discrepancies between one's own response and the average other's response failed to predict shift magnitudes. That study experimentally manipulated group composition on the basis of the discrepancies. In a second study (Lamm, Trommsdorff, & Rost-Schaub, 1972) composed groups according to the discrepancy between

the subject's own response and one's perceived ideal response. They found that greater discrepancies between one's own response and the perceived ideal produced greater risky shifts. Myers (1974) argued that the own-ideal discrepancy should be a better predictor of the polarity shift than own-normative discrepancies because one has a natural tendency to evaluate his or her own position as extremely positive. Because of that tendency, a greater discrepancy between one's own score and the ideal should lead to more of an inclination to shift choices toward the ideal.

The final variety of evidence supporting the social comparison explanation of the polarity shift is choice shifts resulting from the exposure to choices of others. Two types of research designs have been utilized in conducting this research. One is a research design in which subjects are exposed to manipulated group norms. At least three studies (Boulanger & Fischer, 1971; Clark & Crockett, 1971; Middleton & Warren, 1972) found that subjects would shift toward the manipulated group norm, even if that position was counter to the choice shift normally elicited by choice dilemmas. It should be noted, however, that the normative influence effect could have been confounded in those studies with argumentation. That is, the studies either asked confederates to take a particular position and to advance arguments supporting that position, or subjects were presented taped group discussions in which the norms and arguments presented were both manipulated. In the latter experiment, the norm and arguments supported similar positions.

The second group of studies exposing subjects to the choices of others has done so in randomly assigned groups so that the norms were not manipulated. Such studies have met with mixed success in producing polarity shifts. That research asked subjects to make decisions individually, and then exposed subjects to the choices of other group members without exposing them to arguments supporting any given position. A number of studies have found nonsignificant shifts (Bell & Jamieson, 1970; Burnstein, Vinokur, & Trope, 1973; Clark, Crockett, & Archer, 1971; Myers & Bishop, 1971). Other studies have found statistically significant choice shifts, but those shifts are consistently smaller than those observed in studies where discussion is allowed (Clark & Willems, 1969; Stokes, 1971; Teger & Pruitt, 1967; Willems & Clark, 1969, 1971). Lamm and Myers (1978) have suggested that the failure of pretest-posttest designed studies to find equivalent shifts is due to the anchoring effect of declaring one's position. They argue that, in the absence of some minimal reason for change, declaring one's position acts as a public commitment which inhibits change. The reason similar inhibitions do not occur when discussion is present, they argue, is because the subject is able to rationalize changing after discussion.

Myers and his associates have exposed subjects to the choices of others in such a way as to eliminate public commitments. For example, Myers, Bach, and Schreiber (1974) presented subjects with a series of choice dilemmas after assigning them to either a social comparison, relevant arguments, or control condition. In the social

comparison condition, subjects received three choice dilemmas, each containing a copy of the distribution of the choices made by subjects in the control condition. In the relevant arguments condition, subjects discussed the choice dilemmas before being given a response scale. They found that the posttest scores for both experimental groups were significantly polarized from the control group. The shift in the social comparison condition is consistent with the position that subjects shifted their choices after learning that they had underestimated the normative response of similar others.

In a second experiment, Myers (1977) exposed subjects to control group responses on choice dilemmas. As in the previous study, responses were more polarized than the mean response of the control group. In a third condition, an independent group of subjects was shown the response distribution of the previous experimental group. Their responses were more polarized than the control group, but not more polarized than the experimental group. Thus, exposing the third group to the responses of the shifting group did not lead to further polarization.

In summary, there is evidence supporting a social comparison explanation for choice shifts. There is ample evidence suggesting that subjects view their own position as more extreme in the valued direction than the position of the average other person. That evidence also suggests that one's own position is less extreme than the position the subject views as ideal. Research using those discrepancy scores to predict polarity shifts is less consistent. The correlational research

has found little relationship between discrepancy scores and shift magnitudes. Experimental evidence is mixed but generally supportive, especially when the discrepancy between one's own score and the ideal is the predictor.

Finally, there is evidence to suggest that polarity shifts occur when one is merely exposed to the choices of others without discussion. For within subjects designs, the evidence is equivocal and the magnitudes of observed shifts are roughly half the size of shifts obtained with discussion. Using between subjects designs where no public commitment anchor is present has consistently produced shifts of similar magnitudes as those found in group discussions.

Persuasive Argumentation

Another explanation for the polarity shift for which considerable support has accumulated is a persuasive argument explanation. The persuasive arguments explanation makes three assumptions. First, it assumes that for any issue there is a pool of arguments, from which arguments are drawn in making a choice. Second, the assumption is made that, collectively, the arguments are only partially shared. That is, not every group member has considered the entire pool of arguments. Third, during group discussions arguments are presented. The quantity of persuasive novel arguments presented determines the direction of the choice shift. If the novel arguments presented are predominantly risky, the resulting choice shift is risky. If the arguments are predominantly cautious, the resulting choice shift is cautious (Burnstein & Vinokur, 1973; Vinokur & Burnstein, 1974).

Evidence for an argument pool was provided by Vinokur and Burnstein (1974). The pool of relevant arguments is thought to be predominantly risky for choice dilemmas which produce choice shifts toward risk, and cautious for choice dilemmas that produce caution. Support for the position was found when subjects were asked to generate arguments supporting risk and caution on a series of choice dilemmas. They found that the pool of arguments was largely risky for risky items and cautious for cautious items. Furthermore, they found that the proportion of risky and cautious arguments was significantly correlated to both the subject's initial choice on the item, and to the mean initial response on choice dilemmas.

That arguments predict the direction of choice shifts has been demonstrated in two ways. Research has either content analyzed arguments presented in naturally occurring discussions or has manipulated the arguments presented (Bishop & Myers, 1974; Boster, Mayers, Hunter, & Hale, 1980; Boster, Fryrear, Mongeau, & Hunter, 1982; Ebbesen & Bowers, 1974; Silverthorne, 1971). Ebbesen and Bowers (1974), in the first of three experiments, counted the number of risky and cautious arguments presented during group discussions of twelve choice dilemmas. Risk-caution argument proportions were correlated .83 ($p < .01$) with resulting choice shifts. If arguments were predominantly risky, so were the resulting choice shifts. Conversely, if the arguments presented were predominantly cautious, the resulting shift was cautious.

Similarly, Silverthorne (1971) examined arguments presented during the discussion of eight choice dilemmas. Four of the choice

dilemmas consistently produced cautious shifts and four produced risky shifts in previous research. That research indicated that predominantly cautious arguments were presented for cautious items, while the reverse was true for risky items. Bishop and Myers (1974) also found main effects for item when examining the quantity of risky and cautious arguments generated in response to choice dilemmas. Risky arguments were generated in the risky item condition and cautious arguments tended to be generated for cautious items.

Finally, some experiments have manipulated the arguments presented to subjects. Silverthorne (1971) asked subjects to generate arguments favoring the risky alternative to a choice dilemma, the cautious alternative, or both risky and cautious arguments in equal proportion. The type of choice dilemma (typically risky or cautious) was also manipulated. When arguments were presented in roughly equal proportions, shifts on both risky and cautious items were minuscule. For both the normally risky and cautious items, the presentation of arguments in the opposite direction reversed the normal shift. That is, for risky choice dilemmas, shift toward caution were observed when the arguments favored caution and shifts toward risk were observed when the arguments favored risk. Arguments had the same impact on normally cautious items.

Roberts and Castore (1972) manipulated the content of videotaped group discussions so that the majority of the arguments favored either risk or caution on a series of choice dilemmas. They found that subjects' choices tended in the direction of the arguments presented.

It should be noted, however, that argument direction was confounded with the normative response. The number of arguments presented was proportional to the number of confederates with initial choices in the same direction.

Ebbesen and Bowers (1974) presented subjects with audiotaped group discussions which manipulated the number of risky and cautious arguments presented on choice dilemmas. The proportion of arguments favoring risk ranged from .90 to .10 with four levels of the proportion manipulation. They found that the magnitude of the polarity shift and its direction were predicted by the proportion of arguments.

There is some evidence to suggest that a pool of relevant arguments exists for an attitude object, in these instances, choice dilemmas. The pool of arguments is disproportionately distributed toward one choice extreme or the other. Furthermore, there is evidence suggesting that the presentation of the arguments mediates the direction of the ensuing choice shift. Finally, Vinokur and Burnstein (1974) found that when arguments are known by all group members, the arguments are not persuasive.

Social Comparison vs. Persuasive Argumentation

Social comparison and persuasive argumentation explanations of the polarity shift have long been treated as competing explanations of the same phenomenon. Some scholars still suggest that the two explanations are mutually exclusive. Vinokur and his associates, for example, have written that "it seems reasonable to discard interpersonal comparison in favor of persuasive arguments as the explanation for shifts in

choice" (Vinokur, Trope, & Burnstein, 1975). Their conclusion was motivated by a series of experiments purporting to pit social comparison processes against persuasive argumentation. St. Jean and Percival (1974) aptly noted the difficulty in creating such an experiment, and attempts to do so have not passed without criticism. The next portion of this paper will review research attempting to test both persuasive argumentation and social comparison with the purpose of ruling out one explanation while bolstering the other.

