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GROUP INFLUENCE ON INDIVIDUAL RISK TAKING

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This Bulletin is in press in the Journal of  
Abnormal and Social Psychology

Educational Testing Service  
Princeton, New Jersey  
March 1962

## GROUP INFLUENCE ON INDIVIDUAL RISK TAKING

### Abstract

Does group interaction lead to greater conservatism or to greater risk taking in decisions than would obtain were the decisions arrived at individually--or is there an averaging effect? This question was investigated with a procedure in which the protagonist in each of 12 everyday life situations must choose between two courses of action, one of which involves considerably more risk than the other but also is much more rewarding if successful. The S must decide on the lowest level of probability for the success of the risky alternative that he would deem sufficient to warrant its choice.

A total of 218 liberal arts university students participated in the study. In the experimental condition, the Ss first arrived at individual decisions concerning each of the 12 situations; then, they were brought together in discussion groups of six with the request that they reach a group consensus on each decision; and afterward, they were asked to make all their decisions privately once again. Some Ss also made private decisions yet another time two to six weeks later. The group members' judgments of one another's relative degrees of influence and of popularity within the group also were obtained. There were 14 all-male and 14 all-female groups. In the control condition, Ss made their decisions individually each of two times with one week intervening, under instructions the second time that encouraged them to change rather than simply to recall their earlier decisions.

It was found that (1) group decisions exhibit greater risk taking than appears in pre-discussion individual decisions; (2) post-discussion private

decisions exhibit the same increase in risk taking as occurs in the group decisions; (3) the increase in risk taking resulting from the discussion process is still maintained after a subsequent period of two to six weeks has elapsed; (4) no shift in risk taking level occurs over time in the absence of the discussion process; and (5) degree of risk taking in pre-discussion individual decisions and degree of judged influence within the group are positively related. Two interpretations of these findings were suggested, either or both of which may apply: (1) the knowledge that one's decisions are being made jointly with others leads to a diffusion of personal responsibility, the outcome of which is an increased willingness to take risks; (2) high risk takers are more likely to take the initiative in social situations, with the result that they become more influential in the group.

## GROUP INFLUENCE ON INDIVIDUAL RISK TAKING<sup>1</sup>

What are the effects of group interaction on risk and conservatism in decision making? By risk and conservatism we mean the extent to which the decision maker is willing to expose himself to possible failure in the pursuit of a desirable goal. Consider the situation in which several individuals working separately arrive at a series of decisions, and then are brought together to arrive at a group consensus regarding those decisions. What relationship should one expect to find between the individual decisions and the group consensus?

On the basis of prior experimental studies of individual and group judgment (e.g., Schachter, 1951; see also the section on group pressures and group standards, pp. 165-341, in Cartwright & Zander, 1960), we should predict an averaging effect, i.e., group decisions randomly distributed around the average of the pre-discussion individual decisions. Such an effect would seem to imply a process of minimizing individual losses, or minimizing the maximum individual concession. The cited studies report that inducements toward compromise and concession seem to be exerted most strongly toward group members whose initial individual views are most deviant from the central tendency.

An equally, if not more, compelling alternative hypothesis is that the group discussion will lead to increased conservatism, relative to the average of the prior individual decisions. One may cite the observations of Whyte (1956), among others, concerning the outcomes of conferences and meetings in bureaucratic organizations. Whyte argues that the use of committees and teams in the management of business and other kinds of enterprises leads inexorably to an inhibition of boldness and risk taking, a concentration on the conservative course when a choice must be made

between more and less risky courses of action. How are such effects to be explained? First, it may be that the very nature of the group process or atmosphere encourages such a trend: there may be a fear, for example, of appearing foolhardy to others. Alternatively, or in addition, it is possible that the mechanism underlying an increase in conservatism is one of greater influence being exerted within the group by members whose individual conservatism tendencies are stronger. These two interpretations are not incompatible, of course, since the group process, if encouraging of conservatism, will enhance the influence of the initially more conservative members.

Finally, consideration should be given to the remaining and least likely possibility--that group interaction will eventuate in increased risk taking relative to the average of the prior decisions of the group members working separately. In this regard, Osborn (1957) has reported that group interaction may lead to quite radical, bold, problem solutions. While Osborn claims that special conditions must exist if such effects are to be observed, attempts to produce such conditions experimentally (Taylor, Berry, & Block, 1958) have yielded no evidence whatever for the so-called "brainstorming" phenomenon. Thibaut and Kelley (1959, pp. 267-268) discuss the conflicting evidence on this issue. We might, in passing, also mention mass or crowd phenomena, in which extreme actions taken by groups are well beyond the capacities of the members of such groups considered individually (Brown, 1954; Turner & Killian, 1957). The relevance of such mass phenomena to group decision making in a laboratory context, however, is probably quite remote. In sum, increased risk taking as a consequence of group interaction appeared to us to be the least feasible of the three possibilities discussed above.

