RISK TAKING IN INDIVIDUAL AND GROUP DECISION MAKING: PROBLEMS OF INQUIRY

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ABSTRACT

The growing complexity of contemporary technological society leads to an ever increasing need to rely on the process of group decision making in preference to individual decision making. Since 1961, a considerable number of studies have been published which are concerned with the specific question of whether there exist differences in the degrees of risk taking between individual and group decisions. Most of these studies have been based on the administration of the so-called "dilemma-of-choice" questionnaire - developed by Wallach and Kogan in 1959 - to various experimental subjects in laboratory settings. It appears that the major pertinent researchers who used that questionnaire have assumed that it adequately simulates complex real-life decision making. However, this assumption appears to be questionable.

Most of the studies that have been conducted since 1961 have indicated that group decisions have a significant tendency to be riskier than the average of the individual decisions which were made by the members of the groups prior to the group decision making. On the other hand, some of these studies have indirectly thrown considerable doubts on these findings, and it would appear that the risky shift in group decisions may be an artifact which

results from the particular manner in which the dilemma-of-choice questionnaire frequently has been administered. Because the dilemma-of-choice questionnaire, furthermore, does not seem to be a suitable instrument if used for the investigation of complex risk taking by individuals and groups, it would appear, then, that there exists a definite problem of inquiry.

In order to arrive at a better understanding of the phenomenon of complex risk taking, a theoretical analysis of a number of major variables has been undertaken. This analysis shows that past attempts to deal with complex risk taking have not done justice to the enormous complexity of the phenomenon. Furthermore, the conceptual framework that has been used in the past is naive and does not help to achieve a proper assessment of complex risk taking.

The present paper suggests a new definition of decision-making involving risk and offers a new language as well as new tools for the analysis of complex risk taking. The creation of a more sophisticated conceptual framework permits a fresh approach to the investigation of the phenomenon. It is furthermore shown that such investigations would have to be field rather than laboratory studies.

However, the question of what constitutes a "risky" decision is so complex that an objective assessment of "riskiness" frequently will be difficult, if not impossible. This difficulty is compounded by the fact that the nature of complex group decision making appears to be such that it might be impossible to say whether it differs in riskiness from individual decision making: Complex decision-making

problems which would require group decision making are generally so involved that they would not allow for individual decision making to begin with. The conclusion is drawn that, for now and the near future, research into the question of differences in risk taking in complex individual and group decision making may barely be worth the effort. The only way out of this predicament appears to be to concentrate on the study of complex real-life risk taking by individuals. The results gained from such studies might conceivably enable us to develop, at some future time, methods for studying group risk taking so that it then might become possible to compare individual to group risk taking.

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Chapter I

INTRODUCTION

The growing complexity of contemporary technological society exerts powerful pressures on techniques of decision making. One result of these pressures appears to be that more and more organizations of various types are forced to recognize an increasing need to rely on the process of group decision making in preference to individual decision making. It comes as no surprise, therefore, that the area of decision making has attracted considerable attention among researchers and that an ever increasing number of studies have been directed at its various aspects. However, it was not until the beginning of this decade that any attempts were made to explore the question of whether differences in the degree of risk taking could be observed if group decision making were to be compared to individual decision making.

The first major experimental inquiry comparing degrees of risk taking in individual and group decision making was conducted by Stoner (1961). His experiment showed that group decisions have a significant tendency to be riskier than the average of the individual decisions which were made by the members of the groups prior

to the group decision making. The great majority of pertinent studies that have been undertaken subsequently to Stoner's pioneer work have basically confirmed the results which had been obtained by Stoner. As a consequence of this repeated confirmation, the generality of the risky-shift phenomenon which - under certain experimental conditions - occurs in group decision making appears to have found widespread acceptance. Yet there would seem to exist reason to seriously question the wisdom of this acceptance.

Although the basic concern of past pertinent research appears to have been to gain insights into risk-taking behavior as it might occur in complex real-life decision making, the chosen method of inquiry has been to conduct experimental laboratory studies rather than field research. Furthermore, the vast majority of these experimental laboratory studies used essentially the same tool that had previously been employed by Stoner in his 1961 experiment. This tool, the so-called "dilemma-of-choice" questionnaire, puts subjects into decision-making situations that do <u>not</u> lead to actual consequences for the subjects as far as their decision making is concerned. Only a very small number of studies used methods where the subjects found themselves in an experimental situation that provided for <u>actual consequences</u> to the subjects as a result of their decision making.

The validity of the contention that group decisions have a significant tendency to be riskier than individual decisions rests, therefore, largely on the validity of <u>one</u> experimental instrument. However, the validity of this very instrument appears to be doubt-

ful and should be examined.

There are further reasons why it appears advisable to concentrate on a thorough examination of the rationale that underlies the use of the dilemma-of-choice questionnaire. 1. Experiments which use the dilemma-of-choice questionnaire are assumed to simulate the kind of complex real-life decision making that most investigators are apparently interested in. On the other hand, the few experiments that incorporate actual-payoff conditions did so through the use of experimental procedures which essentially are based on relatively simple gambling-type situations that can hardly be viewed as requiring the subjects to engage in <u>complex</u> decision making. 2. There appear to be few grounds on which one could question the soundness of the gambling-type experiments. The high degree to which gambling-type experiments (which have many of the basic characteristics of <u>pure</u> gambling experiments) approximate reality has also been recognized by two of the major researchers in the field of decision making who recently - with reference to <u>pure</u> gambling experiments - have made the following statement (Kogan and Wallach, 1967a, p. 160):

> .. it is possible to create conditions in the laboratory that will produce a pattern of risk-taking behavior quite similar to that observed in natural gambling situations. As far as gambling behavior is concerned, then, there is no indication that separate "laws" of risk taking will have to be formulated for laboratory and field settings. It seems quite feasible to create conditions in the laboratory that will produce the same sorts of generalizations about risk taking as are derived from naturalistic field studies.

Although it would seem to be possible to postulate reasons why

one might also want to question the soundness of gambling-type experiments, it appears nevertheless highly probable that such criticism would turn out to be of far lesser magnitude than the criticism that can be voiced in questioning the value of those experiments that make use of the dilemma-of-choice questionnaire. 3. There exist virtually no field studies that are concerned with permanent groups engaged in complex decision-making involving risk under real-life conditions. 4. Finally, it appears that so far - to the best of the author's knowledge - no one has made any serious attempts to thoroughly examine the validity of the dilemma-of-choice questionnaire and to explore to what degree it actually approximates the kind of conditions that can be expected to exist in complex real-life decision-making involving risk.

A thorough examination of the validity of the dilemma-of-choice questionnaire and the degree to which it approximates reality should preferably not be restricted to an investigation of only a few of the aspects of the problem, but should rather touch on as many aspects of risk taking in individual and group decision making as possible. Any of a great number of variables could conceivably be of considerable or even crucial importance as far as risk taking in real-life decision making is concerned. The author, then, feels that a theoretical-analytic type of inquiry allows for a greater range of points to be examined than would be possible if an experimental-laboratory approach would be used. It is furthermore hoped that such a theoretical-ana-

lytic investigation might lead to an increased understanding of the factors that govern complex real-life risk taking. If we succeed in gaining this greater understanding, we would certainly have created a sounder basis from which further experimental inquiries might be conducted.

Chapter II

MODES OF INQUIRY

The purpose of this chapter is twofold: Firstly, it is to offer some support for the author's decision to use the theoretical-analytic rather than the experimental-laboratory approach. Secondly, it is to show that the major researchers in the area of decision making (a) have indicated quite clearly that their investigations were aimed at a better understanding of risk taking in complex real-life decision making and (b) seem to have considerable misgivings with regard to their use of the experimental method generally and the dilemma-of-choice questionnaire specifically. In order to facilitate the aims of this chapter, direct quotes will be used rather extensively. It is hoped that the relative awkwardness of direct quoting will be profitably offset by the fact that this method makes it easier to establish as firmly as possible the contentions brought forward in this chapter. At the same time, direct quoting assures that the positions taken by the authors quoted can be related with greater accuracy.

1. Some Words on the Philosophy of Scientific Inquiry

One of the big controversies among social scientists is, of course, whether there is a "right" way to conduct scientific inquiries. This ongoing debate about the respective merits of experimental, field, and theoretical studies has resulted in some degree of polarization among social scientists, where one extreme position is held by "social philosophers" and where the other end of the continuum is occupied by those social scientists who take pride in their exclusive use of "rigorous scientific methodology" and who consider themselves as being very close to the natural scientists. Futhermore, there are those social scientists who do not feel comfortable in either of these two extreme positions and who prefer to take an eclectic position.

It appears to be an open question whether it is legitimate and possible for the social sciences to emulate the methods used in the natural sciences. Nagel (1961) seems to think that the social sciences have a good chance of becoming more and more like the natural sciences with regard to the methods of inquiry used, whereas Scriven (1964) takes a much more sceptical view of this chance, at least as far as psychology is concerned. The main point, however, seems to be that there is no agreement at present among social scientists as to what constitutes sound methods of inquiry. Nagel (1961, p. 448) states this fact very succinctly:

> It is .. generally acknowledged that in the social sciences there is nothing quite like the almost complete unanimity commonly found among competent workers in the natural sciences as to what are matters of established fact, what are the reasonably satisfactory explanations (if any) for the assumed facts, and what are some of the valid procedures in sound inquiry ...
> At any rate, it is a matter of public record that social scientists continue to be divided on central issues in the logic of social inquiry which are implicit in the questions mentioned above.