In one attempt to demonstrate the superiority of persuasive argumentation, Vinokur, Trope, and Burnstein (1975) content analyzed arguments generated in support of one's choice on a series of choice dilemmas. They differentiated between "outcome utilities" and "action utilities." Outcome utilities are arguments which focused on success or failure associated with a given choice, or which focused on the perceived usefulness of that choice. Action utilities, on the other hand, are arguments about the intrinsic desirability of taking a risky or a cautious action. Vinokur et al. argued that if social comparison processes were operating, action utilities should be generated in larger proportions than outcome utilities. They found, however, that less than 10 percent of the generated cognitions were related to action utilities compared to approximately 70 percent which were outcome utilities. Furthermore, the correlation between action utilities and the observed choice shift was .16 ($p > .05$), while outcome utilities were correlated .63 ($p < .05$) with the magnitude of the shift.

An alternative interpretation of those results is plausible. Subjects may engage in social comparison processes, but choose to justify those processes using outcome utilities rather than the action utilities. Indeed, Sanders and Baron (1977) have argued that persuasive arguments may facilitate choice shifts motivated by social comparison processes.

Other research has found that choice shifts occur after discussions even when subjects are unaware of the specific response made by other group members. Clark, Crockett, and Archer (1981) had subjects present positive and negative aspects to alternatives in choice dilemmas without revealing their preferred probability level. They found a polarity shift that was of the same approximate size as shifts found in a normal discussion condition. In a second study, Myers, Wong, and Murdoch (1971) also found significant polarity shifts when arguments were presented but probability preferences were not. This evidence is not supportive of social comparisons because the responses of others were necessary, but unavailable. Social comparison theorists are quick to point out, however, that probability levels preferred by subjects in these experiments could easily be inferred from the arguments presented during discussions. This would be true whether the arguments focused on action utilities or outcome utilities.

In an effort to remedy the problem of inference, researchers have had subjects discuss choice dilemmas without any knowledge of the response scale that usually accompanies the items. Myers, Bach, and Schreiber (1974) found a significant difference between posttest

probability preferences when an arguments-only groups was compared to a control group.

Another method for eliminating inferences of group members' preferences was used by Burnstein and Vinokur (1973). They told subjects that in order to have many positions represented, some subjects would be asked to argue for positions that were different from their preference. In fact, all subjects were either given a different position or were asked to argue their original position. In the experimental condition where subjects argued for their true positions, a significant polarity shift was found on all but one of the choice dilemmas discussed.

Criticism of the manipulation used by Burnstein and Vinokur (1973) was provided by Sanders and Baron (1977). They made two arguments. First, they pointed out that only 14 percent of the subjects had no idea what positions others were arguing for. By comparison, 23 percent of the subjects correctly surmised that all subjects were advocating their true position. For that reason, they suggested that social comparisons could not be ruled out as an explanation for the finding. Second, Sanders and Baron attempted to replicate the findings reported by Burnstein and Vinokur. They found a polarity shift on only one item of five they used.

In a second experiment, Burnstein and Vinokur (1973) told subjects that they would be asked to argue mirror images of their true positions. In this way social comparisons would still be possible, but the arguments presented would be in the direction contrary to the

shift normally produced on the choice dilemma. For risky choice dilemmas, they found an insignificant risky shift. For the summed cautious choice dilemmas, they found a risky shift that was statistically significant. That finding offered support for the persuasive arguments explanation because, despite being able to identify the true positions of other group members, subjects shifted in the direction advocated by the argument.

Sanders and Baron (1977) argued that the results obtained in that research were not convincing. They pointed out that only the summed choice shifts for the cautious items were statistically significant, and that no effect was observed for individual items. This might be due to pitting active processes which are not mutually exclusive against one another. Sanders and Baron also argued that counter-attitudinal advocacy and role playing could have led to the unexpected choice shifts. This latter argument is less compelling, because it gives persuasive argumentation a central role in the observed choice shifts. That is, considering additional arguments because of role playing can still be viewed as a persuasive process, and one that is not contrary to the persuasive arguments explanation.

Additional attempts to pit the persuasive arguments and social comparison explanations against one another have been conducted by Vinokur, Burnstein, and their associates. Burnstein, Vinokur, and Trope (1973) factorially manipulated argument quantity and the number of positions of others that were revealed to subjects. They presented subjects with either five or twenty-five arguments and either one or

five positions of others. They hypothesized a main effect for positions if social comparisons were operating since a subject was more likely to encounter a group member with a score nearer the "most admired position." Recall from the earlier discussion of social comparison processes, that one's underestimation of the positions of others relative to the admired position was supposed to facilitate shifts. They found a main effect for arguments such that the magnitude of the shift increased as the number of arguments increased, but there was no main effect for positions.

More specific cell comparisons made on the Burnstein, Vinokur, and Trope (1973) data do show some support for social comparison processes. While the main effect for positions is nonsignificant, shifts are large in cells where five comparison positions are available as compared to one. In conditions where the opportunity for comparison was high and a small number of arguments was presented, the observed shifts are significantly larger than zero for individual risky items and for a summed shift score of all items combined. The evidence from that experiment certainly offers greater support for persuasive argumentation, but one should not conclude from those results the social comparisons were not contributing to the observed polarity shifts.

Some scholars have argued that social comparisons may prompt choice shifts, but that learning the positions of others stimulates arguments as to why others may hold positions discrepant from the presumed norm. Burnstein and Vinokur (1975) attempted to test the

effect of social comparisons on the generation of arguments. They presented subjects with knowledge of the choices of others and attempted to facilitate or block the generation of arguments. In the facilitation condition, subjects were asked to generate additional arguments for a series of choice dilemmas. In the other condition, subjects were given an irrelevant item to work on after receiving information about the choices of others. They observed significant choice shifts when arguments were generated but not when subjects were given an irrelevant task. Burnstein and Vinokur argued that those data indicated social comparisons were important only insofar as they stimulated additional arguments.

The latter experiment is not without explanatory difficulties. Social comparisons are not presumed to be what Sanders and Baron (1977) called a reflexive action. Social comparisons might easily facilitate cognitive processes which lead one to reconsider an original choice. The blocking of argumentation could easily have blocked or inhibited the ability to process cognitions about the responses of others, whereas the same may not have been true in the argument generation condition.

The research reviewed thus far has attempted to demonstrate superiority of persuasive argumentation to social comparisons in explaining the polarity shift. The weight of the evidence presented may appear to favor such a conclusion, but that research is uniformly open to other interpretations. The same can be said for research which purports to demonstrate the superiority of social comparisons. The

posttest only research conducted by Myers and his associates (Myers, Bach, & Schreiber, 1974; Myers, 1977) has demonstrated that choice shifts occur in the absence of group discussion. It is plausible to assume, however, that being exposed to the choices of others stimulated arguments as to why others might hold views more divergent than was supposed. The resulting choice shifts may have been due, at least in part, then, to arguments and not just social comparison.

Social Decision Schemes

Simply stated, social decision schemes are ways of combining individual preferences so that a group product or outcome can be successfully predicted (Davis, 1973; Staser, Kerr, & Davis, 1980). Social decision schemes are, in part, intended to be descriptive. That is, if one knows the initial distribution of choices and the group decision, a social decision scheme can be applied to describe the outcome. With regard to the polarity shift, the most often applied social decision scheme has been a majority rule. The majority rule decision scheme predicts that the direction of the polarity shift will be toward the position favored by the majority of group members. If individual decisions are skewed in a risky direction, a cautious shift would be predicted. If the initial distribution of choices is skewed in a cautious direction, a risky shift would be predicted. While social decision schemes have been used to describe outcomes of group discussions, whether or not they are used by groups in reaching consensus is another matter.

There is ample evidence to indicate that a majority rule decision scheme may not be used in reaching consensus. Recall the earlier discussion of research on the polarity shift in which no response scale was used, or in which subjects' true responses were not revealed (Clark, Crockett, & Archer, 1971; Myers, Bach, & Schreiber, 1974; Myers, Wong, & Murdoch, 1971). The polarity shifts observed in those studies could not be explained through the operation of a majority decision rule because the positions of others must be made known. However, just as one could infer others' responses to make social comparisons, it is possible that if a majority decision rule were in operation, inferences could be made about the true responses of group members. So while evidence of a polarity shift without knowledge of others' responses tends not to support the application of a majority decision rule to predict the shift, neither can that evidence definitively rule out the decision rule as an explanation for choice shifts.

There is additional evidence that skewness cannot account for polarity shifts. Vinokur (1969) reanalyzed data from earlier experiments that had yielded consistently risky shifts. He reported that skewness in a cautious direction occurred with equal frequency as risky skews. If a majority rule decision scheme were in operation, more of those studies would have had individual decisions skewed in a cautious direction. This is true because a risky shift would necessitate a cautious skew according to the decision rule. Polarity shifts have also been observed in dyads. In dyads no skewness is possible (Baron, Roper, & Baron, 1974; Bateson, 1966; Lamm, Schaub, & Trommsdorff, 1971; Myers & Aronson, 1972; Swap & Miller, 1969).

Does this evidence mean that social decision schemes cannot predict or explain the polarity shift? It does imply that a majority rule is not a necessary condition for the polarity shift. It should be noted, however, that the majority rule decision scheme, or any other decision scheme is not intended to be the sole explanation of the polarity shift. Decision schemes are not incongruent with either social comparison or persuasive arguments explanations of polarization. Laughlin and Early (1982) argue that group interaction is the way in which a group uses a distribution of individual decisions to reach group consensus, and that different explanations of the interaction process (e.g., social comparisons and persuasive arguments) predict the use of different social decision schemes.

