Effect of Role Imposed Academic Abilities on Group Induced Risk Shift with Choice Dilemma Questionnaire Items

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EFFECT OF ROLE IMPOSED ACADEMIC ABILITIES ON GROUP INDUCED RISK SHIFT WITH CHOICE DILEMMA QUESTIONNAIRE ITEMS

by

Sang H. Han

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
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Sang H. Han
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INTRODUCTION

Early Background and Old Approach

People make decisions every day, whether they are minor or important ones. Sometimes they make decisions individually, and sometimes they make them as a group. In the latter case, it often happens that each individual makes his tentative decision and then discusses the same problem with other individuals in a group situation to arrive at a group decision. People have been curious to know how such a group decision following discussion differs from an individual decision. It is also of some practical importance to know the difference, if there is one.

There are many dimensions on which the decision can vary. One of the dimensions is riskiness. One conspicuous decision involving risk was that of the Cuban missiles in 1962. People often wonder whether such a critical decision should be made by one individual or by a group. Stoner (1961) compared the two kinds of decision-making processes on a risk dimension and found that group decisions are riskier than individual ones. Soon after his experiment, several studies replicated his findings (Marquis, 1962; Rim, 1964 a, b; Wallach, Kogan and Bem, 1962; Wallach, Kogan and Bem, 1964).

The typical instrument of these experiments was the Choice Dilemma Questionnaire (CDQ), where the central character in each hypothetical situation faces two alternatives: one alternative, whose chances are uncertain, brings more desirable outcomes if successful; the other
is a sure alternative in terms of chances, but the outcome is less desirable. The subject is asked to choose the lowest odds if he takes the uncertain alternative. The chances are usually expressed as 1,2,3,4,5,6,7,8,9 or 10 chances in ten. Therefore, the lower the odds the subject chooses, the riskier his decision is. Typically, subjects are imposed in a role of the advisor to the central figure, rather than a role of the central figure. A test-retest design is employed in the research. In this design, subjects are first asked to make a decision individually on each problem situation. The same subjects are later assigned to a group where they make a unanimous decision on the identical problem through a group discussion. The means of pre- and post-discussion scores are statistically compared. If the mean score of group decisions is significantly lower than that of individual decisions, the results are interpreted that groups are riskier than individuals. That is why it was called a risky shift phenomenon.

People generally believed that the group stifles individual's ideas and take a conservative rather than a new and bold course when Stoner introduced the risky shift phenomenon. In other words, his findings were the introduction of a contradiction to the then well-accepted social conformity theory. This also accounts for the surge of interest in the risky shift phenomenon in the early 1960's. As the evidence for the risky shift phenomenon accumulated, the phenomenon was believed to be reliable and researchers raced to find the explanation of the phenomenon. Some of the explanations are familiarization (Bateson, 1966), diffusion of responsibility (Marquis, 1962),
and leadership (Rim, 1965).

Meanwhile, contradictory evidence that groups could be more cautious than individuals was first presented by Nórdhy (1962) in his master's thesis. After a careful examination of the experimental data, including tape recordings used by Stoner, Nórdhy and Marquis found out that one of the twelve items adopted by Stoner had shown a cautious shift following group discussions, while six items had shown risky shifts. Nórdhy, therefore, hypothesized that culturally accepted values affect the group discussion in such a way that arguments consistent with these values are readily accepted. He wrote a number of life situation items on which he felt cultural values favor cautious actions. He successfully demonstrated that group decisions are more cautious than individual decisions following group discussions with two items of his questionnaire.

Around that time, R. Brown (1965) devoted a whole chapter to this topic and discussed so-called value theory in his social psychology textbook. According to the theory, the widely accepted value dictates a risky or cautious action in a specific life situation. And group discussions lead participants to discover that they are not as risky or as cautious as they had believed. Therefore, they would shift to the direction which is more consistent with the cultural value. The strength of the value theory approach was that it could explain no shift and cautious shifts as well as risky shifts. As a result of these efforts, we now know that we can make either risky or cautious shift items, even though it is harder to make cautious shift items than risky shift ones.
Since Brown formulated the risk as value hypothesis, it has been tested directly and indirectly by many researchers. One of the first tests were done by Wallach and Kogan (1965), and their findings did not support the value hypothesis. In this experiment, subjects silently exchanged information on their initial individual decisions and revised their decisions until consensus was achieved. No significant risky shift was found. Teger and Pruitt (1967) criticized the Wallach and Kogan research on the grounds that the method employed seemed to force group members to converge on the mean of the initial individual decisions by requiring group consensus. Therefore, in their experiment, subjects were not required to reach consensus, but asked to compare group members' decisions and make a new decision. Significant difference between the initial decision and the revised decisions was found, and it was interpreted as an evidence for Brown's value of risk theory.