For those social scientists who, in this controversy over methods of inquiry, prefer an eclectic approach rather than committing themselves to one or the other of the two extreme positions, the question of what constitutes sound methods of inquiry requires different answers at different times. Since there is probably no one "right" method per se, the problem then seems to be to find the most promising method of inquiry in any given case. However, just what constitutes the "most promising" method in a given case can, of course, again become the object of controversy. With a situation such as this, one is tempted, if not forced, to admit that it may really not be possible to come up with an answer that would be acceptable to everybody. All one can do is to suggest that, in any given case of inquiry, it may be possible to point out enough convincing evidence that favors the use of one specific method over other possible methods of inquiry.

This author, with regard to the method of inquiry chosen for his investigation, would be inclined to defend his choice of the theoretical-analytic method of inquiry by pointing out the following: (a) The problem of complex real-life individual and group decision-making under conditions of risk does not seem to lend itself very well to in-

vestigation by the experimental-laboratory method. Experimental methods used in the past have not even come close to doing justice to the enormous complexity of the problem under investigation, and a number of major researchers in the area of decision making have expressed considerable doubts whether their use of the experimental-laboratory method constituted a satisfactory choice to begin with. However, if this problem has already been acknowledged, it would appear that immediate further research of the experimental type would only help to compound the existing difficulties and doubts. (b) The whole field of decision-making under conditions of risk has already become so frustrating to one of the major researchers (Stoner) that he has decided to get out of it altogether (personal communication from J.A.F. Stoner, spring 1968). Although Stoner's reaction may not be representative for the feelings of other researchers in the field of decision making, it nevertheless appears to be indicative of the fact that all is not well with the state of affairs in this area of research. (c) The problem of risk taking in individual and group decision making has, in the past, been almost exclusively investigated through the use of experimental-laboratory methods. Exclusivity such as this, however, appears to be somewhat suspect, particularly if the methods used have obviously tapped only a very restricted sector of the problem under investigation - if they have at all been directed at the problem. In a situation such as this, using a method of inquiry which is different from those which have been used in the past certainly would ap-

pear to be justified. (d) It seems to be good scientific practice to have a reasonably clear idea of as many aspects as possible of a given problem before the decision should be made to investigate that problem by the use of simulation techniques. Without having such a clear idea, it not only is very difficult to ask the right questions to begin with, but it furthermore becomes very likely that the experimental designs which will be used may turn out to be far too simple and naive; that is, they may not at all be directed at what they are believed to be directed at. However, this is exactly what appears to have happened to research in the field of individual and group decision-making under conditions of risk. There is a certain degree of irony in the fact that at least <u>some</u> major workers in that field appear to be basically aware of the problem and yet nevertheless have failed to deal with it in sufficient depth. As far as the <u>minor</u> workers are concerned, they show little - if any - awareness with regard to the basic methodological problems which are inherent in that particular field of inquiry.

In the next two sections of this chapter the author will examine the question of what presumably constituted the <u>real</u> goals of the inquiries conducted by the major researchers in the area of decision-making involving risk and how these researchers expressed their doubts with regard to the methods of investigation which they have used in the pursuit of their goals.

2. The Goals of Past Pertinent Research

Experimenters who used the dilemma-of-choice questionnaire in their studies presumably did not do so because they had a mere academic interest in finding out how subjects, as individuals or as members of a group, might respond to this kind of questionnaire. Had such been the sole purpose of the experiments, there would hardly be any room for questioning them; and, probably, neither would these experiments have served any particularly useful or important ends. However, there is not much reason to assume that it was such a limited goal which was in the minds of the experimenters who used the dilemma-of-choice questionnaire in their research into the area of decision-making involving risk. Quite to the contrary, there are sufficient grounds to believe that these workers were interested in finding out something about risk-taking behavior of individuals and groups who are in complex real-life decision-making situations.

In the introduction to his thesis, which was the first major experimental work in the area of individual and group decision-making under conditions of risk, Stoner (1961, pp. 1-2) makes the following statement:

> Decision making groups have become an important and controversial part of the American scene. Both in business and in government far more group decisions are made today than were made a century ago. Some observers rejoice at the growing importance of groups in the Nation's life; they cite the advantages of having many minds focused on the same problem, the increased morale which is believed to

> be connected with "participation" in the decision making process, and so on. Other observers complain about the slowness of the group process, the conservatism and caution of groups, and the difficulties of determining who is "really" responsible for a decision made by a group.
> A passing remark of a local business executive aroused the author's interest in a particular phase of the subject of group decision making. The executive, who is also a retired general, was commenting upon managerial decision making and responsibility. He pointed out that Councils of War were discontinued as strategical and tactical decision making bodies during the Civil War because the courses of action which they recommended tended to be very cautious. It was reported that the most cautious member of the group would refuse to accept any course of action other than the safest and that he would succeed in convincing the other members to follow the safest course.
> This executive seemed to feel that a similar situation would prevail in the business environment, and probably in other areas of society where decisions involving risk were being made.

It can be deduced from this statement that Stoner was interested in complex real-life decision-making involving risk and that it was this interest which motivated Stoner to do his thesis in that specific area.

Brown, who has written one of the major analyses of the work done in this area, has expressed his interest in the field of decision making in the following words (1965, p. 656):

> It very often happens that individuals make private decisions concerning a problem and then meet together to arrive at a group decision concerning that same problem. In 1962 the information that there were Soviet missiles in Cuba led the United States to institute a blockade of Cuba. Probably President Kennedy's advisers made their individual decisions from a study of intelligence reports and a consideration of alternatives before meeting as a group to decide on the course of action. It is clearly of some importance to know how such group decisions following discussion differ from individual decisions and that is one of the problems to which research on group dynamics has been addressed.

> There are many dimensions on which decisions can vary and therefore many dimensions on which group decisions might consistently differ from individual decisions. One such dimension, one that was important in the decision about Cuba, is riskiness.

Brown then continues to point out that it is generally assumed that group decisions are more cautious than individual decisions and that "consequently a recent discovery that group decisions following discussion are consistently riskier than individual decisions has occasioned some surprise" (1965, p. 657). Brown, it so happens, was referring to Stoner's 1961 thesis. Judging the position taken by Brown as expressed in the foregoing quotes from his book, it would appear that he, just like Stoner, is interested in complex real-life decision-making involving risk.

Kogan and Wallach, who are probably the most prolific researchers in the area of decision making, also seem to be primarily concerned with what happens in complex real-life decision-making under conditions of risk. In their latest major analysis of decision making - a previous analysis was published by these same authors in 1964 - they have this to say (Kogan and Wallach, 1967a, p. 224):

> To consider decision making under conditions of risk at the level of the individual .. is to consider only part of the psychology of making risky decisions. Whatever may be his individual proclivities, the decision maker, more often than not, carries on his work in a social context. Many, if not most, decisions will be made in active consultation with others.
> One example is managerial decision making. Even when ultimate responsibility resides administratively in the hands of a single individual, hardly ever does he arrive at his decision without soliciting and weighing the opinions of others. Often these others will interact among themselves in arriving at recommendations to present to

> the final decision maker. In many of the situations under consideration, in turn, ultimate responsibility resides in the hands of a group of persons rather than one individual. The final decision is reached directly as a result of discussion to a consensus by the members of a committee. They are experts who pool their viewpoints or their informational resources to find a solution to a problem.

The authors then proceed to describe three fictional situations of considerable complexity as they might occur in real life (Kogan and Wallach, 1967a, pp. 224-226):

The first situation is one where a group of medical doctors has to try to arrive at a decision whether they should perform an extremely delicate operation. X-rays have shown that the patient has a tumor which, if malignant, would quickly lead to the patient's death. If the tumor were non-malignant, however, it could be kept in check by nonsurgical means. The x-ray evidence does not permit any conclusions to be drawn with regard to the nature of the tumor. On the other hand, the operation that would have to be performed if the tumor is malignant would be a very dangerous operation indeed which, if not successful, would lead to the patient's death.

In the second situation, a passenger-carrying freighter with a cargo of high explosives is on fire. This happens at night and during a very stormy sea. The captain and the ship's officers must decide whether to enlist the passengers' help in the fire-fighting efforts or whether the passengers should be put to sea in lifeboats. The former course of action might make it possible to contain the fire and to prevent an explosion, but would - at the same time -

endanger the passengers' lives in the case where the fire could not be contained and the explosion would occur. The latter course of action, on the other hand, would doom the ship, but would remove the passengers from the scene of the explosion. However, the passengers would be exposed to the possibility that some of the lifeboats might capsize in the stormy sea so that some of the passengers would face the high probability of drowning. The fire situation is critical, and very little time can be lost in making the decision.

In the third situation, finally, the chief of state of country X, together with his political and military advisers, must decide whether or not to fight a pre-emptive war against country Y. A new head of government has legally come to power in the neighboring country Y, and this new man is well-known for his long-standing feelings of hostility toward country X. It is possible that he might order his armed forces to attack country X. On the other hand, his new position of power may have a somewhat mellowing influence on him which might lead him to tone down his aggressive attitude toward country X. If country X takes a wait-and-see attitude, however, it might expose itself to military attack from country Y; and the position of country X, if hostilities would break out, would be much better if country X would mount a quick pre-emptive war against country Y. On the other hand, such a pre-emptive war would very likely lead to all sorts of international repercussions the implications of which could turn out to be extremely unpleasant for country X.