Laughlin and Early (1982), using social decisions schemes and the assumptions made by social comparison and persuasive argument explanations, suggested that for items typically producing strong polarity shifts, persuasive argumentation would predict the use of a risk or caution-supported wins decision scheme. Risk or caution-supported wins decision schemes occur when the risky alternative for risky choice dilemmas and the cautious alternative for cautious choice dilemmas are supported by at least two group members, but not necessarily by a majority. For items yielding moderate choice shifts, a persuasive argumentation perspective would predict the best fitting social decision to be the majority rule decision scheme. Social comparison explanations, on the other hand, would predict that the majority rule decision scheme would be the best fitting model for

items producing large or moderate shifts. They found that risk or caution supported wins schemes were the best predictors for items producing a large shift, and that a majority rule scheme best predicted moderate shifts.

Perhaps two relevant points may be made here. First, the use of social decision schemes to predict and explain polarity shifts is not a rival approach to explaining group decision-making. Second, the application of a majority rule decision scheme may not be appropriate in all instances. If the majority in a group supports a cautious alternative on a risky choice dilemma, a risky shift may still occur if there is minority support for the risky position, provided the risky item has had a tendency to produce large shifts in previous research. What the data presented by Laughlin and Early (1982) indicated was that dismissal of social decision schemes because the majority rule decision scheme did not always fit available data constituted a premature rejection of decision schemes in general.

Ambiguity as Mediator of Decision-Making Processes

In spite of attempts to view social comparisons, persuasive argumentation, and social decision schemes as competing explanations for polarity shift, there is evidence supporting all three explanations. If one accepts Laughlin and Early's (1982) premise that social decision schemes are merely maps of social comparison and persuasive argumentation processes, then one is left with two cognitive processes to explain the phenomenon of group choice shifts. Since there is evidence supporting both social comparisons and persuasive argumentation, it seems

reasonable to assume that they are not necessarily competing alternatives. Instead, group choice shifts might be due to some combination of social comparison and persuasion. If the two processes may operate simultaneously, an interesting point of inquiry would be the conditions under which one process might play a dominant role in decision-making. A case may be made for ambiguity as a mediating variable.

In his theory of social comparison processes, Festinger (1954) wrote that humans have a drive to evaluate their opinions and abilities. That drive for evaluation was thought to be heightened when objective, non-social means for evaluating one's opinions were unavailable, so the person is more likely to look toward others and evaluate one's own opinions in comparison to those held by peers. Put another way, the absence of an objective standard creates uncertainty about the attitude. Uncertainty, in turn, motivates a social comparison.

What might be a source of uncertainty relative to the polarity shift? The choice dilemma is the dominant experimental stimulus used in polarity shift research. There is evidence to suggest that the response scale typically accompanying choice dilemmas is difficult for some people to understand. Recall that choice dilemmas are usually accompanied by instructions to "indicate the lowest probability of the risky alternative being successful that you would accept. . . ." The instructions are followed by a series of probability statements, 1 in 10, 2 in 10, . . . , 10 in 10. The ambiguity in such an approach was demonstrated by Reingen (1976). Reingen presented subjects with a

choice dilemma and two completed response scales. One of the scales, attributed to "Person A," was marked at a probability level of 1 in 10. The second response scale was marked at the 7 in 10 interval. Subjects were asked which person took greater risk. Thirty percent of the subjects incorrectly identified the risk taker.

The implications of Reingen's (1976) research is that uncertainty caused by the ambiguity of the response scale may be responsible for some of the polarity shifts which have been reported. He wrote:

Since the group discussion should lead to further task clarification, it is altogether plausible, for example, that a risky shift may be due, in part, to an invalid member's correction of his original anchor point mistake. (p. 304)

When subjects are presented with a choice dilemma, they know what course of action they would prefer to recommend, but they have difficulty checking the interval on the response scale which corresponds to their choice. In such instances of high uncertainty, it is likely that subjects use the responses of others as a guide. Subjects may simply reason that others feel as they do (or cast in social comparison language, that they have at least as much of the valued quality as the average other person), but that others have a better understanding of the response scale. That reaction would be similar to the one obtained by Sherif (1935) when studying the autokinetic effect, and consistent with findings reported by Sanders and Baron (1977) when they studied the polarity shift using the autokinetic effect.

What is predicted, then, is a social comparison effect in situations which are ambiguous. If one views ambiguity as a continuous

variable, the greater the ambiguity, the stronger the social comparison effect should be. That position is consistent with the one taken by Festinger (1954). Boster and Hale (1983) reported findings which were consistent with that prediction. They factorially manipulated item type (risky-cautious), majority (risky-cautious), and ambiguity (high-low). Subjects responded to either a risky or cautious choice dilemma. The choice dilemma was accompanied by an experimentally manipulated distribution of choices "made by subjects who completed the experiment last week." The ambiguity manipulation consisted of giving subjects either the traditional response scale (high ambiguity) or a 10 interval semantic differential type scale (low ambiguity). Using ambiguous scales, they found a statistically significant majority effect, $r = .42$. For the less ambiguous scale, they found a statistically significant item effect, $r = .35$. Boster and Hale interpret those findings as indicating that a social comparison process was dominant in the high ambiguity response scale conditions, and that the effect in the low ambiguity conditions for item was most likely due to the arguments subjects generated about a choice dilemma.

The research findings reported by Boster and Hale (1983) imply that the polarity shifts found in previous research using traditional response scales might be due to a dominant social comparison process. One should, however, not infer that persuasive argumentation has little impact on polarity shifts. While little research has been conducted using the less ambiguous instructions for choice dilemmas, polarity shifts have been demonstrated with other experimental stimuli which

are seemingly unambiguous. It would be interesting to determine, however, whether polarity shifts would occur with choice dilemmas where the response scale was less ambiguous than the traditional variety.

Laughlin and Early (1982) argued that choice dilemma items differed in the amount of uncertainty they produced. They suggested that there is social consensus as to the correct action for some items, but not for others. They predicted that for the former item type, persuasive argumentation processes should produce a polarity shift, but that for items without a demonstrably correct solution, social comparison processes would produce the polarity shift. Their findings supported those predictions. This is closely akin to Festinger's (1954) notion that social comparisons would be heightened in the absence of an objective evaluative tool. Items that produce the highest uncertainty, and hence social comparisons, are those without demonstrably correct solutions.

Summary

The polarity shift is a phenomenon which has been consistently demonstrated, and which has been observed using a wide variety of experimental stimuli. Several explanations for the effect have been formulated. At least three of those explanations: diffusion of responsibility, task familiarization, and leadership, have been found wanting either because of a lack of supportive research, or because they lack parsimony. Three other explanations are parsimonious and have support from available research. Social comparison, persuasive

argumentation, and social decision scheme explanations are not competing alternatives. Most likely they each explain choice shifts, though social decision schemes do not suggest additional cognitive processes than the ones offered by the remaining two explanations.

Both persuasive argumentation and social comparison processes may explain polarity shifts. A case can be made for ambiguity being a prime determinant of which of those processes may be dominant. When ambiguity is present, the likelihood that social comparison will occur increases. In the absence of ambiguity, it seems more likely that persuasive arguments will play an important role in group decision-making.

Two experiments will be conducted to test the effect of ambiguity or uncertainty on the polarity shift. The first is a partial replication of the research conducted by Myers (1977) and by Boster and Hale (1983). The following hypotheses were tested in the first experiment:

1. In the absence of an opportunity for social comparisons, choices will be more extreme in conditions of low ambiguity than in conditions of high ambiguity.

This hypothesis tests the assumption that ambiguity leads to moderation when social comparisons are not possible. It is consistent with Festinger's (1954) reasoning regarding social comparison processes, and is implied from Reingen's (1976) work.

2. In highly ambiguous situations, social comparison processes will be the dominant choice process.

However, in situations with low ambiguity, cognitively generated arguments will be the dominant choice process.

For high ambiguity situations, choices should be influenced by normative responses and less by the argument pool bearing on the decision. This hypothesis is consistent with the rationale developed in the review of literature and with the model tested by Boster and Hale (1983). In the experiment conducted by Boster and Hale (1983), for example, a majority effect was taken as evidence for social comparison processes, and an item effect was taken as evidence for cognitively generated arguments.

CHAPTER II

EXPERIMENT ONE METHODS

Sample

Participants were 294 undergraduate students at Michigan State University. The students were enrolled in courses in communication or family ecology. Their participation was voluntary and earned extra course credit.

Design

One hundred ten of the participants were randomly assigned to one of four control conditions. They completed a series of four choice dilemma items. The choice dilemma questionnaires consisted of items that had yielded either consistently risky or consistently cautious shifts in past research (Fraser, Gouge, & Billig, 1976; Wallach, Kogan, & Bem, 1962). The choice dilemma questionnaires also differed with respect to the ambiguity of the accompanying response scale. The high ambiguity response scale used a series of probability statements that typically accompany choice dilemma items. The low ambiguity response scale was a semantic differential type scale used previously by Boster and Hale (1983). The differential ambiguity of the two scales was demonstrated by Mongeau and Boster (1983). They found that, in general, subjects had greater difficulty understanding the series of probability statements than they did the bipolar scales. The choice dilemma items

used in the control conditions are those shown in the Appendix, sans the percentages accompanying each scale position.