Madras and Bem (1968) also tested the value hypothesis with semantic differential scales. The scales included weak-strong, passive-active, unsuccessful-successful, slow-fast, soft-hard and feminine-masculine dimensions. They tested if the ratings of the high risk taker is different from the ratings of a more conservative decision maker. The results showed a significant difference in evaluation. It appeared to be direct evidence for value of risk, and so Brown's position was strengthened. Another study by Stoner (1968) provided support for the value hypothesis. In this experiment, subjects were asked to guess choices of other people like them before discussion. The subjects consistently predicted that they were
relatively riskier than their self-reference group on risk oriented items. During discussion, the subjects found out that they were not as risky as they had thought, and they shifted toward the extreme to a significant extent. He concluded that the results seem to be more consistent with the value hypothesis than with any other.

Stoner further suggested that to find out how the widely held value affects group decisions, it would be important to understand the group induced shift. His suggestion later generated two arguments. One is "Dominant values influence the flow of information so that they affect group decisions," and the other is "Information of others' choice itself is sufficient enough to change one's initial choice." The former is basically represented by persuasive arguments, the latter by the interpersonal comparison approach, which fits Brown's value theory.

Bernstein, Vinokur and Trope (1973) directly compared these two alternative explanations. They found out what makes a difference is not the information of others' choices, but the number of arguments presented to subjects. The results showed that reliably higher evaluations are given to certain and confident respondents as compared with uncertain and unconfident ones, regardless of the direction of choice.

Later, Blascovich, Ginsburg and Veach (1975) presented contradictory evidence to persuasive argument theory. They employed a gambling task (blackjack). They found a significant difference between individual decision and group decision-making conditions, but no difference was found between groups with discussion and groups
without discussion in terms of risk. In effect, they demonstrated that a risky shifts occur without discussions in group decision. In the same year, more direct evidence for an interpersonal comparison theory was presented by Schwartz, Loomis and Herbert. They employed the standard CDQ and manipulated the group norms of individual choices by giving false information. As in a standard CDQ experiment, subjects in this experiment made their initial choices on each life situation. Subjects were then given (false) information about the mean scores, which was one standard deviation lower (or riskier) than the actual mean scores on risky items. They were later asked to make a decision the second time without discussions. They shifted toward risk to a significant extent. On the other hand, subjects given (false) information of mean scores higher (more cautious) than the actual scores, moved toward caution. On the whole, as evidence supportive of each approach accumulates, the argument is far from being resolved.

New Approach

Meanwhile, a quite different way of looking at risky shifts was introduced by Jellison and Riskind (1971). They found that the greater the general ability of a person, the higher the risk he is expected to take. They therefore suggested that ability is a major determinant of how much risk a person will take. Later, in 1972, they also compared rating of low risk bettors and high risk bettors in a skill condition, where subjects were told that a skill is a determining factor of success. There was a significant difference
in ratings for the adjectives capable, clever, competent, creative, innovative, insightful, and wise. On the other hand, there was no difference in a chance taking situation, where chance was said to be a determining factor. With semantic differential scales (1970), they earlier found that there was no difference in the ratings of being 'honest' between high risk bettors and low risk bettors. No difference was found in the ratings for 'likeable' either. These two adjectives, according to Jellison and Riskind, seem to be excellent indicators of positive human characteristics. They concluded, therefore, that the assumption of universal value of risk in Brown's value hypothesis seem questionable and upheld a social comparison of abilities interpretation.

Vinokur (1971) suggested that the risky shift would be the result of a rational decision-making process, and presented an equation for the minimum acceptable probability with the utility concept as follows:

\[
P = \frac{U_c - U_f}{U_s - U_f}
\]

Where \( P \) : minimum acceptable probability, or point of indifference

\( U_s \) : utility of successful outcome if risky alternative is taken

\( U_c \) : utility of sure alternative outcome

\( U_f \) : utility of the outcome if the gamble fails

He suggested that group discussions facilitate the change in the value of various outcomes and may result in lowering the minimum probability. As a result, the shift in probability is observed.
Kahn (1975) combined the social comparison of abilities approach with Vinokur's expected utility model and presented the subjective expected utility (SEU) model. In this model, he differentiated subjective probabilities from objective probabilities. According to Kahn, objective probabilities are across persons, average and general, but subjective odds are personal and situation specific. For example, if the chances are 5 out of 10 that an average soccer player will make a goal with a penalty kick, the probability would be much higher than .5 for one of the best players to make a point, but the probability would be lower than .5 for a poor player to make it. Therefore, although objective odds are the same, the subjective probabilities can be different for a different individual.