The three situations which have been described above had been suggested by Kogan and Wallach as representative examples of complex real-life group decision-making under conditions of risk. This, of course, leaves little doubt as to these authors' basic goals and concerns.

We have, then, seen that it is highly probable that the real research goals of such major investigators as Stoner and Kogan and Wallach appear to have been to find out what happens in complex real-life group decision-making involving risk, and we have also seen that Brown apparently was interested in the same goal. Furthermore, it would seem reasonable to assume that the work of most of the other researchers in the field of decision making was directed at similar kinds of goals.

We shall now turn to take a look at how this basic concern with complex real-life decision making that has been expressed by the major workers seems to basically conflict with the use of experimental-laboratory methods of inquiry in general and with the use of the dilemma-of-choice questionnaire as the major instrument employed in these investigations specifically, and how the most important researchers in the field of decision making - Kogan and Wallach - have viewed this conflict.

3. The Acknowledged Problems of Reality Approximation

The two principal researchers in the area of decision making appear to be worried by the question of whether complex real-life decision-making under conditions of risk can be adequately and satisfactorily investigated by experimental methods and, specifically, by the use of the dilemma-of-choice questionnaire.

Kogan and Wallach, with reference to the three life situations that were related by this author on pages 14 and 15 of this thesis, etate (1967a, p. 224) that "whether experimentation could be devised that would have any bearing on such examples as these is, of course, a very open question." They further amplify this point with the following statement (pp. 226-227):

> Whether it is possible, within the confines of a contrived experimental setting, to capture anything of the dynamics involved in the examples considered must remain, of course, a moot point. At best, the work carried out in a laboratory may be suggestive of what might happen in life settings, but no more. It nevertheless seemed relevant to depict, at the outset, some possible life situations that fit the category of group risk taking. It remains for the reader to judge whether the experimental findings to be discussed have any bearing on the hypothetical examples presented earlier.

The "experimental findings to be discussed", referred to by Kogan and Wallach in the above statement, consist almost entirely of studies that have used the dilemma-of-choice questionnaire as their basic tool of investigation.

This author is somewhat taken aback by the fact that Kogan and Wallach, despite being fully aware of the basic problem that haunts experimental research in the area of risk taking in group decision

making, seem to prefer to let the matter rest with the statement that has been quoted above. Instead of dealing in depth with the ramifications of their statement, they simply toss the whole matter into the reader's lap. Furthermore, in spite of their clearly expressed misgivings with regard to the validity of experimental research in the area of risk taking - Kogan and Wallach - throughout their subsequent forty-pages-long analysis of pertinent experimental research - consistently treat the results of these experiments in such a fashion that the reader is led to assume that Kogan and Wallach consider these experimental results as being representative of what might be expected to occur in <u>real-life</u> risk taking.

Kogan and Wallach's failure to deal in greater depth with the doubtful validity of experimental research in the area of decision-making under conditions of risk becomes even harder to understand when viewed in the light of earlier statements made by these authors in connection with the same problem (1964, p. 6):

> Many studies carried out from the viewpoint of individual differences have confined themselves to decisions in hypothetical contexts, often on the assumption that these represented a simulation of what the subject would have done in a real decision situation ... The subjects in these studies did not experience positive or negative outcomes as a consequence of their decisions. Choices in these hypothetical decision contexts thus might not have related to choices under payoff conditions ... Subject's ego involvement in decisions of a hypothetical sort might have been quite weak ...

And, with specific reference to the use of the dilemma-of-choice questionnaire, they continue to say this (p. 6):

> The procedure was of a semiprojective nature, the subject having been asked how he would advise others in the situation described. It was assumed, of course, that the subject's advice to others reflected his own regard for the desirability of success relative to the disutility of failure. This "dilemma-of-choice" situation obviously represented decision making of a hypothetical sort.

Then, as they did in 1967, Kogan and Wallach let the matter rest after having expressed their misgivings. We will see in chapter III that an analysis of the origin of the dilemma-of-choice questionnaire shows that Kogan and Wallach, who developed that questionnaire in 1959, apparently never made any attempts at validating it. Although they clearly have long-standing doubts as to its validity, they simply continue to use it year after year. Unfortunately, the situation does not look any brighter when one considers the fact that the same questionnaire has, with or without modifications, <u>also</u> been used by most of the <u>other</u> researchers in the area of individual and group decision-making involving risk.

There are further statements yet by Kogan and Wallach which indicate that they are aware of some very basic research problems in the area of decision-making involving risk. The reader may recall that in the introduction to this thesis (on page 3) a statement was quoted from Kogan and Wallach with reference to experiments of the gambling type that involved real payoffs. In that statement, the authors (Kogan and Wallach, 1967a, p. 160) expressed their belief that "there is no indication that separate 'laws' of risk taking will have to be formulated for laboratory and field settings." This statement, however, implies that where the simulation technique of

the dilemma-of-choice questionnaire is used, we might indeed obtain a set of "laws" which only apply to cases where that particular technique has been employed. Yet if such would be the case, where, then, would the set of "laws" be derived from which would apply to field settings?

Kogan and Wallach address themselves to that particular problem in only indirect fashion by criticizing the fact that American psychologists are reluctant to undertake field studies (1967a, p. 156):

> Whenever a psychologist undertakes the study of risk-taking behavior in a laboratory setting, he has good reason to wonder whether the results obtained have any implications for risk taking in everyday life ...
> Since risk-taking behavior is likely to be highly susceptible to the situational circumstances under which it is assessed, one might expect that psychologists would have made serious efforts to check some of their generalizations in natural field settings. Actually, very few American articles report research of risk-taking behavior in the field. This aversion to field research reflects the American psychologists' preference for contexts that allow maximum experimental control. We should also note the relatively sharp cleavage between "basic" and "applied" research in American psychology, and the associated value connotations that give the former more prestige than the latter. Many psychologists would place field research in the "applied" category.

It should be pointed out that Kogan and Wallach made the above remarks while discussing research in the area of risk-taking behavior per se. In the specific area of studies that compare individual to group risk taking, the absence of field studies is even more notable. However, the main point seems to be that Kogan and Wallach are quite aware of the possibility that laws derived from laboratory studies may not at all apply to field settings.

To sum up, then, Kogan and Wallach - with reference to the area

of decision-making involving risk - have repeatedly expressed their considerable concern with regard to the validity of experimental research generally and the use of the dilemma-of-choice questionnaire in such research specifically. Yet despite their manifest concern, Kogan and Wallach apparently have never made any attempts to follow up the questions which they themselves have raised so poignantly. Why they have failed to do what they should have done a long time ago can only be speculated about, and this author would consider it a rather fruitless expenditure of efforts to engage in such conjecture.

Stoner, who - as might be recalled - did the first major study comparing the degrees of risk taking in individual and group decision making, seems to have had only <u>minimal</u> concern with regard to the validity of the dilemma-of-choice questionnaire and merely directs, in passing, the following remark at this problem (1961, p. 15): "The major disadvantage of this instrument is the subjects' lack of direct involvement with the prizes and stakes." Stoner does not say anything about what he would consider to be the instrument's <u>minor</u> disadvantages.

The author has not come across any evidence which would indicate that the other - more minor - researchers in the area of decision-making involving risk have expressed any particular awareness with regard to the problems of inquiry that exist in that specific area

of research. This, of course, is not to say that they are unaware of the existence of these problems; such awareness may well have been present, but these researchers may - for one reason or another - have chosen not to address themselves to that facet of their investigations. However, the strong suspicion cannot be avoided that these other researchers might have fallen into the pattern of simply continuing work which had come into existence as a result of Stoner's 1961 pioneer study. Their error, of course, is that of omission: These researchers may have continued such work without ever stopping to question the basic premises on which the initiation of work that compares individual to group risk taking originally had been based.

The author now would like to say a few concluding words with regard to the question of the respective merits of experimental and field studies in order to make his position as clear as possible. Nagel rightly attacks the unsoundness of criticizing laboratory experiments on the grounds that they are "unreal", but he continues to state (1961, p. 456) that "it is a sound observation that no generalizations concerning social phenomena based exclusively on laboratory experiments can be safely assumed without further inquiry to hold in natural social environments."

Finally, Nagel makes a statement that can be used as a rather damning argument against the manner in which past pertinent research has been conducted that was based on the use of the dilemma-of-choice questionnaire as the major tool of investigation. Nagel, in that

statement (1961, p. 466) takes the position that ".. if the process of gathering evidence for some hypothesis about a given subject matter yields only data whose characteristics, identified as constituting the relevant evidence, are created by the process itself, it is patently unsound to evaluate the hypothesis simply on the basis of such data." This author feels that nothing can be added to Nagel's statement.

4. Summary

In this chapter an attempt has been made to examine the problem of modes of inquiry. It was indicated that social scientists do not appear to be in agreement as to what constitutes "sound methods of inquiry", and the author has stated his reasons for using the theoretical-analytic method of inquiry for his investigation rather than employing the experimental-laboratory approach. It was further shown that there can be little doubt that the major researchers in the area of individual and group decision-making under conditions of risk, considered the real goal of their studies to be the attempt to find out something about risk-taking behavior in complex real-life decision making rather than merely wanting to determine how subjects might react to the dilemma-of-choice questionnaire. This questionnaire, however, was nevertheless considered by most of the experimenters as constituting a reasonable approximation of conditions as they might be

expected to be present in real-life decision-making situations. It was furthermore shown that the two principal researchers in the area of decision making, Kogan and Wallach, have repeatedly voiced considerable doubts as to the validity of the experimental approach and of the dilemma-of-choice questionnaire in its use in research into complex real-life decision-making involving risk. Yet despite their doubts, these two investigators have failed to make the thorough examination that one might have expected to result from their awareness of the basic problems that exist in their area of research. This author feels that such a thorough examination is overdue.