While both response scale ambiguity and item type were factorially manipulated (risky or cautious item, high or low ambiguity scale), the term "control group" was used to describe these conditions because they lacked a third manipulation provided to the remaining participants. The responses of the control group participants were also compared to participants in the groups receiving the additional manipulation.

The remaining 184 participants were randomly assigned to one of eight groups. Those eight groups differed according to three factorial manipulations. Item type (risky or cautious), scale ambiguity (high or low), and normative response (risky or cautious) were manipulated. The item and ambiguity manipulations were the same as those used in control group conditions. For the normative response manipulation, a number appeared next to each scale position. Participants were told that the numbers represented the percentage of participants previously completing the research who had chosen that response. The numbers were, in fact, the percentage of control group participants that had selected each scale position.

Cautious choice dilemma items elicit response distributions that are skewed in a risky direction, while risky choice dilemma items produce response distributions that are cautiously skewed. That was the case for each of the eight choice dilemma items used in the experiment. The experimental groups received either the actual

response distribution, or a mirror image of that distribution as the normative response manipulation. For example, in risky item-risky normative response conditions, the participants received the actual response distribution obtained from the control group, because the distribution was cautiously skewed. For participants in the risky item-cautious normative response conditions, the mirror image of the obtained distribution was used, because the mirror image was skewed in a risky direction. The normative response manipulations for each item are indicated in the Appendix.

Procedures

The experiment began with the experimenter greeting the participants and explaining the experimental task. The choice dilemma questionnaires were distributed. They were accompanied by the usual instructions. Those instructions were reviewed orally by the experimenter. In conditions with a normative response manipulation, participants were told that the numbers next to each scale position represented the percentage of participants previously completing the research that had chosen that scale position. The experimenter then offered to answer any questions. No questions were asked, and so participants were instructed to begin.

When participants had completed the choice dilemma questionnaire they were orally debriefed by the experimenter. Any questions they had regarding the nature of the experiment were answered. Participants were thanked for their participation, pledged to silence regarding the experiment and excused.

CHAPTER III

EXPERIMENT ONE RESULTS AND DISCUSSION

Choices in Absence of Social Comparisons

This experiment tested two hypotheses. The first concerned the distribution of individual choices when no opportunity for social comparisons was available. That hypothesis is best tested by examining the distribution of choices within the control groups. An unweighted means analysis of variance was used to analyze those data. An ambiguity by item interaction effect was predicted, such that the choices in low ambiguity conditions would be more extreme than those in high ambiguity conditions.

The mean control group responses are shown in Table 1. The analysis of variance produced two statistically significant effects. As predicted, the ambiguity by item interaction effect was statistically significant, $F_{1,109} = 16.09$, $p < .05$, $\eta^2 = .06$. The response for cautious items were more cautious in the low ambiguity condition than in the high ambiguity condition. Similarly, the mean risky choice was riskier in the low ambiguity condition than in the high ambiguity condition. A statistically significant item effect also emerged, $F_{1,109} = 125.98$, $p < .05$, $\eta^2 = .50$. The main effect for item is not inconsistent with the hypothesized interaction effect. That is, the predicted interaction effect was not a crossover interaction. The complete analysis of variance results are shown in Table 2.

Table 1
Distribution of Control Group Choices

	Low Ambiguity	High Ambiguity	
Risky Item	$\bar{x} = 11.59$ $n = 27$	$\bar{x} = 17.59$ $n = 30$	14.58
Cautious Item	$\bar{x} = 27.20$ $n = 25$	$\bar{x} = 24.96$ $n = 28$	26.08
	19.40	21.27	20.33
			N = 110

Table 2
Analysis of Variance for Control Group Choices

Source	Sum of Squares	df	Mean Squares	F	p	η^2
Ambiguity	96.16	1	96.16	3.33	> .05	.01
Item	3636.88	1	3636.88	125.98	< .05	.50
A x I	464.53	1	464.53	16.09	< .05	.06
S/A, I	<u>3060.20</u>	<u>106</u>	<u>28.87</u>	--	--	<u>.43</u>
Total	7257.77	109	66.59	--	--	1.00

The Effect of Ambiguity on Choice Processes

The second hypothesis suggested that ambiguity mediated the processes by which choices were made. An ambiguity by majority by item interaction was predicted. In high ambiguity conditions, the model predicts stronger majority effects than item effects. In low ambiguity conditions, the model predicts stronger item effects than majority effects.

The mean choices are shown in Table 3. From the analysis of variance, three statistically significant effects emerged. The first was an ambiguity by item interaction effect, $F_{1,283} = 28.50$, $p < .05$, $\eta^2 = .04$. However, the interaction effect was not of the order predicted.

The analysis produced the significant majority effect of the type predicted by Myers (1977), $F_{2,283} = 37.28$, $p < .05$, $\eta^2 = .10$. Finally, there was a significant mean effect for item, $F_{1,283} = 319.81$, $p < .05$, $\eta^2 = .45$. The responses in the risky item condition were consistently riskier than those in the cautious item conditions. The complete results of the analysis of variance are shown in Table 4.

The model developed by Boster and Hale (1983) did not fit these data well. To better understand the failing of the model, the data were analyzed by ambiguity conditions. Table 5 shows the mean responses for participants in the low ambiguity conditions. An unweighted means analysis of variance of those data yielded significant main effects for both the majority information and for the type of item.

Table 3
Effect of Ambiguity on Choice Processes

	Low Ambiguity			High Ambiguity		
	Cautious Majority	No Majority	Risky Majority	Cautious Majority	No Majority	Risky Majority
Risky Item	$\bar{x} = 18.17$ $n = 23$	$\bar{x} = 11.59$ $n = 27$	$\bar{x} = 10.59$ $n = 23$	$\bar{x} = 20.27$ $n = 23$	$\bar{x} = 17.57$ $n = 30$	$\bar{x} = 13.18$ $n = 22$
Cautious Item	$\bar{x} = 29.88$ $n = 25$	$\bar{x} = 27.20$ $n = 25$	$\bar{x} = 26.14$ $n = 22$	$\bar{x} = 28.36$ $n = 25$	$\bar{x} = 24.96$ $n = 28$	$\bar{x} = 20.90$ $n = 21$
	24.17	20.33	17.69	N = 294		
		20.58		20.87		

Table 4
Analysis of Variance for Effect of Ambiguity

Source	Sums of Squares	df	Mean Squares	F	p	η^2
Ambiguity	6.18	1	6.18	< 1.00	> .05	.00
Majority	2081.05	2	1040.53	37.28	< .05	.10
Item	8925.87	1	8925.87	319.81	< .05	.45
A x M	129.60	2	64.80	2.32	> .05	.01
A x I	795.57	1	795.57	28.50	< .05	.04
M x I	55.11	1	55.11	1.97	> .05	.00
A x M x I	73.57	2	36.79	1.32	> .05	.00
S/A, M, I	<u>7898.56</u>	<u>283</u>	<u>27.91</u>	--	--	<u>.40</u>
Total	19965.51	293	68.14	--	--	1.00

Table 5
Choice Means for Low Ambiguity

	Cautious Majority	No Majority	Risky Majority	
Risky Item	$\bar{x} = 18.17$ $n = 23$	$\bar{x} = 11.59$ $n = 27$	$\bar{x} = 10.52$ $n = 23$	13.43
Cautious Item	$\bar{x} = 29.88$ $n = 25$	$\bar{x} = 27.20$ $n = 25$	$\bar{x} = 26.14$ $n = 22$	27.74
	24.03	19.39	18.33	20.58
N = 145				

It was predicted that the item effect would be substantially larger than the majority effect, and the data bore out that conclusion. The η^2 value for the majority effect was .07 but was .59 for the type of item. The complete analysis of variance results are shown in Table 6.

The predicted relationship between ambiguity and the dominant choice process fares less well in the high ambiguity conditions. In high ambiguity conditions, social comparisons were predicted to be the dominant choice process. Such a relationship would be indicated by a majority effect that was stronger than the accompanying item effect. The mean choices in high ambiguity conditions are shown in Table 7. The analysis of variance on those data produced statistically significant majority and item effects. Nevertheless, the item effect was stronger than the majority effect ($\eta^2 = .30$ for item and .18 for

majority). The complete results for the analysis of variance are shown in Table 8.

Table 6
Analysis of Variance for Low Ambiguity

Source	Sums of Squares	df	Mean Squares	F	p	η^2
Majority	888.42	2	444.21	14.92	.05	.07
Item	7423.13	1	7423.13	249.43	.05	.59
M x I	125.66	2	62.83	2.11	.05	.01
S/M,I	<u>4137.09</u>	<u>139</u>	<u>29.76</u>	--	--	<u>.33</u>
Total	12574.30	144	87.32	--	--	1.00

Table 7
Choice Means for High Ambiguity

	Cautious Majority	No Majority	Risky Majority	
Risky Item	$\bar{x} = 20.27$ n = 23	$\bar{x} = 17.57$ n = 30	$\bar{x} = 13.18$ n = 22	17.01
Cautious Item	x = 28.36 n = 25	x = 24.96 n = 28	x = 20.90 n = 21	24.74
	24.32	21.27	17.01	20.88
N = 149				

Table 8
Analysis of Variance for High Ambiguity

Source	Sums of Squares	df	Mean Squares	F	p	η^2
Majority	1327.65	2	663.83	24.99	.05	.18
Item	2225.80	1	2225.80	83.80	.05	.30
M x I	2.86	2	1.43	1.00	.05	.00
S/M,I	<u>3754.80</u>	<u>143</u>	<u>26.56</u>	--	--	<u>.52</u>
Total	7311.11	148	49.40	--	--	1.00

Discussion

Certainly ambiguity has a moderating influence on behavior when social comparisons are not possible. That moderating influence was indicated by more extreme choices made in low ambiguity conditions compared to high ambiguity conditions. Uncertainty was heightened by the ambiguity of the accompanying response scale in high ambiguity conditions. Most likely, participants knew what course of action they preferred, but they had difficulty matching their opinions with an interval on the response scale. Such difficulty would produce the obtained pattern of mean responses.