He also distinguished a true risky shift from the SEU interpretation of risky shift. The former is referred to as a shift in subjective probability of success, and the latter is the shift in only objective probabilities, but not in subjective probabilities. According to his interpretation, the shift in objective probabilities could arise from either a change in the utility of the various outcomes or from a change in subjective probability function relating objective odds to subjective ones. For example, a college senior has been offered a job upon graduation and has also been accepted into a doctoral program in University A. His acceptable level of risk may be decided on the basis of his value (utility) evaluation of the Ph.D. degree, the job and failure. If he values the Ph.D. degree to a moderate degree, but is much bothered by the idea of failure, his risk level may be very low. After a group discussion,
however, if his value on the three outcomes is changed so much that he values the Ph.D. degree very highly, and is not much bothered by the idea of failure, his risk level will become high. This is an explanation of risky shifts based on the expected utility model (EU). In this model, Vinokur implicitly makes an assumption that the relative frequencies on the CDQ items accurately represent the individual's subjective probabilities of success. Kahn, however, suggests that objectively presented relative frequencies on the CDQ questionnaire are not personal or subjective probabilities but objective probabilities. Therefore, $P$ in Vinokur's equation would be replaced with $S$ to indicate subjective probabilities, and the corresponding objective probabilities should be figured out from these subjective probabilities. This is why he labeled his modification of the EU model as an SEU model.

As mentioned earlier, Kahn Differentiated a shift in subjective probability from the shift in the subjective probability function. He also suspected that ability is a possible factor in changing the subjective probability function, and that group discussions makes the ability more salient and results in increased general perception of ability. He therefore hypothesized that risky shift following group discussion is due to change in the subjective probability function. In the results of this experiment, there was no difference between the initial choice and the revised choice following group discussion in terms of subjective probabilities of success, even though there was a significant difference between the two choices in terms of objective probabilities. Therefore, he interpreted the
risky shift in CDQ items as a result of change in subjective probability function. In other words, the same subjective probability can be expressed in different objective odds because the discussion affects the relationship between objective odds and subjective odds. However, he could not exclude the possibility of shift in utilities from his explanation of the risky shift.

The Purpose of the Present Study

As Kahn mentioned, if the risky shift in the standard CDQ experiment is not an advocated risk, which is a shift in subjective probabilities, the various competing explanations of the advocated risk are technically moot. It will be a turning point in studies of risk shifts if his findings are true. He assumed that the ability is the possible factor changing the subjective probability function, but he did not test the effects of the ability directly. In the present study, in order to measure the effects of the ability factor in the context of risky shifts, academic ability is employed, which is a relevant ability in an academic situation. The academic ability of the hypothetical person is clearly expressed in the instruction of the CDQ questionnaire. Three experimental conditions are employed to manipulate an academic ability factor: in condition A, subjects are imposed in a role of a good student in condition B, subjects play a role of a poor student; in condition C, as in the standard CDQ experiment, subjects are asked to pretend to be advisors to the central character. This study includes five life situations. Three are academic ability related, and the other two are unrelated to academic ability.
Kahn also suggested that the chances of success written on the CDQ items represent objective probabilities. It seems to be contrary to the general belief. In his experiment, subjects differentiated subjective odds from objective odds. It might be the results of the particular experimental design to 'prod' the subjects to distinguish them. In the standard risk shift experiments, subjects were not forced to differentiate between them. In the present experiment, therefore, without forcing subjects to do so, his two assumptions are tested, which are the differentiation of the two kinds of probabilities and the effects of the ability factor. Conditions A (good student role) and B (poor student role) are compared in terms of initial choices to see if there are significant differences between the two conditions. If there are significant differences, it may be differences in objective probabilities, for there is no good reason to assume that the subjective probability of subjects is different in the two conditions, because subjects have been randomly assigned to each condition. It can also be said that subjects differentiate the two kinds of probabilities without being forced to do so.

Another reason why the ability of the central character is defined is to make the situation more realistic because, in most real decision making situations, the level of required ability is known to the decision maker. In the standard CDQ items, however, the ability of the central character is not mentioned.

Kahn suspected that group discussion increases the perception of ability, but it was not clear that the group paid attention to
the ability factor in his experiment. In this experiment, in order to prevent subjects from overlooking an ability factor, the academic ability was described for conditions A and B in the instructions. As the academic ability of the central character is described in an imposed role, the group is likely to talk about the ability factor during discussion. However, if the central character is very well defined with respect to his academic ability, there is no need to increase the perception of the ability through discussion. In this experiment, therefore, three broadly defined ability levels were employed. More specific descriptions of ability were not employed because the experimental effect of "discussion" would not be expected to appear if the exact degree of ability were defined. Therefore, it is possible that a difference in shift toward risk between conditions A and B on the academic ability related items are a result of group discussions increasing the perception of the ability. As mentioned above, two different kinds of items are used. The reason for doing this is to see the effects of the ability on the two different kinds of items. In other words, the purpose is to see whether or not the academic ability factor also affects decisions on academic ability unrelated items. If the ability affects only decisions on academic ability related items, it supports indirectly the social comparison theory of ability. From the above reasoning, the following hypotheses were generated:

First, good student role subjects take more risk than poor student role subjects in terms of initial choices on the academic ability related situations.
Second, good student role subjects shift more toward risk than poor student role subjects following group discussions on the academic ability related situations.