However, before this detailed analysis of factors that appear to be of prime importance in complex real-life decision making can be attempted, it is necessary to first take a look at the history of previous pertinent research. Furthermore, the origin of the dilemma-of-choice questionnaire must be examined. To deal with these tasks, then, will be the purpose of the following chapter.

Chapter III

THE HISTORY OF PREVIOUS RESEARCH

We shall now turn to take a look at the history of past research that has been concerned with comparisons of individual and group decisions involving risk. It is not the central purpose of this thesis to give a comprehensive history of past pertinent research, but the focus rather is on a thorough examination of the question to what extent past experimental research that used the dilemma-of-choice questionnaire as its basic tool of investigation constituted a reasonable approximation of complex real-life decision-making involving risk. Therefore, the description of past pertinent research will be brief and will not deal with details of the experimental designs that have been used in such research; nor will there be a description of methods of statistical evaluation that have been employed by the various investigators. The origin of the dilemma-of-choice questionnaire will be examined in considerable detail, and an attempt will be made to build a bridge to chapter IV where the central part of this thesis begins.

1. A Preliminary Recapitulation

It may be well to start this chapter with a consideration of some basic facts that exist with regard to past pertinent research; also, the author's position concerning these facts will be restated.

It is not the case that complex real-life group decision making had been observed to be riskier than such decision making by individuals, and that - as a result of such observations - experimental research had been conducted into the question of why such group decision making is riskier. Quite to the contrary! The situation is rather such that investigators became interested in the problem of whether there might exist any differences in risk taking between individuals and groups who find themselves in complex real-life decision-making situations, and that - as a result of this interest - these investigators proceeded to use experimental laboratory studies in order to find an answer to their question. When they found what they thought was their answer - their answer happened to be that group decisions are riskier than individual decisions - they accepted that answer and began to investigate why group decisions are riskier.

Yet, during all this, they did not bother (a) to conduct a thorough check of the validity of their experimental procedures and (b) to take a good look at actual real-life decision-making groups. Neither did they apparently find it necessary to think much about the possible dynamics of such real-life decision-making

groups and the variables which might be important influences in the decision making of such groups. Furthermore, the investigators who conducted the pertinent research used almost exclusively one basic tool of inquiry: the dilemma-of-choice questionnaire.

This author, then, feels strongly that, under the circumstances, the focus of his investigation should be on the validity of that predominant method of inquiry used in past pertinent research, and he furthermore feels that he should concentrate on the analysis of the variables which very likely govern the risk-taking behavior of real-life decision-making groups. When viewed within the framework of the present investigation, details of experimental designs and methods of statistical evaluations used in past pertinent research appear to be of minor importance.

2. Some Early Studies

Experimental studies specifically directed at comparing the degrees of risk taking in individual and group decisions were not conducted until the beginning of the sixties. Kogan and Wallach (1967a, p. 232) describe a study that was done by Hunt and Rowe in 1960, and this study was probably the first experiment of the comparison kind. In that study, the subjects were placed in a hypothetical investment situation. The results of Hunt and Rowe's experiment, according to Kogan and Wallach, showed that there are no differences in the de-

grees of risk taking between individual and group decisions.

In another early study (Lonergan and McClintock, 1961), the subjects were asked to make chance bets under experimental conditions where the subjects could win or lose money. The results of that study showed that only a very slight and statistically nonsignificant shift toward greater riskiness took place in the group decision making.

A third early study (Atthowe, 1961), again of the basic gambling-type (wagers on mathematical problems), indicated a shift toward greater caution in group decisions. However, Atthowe used dyads as his "groups". This probably puts the experiment into a substantially different category if comparisons are made to the other two studies because the dynamics that operate in dyads are different from those that influence the behavior of larger groups.

At any rate, the results of the three experiments mentioned above do not permit for any definite conclusions to be drawn with regard to possible differences between individual and group risk taking. None of these three experiments - at the time of their publication - seemed to have attracted any particular attention among other researchers in the area of decision making, and it would very much seem that studies comparing individual and group risk taking simply were not yet "in". Furthermore, there is every indication that Stoner, to whose 1961 study we shall turn next, had <u>not</u> been aware of the existence of these three studies. His thinking, therefore, could not have been influenced by

the findings of these three experiments.

3. Stoner's 1961 Study

Stoner (1961) conducted the fourth early experimental study with regard to individual and group risk taking, and his study - unlike the three mentioned above - attracted a great deal of interest indeed. In his experiment Stoner used the so-called "dilemma-of-choice" questionnaire which had previously been developed and used by Wallach and Kogan (1959, 1961) and which is reproduced in the appendix. This questionnaire describes in relatively brief fashion twelve complex decision-making situations involving risk as they might occur in real life.

In each of these fictional situations an imaginary central character - a Mr. X - has to choose between two alternative courses of action: One course of action is "safe" whereas the other is "risky". If Mr. X decides for the safe course, he can be certain to retain a less valuable "stake" but must, at the same time, ignore the possibility of obtaining a more valuable yet less certainly available "prize". If, however, Mr. X decides in favor of the risky course, he will risk the loss of his stake without being certain of winning the prize; in other words, he might find himself - as a result of having made the risky decision - worse off than he was before he made this decision. With each of these twelve items, several different levels of probability are given which govern the chances Mr. X has of being successful in obtaining the

prize. The subjects to whom the questionnaire is given are asked to make a decision as to the level of probability at which they would advise Mr. X to take the risky course of action. The procedure, then, appears to be essentially of a projective nature.

Stoner, in his 1961 experiment, handed individual copies of the questionnaire to each of his 101 subjects and asked them to record their private decisions on their copy of the questionnaire. The subjects had approximately 2½ minutes per question for making their decisions. Stoner assumed that these decisions established the subjects' willingness to take risks, an assumption which will be thoroughly examined in chapter V.

At some later time (presumably after not more than a few days; Stoner is not specific on this point), 78 of these 101 subjects were brought together in thirteen groups of six members each. In each of these groups each subject was given an individual copy of the questionnaire, and the subjects were asked to make a unanimous group decision regarding the advice that should be given to Mr. X. Each subject was also told to record these group decisions on his copy of the questionnaire. After the subjects had accomplished this task, they were given a post-decision answer sheet on which they had to record both the group's decision for each of the twelve items as well as their own private decisions as they would have been made by the subjects at the time the group decisions had been agreed upon.

Stoner also used a control group of 23 subjects who were <u>not</u> brought into a group decision-making situation but to whom the ques-

tionnaire was once more individually administered after a period of between six to twenty-two days following the first administration of the questionnaire.

The results of Stoner's experiment were as follows: (a) The levels of probability at which the groups advised Mr. X to take the risky course of action were significantly lower than the average levels of probabilities at which the group members had made their earlier private decisions during the first administration of the questionnaire. (b) The group members' second private decisions - the ones they had been asked to record immediately after the group decisions had been made - also showed the same shift that had appeared in their group decisions. In other words, this evidence appears to indicate that the subjects very likely could not have felt being pressured by the group when they decided for a riskier decision together with the other group members. (c) The control group, on the other hand, showed no significant shifts toward either lower or higher levels of probability at the time when the second private administration of the questionnaire was conducted with the control group.

Stoner interpreted the results of his investigation as an indication that group decisions have a significant tendency to be riskier than individual decisions. Stoner's assumption, of course, is only justified if his basic assumption is valid that the dilemma-of-choice questionnaire, in the first place, measures subjects' willingness to take risks. However, this problem of validity will, as has been pointed out on the previous page, be thoroughly examined in chapter V.

4. The Impact of Stoner's Study

The finding of Stoner's study that group decisions are riskier than individual decisions ran counter to the widely held belief that group decisions are more cautious than individual decisions. Stoner (1961) feels that this belief possibly is held by the majority of people, and Bateson (1966, p. 119) claims that when he asked English college students "whether they would expect an increase or a decrease in riskiness following .. group discussion, about 90 per cent predict a decrease." Brown (1965, p. 657) also expresses his surprise at Stoner's findings by stating that "the academic committees on which one has served, committees to decide on appointments, course offerings, and degree recommendations do not leave one breathless with their daring." Similar sentiments have been voiced by Whyte (1956) with regard to the team approach in business. It would furthermore appear to be a matter of public record that people in all walks of life frequently indicate their conviction that decision-making groups are slow to arrive at their decisions and that, after these groups finally have arrived at a decision, such a decision more often than not is overly cautious and conservative. At any rate, it was probably largely because of the unexpected nature of Stoner's findings that other workers began to direct considerable research activities at this risky-shift phenomenon.

In most of the inquiries that were conducted subsequently to Stoner's 1961 experiment, the dilemma-of-choice questionnaire has been

used as the major tool of investigation. The mere fact that this questionnaire enjoys such a widespread acceptance is a strong indication, it would seem, that the basic validity of this instrument very likely has not been seriously questioned by those workers who had no hesitation to use it in their own investigations.