An examination of the literature reveals little experimental research which addresses itself explicitly to the problem of the present investigation. Lonergan and McClintock (1961) report that membership in an interdependent group led to no significant move toward greater conservatism or risk taking in a betting situation involving monetary gain or loss. Since the group situation was so structured that a consensus was not required, however, this experiment is not directly relevant to the aims of the present study. Hunt and Rowe (1960) report no difference between three-person groups and individuals in riskiness of investment decisions. However, the brevity of the group interaction (15 minutes) and the disruptive influence of having the various groups meet within sight of each other in a large room render their results inconclusive. Atthowe (1961), comparing individual and dyadic decisions in the choice of the better of two alternative wagers, found greater conservatism in the dyadic decisions. But the relevance of this result to the problem at hand is called into question when we learn that the alternative wagers were presented to the Ss as "problems taken from the mathematical reasoning section of an advanced intelligence test and arranged as wagers" (p. 115). This could well contribute to a conservative strategy.

We turn, finally, to a study by Stoner (1961), which provides the starting point for the research to be reported. Using male graduate students of industrial management as Ss, Stoner observed that a group consensus regarding degree of risk to be taken in resolving a "life dilemma" situation deviated from the average of pre-discussion decisions in the direction of greater risk taking. These results took us by surprise. We wondered whether the finding could be generalized to other

subject populations, whether it was an enduring effect, and whether it might have anything to do with relationships between risk taking and perceived group influence.

One issue that arises in interpreting Stoner's study concerns the effect that expectations about one's role might have on the results. Thus, a group of male graduate students of industrial management might make more risky decisions qua group than would each such student individually--the result obtained by Stoner--because the presence of their peers reminds each that one of the positively sanctioned attributes of the business manager role which they occupy or aspire to occupy is a willingness to take risks in their decision making. Stoner's use of a male business school sample, therefore, leaves open the possibility that his results may be a function of this particular group's self-assigned professional role alone. It also is possible that a group of males, regardless of their professional role, might make more risky decisions when gathered together because the presence of other males serves as a reminder that one of the expected indications of manliness in our society is a willingness to be bold and daring in decision making. Conversely, a group of females might make more conservative decisions when gathered together, or at least might fail to shift in a risky direction, since risk taking tendencies are not likely to be mutually reinforced in groups for whom risk is not a positive social value (see, e.g., Komarovsky, 1950; Milner, 1949; Wallach & Caron, 1959).

In the present experiment, we shall employ samples of male and female undergraduates enrolled in a liberal arts curriculum at a large state university. If the effects observed by Stoner are found to hold for

both of the above samples, this would constitute strong evidence for the generality of the phenomenon and its independence of occupational and sex role considerations. Furthermore, the use of previously unacquainted subjects whose ascribed status is initially equal will insure that whatever effects are obtained cannot be attributed to an association between initially high or low status, on the one hand, and risk or conservatism, on the other. If initial status levels were unequal, low status individuals might simply adopt the standards of those whose status is high--an outcome which would tell us nothing about the effect of group interactional processes as such on individual risk taking.

One should distinguish initially ascribed status from status indices (e.g., perceived influence and popularity) derived from the group experience. Since such indices may bear some relation to initial risk taking level, the necessary sociometric-type judgments will be obtained.

Finally, evidence will be presented with regard to the following two questions: Is the group-induced effect on risk taking limited only to the group member's overt compliance in the group setting or does it also extend to his covert acceptance when he makes post-group decisions as an individual (see Festinger, 1953; Kelley & Thibaut, 1954)? To what extent are group effects on individual decision making relatively enduring or short-lived?

#### Method

##### Assessment of Level of Conservatism or Risk Taking

The instrument used for assessing level of conservatism or risk taking, as developed in some of our prior research (Wallach & Kogan, 1959, 1961; Kogan & Wallach, 1961), is called an "opinion questionnaire"

and contains descriptions of twelve everyday life situations. The central person in each situation must choose between two courses of action, one of which is more risky than the other but also more rewarding if successful. For each situation the S must indicate the lowest probability of success he would accept before recommending that the potentially more rewarding alternative be chosen. The probabilities listed are 1, 3, 5, 7, and 9 chances of success in 10, plus a final category (scored as 10) in which S can refuse to recommend the risky alternative no matter how high its likelihood of success.

The situations were so designed as to cover a wide range of content, and may be summarized as follows:

1. An electrical engineer may stick with his present job at a modest but adequate salary, or may take a new job offering considerably more money but no long term security.
2. A man with a severe heart ailment must seriously curtail his customary way of life if he does not undergo a delicate medical operation which might cure him completely or might prove fatal.
3. A man of moderate means may invest some money he recently inherited in secure "blue-chip" low-return securities or in more risky securities that offer the possibility of large gains.
4. A captain of a college football team, in the final seconds of a game with the college's traditional rival, may choose a play that is almost certain to produce a tie score, or a more risky play that would lead to sure victory if successful, sure defeat if not.
5. The president of an American corporation which is about to expand may build a new plant in the United States where returns on the investment would be moderate, or may decide to build in a foreign

country with an unstable political history where, however, returns on the investment would be very high.

6. 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 receive the Ph.D., or may enter university Y which has a poorer reputation but where almost every graduate student receives the Ph.D.

7. A low-ranked participant in a national chess tournament, playing an early match with the top-favored man, has the choice of attempting or not trying a deceptive but risky maneuver which might lead to quick victory if successful or almost certain defeat if it fails.

8. A college senior with considerable musical talent must choose between the secure course of going on to medical school and becoming a physician, or the risky course of embarking on the career of a concert pianist.

9. An American prisoner-of-war in World War II must choose between possible escape with the risk of execution if caught, or remaining in the camp where privations are severe.