Third, there is no difference among the three conditions on the nonacademic ability situation.
METHODS

Subjects
The subjects were 67 graduate and undergraduate students at Western Michigan University.

Materials
A booklet containing five items depicting hypothetical life situations was used with the first page presenting instructions. Three out of five items were adopted from other previous choice dilemma questionnaire (Wallach and Kogan, 1964) experiment's material, all three proven risky shift items, and the other two were newly written as risky items for this experiment. The probability scale was divided into 10 points, and each point was verbalized in terms of chances, while some other experiments used a 5 point scale (1, 3, 5, 7, and 9). The five items are described on the next five pages.

Procedure
The subjects were randomly assigned to one of three role conditions at the beginning of the experiment:

Condition A - Role of good students who are students in the top 25% of the class, receiving good grades without considerable effort. (24 subjects)

Condition B - Role of poor students who have a hard time
Situation One

Mr. A is currently a college senior who is very eager to pursue graduate study in chemistry leading to the Doctor of Philosophy degree. He has been accepted by both University X and University Y. University X has a world-wide reputation for excellence in chemistry. While a degree from University X would signify outstanding training in this field, the standards are so very rigorous that only a fraction of the degree candidates actually receive the degree.

University Y, on the other hand, has much less of a reputation in chemistry, but almost everyone admitted is awarded the Doctor of Philosophy degree, though the degree has much less prestige than the corresponding degree from University X.

Listed below are probabilities or odds that Mr. A would be awarded a degree at University X, the one with the greater prestige.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. A to enroll in University X rather than University Y.

_____ The chances are 1 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 2 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 3 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 4 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 5 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 6 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 7 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 8 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 9 in 10 that Mr. A would receive a degree from University X.
_____ The chances are 10 in 10 that Mr. A would receive a degree from University X.
Situation Two

Mr. H, an electrical engineer who is married and has one child, has been working for a large electronics corporation since graduating from college five years ago. He is assured of a lifetime job with a modest though adequate salary, and liberal pension benefits upon retirement. On the other hand, it is very unlikely that his salary will increase much before he retires.

While attending a convention, Mr. H is offered a job with a small, newly founded company which has a highly uncertain future. The new job would pay more to start and would offer the possibility of a share in the ownership if the company survived the competition of the larger firms.

Listed below are probabilities or odds of the company proving financial sound.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. H to take the new job.

- The chances are 1 in 10 that the new company would survive the competition of the larger firms.
- The chances are 2 in 10 that the new company would survive the competition of the larger firms.
- The chances are 3 in 10 that the new company would survive the competition of the larger firms.
- The chances are 4 in 10 that the new company would survive the competition of the larger firms.
- The chances are 5 in 10 that the new company would survive the competition of the larger firms.
- The chances are 6 in 10 that the new company would survive the competition of the larger firms.
- The chances are 7 in 10 that the new company would survive the competition of the larger firms.
- The chances are 8 in 10 that the new company would survive the competition of the larger firms.
- The chances are 9 in 10 that the new company would survive the competition of the larger firms.
- The chances are 10 in 10 that the new company would survive the competition of the larger firms.
Situation Three

Mr. B has been promised a good job by a large corporation if he graduates by the end of the present semester with a grade of "B" or better. Most students would consider the job most desirable. In order to graduate by the end of the semester, Mr. B must take 21 credit hours. He is used to taking 14 or 15 credit hours a semester. He wonders if he can maintain a B average and take 21 hours. If he gets bad grades, it will affect his career, as the 21 hours will be in his major.

Listed below are probabilities or odds that Mr. B would get a grade of "B" or better. Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. B to take 21 credit hours.

- The chances are 1 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 2 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 3 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 4 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 5 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 6 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 7 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 8 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 9 in 10 that Mr. B would get a grade of "B" or better.
- The chances are 10 in 10 that Mr. B would get a grade of "B" or better.
Situation Four

Mr. P has had a plane accident in the desert. The plane is on fire, but he has managed to escape. However, his wife and three-year-old son are still in the plane. He sees two alternatives. The first alternative would save his son but not his wife. The second alternative would save both his wife and son but is not a sure alternative, because if he fails, he loses both his wife and son.

Listed below are probabilities or odds that Mr. P would save both of them. Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. P to take the second alternative.