The tacit acceptance of the validity of the dilemma-of-choice questionnaire as the principal instrument of investigation must have been considerably strengthened by the fact that the results which had been obtained by Stoner were again and again confirmed in the vast majority of subsequent research in which this questionnaire was used. The risky-shift effect in studies which used the dilemma-of-choice questionnaire was observed in American experiments (e.g.: Kogan and Wallach, 1967b; Marquis, 1962; Teger and Pruitt, 1967; Wallach and Kogan, 1965; Wallach, Kogan, and Bem, 1962; Wallach, Kogan, and Burt, 1965), in a British inquiry (Bateson, 1966), and in Israeli investigations (e.g.: Rim, 1964 and 1965). The risky-shift phenomenon was observed with males and females (Wallach, Kogan, and Bem, 1962) and with senior executives as well as with college students (Marquis, 1962). Teger and Pruitt (1967) found the effect to occur even with groups who restricted themselves to a non-verbal exchange with regard to their individual decisions on the dilemma-of-choice questionnaire. Wallach and Kogan (1965) discovered that it is <u>not</u> necessary to require of groups that they reach a unanimous decision and that merely <u>discussing</u> the problems is sufficient

for achieving the risky-shift effect. Wallach and Kogan's 1965 study was replicated, and the results were confirmed, in an experiment by Wallach, Kogan, and Burt (1965).

Although the confirmation of Stoner's findings was not restricted to experiments which used the dilemma-of-choice questionnaire, there are apparently only two published experiments in which this procedure was not employed. Wallach, Kogan, and Bem (1964) obtained the risky-shift effect in an experiment that offered possible monetary gains to subjects who were engaged in problem-solving activities, and the same authors (Bem, Wallach, and Kogan, 1965) observed the risky shift in an investigation where the subjects had been given the impression that they might suffer physical discomfort and pain as a result of their decisions. However, these two experiments were essentially of the gambling-type, and such experiments - as was pointed out in the introduction to this thesis on pages 3 and 4 - cannot be considered to simulate complex decision making. For this reason the author will not include these two experiments in his further considerations of past research.

The fact that the reality of the risky-shift phenomenon in group decision making has found considerable acceptance, at least among the major researchers in the field of decision making, is reflected in the following statements. Kogan and Wallach (1967a, p. 249) feel that

> the phenomenon of a group-induced risky shift .. would seem to have considerable generality. It is applicable whether the consequences under consideration are hypothetical or actual.

The same authors (Kogan and Wallach), with specific reference to the dilemma-of-choice questionnaire technique, state (1967a, p. 242) that "the phenomenon of a group-induced shift toward enhanced risk taking on this procedure seems to be consistent and enduring." Brown (1965) also largely accepts the reality of the risky-shift phenomenon. The basic acceptance of the phenomenon can furthermore, by implication, be deduced from the apparent fact that, to the author's knowledge, only one researcher has questioned the reality of the risky-shift effect: Stoner (1967) appears to be the only one who has specifically and directly addressed himself to this problem. However, as we shall see in the next section of this chapter, the results of a number of recent studies can be interpreted as constituting at least indirect evidence against the generality of the risky-shift phenomenon.

Finally, a few words should be said with regard to the explanations that have been offered for the risky-shift phenomenon in group decisions. Of the many explanations which have been advanced and tested, only four appear to remain strong contenders.

Bateson (1966) and Flanders and Thistlewaite (1967) feel that the risky-shift effect is a result of information exchange between the group members and of the subjects' consequently greater degree of familiarization with the problems after they have been discussed by the group members. Brown (1965) makes the qualified suggestion that groups may, at times, value risk per se and therefore may, when this condition prevails, exhibit a tendency towards increased risk

taking. Rim (1965) and Kogan and Wallach (1967a) favor the explanation that leadership influences in groups account for the greater riskiness which has been observed in certain kinds of group decision making, with Kogan and Wallach (1967a and b) being inclined to suspect that diffusion of responsibility in group decision making is an additional factor that accounts for the risky-shift phenomenon. With regard to leadership influences and diffusion of responsibility, Kogan and Wallach (1967a, p. 262) state that "the (risky-shift) phenomenon may arise from a person-centered factor of greater persuasiveness on part of the high risk takers, from a group-centered factor of diffusion of responsibility, or from both."

Although there exists, at present, no agreement among the researchers as to what causes the risky-shift in group decision making under certain experimental conditions, the evidence against the risky-shift phenomenon - which will be examined in the next section of this chapter - seems to furnish a fairly strong foundation for the contention that, for reasons to be discussed later, the information-exchange/familiarization hypothesis might be the strongest of the four explanations that have been mentioned above, and that it might be the one most likely to explain the risky shift which occurs under certain experimental conditions.

5. Evidence Against the Risky-Shift Phenomenon

It must be stated at the outset that the evidence against the risky-shift phenomenon is not direct evidence such as would result from experiments which prove that there is no risky shift. Evidence of this kind, to the author's knowledge, does not exist. The experimental findings which the author interprets as constituting evidence against the risky-shift phenomenon do so only in indirect fashion; the author has simply chosen to look at these findings from a point of view different from that which has been taken by the researchers who previously made and interpreted these findings.

Brown (1965) was probably the first who publicly cast doubt on the universality of the risky-shift phenomenon. He pointed out that Nordhøy, while working on his Master's thesis at the Massachusetts Institute of Technology, became concerned with the fact that one item in the dilemma-of-choice questionnaire used by Stoner, item 12, had, following group discussions, consistently gone into the direction of greater caution. Nordhøy then, according to Brown, began to look at what had happened to this item in experiments that other workers had conducted subsequently to Stoner's 1961 inquiry. Nordhøy again found that item 12 went consistently into the cautious direction following group discussions. He then wrote additional dilemma-of-choice items that, in subsequent experiments conducted by Nordhøy, also went into the direction of greater caution after group

discussions.

Stoner, in a recent study that set out to explore the possibility of writing items where the direction of the shift could be predicted in advance, has dealt specifically with this shift towards greater caution that occurs with some items (1967, p. 8):

> ... the basic risk-taking instrument was a 12 item life situation questionnaire which included four risky-shift items used in earlier research (Stoner, 1961, Marquis, 1962, Wallach, Kogan, and Bem, 1962, etc.), the two items from Nordhøy's research which demonstrated cautious shifts, and six new items. For two of the new items an attempt was made to engage widely held values favoring a risky course of action. For four of the items an attempt was made to engage cautious values. Thus, it was expected that two new items would demonstrate risky shifts and four new items would demonstrate cautious shifts ...

The results of Stoner's study showed that all six risk-oriented items had shifted in the expected direction, that the two caution-oriented items taken from Nordhøy's work showed no significant shifts in either direction, and that two out of the four new caution-oriented items had shifted significantly in the cautious direction whereas the other two showed no significant shifts in either direction. Stoner (1967, p. 19) concludes from this that whereas "it appears to be a rather simple matter to write items which demonstrate risky shifts (both new .. attempts were successful), formulating cautious-shifting items is more difficult (only two of the four attempts were clearly successful)."

Stoner, in discussing the results of his 1967 experiment, takes the position that his findings favor the value hypothesis. The value hypothesis, stated on pages 35 and 36, had been suggested by Brown (1965). Because Brown had been aware that some items of the dilemma-

of-choice type have a tendency to shift in the cautious direction following group discussion, he had suggested a dual-nature value hypothesis: Depending on the nature of the choice dilemma, the group interaction may bring to the fore either values favoring risky action or values favoring cautious action. However, the central point is not so much what causes the cautious shift on some items, but rather is that such a cautious shift can occur: Whatever may be the reason for the cautious shift, the fact remains that such a shift restricts the generality of the risky-shift phenomenon.

Rabow, Fowler, Bradford, Hofeller, and Shibuya (1966) found that two items (items 3 and 5 in their study) which had shown risky shifts in a previous study by Wallach, Kogan, and Bem (1962), did no longer do so if the idendity of the anonymous "Mr. X" was changed to "your father" and "your brother". They furthermore modified one item (item 4 in their study) that previously had been used by Wallach, Kogan and Bem in their 1962 study and that had - in that study - gone into the risky direction, and they (Rabow et al.) also created one new item (item 6 in their study) which had never been used in any previous studies. They found that both the items 4 and 6 went into the cautious direction in their study (Rabow et al.).

Although Kogan and Wallach criticize the findings of Rabow et al. on the grounds that the cautious-shifting items involved unethical aspects connected with the risky alternative and that these aspects led to a "reduction of the desirability difference between the uncertain

and the certain options" (1967a, p. 241), this criticism cannot be justified with regard to the two items where the idendity of "Mr. X" had been changed to "your father" and "your brother" (items 3 and 5 in the study by Rabow et al.). The example which is cited in Kogan and Wallach's criticism (item 6 in the study by Rabow et al.) is one of the two items (the other is item 4) where Rabow et al. deliberately introduced norm conflicts. It is furthermore the more extreme of the two and is the one which, as was stated above, never had been used in previous studies. The two items where the idendity of the central character had been changed (items 3 and 5 in the study by Rabow et al.), come straight from the original dilemma-of-choice questionnaire, and nothing but the idendity of the central character had been changed in these items. Kogan and Wallach's criticism, then, stands on very shaky grounds. It does not at all invalidate the evidence found by Rabow et al. that the changing of the central character from "Mr. X" to "your father" and "your brother" in items 3 and 5 eliminated risky shifts which previously (Wallach, Kogan, and Bem, 1962) had occurred for these two items.