10. A successful businessman with strong feelings of civic responsibility must decide whether or not to run for Congress on the ticket of a minority party whose campaign funds are limited.

11. A research physicist, just beginning a five-year appointment at a university, may spend the time working on a series of short-term problems which he would be sure to solve but which would be of lesser importance, or on a very important but very difficult problem with the risk of nothing to show for his five years of effort.

12. 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.

The response categories are arrayed from chances of one in 10 upward for the odd items and in the reverse order for the even items, thus counterbalancing for any possible order preference effect in choice of probability levels. An overall conservatism-risk taking score is derived by adding the scores for the separate items. The larger this score, the greater S's conservatism.

Our prior research, cited above, yielded split-half Spearman-Brown reliability coefficients ranging from .53 to .80 for various age and sex samples, suggesting that the instrument possesses satisfactory internal consistency. The results of the present experiment will provide evidence, furthermore, of high test-retest reliability.

Regarding the instrument's construct validity as a risk taking measure, our earlier studies, cited above, have yielded findings consistent with a risk taking interpretation. For example, degree of conservatism as measured with the present instrument increases with age from young adulthood to old age for both males and females, and increases with degree of subjective probability of personal failure in a motor skill game with actual motor skill controlled.

#### The Experimental Condition

Subjects. The Ss were invited to participate in an experiment which would take no longer than two hours and for which remuneration would be provided. Six Ss were scheduled for any one time, with every effort being

made to insure that previously acquainted persons were not signed up for the same session. A total of 167 Ss participated in the experimental condition--14 all-male groups and 14 all-female groups.<sup>2</sup> The Ss were liberal arts students enrolled in summer session courses at the University of Colorado in Boulder.

Pre-discussion individual decisions. The experiment was run in a seminar room around a very long table. For the initial administration of the questionnaire, Ss took alternate seats with E at one end. The six Ss were requested to read the instructions to the questionnaire and to look over the first item. The E then emphasized two points in further standard instructions: (1) that the more risky alternative is always assumed to be more desirable than the safer course, if the former should prove successful; (2) that the odds which S marks indicate the lowest odds S would be willing to take and still advise the central figure to give the risky alternative a try. The Ss were told there was no time limit, that they should consider each of the 12 situations carefully, and that they could return to an earlier question if they wished to. The conservatism-risk instrument then was filled out individually by each of the six Ss in a group administration session that took about 20 minutes. To avoid giving any of the Ss the feeling that they were being rushed, the questionnaires were not collected until all had finished.

Group discussion and consensual group decisions. Without having had any prior expectation that they would be requested to discuss their decisions, the six Ss were then asked to move together into a discussion group at one end of the table. They now each were given another copy of the questionnaire, and a stand-up cardboard placard with the identification letter K, L, M, N, O, or P on it was placed before each S. The E then

told them that the questionnaire now before them was the same one they just finished taking. They had taken it, he continued, to familiarize them with all the situations and to give them some idea where they might stand on each. Now he wanted the group to discuss each question in turn and arrive at a unanimous decision on each. This time they could not return to a question, but rather had to discuss each one until the group decision was reached before going on to the next. When the group reached its decision on a question, all Ss were to mark it on their questionnaires in order to have a record. The group would be completely on its own, E not participating in the discussion at all.

The E then retired to the other end of the table in order to be as far from the group as possible. A question that often arose before discussion had started was what to do if a deadlock occurs. The E's standard reply was: "Most groups are able to come to some decision if those who disagree will restate their reasons, and if the problem is re-read carefully." Most groups succeeded in reaching a unanimous decision on most items, although an occasional deadlock did occur on one or another item. The group discussions were of such a nature as to indicate that the participants were highly involved in the decision tasks.

Post-discussion individual decisions. After the discussion was over, E proceeded to ask the group members to spread apart for some further individual work and to take their questionnaires and identification placards with them. In standard instructions, he requested them to go back over the situations and indicate their own present personal decisions with a "P." He noted that while in some cases the Ss may have agreed with the group decision, in other cases they may have disagreed with it. In the

former cases the "P" would be placed on the same line as the check mark; in the latter cases, on a different line.

While the consensual decisions by the group would indicate the public effect of the discussion process, the private post-discussion decisions made once again on an individual basis would indicate whether the discussion process had influenced covert acceptance as well as public compliance.

Rankings for influence and popularity. After the post-discussion individual decisions had been made, a ranking sheet was passed out to each S requesting that he rank everyone in the group (identified by their letter placards), including himself, in terms of how much each influenced the final group decision. Then each S was requested to rank everyone in the group (except, of course, himself) in terms of how much he would like to become better acquainted with each.

The rankings for influence provided the information needed for examining possible relationships between strength of individual risk taking or conservatism tendencies, on the one hand, and degree of influence in the group, on the other. If such relationships existed, it seemed to be of interest to determine whether they were specific to perceived influence or would prove to be dependent upon S's popularity; hence the second set of rankings.

Secrecy instructions. After the ranking sheets were collected, E told the group that the research would be carried out in coming weeks, and that they could now appreciate why it would be important for the content of the experiment to be kept secret, since a person who even knew that the group would be discussing the same questions which he had filled out individually would have a tendency to mark logically

defensible answers instead of his true opinion, etc. The Ss therefore all were sworn to secrecy. Various indications suggest that this pledge was faithfully kept.