The issue which has received the most attention recently is the debate over which of two processes is responsible for choice shifts. Two arguments were made in the review of literature regarding that issue. First, the argument was made that social comparison processes and persuasive argumentation were not mutually exclusive explanations of choice shifts. That is, some amount of shift might be accounted for by social comparisons, and another proportion by persuasive argumentation. Second, a rationale was presented involving ambiguity as a mediating influence for which choice shift process would be dominant. The data from this experiment are relevant to both arguments.

Persuasive arguments explanations for choice shifts argue that for every decision-making situation, there is a pool of arguments that one may draw upon. One's choice is thought to be a result of the arguments that they consider, so that a risky choice would be an indication of considering more risky arguments than cautious ones.

The pools of arguments are thought to be predominantly risky on items which consistently elicit risky shifts, and predominantly cautious for items which elicit cautious shifts. Item main effects would be the best evidence that participants were drawing upon an argument pool. A strong item effect emerged in these data.

There is also evidence of social comparison processes. If, as social comparison theorists suggest, individuals underestimate the normative response, and subsequently adjust their own choice, a main effect for majority would be evidence of social comparisons. A majority effect would indicate that participants took notice of the choices of others, and that their responses were influenced by those choices. Majority effects, though not strong ones, were found. It appears, then, that these results offer support for the position that both social comparison and argumentation processes may influence choices.

These data are also relevant to the question of whether ambiguity or uncertainty mediates choice processes. It was hypothesized that social comparison processes would be dominant in ambiguous conditions, but that in situations with low ambiguity, choices would be determined more by the pool of arguments considered. For low ambiguity conditions, the item effect was much stronger than the majority effect. Those results tend to support the hypothesized relationship. Participants' choices appeared to be determined more from the arguments that they considered and less by the normative response.

The results for high ambiguity conditions do not support the hypothesized relationship. If the choices made by participants in the

high ambiguity conditions were motivated by social comparisons, one would expect the majority effect in those conditions to be larger than the item effect. In fact, the opposite occurred. Thus, these data failed to replicate the earlier finding of Boster and Hale (1983). One reasonable explanation for the present findings is that the majority manipulations were less clear in the present research. That is, the normative response in the research by Boster and Hale (1983) was probably easier to identify because the mean, median, and mode responses were more extreme, and the majority distributions were more skewed.

If participants had difficulty discerning the normative response, what would the likely result be? Certainly some individuals would be able to discern the normative response, and those individuals would make choices in the direction of the norm. Those participants that could not discern the normative response and were confused by the accompanying response scale would be likely to choose a moderate scale interval. That moderation would decrease the strength of the majority effect and increase the magnitude of the item effect. The data reported from the experiment support that mode of decision-making.

Since manipulation checks were not administered, one cannot say with certainty whether that post hoc explanation is correct. One thing is clear, however, and that is that the hypothesized relationship between ambiguity and decision-making modes was not supported. Furthermore, the shortcoming of the proposed relationship occurred in the high ambiguity condition.

The second hypothesis was only partially supported. The preceding discussion offered an explanation for the pattern of results that was obtained. In retrospect, it should also be noted that the second hypothesis was an unfair test of the theory developed in the review of the literature. The weight of the evidence reviewed did not suggest that the size of the social comparison effect would be larger than the item effect in highly ambiguous situations, or smaller than the item effect in less ambiguous situations. Instead, the reviewed literature suggested that the social comparison effect size would be larger in the high ambiguity conditions than the low ambiguity conditions. It also suggested that the effect size for item would be larger in low ambiguity conditions than in high ambiguity conditions. Ambiguity would influence the relative importance of the two choice shift processes, but would not necessarily produce the three-way interaction effect developed in the hypothesis. The obtained results are much more in line with this reasoning, which is consistent with the logic of the theory.

Shortcomings of the Experiment

The majority manipulations used in the experiment differed noticeably from one another. Perhaps it would have been more useful to aggregate responses across ambiguity conditions to formulate the majority manipulations. That is, the only thing the majority manipulations had in common across ambiguity conditions was skewness. Cautious majority conditions presented majority manipulations that were skewed in a risky direction. Risky majority manipulations presented cautiously

skewed distributions. Within that parameter, however, there was little similarity across conditions. If responses from control groups would have been aggregated across ambiguity conditions the majority manipulations would have been more consistent. In defense of the procedure used, one criticism of the Boster and Hale (1983) research had been that the majority manipulations were too well defined. The procedures employed in the present experiment were chosen so that the majority manipulations would be more natural and realistic.

More importantly, the hypothesized relationship between ambiguity and decision-making processes assumed that the normative response would be identifiable. If the normative response could not be discerned by subjects, the functional form of the relationship between ambiguity, item, and majority would change. The anticipated functional form would resemble the one obtained. But without manipulation checks to determine how many participants could correctly identify the direction of the normative response, one can only speculate as to why the item effect was so much stronger than the majority effect in high ambiguity conditions of the experiment.

Introduction to the Second Experiment

The next experiment was designed on the assumption that experiment one would more closely replicate Boster and Hale's (1983) previous effort. They found that social comparison processes tended to influence choices made in highly ambiguous situations, and argued that individually generated arguments influenced choices when ambiguity was low. That conclusion had important implications for polarity shift

research, because most of the research had been conducted using choice dilemma questionnaires accompanied by ambiguous response scales. The conclusions drawn by Boster and Hale imply that social comparisons were largely responsible for polarity shifts reported in the literature.

The second experiment utilized the most typical polarity shift research paradigm. That is, participants completed a series of choice dilemma items individually, and then reached group consensus on each item. When a group decision was made participants completed the choice dilemma items individually for a second time. This experiment was important because it utilized both highly ambiguous and less ambiguous forms of the choice dilemma questionnaire. Hence, the research addressed the question of whether or not choice shifts, or polarity shifts, will occur in low ambiguity conditions.

The experiment also offered a second chance to test the distributional assumptions drawn from Reigen's (1976) work. Whether or not the highly ambiguous form of the choice dilemma questionnaire led to less extreme mean initial choices could be determined. It was possible to test that distributional assumption because individual decisions were made on choice dilemma items, and those items were accompanied by more or less ambiguous response scales.

Finally, research on the polarity shift which has employed the traditional response scale has found that the magnitudes of the choice shifts are positively related to the initial extremity of individual responses (Clark & Willems, 1969; Marquis, 1968; Myers & Aronson, 1972; Teger & Pruitt, 1967). The case built in earlier

chapters for the effect of ambiguity implies that the relationship between initial extremity and the magnitude of choice shifts would be more moderate in low ambiguity conditions. Participants have no problem determining what course of action they find preferable, and they are less concerned with the choices of others. Hence, one would expect shifts of smaller magnitudes in low ambiguity conditions when compared to high ambiguity conditions. If initial opinions in low ambiguity conditions are more extreme than in high ambiguity conditions, one would expect a more moderate relationship between the mean initial choice and the magnitude of the polarity shift when ambiguity was low. That assumption is easily testable by correlating the prediscussion mean choice with the choice shift magnitude. The second experiment, then, tested the following hypotheses:

1. Initial choices made without an opportunity for social comparisons will be more extreme in conditions of low ambiguity as compared to high ambiguity.
2. Significant choice shifts occur in conditions of high and low ambiguity.
3. The relationship between initial choices and the magnitude of choice shifts will be positive and stronger in conditions of high ambiguity than in low ambiguity conditions. Both relationships will be positive.

The experiment testing these hypotheses is described in the following chapter.

CHAPTER IV

EXPERIMENT TWO METHODS

Sample

Participants in the study were 150 undergraduate students enrolled in speech courses at the University of Hawaii, Manoa. Their participation was voluntary and earned extra course credit. The 150 participants composed 45 groups which varied in size from three to four members. There were 30 groups of three members and 15 groups of size four.

Design

The experiment was a 2 x 2 factorial design with independent groups. Each group discussed four choice dilemma items. One set of four items had elicited consistently cautious shifts in past research. The other set of four items had produced consistently risky shifts in past research. They are the same choice dilemma items as were used in the first experiment. Those choice dilemma items were accompanied by a response scale which was either high or low in ambiguity. The response scales are also those used in the first experiment, sans the majority manipulation, and are shown in the Appendix. Groups were randomly assigned to experimental conditions.

Participants first made individual decisions on the choice dilemma items. The items were then discussed until group consensus was reached. After the group discussion, the participants made individual decisions on each item a second time.

Procedure

Participants reported to a laboratory room where they were greeted by the experimenter. Participants were seated in desk chairs that were arranged in a circle.

The experimenter presented each participant with a questionnaire which consisted of four choice dilemma items. The items were accompanied by the usual written instructions. After the instructions had been read, the experimenter reviewed them orally, and asked if there were any questions. No questions were asked, so the experimenter explained that he would wait outside until each participant had completed the questionnaire. He asked that the participants inform him when the questionnaires had been completed.