The fact, then, that items 3 and 5 in the study by Rabow et al. did no longer exhibit any shifts following group discussions constitutes the second restriction of the generality of the risky-shift phenomenon.

Bateson (1966) and Flanders and Thistlewaite (1967) found that the shift magnitude can be reduced or that the shift can be entirely

eliminated if the subjects, before entering into a group meeting and discussion, are given a sufficient chance to familiarize themselves with the items on the questionnaire and to think about as many aspects of the problem as possible (the reader may recall that the subjects in Stoner's 1961 study had only about 2½ minutes per question to make their decision). Kogan and Wallach (1967a and b) are not any happier with these findings than they were with the findings of Rabow et al. In the case of the familiarization hypothesis, however, Kogan and Wallach's criticism is restricted to attacking Bateson's findings only. Flanders and Thistlewaite's study was published the same year in which Kogan and Wallach's two studies were published - 1967 - and it must be assumed that Kogan and Wallach had not been aware of Flanders and Thistlewaite's study.

To support their criticism of Bateson's study, Kogan and Wallach (1967a) refer to their other study (1967b) in which they had made tape recordings of interacting groups and then had played back these tapes to other subjects who merely had to listen to these tapes but who had not been put into the group-discussion situation. Kogan and Wallach (1967b) found that both the interacting and the listening groups showed shifts in the risky direction, but that the shift magnitude for the interacting groups was considerably larger than for the listening groups. The authors concluded from this evidence that familiarization alone cannot account for the risky shift in group discussion.

However, it would seem that Kogan and Wallach's argument may not be as sound as it might appear at a first glance. Listening to tape

recordings of discussions is a very passive kind of activity which probably does not lead the subjects to an involvement and a degree of familiarization as intensive as can be expected to result from having to sit down and to think and write out as many arguments as possible with regard to the items, a condition which characterized both Bateson's and Flanders and Thistlewaite's experiments. Furthermore, in Bateson's study each subject was told to prepare a brief, and in Flanders and Thistlewaite's experiment the subjects were told to make their notes in preparation for a defense of their positions which they would have to make in a subsequent group discussion. It must also be considered, with regard to Kogan and Wallach's criticism, that the results of the study by Flanders and Thistlewaite support and considerably strengthen Bateson's position. At any rate, the results from the 1966 study by Bateson and from Flanders and Thistlewaite's 1967 study constitute the third case of evidence against the generality of the risky-shift phenomenon. After all, if it seems that more familiarization with the problems eliminates the risky shift in many cases, then the risky-shift phenomenon appears to have been a rather somewhat artificial one to begin with.

We have, then, a situation where it would seem that the risky-shift effect in group discussions may well not be as "robust" as Kogan and Wallach (1967a, p. 265) declare it to be: We have seen that some items consistently shift in the cautious direction; that some items - if the idendity of the central character is changed from "Mr.

X" to "your father" and "your brother" - do not exhibit any shift tendencies following group discussion once the identity has been changed; and that subjects who have a chance to thoroughly think about the problems and to familiarize themselves with as many aspects of these problems as possible, also frequently do not any longer exhibit significant shifts - if any - in subsequent group discussions.

Although the evidence that has been dealt with in this section of the chapter throws considerable doubts on the generality of the risky-shift effect in group discussions under certain experimental conditions, it nevertheless must be made clear that this evidence against the risky-shift phenomenon comes exclusively from studies which used the dilemma-of-choice questionnaire, or modifications thereof, in their experimental designs. This apparent limitation with regard to the evidence against the risky-shift effect, however, really appears to be quite unimportant if one considers the fact that the evidence for the risky-shift phenomenon, with only two exceptions, also is derived from experiments which used the dilemma-of-choice questionnaire. This fact seems to sort of even the odds.

6. Four Explanatory Hypotheses Revisited

Although the author will not attempt to settle the controver-

sies that have arisen over the question of what causes the risky-shift in group discussions under certain experimental conditions and whether this shift tendency is as general and robust as Kogan and Wallach seem to think it is, the author nevertheless finds it tempting to say a few final words with regard to the four hypotheses that different researchers have offered as explanations for the observed risky-shift phenomenon.

The reader may recall that in the final paragraph of section 4 of this chapter (on page 36) the statement had been made that this author thinks that the information-exchange/familiarization hypothesis may be the most likely explanation for the risky-shift phenomenon. We shall now take another look at this statement.

As had been stated on pages 35 and 36, four explanations for the risky-shift effect appear to remain strong contenders. These four explanations, in brief, were as follows: (a) the information-exchange/familiarization hypothesis; (b) the value hypothesis; (c) the leadership hypothesis; and (d) the leadership/responsibility-diffusion hypothesis.

If we look at hypotheses (c) and (d) first, it becomes quickly evident that these two hypotheses require the risky-shift phenomenon to be as general and robust as it is supposed to be according to Kogan and Wallach. We have, however, seen that the shift effect does <u>not</u> appear to be of a truly general or robust nature. This, then, creates the rather embarrassing question why, in some cases,

leadership influences and diffusion of responsibility are either not present, or, if they are present, why they fail to exhibit their alleged tendency to exert pressures towards greater riskiness. Stoner expresses similar sentiments when he discusses the fact that some items on the dilemma-of-choice questionnaire do not shift into the risky direction and that some items even shift into the cautious direction. He states that "unfortunately, there is nothing, to the author's knowledge, in the diffusion of responsibility hypothesis which explains why responsibility diffuses for some life situation items and not for others" (Stoner, 1967; p. 21).

The value hypothesis, on the other hand, allows for shifts to go in either the risky or the cautious directions, depending on which kind of value becomes strongly engaged; and it allows for no shifts to occur if neither values favoring risk nor values favoring caution become strongly engaged. In other words, the value hypothesis does not depend on the postulation of a general and robust risky-shift phenomenon. However, the value hypothesis still is based on the assumption that group discussions frequently result in shifts towards either greater caution or greater risk.

The information-exchange/familiarization hypothesis, then, is the last one which remains to be considered, and it appears more and more that this hypothesis may be the most likely explanation for the risky-shift effect in group discussions under certain experimental conditions. Under this hypothesis, subjects who are given a chance to sufficiently familiarize themselves with the problems can be ex-

pected, in most cases, not to exhibit any shifts towards greater riskiness in subsequent group discussions. To be sufficiently familiar with various aspects of a problem on which one has to make a decision, furthermore, would also appear to be one of the major prerequisites demanded by persons who find themselves in a real-life decision-making situation involving risk. However, if this last statement is true, then it would seem that the risky-shift that follows group discussions is an artifact that results from the un-lifelike experimental conditions under which, prior to group discussion, subjects are not given sufficient time to become thoroughly familiar with the problem.

The information-exchange/familiarization hypothesis would, of course, be even stronger if there had been any experiments performed that would have tested this hypothesis on cautious-shifting items only. However, such experiments have, unfortunately, not yet been undertaken. Furthermore, the fact that - as Stoner (1967) has pointed out - it is rather difficult to write cautious-shifting items, would appear to create considerable difficulties in the execution of such experiments. Yet if such experiments could be properly performed, the author would be inclined to suspect that they would very likely show that cautious-shifting items no longer would tend to exhibit a cautious shift in subsequent group discussions if the subjects had been given a chance to thoroughly familiarize themselves with the items before going into the group discussion. This expectation would seem to be logical if one considers that there exists

strong evidence which indicates that familiarization eliminates, in most cases, the risky shift that frequently follows group discussion. If that is so, why, then, should familiarization not also eliminate the cautious shift that occurs with some items? The fact that, with some items, no shift after group discussion occurs to begin with, does not really contradict the position taken by the author. The no-shift effect can easily be explained with the value hypothesis, and the author sees no reasons for considering the information-exchange/familiarization hypothesis to be incompatible with the value hypothesis.

However, the author is, to repeat an earlier statement, not attempting to settle the controversies that exist with regard to the generality and causes of the risky-shift effect in group decision-making under certain experimental conditions; he merely intended to show (a) that the risky-shift effect may not be as general as has been widely assumed, and (b) that the shift effect could well be an artifact of the specific experimental conditions.

7. An Intermediate Recapitulation

In any examination of previous research in the area of individual and group decision-making under conditions of risk, the danger to lose one's bearings is ever present. It may be advisable, therefore, to glance back and to attempt a pulling-together of what ap-

pear to be the salient facts with regard to past pertinent research.

(a) Past research has virtually exclusively been performed under experimental laboratory conditions. Field research into complex real-life decision-making involving risk, and thorough theoretical examinations of the variables which govern this type of decision-making, appear to be - at least as far as can be assumed from the study of North American literature on the subject matter - totally absent. This situation, it would seem, is a result of most North American psychologists' preference for research under controlled experimental conditions and of these psychologists' bias which favors "pure" over "applied" research.