Post-post-discussion individual decisions. A further session of individual decision making took place approximately two to six weeks later for some Ss. These Ss individually were given the conservatism-risk questionnaire a third time and were asked to reconsider the situations. The standard instructions emphasized that E was not interested in testing S's memory, but rather wanted S truly to reconsider each situation. The instructions thus oriented the Ss away from simply trying to recall their prior decisions. Each S was paid for this further work.

#### The Control Condition

Subjects. Control Ss were obtained in the same way as the experimental Ss, and likewise received remuneration for their work. The controls were signed up to participate in two sessions: the first to last about 20 minutes; the second, exactly one week later, to last about 15 minutes. A total of 51 Ss participated in the control condition--24 males and 27 females. Like the experimental Ss, the controls were liberal arts students enrolled in summer session courses at the University of Colorado in Boulder.

First individual decision session. The first session was identical to the pre-discussion individual decision part of the experimental condition. From six to eight Ss of the same sex, scheduled for the same time, filled out the conservatism-risk instrument while sitting together in physical conditions identical to those of the experimental Ss and at approximately the same time of day as the experimental Ss had worked.

Exactly the same instructions were provided as had been given the experimental Ss.

After the first session, the control Ss were sworn to secrecy. They also were told that they would be taking a similar questionnaire the next week, and that it was extremely important that they not discuss it with one another nor with anyone else, since such discussion might affect the way they filled out next week's questionnaire.

Second individual decision session. The same control Ss who had participated in a particular first individual decision session came back exactly one week later. After checking that no discussion had taken place in the intervening week among the controls, E handed out new copies of the questionnaire and explained that this questionnaire was identical to the one taken last week. Each S was requested to go back over the situations and reconsider them, E emphasizing that he was not interested in testing S's memory but rather wanted S truly to reconsider each situation. The instructions were so designed, therefore, as to dissuade S from assuming that the most socially acceptable thing to do would be to try to make the same decisions that he had made a week ago. Change was encouraged rather than discouraged. Control Ss were sworn to secrecy again at the end of the second session.

#### Results

##### Consensual Group Decisions Compared with Pre-Discussion Individual Decisions

Tables 1 and 2 examine, for male and female groups respectively, the significance of the conservatism difference between the mean of the pre-discussion individual decisions made by the members of each group and that group's consensual decisions. The basic test is carried out using

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Insert Tables 1 and 2 about here  
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the total conservatism score, which consists of all 12 item scores combined. Tests also are carried out for each item separately.

In the case of the total score, a group's difference score is the sum of the 12 unanimous group decision scores minus the average of the pre-discussion total individual decision scores for the six members.<sup>3</sup> Since larger scores indicate greater conservatism, a negative difference (or score decrease) indicates a shift in the risky direction. A t test is used to determine whether the 14 difference scores for the groups of each sex are significantly different from zero (McNemar, 1955, pp. 108-109).<sup>4</sup> These total score data indicate a move in the risky direction significant beyond the .001 level for the 14 male groups, and a move in the risky direction significant beyond the .005 level for the 14 female groups. Furthermore, the degree of shift is not significantly different for the two sexes.

In the case of the scores for a single item, a group's difference score consists of the unanimous group decision on that item minus the average of the pre-discussion individual decision scores on that item for the six members. Once again a negative difference or score decrease indicates a shift in the risky direction, and a t test is applied to determine whether the difference scores for all groups that reached a unanimous decision on the item in question are significantly different from zero. For both the male and female groups, we find that 10 of the 12 items show shifts in the risky direction, seven of them significant in each case. Five of those seven are the same for both sexes. Only

two items show any indication for either sex of not sharing in the general shift toward greater risk taking: items 5 and 12. It should be noted that these two items exhibited, in our previous research, the lowest correlations with the overall risk-conservatism score, suggesting that they are relatively impure measures of the psychological dimension being tapped by the other 10 items.

In sum, the evidence from Tables 1 and 2 indicates a strong move toward greater risk taking when groups arrive at unanimous decisions, compared with the risk levels ventured by the same persons in pre-discussion individual decisions. Furthermore, this move toward greater risk taking obtains for females as well as for males.

A further question concerns the extent to which the risky shift is consistent from one group to another. Consider one example of several consistency tests that have been conducted, all of which yield highly similar results. Suppose we define a group as showing a risky shift from pre-discussion individual decisions to consensual group decisions if the difference score for its total score, as defined above, is a negative one. Fourteen out of 14 male groups and 12 out of 14 female groups are found to move in the risky direction, both results being very significant by a sign test. Such a finding demonstrates, therefore, that the risky shift phenomenon is quite consistent across groups.

Post-Discussion Individual Decisions Compared with Pre-Discussion Individual Decisions

In Tables 3 and 4 we present, once again for male and female groups respectively, the significance of the difference between the mean of the pre-discussion individual decisions and the mean of the post-discussion individual decisions made by the members of each group.

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Insert Tables 3 and 4 about here  
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The basic test once again is provided by the total conservatism score, but tests also are presented for each item separately.

For the total score, a group's difference score consists of the average of the post-discussion total individual decision scores for the members minus the average of the pre-discussion total individual decision scores for the same members. Negative difference scores again indicate risky shifts, and a t test is applied to determine whether the 14 difference scores for the groups of each sex are significantly different from zero. We find, once again, a shift in the risky direction significant beyond the .001 level for the 14 male groups, and a risky shift significant beyond the .005 level for the 14 female groups. As before, the degree of shift is not significantly different for the two sexes.