_______ The chances are 1 in 10 that Mr. P would save both his wife and son.
_______ The chances are 2 in 10 that Mr. P would save both his wife and son.
_______ The chances are 3 in 10 that Mr. P would save both his wife and son.
_______ The chances are 4 in 10 that Mr. P would save both his wife and son.
_______ The chances are 5 in 10 that Mr. P would save both his wife and son.
_______ The chances are 6 in 10 that Mr. P would save both his wife and son.
_______ The chances are 7 in 10 that Mr. P would save both his wife and son.
_______ The chances are 8 in 10 that Mr. P would save both his wife and son.
_______ The chances are 9 in 10 that Mr. P would save both his wife and son.
_______ The chances are 10 in 10 that Mr. P would save both his wife and son.
Situation Five

Mr. K has been offered a job as an accountant upon his graduation with a bachelor's degree in accounting at a salary of $9,000 a year. However, he is considering taking the CPA (Certified Public Accountant) examination because he will have a more promising future as well as a better salary if he passes the examination. It is well known that the CPA examination is very difficult to pass. He is considering sacrificing the job in order to prepare for the examination, in that it is not possible to take the examination and accept the job at the same time.

Listed below are probabilities or odds that Mr. K would pass the examination. Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. K to take the exam.

- The chances are 1 in 10 that Mr. K would pass the exam.
- The chances are 2 in 10 that Mr. K would pass the exam.
- The chances are 3 in 10 that Mr. K would pass the exam.
- The chances are 4 in 10 that Mr. K would pass the exam.
- The chances are 5 in 10 that Mr. K would pass the exam.
- The chances are 6 in 10 that Mr. K would pass the exam.
- The chances are 7 in 10 that Mr. K would pass the exam.
- The chances are 8 in 10 that Mr. K would pass the exam.
- The chances are 9 in 10 that Mr. K would pass the exam.
- The chances are 10 in 10 that Mr. K would pass the exam.
keeping up with their classes. (21 subjects)

Condition C - Role of advisors to the hypothetical figure facing choice dilemma whose roles were typical in the previous experiments with the CDQ. (22 subjects)

A control group which did not have group discussion was eliminated from this experiment because the previous experiments repeatedly showed that there was no difference between two identical booklet administrations. In the first two conditions, subjects had an opposite role to each other's conditions in terms of academic performance in the class. Therefore, the role and discussion may affect the decisions on the problem situations related to academic abilities. The third role condition was employed to see if the same results would be obtained as those of the previous experiments. Group sizes ranged from 4 to 6 persons per group: 5 four-person groups, 7 five-person groups, and 2 six-person groups. At the beginning of the first administration of the CDQ questionnaire, subjects were told that they would play a role. The booklets were distributed and they were asked to read the instructions carefully. On the first page, the instructions were explicitly written and the sentences concerning the role playing were underlined. The instructions were as follows:

There are five situations depicted on the following pages. Please read these and decide what is your opinion as if you were the person faced with making a difficult decision in the problem. Assume that the two alternatives, the one which is the most doubtful of success would be the best if it were successful. Suppose that you are a student in the top 25% of the class who receives good grades without considerable effort. Think of yourself as the person in the
Suppose that you are a student having a hard time keeping up with your classes, and that you have to study twice as much as other students with the same classes. 

___________________________. (for condition B) 

__________________________ as if you were an advisor to the person faced with making a difficult decision in the problem. 

__________________________. If you take that alternative, you are to pick the lowest probability of success that he should accept. Think of yourself as being in a position where the person must take the advice that you give him. (for condition C)

During the first part of the experiment, no talking was allowed, but they were allowed to ask questions to the examiner. Subjects were allowed to have as much time as they wanted. All the subjects finished within 15 minutes. The second part of the experiment was administered with a time limit of 25 minutes, but a maximum of 30 minutes was allowed if needed. This time, the experimenter also answered questions about the instructions. The identical booklet was distributed with different instructions, and each subject had the same role as in the first part of the experiment. The second set of instructions were as follows:

The questionnaire you now have in front of you is the same as the one that you completed before. It was administered to you so that you could familiarize yourself with all of the situations. Now discuss the problem as a group, one problem at a time. During the discussion, suppose that you were a student in the top 25% of the class who receives good grades without considerable effort. I would like you to try to arrive at a unanimous decision if possible on each problem. If you are unable to arrive at a unanimous decision after discussing the problem, please indicate the decision of the majority by
marking an M an your individual decision by marking an X. Please do not feel bound by what you marked as your decision on the practice booklet. Whether or not you change, or how much you change is not important. What is important is that you discuss each problem seriously and reconsider each answer carefully. (for condition A)

_________________________, suppose that you were a student having a hard time keeping up with your classes, and who studied twice as much as other students with the same classes.