When the first questionnaire was completed, the experimenter distributed a copy of the first discussion item. The experimenter explained that each of four items would be discussed in turn. Participants were instructed to discuss each item, and decide as a group, which response to the choice dilemma was best. Participants were told that when each group member agreed upon a response, one member of the group should inform the experimenter, who would then distribute the next item. Subjects were given 15 minutes to discuss each item.

Before distributing the first item the experimenter asked if there were any questions. None were asked, so the item was distributed and the experimenter left the room.

When the participants finished discussing an item, the experimenter returned and asked what decision had been reached. When the decision was revealed, the experimenter distributed the next discussion item and left the room.

When the final item had been discussed, the experimenter returned and asked what decision had been reached. When the decision was revealed, the experimenter distributed the final questionnaire. That questionnaire consisted of the four choice dilemma items, which the participants were instructed to complete individually. The final questionnaire also asked participants if any of the group discussions had differed from their own initial decisions. If so, they were asked to relate, to the best of their recollection, why they had changed.

When the final questionnaire was completed, the experimenter orally debriefed the participants. Any questions they had about the experiment were answered. They were pledged to silence regarding the nature of the experiment, thanked for their participation, and dismissed.

CHAPTER V

EXPERIMENT TWO RESULTS AND DISCUSSION

Distribution of Initial Individual Choices

These data offered a second test of the distributional assumptions taken from Reingen's (1976) research. It was predicted that initial responses would be more extreme in low ambiguity conditions than in high ambiguity conditions. An unweighted means analysis of variance was used to test the distributional hypothesis. An ambiguity by item interaction effect would support the research hypothesis provided the means were in the hypothesized directions.

The distribution of initial individual responses is shown in Table 9. The analysis of variance for those responses produced two statistically significant effects. The first effect was a main effect for item. Choices on risky items were significantly more risky than the choices on cautious items, $F_{1,146} = 135.85$, $p < .05$, $\eta^2 = .47$. There was also a significant ambiguity by item interaction effect, $F_{1,146} = 7.54$, $p < .05$, $\eta^2 = .03$. As predicted, cautious condition choices are more cautious in low ambiguity cells than high ambiguity cells, and risky condition choices are riskier in low ambiguity cells than in high ambiguity cells. The complete analysis of variance results are shown in Table 10.

Table 9
Prediscussion Individual Choices

	High Ambiguity	Low Ambiguity	
Risky Item	$\bar{x} = 17.35$ $n = 40$	$\bar{x} = 14.03$ $n = 37$	15.69
Cautious Item	$\bar{x} = 26.12$ $n = 40$	$\bar{x} = 28.27$ $n = 33$	27.20
	21.74	21.15	21.44
			N = 150

Table 10
Analysis of Variance for Prediscussion Choices

Source	Sums of Squares	df	Mean Squares	F	p	η^2
Ambiguity	13.05	1	13.05	1.00	.05	.00
Item	4968.00	1	4968.00	135.85	.05	.47
A x I	275.97	1	275.97	7.54	.05	.03
S/A, I	<u>5339.38</u>	<u>146</u>	<u>36.57</u>	--	--	<u>.50</u>
Total	10596.40	149	--	--	--	1.00

Choice Shifts

The data from this experiment address a question which emerged from the research by Boster and Hale (1983). That is, they address whether or not significant choice shifts would occur in situations with low ambiguity. Choice shifts have consistently been found in research employing the typical response scale with choice dilemma items, but little research has been conducted using less ambiguous substitutes. It was hypothesized that polarity shifts would occur for both the more and less ambiguous scales.

No groups failed to reach consensus on an item. In the risky item-high ambiguity groups, ten groups exhibited risky shifts and two groups shifted in a cautious direction. For risky item-low ambiguity groups, nine groups shifted in a risky direction, one group shifted in a cautious direction, and one group exhibited no shift. For cautious item-high ambiguity groups, eight groups shifted in a cautious direction, while four shifted in a risky direction. In cautious item-low ambiguity groups, seven groups engaged in cautious shifts and two in risky shifts. From these descriptive data, it would appear that shifts occur regardless of the ambiguity condition. Whether or not those shifts were statistically significant is another matter.

The hypothesis was tested using correlated t-tests to determine whether the obtained shifts were statistically different from zero. The change scores were produced by subtracting the mean individual decision from the group consensus. Negative scores are indicative of risky shifts and positive scores are indicative of cautious shifts. The mean shifts

are shown in Table 11. For the risky item-high ambiguity condition $t_{11} = -1.61$, $p > .05$. In the cautious item-high ambiguity condition $t_{11} = 1.29$, $p > .05$. For the risky item-low ambiguity condition $t_{10} = -2.27$, $p < .05$. Finally, for the cautious item-low ambiguity condition $t_9 = 1.96$, $p < .05$.

Table 11
Group Shift Means

	High Ambiguity	Low Ambiguity	
Risky Item	$\bar{x} = -1.28$ $n = 12$	$\bar{x} = -3.05$ $n = 11$	-2.17
Cautious Item	$\bar{x} = 1.25$ $n = 12$	$\bar{x} = 1.93$ $n = 10$	1.59
	-.02	-.56	-0.29
			N = 45

n = Number of groups.

Polarity shifts were produced only for groups in the low ambiguity conditions, but any number of processes could account for those shifts. The normative response was not manipulated, so that social comparisons cannot be ruled out as a possible explanation for the shifts. Pressures toward conformity exerted by group members could also account for the shifts.

An interesting question is whether or not persuasive argumentation is responsible for the reported choice shifts. One form that evidence of persuasive argumentation might take is that postdiscussion individual choices would converge toward the group consensus. To determine whether this occurred, change scores were computed by subtracting the initial individual decision from the postdiscussion decision. These change scores differ from those used to compare initial individual decisions and group decisions. To compare group and individual decisions, the individual decision mean was subtracted from the group consensus score. If postdiscussion individual choices converged toward the group choice, one would expect shifts computed using the postdiscussion individual means to be comparable with those found when shift scores were computed using the group choice.

In comparing initial individual decisions with group decisions, choice shifts in the low ambiguity conditions were significantly different from zero. When comparing initial individual decisions with postdiscussion individual decisions, the choice shifts for both risky and cautious items were significantly different than zero. For risky items $t_{10} = 3.06$, $p < .05$, and for cautious items $t_9 = 2.13$, $p < .05$. The mean change for risky items was -3.52 , and was 2.13 for cautious items.

At one point, participants were asked to relate the reasons for their choice shifts. Sixteen percent of them mentioned being in the minority as a motivation to change. Of those who alluded to the

normative response, 79 percent were in the high ambiguity conditions. Few participants mentioned the normative response while an overwhelming majority wrote vaguely of changing their minds during the discussion, or of being persuaded by other group members. There is evidence of greater reliance on social comparison, however, in the high ambiguity conditions.

Initial Choices and Magnitude of Shifts

It was predicted that the magnitude of choice shifts would be positively related to the mean prediscussion decision made by group members. The correlation coefficients for the relationship between the mean individual prediscussion choice and the magnitude of the choice shift was .94 for groups using the highly ambiguous response scale, and .91 for groups using the less ambiguous form of the scale. Both correlation coefficients are statistically significant, $p < .05$, but they do not differ significantly from one another as was anticipated. More extreme initial choices are related to the extremity of choice shift, but that relationship appears not to be influenced by ambiguity.

Discussion

This research addressed three issues related to the impact of ambiguity on choice shifts. As was the case in the first experiment, choices made in the absence of an opportunity for social comparisons tended to be more extreme in low ambiguity conditions. If a substantial portion of participants had difficulty interpreting the response

scale that typically accompanies choice dilemma questionnaires, they should choose either a moderate position on the response scale or a mirror image of their true choice (Boster & Hale, 1983). Either of those two behaviors would result in a more moderate mean choice than would have occurred with a less ambiguous response scale.

Another issue addressed in the experiment was whether choice shifts would occur in situations with low ambiguity, specifically, when the response scale accompanying the choice dilemmas was easily understood. The question of whether choice shifts could be observed in low ambiguity conditions seemed relevant because most of the research on choice shifts had utilized choice dilemma items accompanied by an ambiguous response scale.

This research found significant choice shifts for a less ambiguous form of the choice dilemma response scale. Furthermore, there was some evidence that persuasion had a hand in the shifts. The postdiscussion individual choices converged toward the group decisions.

Insignificant choice shifts were found for the more ambiguous conditions. That is inconsistent with a large body of previous research. However, it should be noted that the obtained t -value in one high ambiguity condition was significant at $p < .10$ but not at $p < .05$. With the analyses conducted on such a small quantity of groups, the inconsistent finding can be attributed to the power of the t -test in those conditions.

The final question addressed in this experiment was whether the relationship between the mean prediscussion individual decision

and the magnitude of the polarity shift would be comparable regardless of ambiguity. It was hypothesized that the relationship between initial choices and the magnitude of the polarity shift would be stronger for ambiguous conditions than for less ambiguous ones. There was no support for that hypothesis. The two correlation coefficients were not significantly different.

Furthermore, it might be misleading to attribute the strong correlations to the extremity of individual opinions. The strength of the correlations might well be due to the strength of the items, i.e., due to the fact that risky shifts were obtained for risky items and cautious shifts were obtained for cautious items.