(b) The experimental research that has been conducted has largely relied on one basic method of investigation, namely, the use of the dilemma-of-choice questionnaire or of modifications thereof. This, it would appear, had been done because the use of this questionnaire was thought to create experimental conditions in which complex real-life decision-making under conditions of risk could be satisfactorily simulated. Although two of the major researchers in the field of decision making (Kogan and Wallach) have repeatedly expressed considerable doubts with regard to the validity of the experimental approach and the use of the dilemma-of-choice questionnaire in their investigations, both these researchers - just as the vast majority of the other researchers - continue to use the experimental method as well as the dilemma-of-choice questionnaire. It can be assumed that because of the manifestly strong desire to simulate complex real-life decision

making, very few experiments of the gambling-type which incorporate real-payoff conditions have been performed. Such gambling-type experiments, although they appear to come far closer to real-life decision making than those experiments where the dilemma-of-choice questionnaire has been used, nevertheless do not seem to inquire into complex decision making - unless, of course, one would take the position that gambling decisions constitute complex decision making, a position to which the author cannot subscribe.

(c) The results of experimental research which used the dilemma-of-choice questionnaire as the major tool of investigation are ambiguous, to say the least. Many of the workers who have employed this method of investigation appear to take the position, however, that there is strong evidence for the contention that group decisions are riskier than individual decisions. Based on this position, these workers have expanded considerable energies to inquire into the problem of what causes this apparent enhanced risk taking in group decision making. They have not, however, arrived at any consensus as to what the causes are.

(d) A number of the inquiries that had been motivated by the desire to find out what causes the risky-shift phenomenon have, incidentally, produced evidence which not only throws considerable doubts on the generality of the phenomenon but furthermore gives rise to the suspicion that the risky-shift effect observed in certain types of experimental laboratory research may by somewhat of an artifact.

(e) The assumption can be made that it is possible to develop modified research designs which use the dilemma-of-choice approach in order to find out for sure whether or not the risky-shift phenomenon observed in past research that used this specific approach is an artifact. If, as this author suspects, the phenomenon would turn out to be an artifact, then the conclusion would have to be drawn that no differences exist between individual and group decision making with regard to the degree of risk taking - under these experimental conditions! On the other hand, if such hypothetical research would show that the risky-shift effect in group decisions is not an artifact after all, then the conclusion would have to be that group decisions are riskier than individual decisions in many instances - under these experimental conditions! So, whatever the results of future experimental research using the dilemma-of-choice approach would turn out to be, we still would be facing the same basic problem we are facing now: Does experimental research which uses the dilemma-of-choice questionnaire - or modifications thereof - really constitute a valid simulation of complex real-life decision-making under conditions of risk?

Although - at least in the author's estimation - part of the evidence that had been discussed in this and the previous chapters, already has cast considerable doubts on the validity of past pertinent research, it nevertheless remains absolutely necessary to inquire into the nature of complex real-life decision-making involving

risk. Only such an inquiry can show the full extent of the chasm that seems to exist between complex real-life decision making on one hand and - on the other - past attempts to simulate this type of decision making in the laboratory.

However, before we can begin the inquiry into complex real-life decision making, we have to look first at the origin of the dilemma-of-choice questionnaire.

8. The Origin of the Dilemma-of-Choice Questionnaire

The dilemma-of-choice questionnaire was first developed and used by Wallach and Kogan (1959 and 1961). To the author's knowledge, no papers that deal with the validation of the instrument have been published by its creators, but it is certain that it had not been developed for the purpose of investigating possible differences that might exist between individual and group decisions with regard to degrees of risk taking. Stoner (1961) was definitely the first researcher who used the dilemma-of-choice questionnaire for that specific purpose.

As for Wallach and Kogan, they first used this instrument in a 1959 study which was entitled "Sex Differences and Judgement Processes", and the dilemma-of-choice questionnaire was only one of several different instruments employed in that study. The authors present an abbreviated version of the questionnaire in their study

and claim that it measures conservatism-risk taking. However, at no point in their paper do they address themselves to the question of the validity of the instrument, and neither do they define what they mean by "risk taking".

The place which the dilemma-of-choice questionnaire had in that study, and the importance which the authors might have assigned to it, can only be determined indirectly; and this might best be accomplished by considering a quotation taken from that study (Wallach and Kogan, 1959; p. 557):

> It is evident .. that a thorough assessment of conservatism in judgement requires us to consider not only the particular decisions made, but also how certain or uncertain the individual's decisions seem to him. While both certainty and extremity of judgement may be a reflection of some more basic process such as risk-taking, it is no less essential that we specify more exactly the factors that may underlie sex differences in judgement. Accordingly, the present research will explore the extremity of judgements for men and women when made at varying levels of certainty. The study will also contrast various realms of content, and inquire as to possible sex differences across areas of subject-matter in willingness to choose a risky alternative.

The author feels that this quotation indicates with reasonable certainty that the dilemma-of-choice questionnaire was <u>not</u> the major instrument in that particular study. Neither does it appear as if that study was concerned primarily with the question of <u>risk taking</u>. It rather seems that the authors' <u>first</u> concern was with sex differences in certainty and extremity of judgement and that they must have felt that it might be interesting to <u>also</u> get some form of measure that might possibly reflect on the subjects' willingness to take risks. However, as was pointed out earlier, the authors, in that study,

do not define risk taking.

The concept of risk taking seems to be first touched upon by Wallach and Kogan in a study that did not employ the dilemma-of-choice questionnaire and that was directed at the question of how certainty of judgement relates to an individual's subjective evaluation of risk. In that study, Kogan and Wallach (1960, p. 211) state that risk "may well have two, somewhat different facets: A 'choice' aspect, where the focus is on probability; and a 'danger' aspect, where the emphasis is on severity of negative consequences." This statement tells us something about Kogan and Wallach's concept of risk taking, but surely not very much. In order to find out a bit more about their concept of risk taking, we have to go to a third study of theirs.

That study (Wallach and Kogan, 1961) investigated the question of how age differences might influence certain aspects of judgement and decision making, and it is the second study in which the dilemma-of-choice questionnaire had been used. The authors describe the purpose of that study with the following words (1961, p. 23):

> In making supposedly rational decisions, we must investigate at least two types of quantity, namely, the relative properties of different outcomes of alternative courses of action and the degree of our preferences for the different outcomes. The extent to which the fear of failure deters us and the hope of success spurs us on, as well as the degree of our confidence in what may happen, all determine our decisions. ... The present paper has two major concerns: (1) The investigation of empirical relationships among variables derived from the domain of decision making and the psychology of judgement; (2) the examination of age differences in these domains.

It can be seen, then, that this study was somewhat more specifically concerned with decision making. In order to gain a better insight into the authors' concept of risk taking, we have to look at another of their statements in the same study. This statement addresses itself directly to the use of the dilemma-of-choice questionnaire in that particular study. In explaining the purpose of the questionnaire, Wallach and Kogan give some indication of their idea of risk taking (1961, p. 27):

> A questionnaire index of disutility or deterrence of failure was constructed (Wallach and Kogan, 1959) ... This index measures the relative disutility or deterrence of failure versus the utility of success regarding the more risky alternative.

It would appear, then, that risk taking - for Wallach and Kogan in 1961 - is not to be deterred by the "disutility of failure" in one's decision making because one is more attracted by the "utility of success." However, the authors - in that study - again do not say anything about the validity of their questionnaire; they merely state flatly, as can be seen from the above quote, that the questionnaire measures risk taking.

By the year 1961, then, the dilemma-of-choice questionnaire had been in existence for two years and had been used in two studies by its creators. Neither of these two studies were directed at comparisons of individual and group decisions involving risk. The questionnaire was alleged to measure risk taking, but the validity of that claim had not been proven by Wallach and Kogan. Furthermore,

they had given only a very perfunctory definition of risk taking. It would also appear that the dilemma-of-choice questionnaire came into existence rather accidentally as a result of Wallach and Kogan's desire to tap an additional variable in their 1959 study which was primarily directed at an examination of possible sex differences in judgement processes.

This, then, was the situation at the time when Stoner decided to do his Master's thesis - entitled "A Comparison of Individual and Group Decisions Involving Risk" - at the Massachusetts Institute of Technology in 1961 under the guidance of Donald G. Marquis and Michael A. Wallach.

It was in Stoner's thesis that the dilemma-of-choice questionnaire was first used for the specific purpose of investigating possible differences in the degrees of risk taking in individual and group decision making. Stoner (1961, p. 10) justifies the use of the dilemma-of-choice questionnaire as the major tool employed in his investigation as follows: "The instrument employed to measure willingness to choose risky alternatives in both the individual and group setting is a questionnaire devised by Wallach and Kogan (1959, 1961) for a similar purpose." It should be pointed out that Stoner appears to stretch the truth when he uses the words "for a similar purpose": As was pointed out above, neither in their 1959 nor in their 1961 study did Wallach and Kogan use the dilemma-of-choice questionnaire for the study of possible differences between individual and group risk taking.

Stoner, aside from using the dilemma-of-choice questionnaire, indirectly indicates his basic acceptance of the validity of the instrument when he describes the essential nature of the items in the questionnaire and the fact that with each item several probabilities of winning the prize are given (1961, p. 10):

> ... The subject is asked to advise the central character in each situation. The advice is given by selecting the lowest probability of success for which the character should pursue the risky course of action.
> Therefore, in comparing two individuals who chose different probabilities in accepting the risky course of action, it is possible to say that in situations with "equal" stakes and "equal" prizes, one individual demanded a lower probability of success, and thus was more risky, than the other.

The second paragraph of the above quotation is, of course, the key to Stoner's position with regard to the validity of the dilemma-of-choice questionnaire.