_________________________. (for condition B)

_________________________, suppose that you were an advisor to the person in the problem situation.

_________________________. (for condition C)

As shown in the instruction, in order to prevent a deadlock to reaching unanimous group decision, majority opinions were allowed if the groups faced a deadlock situation. The order of presentation changed with respect to the academic ability related items as well as with the two nonacademic items, thus preventing any possible "order effect" among situations.
RESULTS

Table 1 shows the pre-post scores for each role playing condition. Only 4 out of 15 possible combinations of situations and experimental role conditions are statistically significant at the 5% level using correlated t tests. Some of the previous CDQ studies showed reliable prediction of post-discussion scores based on the initial scores, which they claim as evidence for a group polarization (Moscovici and Savalloni, 1969; Blahut, 1973). But the mixed results in this experiment do not allow prediction of the direction of post-discussion scores on the basis of pre-discussion scores which are initial scores.

One interesting finding is that on the three academic oriented items, the magnitude of shift following discussion is larger in the first two role conditions than in the advisor role condition. This may be because the academic ability information helps the subjects to be more involved in the discussion.

Table 2 shows the initial choices of two conditions of each situation. The first three are academic ability related items and the other two are not. There is no significant difference in initial choices between conditions A (good student roles) and B (poor student roles) across all five situations.

The first situation describes a student pursuing a Ph.D. degree in chemistry. The previous experiments successfully showed that it was a risky item. In this experiment none of the three role groups made a significant shift in either direction following the discussion. Interestingly enough, the good and the poor student role
<table>
<thead>
<tr>
<th>Situation</th>
<th>Role Group</th>
<th>Pre- Mean</th>
<th>Post Mean</th>
<th>Observed Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>One (Ph.D.)</td>
<td>A (good)</td>
<td>5.4</td>
<td>4.875</td>
<td>-.525</td>
</tr>
<tr>
<td></td>
<td>B (poor)</td>
<td>5.33</td>
<td>6.0</td>
<td>+.67</td>
</tr>
<tr>
<td></td>
<td>C (Advisor)</td>
<td>4.136</td>
<td>4.32</td>
<td>+.184</td>
</tr>
<tr>
<td>Two (Engineer)</td>
<td>A</td>
<td>4.875</td>
<td>4.83</td>
<td>-.45</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>5.52</td>
<td>4.90</td>
<td>-.62</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>5.00</td>
<td>5.23</td>
<td>+.23</td>
</tr>
<tr>
<td>Three (B grade)</td>
<td>A</td>
<td>5.7</td>
<td>6.7</td>
<td>+1.00</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>5.67</td>
<td>7.19</td>
<td>+1.05*</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>5.68</td>
<td>5.23</td>
<td>-.45</td>
</tr>
<tr>
<td>Four (Plane)</td>
<td>A</td>
<td>2.292</td>
<td>1.375</td>
<td>-.815*</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>2.52</td>
<td>1.43</td>
<td>-1.09*</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>3.41</td>
<td>1.59</td>
<td>-1.82**</td>
</tr>
<tr>
<td>Five (CPA)</td>
<td>A</td>
<td>4.29</td>
<td>3.79</td>
<td>-.50</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>5.19</td>
<td>4.14</td>
<td>-1.05</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>4.86</td>
<td>4.77</td>
<td>-.09</td>
</tr>
</tbody>
</table>

- Shift toward risk
+ Shift toward caution
* P < .05
** P < .01
Table 2

Comparison of Good and Poor Student Role Groups

<table>
<thead>
<tr>
<th>Situation</th>
<th>A (Good)</th>
<th>B (Poor)</th>
<th>Probabilities *</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>5.417</td>
<td>5.333</td>
<td>.886</td>
</tr>
<tr>
<td>Three</td>
<td>5.708</td>
<td>5.667</td>
<td>.958</td>
</tr>
<tr>
<td>Five</td>
<td>4.292</td>
<td>5.190</td>
<td>.173</td>
</tr>
<tr>
<td>Two</td>
<td>4.875</td>
<td>5.524</td>
<td>.340</td>
</tr>
<tr>
<td>Four</td>
<td>2.292</td>
<td>2.524</td>
<td>.723</td>
</tr>
</tbody>
</table>

Situations One, Three and Five are academic ability related items, and Situations Two and Four are unrelated to academic ability.

* Two tail independent sample t test
groups moved in the opposite direction. The three different role conditions yielded a significant difference.

The second situation depicts an electrical engineer who is offered a job from a small firm with an uncertain future. This item was classified as a risky one in Wallach and Kogan's original CDQ research, but in this experiment neither group discussion effects nor role playing effects appear to exist. The role effect was not expected because the content was not related to the central figure's academic ability. Figure 2 shows that the mean scores of all three groups cluster, and little difference between pre- and post-discussion exists. Therefore, it can be said that the three different role conditions did not yield a significant difference.