Turning to the scores for each separate item, a group's difference score consists of the average of the post-discussion individual decision scores on that item minus the average of the pre-discussion individual decision scores on that item. With a negative difference score indicating a risky shift and a t test applied to indicate whether the 14 difference scores for each sex on an item are significantly different from zero, we find that nine of the 12 items show separate significant shifts in the risky direction for the male groups (with one additional item shifting non-significantly in the same direction), and that eight of the 12 items show separate significant shifts toward greater risk taking for the female groups (with two additional items shifting non-significantly in that direction). The eight items showing significant risky shifts for the

females are among the nine showing significant risky shifts for the males. Items 5 and 12 once again are the only ones for either sex showing any indication of not sharing in the general shift toward greater risk taking found in both sexes.

There is clear evidence, therefore, that post-discussion individual decisions exhibit a strong move toward greater risk taking when compared with pre-discussion individual decisions arrived at by the same persons, and do so for both sexes. The group discussion process, in other words, seems to have an effect on private attitudes (post-discussion individual decisions) that is just as significant as its effect on publicly expressed views (unanimous group decisions).

Once again we may inquire about the extent to which the risky shift is consistent from group to group. Several consistency tests have been carried out, all yielding highly similar results. As an example, suppose we define a group as exhibiting a shift in the risky direction from pre-discussion to post-discussion individual decisions if the difference score for its total score, as defined in this section, is a negative one. Fourteen out of 14 male groups and 12 out of 14 female groups are found to shift in the risky direction, both results being quite significant by a sign test. Such a finding demonstrates, therefore, that the risky shift phenomenon is quite consistent across groups in regard to covert acceptance as well as overt compliance.

#### Control Ss

To insure that the move toward greater risk taking just described actually is a result of the group discussion process, we must turn to the findings for the control Ss. The comparability of control and

experimental Ss is indicated in Table 5. We note that, in the case both of males and females, the experimental and control Ss have approximately the same initial total conservatism scores, and also are approximately the same in age.<sup>5</sup> Item-by-item comparisons of experimental and control Ss of each sex on initial conservatism scores also were carried out and show that controls and experimentals within sex obtain highly similar scores.

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Insert Table 5 about here  
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In Tables 6 and 7 we present, for male and female control Ss respectively, the significance of the difference between decisions made during the first and the second sessions. It will be recalled that one week intervened between these two sessions, and that instructions for the second session requested the Ss not to try simply to remember what they had marked before, but to reconsider their decisions. It is evident that the total conservatism score shows no shift from first to second session for either sex. Turning to the separate tests carried out on each

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Insert Tables 6 and 7 about here  
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item, we find that none of the 12 items shows a significant shift for the males, and only one of the 12 items shows a significant shift for the females. When no group discussion and achievement of group consensus intervenes, then, there is no systematic shift toward greater risk taking or greater conservatism, and this despite instructions that

encourage shifts by emphasizing that we are not interested in the Ss' memories.

The data for the control Ss also provide us with an opportunity for determining the test-retest reliability of the conservatism-risk instrument, with one week intervening and under instructions that encourage change rather than constancy. For the 24 male Ss, the product-moment correlation coefficient between total conservatism scores in the first and second sessions is .78. For the 27 female Ss, the same correlation coefficient is .82. Test-retest reliability of the instrument, therefore, is quite high.

#### Pre-Discussion Risk Taking and Influence in the Group

Our data concerning perceived influence within the group consisted in each individual's ranking of all group members, including himself, in terms of how much each influenced the group's decisions. A first question to ask of these influence rankings is: how consistent are they from member to member within a group? To determine the degree of agreement among a group's members in their rankings of one another for influence, Kendall's coefficient of concordance (Siegel, 1956, pp. 229-238) was applied to each group's influence rankings. If the members of a group agree regarding who among themselves are more influential and who less so, then W will be significantly large. Table 8 presents the results of these tests for all 28 groups. It is evident that agreement in influence rankings is quite high: the degree of agreement is significant for all 14 of the male groups, and for 11 of the 14 female groups.

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Insert Table 8 about here  
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Given this high agreement among group members in their rankings of one another for influence, an approximate overall estimate of degree of influence for a given group member was obtained by averaging the influence ranks that had been assigned to that person by all members of the group (including that person). The lower the average, the greater that S's perceived influence (i.e., the higher the assigned influence ranks for that person). These average influence scores for the Ss of each sex were correlated with the initial total conservatism scores obtained by the same Ss. The resulting product-moment correlation coefficients are shown in Table 9. They are significant beyond the .005 and .05 levels for the 82 males and the 82 females respectively: persons higher in initial risk taking are rated as having more influence on the group decisions.

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Insert Table 9 about here  
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Average popularity scores for each group member were constructed by averaging the popularity rankings assigned by all the other members of the group. We note in Table 9 that there emerges a very strong relationship between this average popularity score and the average influence score for both the male and the female group members: persons rated high in influence also tend to be rated high in popularity. This general relationship has, of course, been known for some time (see, e.g., Horowitz, Lyons, & Perlmutter, 1951; Back, 1951; Tagiuri & Kogan, 1960), so that our obtaining it here increases our confidence in the respective measures being used to assess influence and popularity. It is further

evident in Table 9, however, that degree of initial risk taking is not related to degree of popularity within the group for either sex.