Shortcomings of Experiment Two and Directions for Future Research

The most disappointing aspect of the experiment concerned inability to explain the converging postdiscussion individual choices. If such an effect is inconsistent with social comparison processes, as Myers and Lamm (1976) assert, then the convergence in the high ambiguity conditions is difficult to explain. If converging individual decisions are not inconsistent with social comparison processes, this experiment confounded the item manipulation with normative response. Either of the two problems could have been alleviated if the composition of the group or the normative response had been manipulated. That is, the proportion of the opinion change that was due to item effects or persuasive arguments could have been discerned from any portion that was due to group composition.

Unfortunately, in naturally formed groups, there is a tendency for the group norm to be risky for risky items and cautious for cautious items. Without the normative response manipulation, it is difficult to determine what proportion of the choice shift was internalized because of arguments. And since the argument was made that both social comparison processes and persuasive argumentation may operate simultaneously, making such a distinction seems useful.

The results of the two experiments reported here were not unqualified successes. Nevertheless, the results were promising and seem to warrant future efforts. Experiments testing the effect of ambiguity on choice shift processes, have all manipulated ambiguity by manipulating the response scale accompanying a choice dilemma questionnaire. Future research on the effect of ambiguity ought to move away from that manipulation. The purpose of those research efforts was not to demonstrate that the polarity shift was a measurement artifact, but was to demonstrate the role of ambiguity in the decision-making process generally. For that reason, it would be useful to vary the ambiguity manipulation.

The research of Laughlin and Early (1982) is especially useful in that regard. They argued that choice dilemma items inherently differ in the amount of uncertainty they evoke. Being able to scale a series of choice dilemmas according to that uncertainty, in addition to risk or caution, would be useful. Research to scale decision-making tasks according to task ambiguity might also be a fruitful endeavor.

Finally, as was alluded to previously, future experiments should manipulate the normative response or group composition. Myers (1977) suggested that the best evidence for social comparison processes are those instances when groups or individuals reached a decision that was influenced by normative response information. That evidence is even more compelling when the decision is contrary to those normally elicited by the decision-making task. Manipulating group composition is a difficult task, because it is difficult to find individuals who respond in an extremely risky manner to cautious items, or vice versa. Nonetheless, those attempts might provide less equivocal findings.

Concluding Remarks

These experiments produced four important findings. First, both experiments indicated that ambiguity exerts a moderating influence on individual choices when social comparisons are not possible. For cautious items, individual choices are more cautious when ambiguity is decreased. For risky items, individual choices were riskier in low ambiguity conditions than in high ambiguity conditions.

Second, there was evidence to suggest that both social comparison processes and self generated argument processes influenced choices. That is, both majority effects and items effects were found. The majority effects indicated that, despite normally elicited responses to choice dilemmas, choices tended toward the position taken by the majority. The item effect indicated, that across normative response manipulations, decisions tended to be in the direction typically

elicited by the items. Item effects are taken as evidence for argumentation processes, because the pool of arguments for a particular item will be distributed so that the majority of the arguments favor the direction of the typical response. These are not persuasive argumentation processes in the sense that arguments are shared during discussion. Instead, the item effect is an indicator that the individual's response was formulated after considering self generated arguments. For both high and low ambiguity conditions, the item effect was substantially stronger than the majority effect.

Third, ambiguity was predicted to mediate whether social comparison processes or argumentation processes would dominate the decision-making process. For high ambiguity conditions, social comparison processes were hypothesized to exert a greater influence than self-generated arguments. The converse was true for low ambiguity situations. In both ambiguity conditions, self-generated arguments appeared to exert a greater influence than social comparison processes. One possible explanation for the failure of the data to support the former prediction was that the majority manipulations may have been difficult to interpret in the high ambiguity conditions. The pattern of means in the high ambiguity conditions is consistent with that notion. However, in the absence of specific manipulation checks, that explanation is speculative.

Fourth, the extremity of initial choices is positively and strongly related to the magnitude of choice shifts made by groups. That finding is consistent with past research. Most of that research

employed ambiguous response scales to accompany choice dilemma items. Strong relationships between initial choices and the magnitude of the choice shift were found for both ambiguity conditions in this research.

The primary purpose of these experiments was to test certain hypotheses about the effect of ambiguity on choices and choice shift processes. While the results were not unequivocal, they were promising and further research on the effects of ambiguity would seem to be in order.

APPENDIX

MEASUREMENT ITEMS

APPENDIX MEASUREMENT ITEMS

Cautious-Ambiguous Items

The president of an American corporation which is about to expand may build a new plant in the United States where returns on investment would be moderate, or may decide to build a plant in a foreign country with an unstable political history where, however, returns on investment would be very high. What is the lowest probability of the foreign government remaining stable that you would accept before recommending that the corporation expand overseas?

	<u>Cautious Majority*</u>
_____ 1 in 10	0%
_____ 2 in 10	4%
_____ 3 in 10	4%
_____ 4 in 10	4%
_____ 5 in 10	36%
_____ 6 in 10	25%
_____ 7 in 10	18%
_____ 8 in 10	7%
_____ 9 in 10	4%
_____ 10 in 10	0%

*Opposite majority is mirror image of the scale.

A recently married young man with a pregnant wife is deciding whether or not to give up his hobby of sports car racing because of the possibility of having a wreck and seriously injuring himself. What is the lowest probability of the man racing safely that you would accept before recommending that he continue to race?

Cautious Majority

_____ 1 in 10	0%
_____ 2 in 10	4%
_____ 3 in 10	11%
_____ 4 in 10	7%
_____ 5 in 10	11%
_____ 6 in 10	18%
_____ 7 in 10	0%
_____ 8 in 10	14%
_____ 9 in 10	7%
_____ 10 in 10	29%

An engaged couple must decide, in the face of recent arguments suggesting some sharp differences of opinion, whether or not to get married. Discussions with a marriage counselor indicate that a happy marriage while possible, would not be assured. What is the lowest probability for a happy marriage that you would accept before recommending that the couple get married?

	<u>Cautious Majority</u>
_____ 1 in 10	4%
_____ 2 in 10	4%
_____ 3 in 10	18%
_____ 4 in 10	18%
_____ 5 in 10	4%
_____ 6 in 10	18%
_____ 7 in 10	18%
_____ 8 in 10	14%
_____ 9 in 10	0%
_____ 10 in 10	4%

A man about to embark on a vacation trip experiences severe abdominal pain and must choose between disrupting his vacation plans in order to see a doctor, or boarding an airplane for an overseas flight. Please indicate the lowest probability for a safe journey that you would accept before recommending that the man board the plane.

Cautious Majority

_____ 1 in 10	0%
_____ 2 in 10	0%
_____ 3 in 10	7%
_____ 4 in 10	11%
_____ 5 in 10	7%
_____ 6 in 10	14%
_____ 7 in 10	11%
_____ 8 in 10	11%
_____ 9 in 10	18%
_____ 10 in 10	21%

Cautious-Unambiguous Items

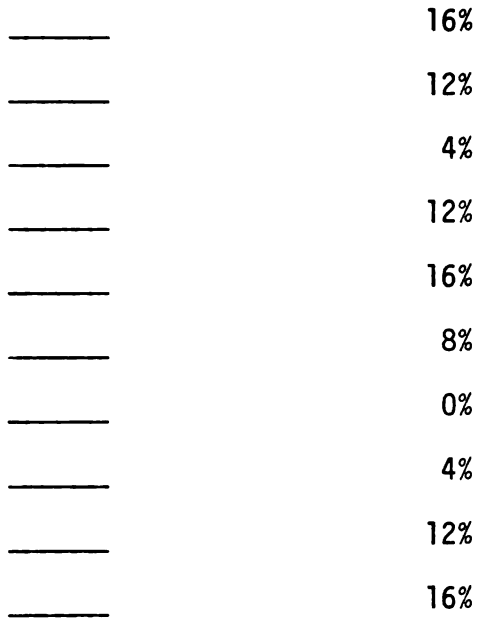
The president of an American corporation which is about to expand may build a new plant in the United States where returns on investment would be moderate, or may decide to build a plant in a foreign country with an unstable political history where, however, returns on investment would be very high. Please mark the scale position which most accurately reflects the recommendation you would make to the president of the corporation.

Strongly Recommend Expanding Overseas		<u>Cautious Majority</u>
_____		0%
_____		8%
_____		16%
_____		4%
_____		0%
_____		0%
_____		8%
_____		24%
_____		24%
_____		16%
Strongly Recommend Not Expanding Overseas		

A recently married young man with a pregnant wife is deciding whether or not to give up his hobby of sports car racing because of the possibility of having a wreck and seriously injuring himself. Please mark the scale position which most accurately represents the recommendation that you would make to the young man.

Strongly Recommend
Giving Up Racing

Cautious Majority

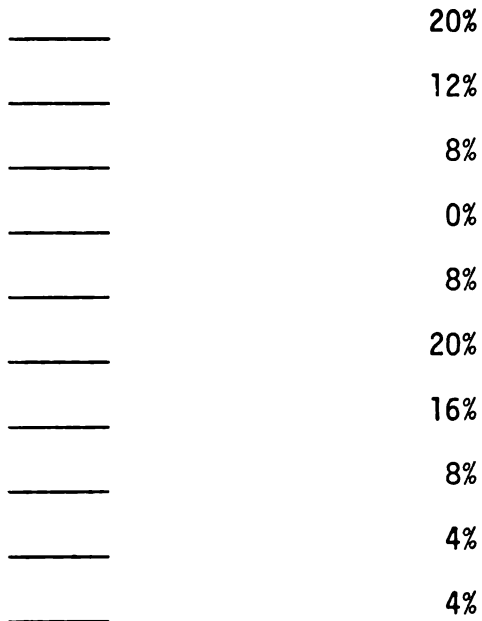


Strongly Recommend
Not Giving Up Racing

An engaged couple must decide, in the face of recent arguments suggesting some sharp differences of opinion, whether or not to get married. Discussions with a marriage counselor indicate that a happy marriage, while possible, would not be assured. Please mark the scale position which most accurately represents the recommendation you would make to the couple.