The third situation is about a student who wonders if he can maintain a B average if he takes 21 credit hours a semester. This item was written as a risky shift one, but has turned out to be a cautious shift one. It might have been a risky shift item if one sentence had been eliminated, which is 'If he gets bad grades, it may affect his career, as the 21 hours will be in his major.' This may be a good example of slight change in content, which can change a risky shift item into a cautious item or vice versa. Both the good student and the poor student role playing groups became more cautious, but the advisor group did not shift in either direction. The discussion treatment affected each group differently. Figure 3 also tells us that group discussion and interaction effects are significant at a 5% level.

In the fourth situation, the hypothetical person has an accident,
Figure 1

Situation One

Sources of effects
A  - Role group
B  - Pre & Post Discussion
A x B

Probabilities *
A  - Role group .011
B  - Pre & Post Discussion .744
A x B .164

Number of chances in 10

Pre Post

* Probabilities are from 2 way repeated measure ANOVA with a repeated factor being pre- and post-scores.
Figure 2

Situation Two

Source of effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Roles groups</td>
<td>.758</td>
</tr>
<tr>
<td>B - Pre &amp; Post Scores</td>
<td>.599</td>
</tr>
<tr>
<td>A x B</td>
<td>.402</td>
</tr>
</tbody>
</table>

Number of chances in 10

- Good Student
- Poor Student
- Advisor

Pre Post
Figure 3

Situation Three

Source of effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Role group</td>
<td>.189</td>
</tr>
<tr>
<td>B - Pre &amp; Post Scores</td>
<td>.033</td>
</tr>
<tr>
<td>A x B</td>
<td>.038</td>
</tr>
</tbody>
</table>

![Graph showing the number of chances in 10 for Pre and Post stages for Good Student, Poor Student, and Advisor.]

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and his wife and son need help to get out of the plane on fire. This item was taken from the original CDQ questionnaire (Wallach and Kogan, 1959), and the previous experiments consistently showed that the item is a risky shift one, which means the presence of discussion effects. The role playing effects among groups were not expected because the content does not deal with academic performance. The results are congruent with the above hypothesis. Therefore, there is no interaction effect. During this experiment, a question had been raised with respect to the content of the item. If there are some chances to save both wife and son, would it be ethical to save one at the expense of the other only because the successful results of that alternative seem apparent? It is suspected that the answer would be 'No' and that the item involves ethical problems in a sophisticated manner. It is, therefore, questionable whether the item is an appropriate one to measure a shift on a risk-caution dimension.

In the last situation, an accounting student is in a situation where he has to choose to take a CPA examination or a job in his major. The item was designed as a risky item. Even though all three groups moved toward risk, the group discussion treatment did not produce any significant difference. As shown in Figure 5, the poor student role group took more risk than the other two, which is not statistically significant. This item may be a good example of a situation where risk is seemingly desirable, but actually this is not the case. These results also suggest that we cannot tell if a specific situation facilitates risk through group discussion until the

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item is actually tested.
Figure 4

Situation Four

Source of effects

A - Role group
B - Pre & Post Scores
A x B

Probabilities

A - Role group      .348
B - Pre & Post Scores .000
A x B              .424

Number of chances in 10

Pre Post

Good Student
Poor Student
Advisor

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Figure 5
Situation Five

Source of effects
A - Role group
B - Pre & Post Scores
A x B

Probabilities
A - Role group .342
B - Pre & Post Scores .119
A x B .579

Number of chances in 10

Pre Post

Good Student
Poor Student
Advisor
DISCUSSION

In this experiment, the subjects in the first two conditions (the good and the poor student roles) were instructed to pretend to have different levels of academic ability. Therefore, they are expected to have different objective probabilities if they have the same subjective probabilities and if ability dictates the relationship between the objective and subjective probabilities. There is no apparent reason to believe that the subjects in role condition A are different from those in role condition B in their subjective probabilities of success, because they were randomly assigned to the two conditions. On the three academic ability related items, however, the good student role subjects and the poor student role subjects are not significantly different in terms of their initial individual scores. These results do not support the hypothesis that the individuals with higher ability are expected to take more risk in terms of the objective probabilities. Then why is there no difference between the two role conditions? There are two possible explanations. One is that ability does not affect the relationship between the two probabilities. Therefore, the equations representing the relationship for the two conditions are not different. But, as mentioned in the soccer player's example, this explanation does not agree with our experience and logical reasoning. Furthermore, there is no experimental support for it. The other is that the subjects did not differentiate the objective odds from the subjective ones, and the subjects possibly perceived
the chances on the CDQ questionnaire as the subjective probabilities. The latter can also explain why the results of this experiment do not support Jellison's hypothesis, which is that the greater the general ability of a person, the higher the risk he is expected to take.