Finally, we also find from Table 9 that risk taking and influence are significantly related for each sex when popularity ratings are held constant. The partial correlation coefficients are significant beyond the .01 and .02 levels for the males and females, respectively. It is evident, therefore, that the relationships obtained for both sexes between degree of initial risk taking and degree of influence on group decisions are not dependent upon members' popularity.

#### Maintenance of the Risky Shift Over a Subsequent Period of Time

An interesting further question concerns the extent to which the shift toward greater risk taking, which we have found to result from group discussion, is maintained over a subsequent period of time. We were able to gather evidence on this point for males but not for females. In the case of the former, but not in the case of the latter, a random sample of Ss from the original groups could be obtained for further study. The 22 males who were available for further work were approximately evenly distributed among the 14 original male groups. After a time interval of roughly two to six weeks had elapsed since the group session, these Ss individually were given the conservatism-risk questionnaire a third time, as described in the section on procedure.

The comparability of the random male sub-sample of 22 to the original male experimental condition sample of 82 is evident from the following data on total conservatism scores. The mean pre-discussion total conservatism score was 66.9 for the sample of 82, and also was 66.9 for the sub-sample of 22. The mean post-discussion total conservatism

score, in turn, was 56.6 for the whole sample and 56.2 for the sub-sample. The t test of the difference scores had yielded a t significant beyond the .001 level (t = 9.12) for the whole sample, and it also yielded a t significant beyond the .001 level (t = 4.70) for the sub-sample.

Turning now to the total conservatism scores obtained by this sub-sample when they took the questionnaire again two to six weeks after the group discussion (call these scores the "post-post-discussion" individual decisions), the mean score is 54.6. The mean of the difference scores obtained by subtracting each S's pre-discussion total conservatism score from his post-post-discussion total conservatism score is -12.3, with a t test of these difference scores yielding a t value of 4.92 (p < .001), hence indicating a risky shift from the pre-discussion individual decisions to the post-post-discussion individual decisions. The mean of the difference scores obtained, in turn, by subtracting each S's post-discussion total conservatism score from his post-post-discussion total conservatism score is only -1.6, and a t test of these difference scores is not significant, hence indicating no further change from the post-discussion individual decisions to the post-post-discussion individual decisions. Item-by-item analyses tell the same story: the only significant item shifts are risky ones, and they are as strong from pre-discussion to post-post-discussion sessions as they are from pre-discussion to post-discussion sessions.

In sum, the data available on the point indicate that the shift in the risky direction found to occur as a result of the group discussion process is maintained over a subsequent period of time.

#### Discussion and Conclusions

The following conclusions may be drawn from the preceding evidence:

1. Unanimous group decisions concerning matters of risk show a shift toward greater risk taking when compared with pre-discussion individual decisions made by the same persons and concerning the same matters. This holds for both sexes.
2. Post-discussion individual decisions that follow unanimous group decisions exhibit the same kind of shift toward greater risk taking as appears in the group decisions. This is the case for both sexes. Covert acceptance as well as overt compliance thus are affected in the same manner by the discussion process.
3. This shift toward greater risk taking as a result of the discussion process is still maintained when two to six weeks have elapsed since the discussion occurred. Evidence on this point was available only for males.
4. No shift in risk taking level of individual decisions occurs over time in the absence of the discussion process. This holds for both sexes.
5. There is a positive relationship between degree of risk taking in pre-discussion individual decisions and the extent to which group members are perceived by one another as influencing group decisions. This relationship is specific to judgments of influence, in that it obtains when judgments of popularity are held constant, and also no relationship is found between pre-discussion individual risk taking and the extent to which group members are judged to be popular. These statements all hold for both sexes.

The present study indicates, then, that group interaction and achievement of consensus concerning decisions on matters of risk

eventuate in a willingness to make decisions that are more risky than those that would be made in the absence of such interaction. Furthermore, although initial ascribed status levels of the group members are equal, it is found that persons with stronger individual risk taking proclivities tend to become more influential in the group than persons who are more conservative. Two alternative interpretations of these findings can be suggested; one more group-centered, the other more person-centered: (1) It is possible that there is at work in these groups a process of diffusion or spreading of responsibility as a result of knowing that one's decisions are being made jointly with others rather than alone. Increased willingness to take risk would eventuate from this decreased feeling of personal responsibility. That initial risk taking and judged influence within the group are positively related could well occur as a consequence of this process, since one of its effects would be for the views of high risk takers to be given more weight by the rest of the group. (2) Alternatively, the fact that high risk takers exert more influence may be a cause of the group's movement toward greater risk taking. It is possible that high risk takers are also more likely to take the initiative in social situations. Of course, these two interpretations are not necessarily mutually exclusive. Both of them may contribute to the group effect.