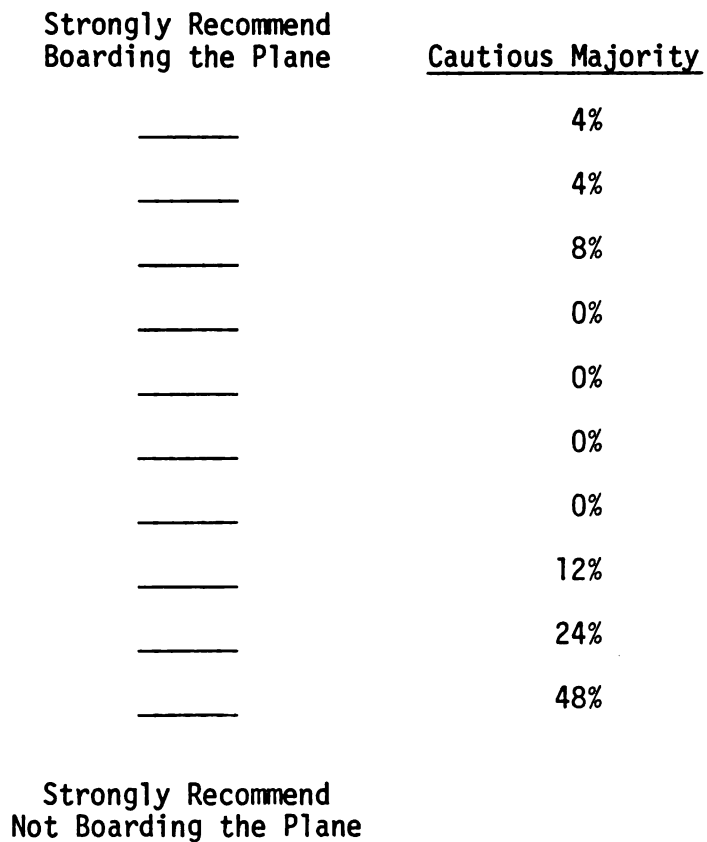
Strongly Recommend
Getting Married

Cautious Majority



Strongly Recommend
Not Getting Married

A man about to embark on a vacation trip experiences severe abdominal pain and must choose between disrupting his vacation plans in order to see a doctor, or boarding an airplane for an overseas flight. Please mark the scale position that most accurately represents the recommendation you would make to the man.



Risky-Ambiguous Items

The captain of a college football team in the final seconds of a game with the team's traditional rival may choose a play which is almost to sure victory if successful, sure defeat if not. Please indicate the lowest probability of the risky plan being successful that you would accept before recommending the risky play to the football captain.

	<u>Risky Majority</u>
_____ 1 in 10	3%
_____ 2 in 10	7%
_____ 3 in 10	23%
_____ 4 in 10	13%
_____ 5 in 10	27%
_____ 6 in 10	10%
_____ 7 in 10	7%
_____ 8 in 10	3%
_____ 9 in 10	7%
_____ 10 in 10	0%

A recent medical school graduate is choosing between two long-term projects. One is almost certain to be a success and will help his/her career but will not be of major importance. The other will be a complete success or a complete failure. If successful it will lead to a cure for a disease which leaves children blind and mentally retarded. Please indicate the lowest probability for the important project being successful that you would accept before recommending that the doctor pursue that project.

Risky Majority

_____ 1 in 10	17%
_____ 2 in 10	20%
_____ 3 in 10	3%
_____ 4 in 10	17%
_____ 5 in 10	17%
_____ 6 in 10	3%
_____ 7 in 10	13%
_____ 8 in 10	7%
_____ 9 in 10	0%
_____ 10 in 10	3%

A college senior planning graduate work in chemistry may enter University X where, because of rigorous standards, only a fraction of the graduate students manage to obtain a Ph.D., or may enter University Y which has a poorer reputation but where almost every graduate student obtains the Ph.D. What is the lowest probability of obtaining the Ph.D. that you would accept before recommending that the graduate student enter University X?

	<u>Risky Majority</u>
☐ 1 in 10	7%
☐ 2 in 10	7%
☐ 3 in 10	7%
☐ 4 in 10	30%
☐ 5 in 10	13%
☐ 6 in 10	13%
☐ 7 in 10	13%
☐ 8 in 10	10%
☐ 9 in 10	0%
☐ 10 in 10	0%

A person involved in an airplane accident must choose between rescuing only his/her child or attempting to rescue both the child and his/her spouse with the realization that both will die if the attempt is unsuccessful. Please indicate the lowest probability of the rescue being successful that you would accept before recommending an attempt to rescue both the child and the spouse.

	<u>Risky Majority</u>
_____ 1 in 10	33%
_____ 2 in 10	7%
_____ 3 in 10	13%
_____ 4 in 10	13%
_____ 5 in 10	10%
_____ 6 in 10	3%
_____ 7 in 10	7%
_____ 8 in 10	3%
_____ 9 in 10	0%
_____ 10 in 10	10%

Risky-Unambiguous Items

The captain of a college football team in the final seconds of a game with the team's traditional rival may choose a play which is almost certain to produce a tie score, or a more risky play which will lead to sure victory if successful, sure defeat if not. Please mark the scale position which most accurately represents the recommendation you would make to the football team captain.

Strongly Recommend
Playing for the Win

Risky Majority

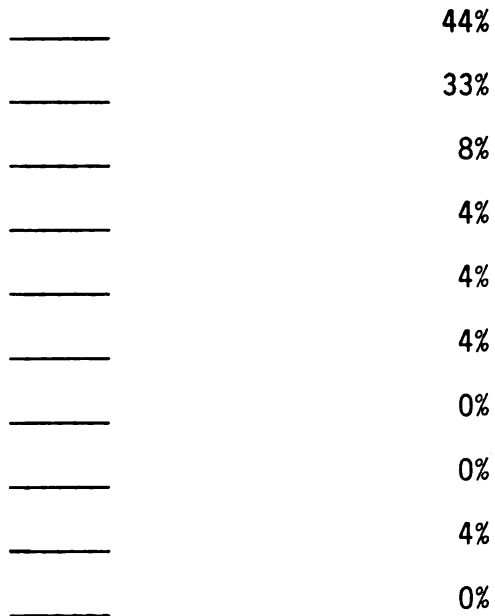
_____	37%
_____	22%
_____	19%
_____	11%
_____	0%
_____	0%
_____	7%
_____	0%
_____	0%
_____	4%

Strongly Recommend
Playing for the Tie

A recent medical school graduate is choosing between two long-term projects. One is almost certain to be a success and will help his/her career but will not be of major importance. The other will be a complete success or a complete failure. If successful it will lead to a cure for a disease which leaves children blind and mentally retarded. Please mark the scale position that most accurately reflects the recommendation you would make to the doctor.

Strongly Recommend
Working on the
Important Project

Risky Majority



Strongly Recommend
Not Working on the
Important Project

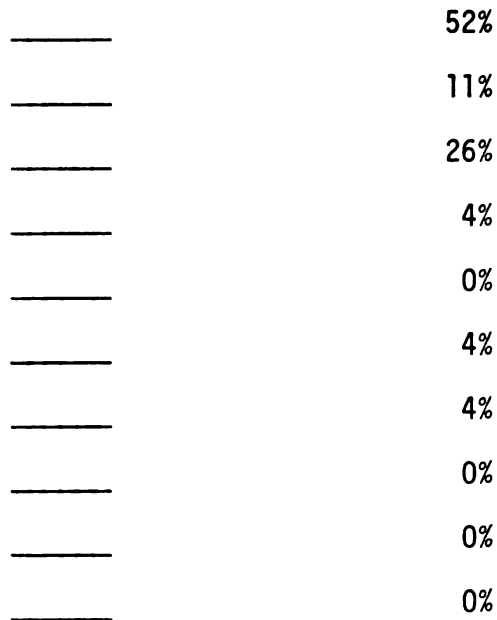
A college senior planning graduate work in chemistry may enter University X where, because of rigorous standards, only a fraction of the graduate students manage to obtain a Ph.D., or may enter University Y which has a poorer reputation but where almost every graduate student obtains the Ph.D. Please mark the scale position that most accurately represents the recommendation you would make to the graduate student.

Strongly Recommend Attending University X	<u>Risky Majority</u>
_____	11%
_____	7%
_____	30%
_____	19%
_____	4%
_____	4%
_____	4%
_____	11%
_____	7%
_____	4%
Strongly Recommend Attending University Y	

A person involved in an airplane accident must choose between rescuing only his/her child or attempting to rescue both the child and his/her spouse with the realization that both will die if the attempt is unsuccessful. Please mark the scale position that most accurately represents the recommendation you would make to the accident victim.

Strongly Recommend
Attempting to
Save Both

Risky Majority



Strongly Recommend
Attempting to Save
the Child Only

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