As mentioned earlier, Kahn suggested that ability is a possible determining factor changing relationships between objective probabilities and subjective probabilities during the discussion. The second hypothesis was derived from this suggestion. However, the results of the present study do not support this hypothesis, which is that good student role subjects shift toward risk more than poor student role subjects after discussion in three academic related situations. In situation one, the good student group moved toward risk and the poor student group toward caution. It is, however, not statistically significant. In situation three, both groups moved toward caution. The shift of the good student group is almost significant at a 10% level, and the shift of the poor student group is significant at a 5% level. These results are hard to explain with either the social comparison theory of ability or the SEU model. The results in situation five are also difficult to explain with the SEU model because the magnitude of shift toward risk is larger in the poor student role group than in the good student role group, even though they are not significant. In other words, the results of the three academic ability related situations proved the second hypothesis untrue and also weakened Kahn's assumption about the ability.
The third hypothesis is that there is no difference among the three role conditions on nonacademic ability items. The results support the hypothesis, but it has little value after the first two hypothesis concerning the effect of academic ability on decisions on academic related situations have not been supported true. Therefore, it is concluded that the results of this experiment fail to support another recent explanation of the 'risky shift.'

In order to make certain that the results of the previous standard CDQ experiments are reliable, the advisor's role condition (the third condition in this experiment) was employed as a duplicate of the standard CDQ experimental design. Unexpectedly, the results of advisor role conditions are, at best, mixed. Even though three out of five items employed in this experiment were repeatedly classified as risky shift items in the previous experiments (Stoner, 1961, 1968), only one of them succeeded in replicating the previous results in the present study. This raised a fundamental question about the shift following group discussion. Are group induced shifts reliable?

It has been 15 years since Stoner's original finding was presented, but we still do not know how reliable the group induced shift is, and we do not know what the determinants of the shift are. As briefly mentioned in the introduction, many researchers tried to explain the shift, and they presented contradictory evidence to one another. As a result, we are now more confused than at the beginning. Some of the reasons for the confusion seem to be over-generalization and unnaturalness of the experimental settings. First, over-generalization is often found in the research. For example, results from
experiments employing gambling situations have been used to discredit the results from the experiment with CDQ items, and vice versa (McCauley, Stitt, Woods and Lipton, 1973; Zajonc, Wolosin, Wolosin, and Sherman, 1969). These two kinds of situations have different characteristics, and so each one may represent a different kind of risk-taking behavior. Second, unnaturalness is one of the disadvantages of laboratory experiments. But the laboratory experiment is justified when it includes the essential features of a real situation. How well has the research involving shifts satisfied the condition? We cannot think of risk taking without assuming the consequences of a decision. The more serious the consequence is, the more difficult the decision making involving risk becomes. Accepting consequences is a critical factor in real life risk taking. It does not seem that we have taken the factor seriously so far. In a standard CDQ experiment, the subject who plays the advisor's role does not virtually assume any undesirable or desirable consequence from his decision making. Even in some experiments employing gambling or real game situations, the consequences are nominal. For example, subjects did not actually risk losing anything; they won less money if their guess was wrong, or they were given two dollars for horse race betting (Zajonc, Wolosin, Wolosin, and Sherman, 1969; McCauley, Stitt, Woods, and Lipton, 1973). In this respect, it is hard to say that these sorts of experiments test a better representative of risk taking behavior than the standard CDQ experiments. In a real life situation requiring group decisions or an important matter, it is hard to imagine that a group would be allowed to have about five minutes for
discussion. It is also hard to believe that a discussion group would be given only one paragraph of information, with some critical information missing, as in most CDQ items. For instance, academic ability information is not given to the group in a situation like item one in this experiment. There is also a possibility that the effect of 'cue' factor inadvertently distorts the experimental results. In some experiments, the experimenter 'prods' subjects to a certain direction with his instructions and an unrealistic time limit. Otherwise, they might not give a considerable weight to the 'hint' factor (Kahn, 1975). In a real situation, participants are likely to be given much more time and information and assume consequences from their decision in many different ways. Consequently, they may be more involved in the discussion and review the situation in many respects. Therefore, the factor which group members consider most important at the beginning of the discussion may be different from the most important factor at the conclusion of the discussion. That is why the magnitude of the 'cue' factor effect is questioned in a real life situation (Jellison and Riskind, 1971, 1972).

We should first know what the essential features of decision making involving risk are before we study the effect of group discussion on risk taking. Therefore, as Cartwright suggested, it will be more fruitful to study the process in a real situation before attempting to find the determining factors of risk taking behavior and interactions among them.
REFERENCES