That females as well as males show the same change toward greater risk taking as a result of the group interaction condition, and that the samples of both sexes were liberal arts university students, renders it unlikely that the results can be explained on the basis of reinforcement by others of one's expectation as to whether one's appropriate role is to be more or less of a risk taker. We noted earlier that

Stoner (1961) found a move toward greater risk taking in group as compared to individual decision making by male graduate students of industrial management, and we pointed out that this result might be accounted for in terms of the professional role that they had assigned themselves by becoming graduate students in a business school. Presence of peers might be expected to increase the salience of their business manager role, and a greater willingness to take risks in decision making might well be perceived as one of the attributes of that role. Such a role expectation interpretation is ruled out for the present study, however, through our use of liberal arts students as Ss. In addition, the possibility of explaining the results in terms of males' perceiving their appropriate role as one of willingness to be bold and daring, and being reinforced in this view by interaction with other like-minded males, is ruled out by the present study's obtaining the same results for females as for males. This outcome would not be expected if the findings depended on sex-linked role expectations as to whether one should be more risky or more conservative. This outcome also, of course, rules out interpretation in terms of any possible sex-linked differences in major fields of study.

That the group-induced move toward greater risk taking in individual decisions is still maintained two to six weeks after the discussion, provides evidence, incidentally, which supports Lewin's (1947) view that "group carried" attitudinal changes maintain themselves (see also Pelz, 1958).

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Footnotes

1. This research was supported by a grant (G-17818) from the National Science Foundation. A Master's thesis by J.A.F. Stoner at M.I.T.'s School of Industrial Management, with D.G. Marquis and M.A. Wallach as faculty advisers, was instrumental in inspiring the present investigation. We are greatly indebted to J.A.F. Stoner and D.G. Marquis for their aid and advice, and to V. Raimy and M. Wertheimer for facilities at the University of Colorado in Boulder. Thanks also are due S. Messick and A. Myers for comments.
2. Of the 14 male groups, 13 contained six Ss each, and one contained five Ss. An S in one of the six-person male groups misunderstood instructions for the pre-discussion individual decisions, so that his decision scores were removed prior to analysis. All 14 of the female groups contained six Ss each. An S in each of two female groups misunderstood instructions for the pre-discussion individual decisions, so that the decision scores of these two females were removed prior to analysis.
3. Any deadlocked item is, of course, not included in either term for the group in question.
4. All significance levels cited in this study are based on two-tailed tests.
5. It might also be mentioned that, in confirmation of earlier findings (Wallach & Kogan, 1959, 1961), there is no sex difference in initial total conservatism scores for either the experimental or the control Ss.

Table 1

Significance of Conservatism Difference between Mean  
of Pre-Discussion Individual Decisions for a Group's  
Members and Group's Consensual Decision: Males

Item	Mean difference <sup>a</sup>	Number of groups <sup>b</sup>	<u>t</u>	p
All combined	-9.4	14	6.46	< .001
1	-1.0	14	4.34	< .001
2	-0.2	14	< 1.00	n.s.
3	-1.1	13	2.19	< .05
4	-1.8	13	6.18	< .001
5	+0.1	13	< 1.00	n.s.
6	-1.2	13	3.35	< .01
7	-2.0	14	9.64	< .001
8	-1.1	14	1.97	n.s.
9	-1.0	10	3.67	< .01
10	-0.4	13	< 1.00	n.s.
11	-1.1	12	4.37	< .005
12	+0.8	11	2.34	< .05

<sup>a</sup>In Tables 1, 2, 3, 4, 6, and 7, a negative difference signifies a risky shift, a positive difference signifies a conservative shift.

<sup>b</sup>In Tables 1 and 2, number of groups for an item is less than 14 when one or more groups deadlocked on that item. Any deadlocked item is, of course, not included when calculating scores for all items combined.

Table 2

Significance of Conservatism Difference between Mean

of Pre-Discussion Individual Decisions for a Group's

Members and Group's Consensual Decision: Females

Item	Mean difference	Number of groups	<u>t</u>	<u>p</u>
All combined	-9.4	14	3.91	< .005
1	-1.0	13	4.17	< .005
2	-0.6	14	1.65	n.s.
3	-0.4	14	1.12	n.s.
4	-1.4	14	2.60	< .025
5	+0.7	14	1.90	n.s.
6	-0.8	13	2.63	< .025
7	-2.0	12	3.21	< .01
8	-1.7	14	5.26	< .001
9	-0.8	12	1.19	n.s.
10	-1.5	13	3.18	< .01
11	-0.9	13	2.28	< .05
12	+0.6	6	2.00	n.s.

Table 3

Significance of Conservatism Difference between Mean of  
Pre-Discussion Individual Decisions for a Group's  
Members and Mean of Post-Discussion Individual  
Decisions for a Group's Members: Males

Item	Mean difference	Number of groups	t	p
All combined	-10.4	14	9.12	<.001
1	-1.0	14	4.32	<.001
2	-0.6	14	2.87	<.02
3	-1.1	14	3.04	<.01
4	-1.7	14	8.14	<.001
5	+0.1	14	<1.00	n.s.
6	-1.1	14	3.79	<.005
7	-1.8	14	7.80	<.001
8	-1.1	14	3.54	<.005
9	-1.1	14	3.99	<.005
10	-0.3	14	<1.00	n.s.
11	-0.8	14	4.36	<.001
12	+0.1	14	<1.00	n.s.

Table 4

Significance of Conservatism Difference between Mean of  
 Pre-Discussion Individual Decisions for a Group's  
 Members and Mean of Post-Discussion Individual  
 Decisions for a Group's Members: Females

Item	Mean difference	Number of groups	<u>t</u>	p
All combined	-8.2	14	3.67	<.005
1	-0.9	14	5.09	<.001
2	-0.7	14	2.67	<.02
3	-0.6	14	2.58	<.025
4	-1.4	14	3.40	<.005
5	+0.6	14	1.85	n.s.
6	-0.8	14	2.90	<.02
7	-1.7	14	3.56	<.005
8	-1.2	14	4.44	<.001
9	-0.5	14	<1.00	n.s.
10	-0.7	14	1.95	n.s.
11	-0.9	14	2.89	<.02
12	+0.7	14	3.66	<.005

Table 5

Comparability of Experimental and Control  
Ss in Initial Conservatism and Age

Mean Initial Overall Conservatism					
	Males		Females		
	Mean	<u>N</u>		Mean	<u>N</u>
Experimental <u>Ss</u>	66.9	82 <sup>a</sup>		65.6	82 <sup>a</sup>
Control <u>Ss</u>	68.3	24		64.6	27
<u>t</u>	0.41			0.34	
<u>p</u>	n.s.			n.s.	

  

Mean Age					
	Males		Females		
	Mean	<u>N</u>		Mean	<u>N</u>
Experimental <u>Ss</u>	20.7	82 <sup>b</sup>		20.3	84
Control <u>Ss</u>	21.0	24		20.7	27
<u>t</u>	0.41			0.67	
<u>p</u>	n.s.			n.s.	

<sup>a</sup>Initial overall conservatism scores were available for 164 of the experimental Ss. See footnote 2 in text.

<sup>b</sup>One S forgot to list his age, and one group contained five rather than six Ss.

Table 6

Significance of Conservatism Difference between First  
and Second Decisions by Male Control Ss

Item	Mean difference	Number of Ss	t	p
All combined	+1.5	24	<1.00	n.s.
1	+0.4	24	<1.00	n.s.
2	-0.3	24	<1.00	n.s.
3	+0.3	24	<1.00	n.s.
4	+0.8	24	2.00	n.s.
5	-0.4	24	1.06	n.s.
6	0.0	24	<1.00	n.s.
7	+0.4	24	1.03	n.s.
8	+0.5	24	1.63	n.s.
9	-0.1	24	<1.00	n.s.
10	+0.1	24	<1,00	n.s.
11	+0.1	24	<1.00	n.s.
12	-0.4	24	1.42	n.s.

Table 7

Significance of Conservatism Difference between First  
and Second Decisions by Female Control Ss

Item	Mean difference	Number of Ss	t	p
All combined	-2.2	27	1.26	n.s.
1	-0.4	27	<1.00	n.s.
2	-0.2	27	<1.00	n.s.
3	-1.0	27	2.61	<.02
4	-0.4	27	1.12	n.s.
5	-0.3	27	<1.00	n.s.
6	-0.2	27	<1.00	n.s.
7	0.0	27	<1.00	n.s.
8	0.0	27	<1.00	n.s.
9	+0.2	27	<1.00	n.s.
10	+0.3	27	1.03	n.s.
11	-0.3	27	<1.00	n.s.
12	+0.1	27	<1.00	n.s.

Table 8

Degree of Agreement Among Group Members in  
Rankings of One Another for Influence  
(Kendall's Coefficient of Concordance)

Males				Females			
Group	N	W	p	Group	N	W	p
1	6	.64	<.01	1	6	.85	<.01
2	6	.55	<.01	2	6	.61	<.01
3	6	.74	<.01	3	6	.31	n.s.
4	6	.72	<.01	4	6	.79	<.01
5	6	.70	<.01	5	6	.47	<.01
6	6	.50	<.01	6	6	.67	<.01
7	5	.56	<.05	7	6	.13	n.s.
8	6	.50	<.01	8	6	.59	<.01
9	6	.62	<.01	9	6	.59	<.01
10	6	.66	<.01	10	6	.69	<.01
11	6	.66	<.01	11	6	.83	<.01
12	6	.55	<.01	12	6	.80	<.01
13	6	.54	<.01	13	6	.70	<.01
14	6	.73	<.01	14	6	.30	n.s.

Table 9

Product-Moment Correlations Among Initial  
Conservatism, Influence, and Popularity<sup>a</sup>

	Males ( <u>N</u> = 82) <sup>b</sup>		Females ( <u>N</u> = 82) <sup>b</sup>	
	<u>r</u>	<u>p</u>	<u>r</u>	<u>p</u>
Initial overall				
risk taking and influence	.32	<.005	.22	<.05
Initial overall				
risk taking and popularity	.15	n.s.	-.04	n.s.
Influence and popularity	.72	<.001	.54	<.001
Initial overall				
risk taking and influence, popularity held constant <sup>c</sup>	.30	<.01	.28	<.02

<sup>a</sup>Small score values signify greater risk taking, greater influence, and greater popularity.

<sup>b</sup>While all influence and popularity scores are based on the 167 Ss in the experimental condition, the correlations are based on the 164 of those Ss for whom initial overall risk taking scores were available.

<sup>c</sup>Partial correlation coefficients.

N O T I C E

The report titled "Group influence on individual risk taking," (RB-62-5), by M. A. Wallach, N. Kogan, and D. J. Bem, is no longer available in Research Bulletin form. However, it has been published and appears in the Journal of Abnormal and Social Psychology, 1962, 65, 75-86.

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