Stoner further amplifies his position as follows (1961, pp. 14-15):

> The questionnaire has a number of features which make it a logical choice as the instrument for this experiment. It offers the subject twelve different situations in which the stakes and prizes differ greatly. Each question is quite ambiguous, forcing the subject to project himself into the situation in order to be able to make a choice which is meaningful to himself. Although the concept of expected value can be used as a convenient tool for working towards a solution to some of the questions, none of the questions is sufficiently detailed to allow more than a very rough approximation to be made through this means. Subjects tend to find the situations both interesting and involving. The number of situations increases the reliability of the instrument, and the variety of situations helps to give the results a degree of generality.

The two quotations which have been cited above seem to indicate clearly that Stoner must have thought that the instrument is basical-

ly valid. However, it must be held to Stoner's credit that he was not entirely free of misgivings when he decided to use the dilemma-of-choice questionnaire as the principal instrument in his investigation. His concern is indicated in one solitary statement on page 15 of his thesis:

> The major disadvantage of this instrument is the subjects' lack of direct involvement with the prizes and stakes. If the subject firmly disagrees with the majority of the group members on the course of action to be pursued, he can still agree to the choice without running the risk of a tangible loss.

As the present author has already pointed out much earlier - on page 21 - in connection with the first sentence of the above quote, Stoner speaks of the "major disadvantage" of the instrument, but nowhere does he say what he thinks are the minor disadvantages of the dilemma-of-choice questionnaire.

Indicentally, although this point will be dealt with in great detail in chapter V, Stoner's statement which had been quoted immediately above touches on what is probably the central weakness in the dilemma-of-choice approach, and very likely is the main reason why this instrument should be ruled out as a valid tool for investigating risk taking: If the subjects are not "running the risk of suffering a tangible loss", then what kind of a "risk" are they running? It cannot, of course, be disputed that subjects who do the dilemma-of-choice questionnaire are in a decision-making situation, because this they obviously are, but there exists a very strong argument that they may not be in a decision-making situation involving risk! But more about that in chapter V.

It should be pointed out that the dilemma-of-choice questionnaire has not always been used in its original form in past pertinent research, and some of the modified and new items that have been employed as part of the total number of dilemma-of-choice items in two recent studies (Rabow, Fowler, Bradford, Hofeller, and Shibuya, 1966; and Stoner, 1967) can be found in the appendix. However, these modified and new items do not constitute a departure from the basic spirit of the original questionnaire, and the statement made in the last paragraph applies to these items as well.

Finally, although this probably is not of any great importance, the range of theoretical life situations which have been depicted in various dilemma-of-choice items indicates the existence of a large reservoir of potential items of this kind. It may be sheer speculation, but the author cannot help but wonder whether the ease with which dilemma-of-choice items can be written - provided one does not attempt to write cautious-shifting items - may have something to do with the popularity which the dilemma-of-choice approach has enjoyed in previous pertinent research.

9. Building a Bridge

It is now time to sum up the previous section and to attempt the building of a bridge to the next chapter.

The previous section of the present chapter revealed a very peculiar situation: Although the dilemma-of-choice questionnaire apparently never had been validated, it was nevertheless considered, by its creators, to measure the degrees to which individuals are willing to take risks. After it had been used only twice as a secondary instrument in investigations which did not deal with comparisons of individual and group risk taking, Stoner decided to use the dilemma-of-choice questionnaire as the major instrument in his investigation which was concerned with comparisons of individual and group decisions involving risk.

Stoner accepted the basic validity of the instrument but nevertheless was the first researcher who, in print, expressed some misgivings with regard to its validity. Furthermore, it would appear that the particular misgivings which Stoner stated, may well turn out to be the key argument against the validity of the dilemma-of-choice questionnaire as an instrument which measures risk taking.

Yet, as we have seen in chapter II, the basic weakness of the dilemma-of-choice questionnaire as a measure of risk taking apparently had - for obscure reasons - not been perceived by most of the researchers who, subsequent to Stoner's study, continued to use the questionnaire in their own investigations. Even Kogan and Wallach did not begin to publicly express doubts about their own questionnaire until some years after Stoner's 1961 study. Yet Kogan and Wallach, despite their own stated misgivings with regard to the validity of the dilemma-of-choice questionnaire, afterwards still continued to

use the questionnaire - and they still do! - in most of their investigations into comparisons of individual and group decisions involving risk. The rest, as was shown earlier in the present chapter, is history.

The author has now come to the end of his analysis of past pertinent research, an analysis to which, essentially, the whole first part of this thesis had been devoted.

This analysis, in the author's view, has amassed substantial evidence that indicates that the validity of most of the past research into comparisons of individual and group decisions involving risk is doubtful. However, this evidence against the validity of most of the past pertinent research is bound to be strongly supported by additional evidence which emerges from the analysis of the major variables that very likely govern much of complex real-life decision-making under conditions of risk.

Since this analysis - which will begin in the next chapter - will use the same theoretical-analytic approach that has been employed throughout this thesis, the author may be permitted to say a few final words with regard to this type of approach.

The problem is not whether a theoretical-analytic inquiry into the validity of past pertinent research will be considered as scientifically "acceptable" by the majority of North American psychologists. The problem rather is that without such a basic theoretical-analytic inquiry there appear to exist few, if any, chances to find

the answer to the principal question of whether there exist any differences with regard to the degrees of risk taking between individuals and groups who are engaged in real-life complex decision making. To put the problem into a nutshell: Before one can attempt to simulate something, one must first be quite clear about the nature of that which one wants to simulate. It is the author's considered view, however, that past pertinent researchers who used the dilemma-of-choice questionnaire as their major tool of investigation, had apparently not been clear about the nature of that which they wanted to simulate in the laboratory, namely, complex real-life decision-making under conditions of risk.

We shall now turn to chapter IV and begin the second part of this thesis: The investigation of the major variables which probably govern the behavior of real-life groups who are engaged in complex decision-making involving risk. This investigation will, in the next chapter, be concerned with some basic definitions of risk taking which have been advanced in the past by major pertinent researchers. Furthermore, a look will be taken at what we already know with regard to some of the important variables which govern complex risk taking.

Chapter IV

WHAT WE KNOW ABOUT RISK TAKING

Before it becomes possible to turn our attention towards the attempt of finding a <u>better</u> understanding of complex real-life decision-making involving risk, it is necessary to examine to some extent that which we <u>already</u> know about this area. In order to do this, the author will first deal with definitions of risk taking that have been advanced by some of the major pertinent researchers. After this has been done, a step will be taken in the direction of determining what can be said with regard to two extremely important aspects of complex decision making: The problems of value and of probability, in connection with which a number of questions will be raised which can only be answered by conducting further research. Finally, the problem of static versus dynamic decision making will be briefly considered.

1. Stoner's Definition of Risk Taking

According to Stoner (1961, p. 6), "the realm of decision making under risk is not clearly understood at present; in fact, the very word 'risk' means different things to different people." It would seem that Stoner's statement not only accurately reflected the situation as it was in 1961, but that it applies just as much to the situation as it is now in 1968: We simply do not appear to have a clear idea of what we mean when we speak of risk taking.

One reason for this rather unfortunate situation would seem to be that past research in decision making placed considerable emphasis on the examination of gambling-type decision making. Such decision making is generally characterized by having clearly identifiable elements: There is a "stake" which can be exposed to loss; there is a "prize" which can be won; there is the probability which governs the likelihood of winning the prize; and there are two courses of action - a cautious and a risky course. The cautious course assures the retention of the stake and rules out the obtaining of the prize, and the risky course makes possible the obtaining of the prize or the loss of the stake if the prize is not obtained.

Any decision-making situation that has the aforementioned basic structure - and such situations will almost always be of the gambling-type - lends itself reasonably well to controlled experimental studies because there exists a consistent basis for measuring risk taking: If the subject chooses the risky course, he acts - by de-

finition - "riskier" than if he had chosen the cautious alternative. Furthermore, if it is possible to vary the probabilities which govern the likelihood of winning the prize, then the subject acts "riskier" if he chooses a lower rather than a higher probability. This, of course, is not to say that this kind of risk-taking research is free of problems of measurement, but these problems are minor if compared to those which are encountered if the objective is to study risk taking in complex real-life situations.

It is this clear-cut structure of the gambling-type situation which is supposed to be represented in the items of the dilemma-of-choice questionnaire. However, it shall be shown later on that this is not the case. A cautious and a risky alternative exist in only seven of the twelve items of the questionnaire (in items 1, 3, 4, 5, 6, 10, and 11), and objective probabilities for winning the "prize" can - at best - be established for only five of the twelve items (items 2, 6, 8, 9, and 10), only two of which (items 6 and 10) also fit in with the first group.

It seems to be fairly obvious that Stoner's analysis of the components of risk-taking behavior must have been based on the assumption that the items of the dilemma-of-choice questionnaire represent the simple gambling-type structure (1961, pp. 6-8):

> The author will not attempt a rigorous definition of risk, but will instead describe the four parameters which he considers to be inherent in situations involving risk. The parameters are the stake, the prize, the probability of losing the stake and the probability of winning the prize.
> The stake is that which the individual must expose to loss in order to participate in the risky situation. For simplicity

it is assumed here that all stakes and prizes have positive utility.
The prize is that which he stands to gain if the situation is decided in his favor.
The probability of losing the stake and the probability of winning the prize are largely self-explanatory terms, but it should be pointed out that the author is referring to "objective" or "statistical" probabilities and not to "subjective" or "psychological" probabilities. ...
Although "risky decision" is a hard term to define in such a way that most individuals will agree with the definition, it is not difficult to establish some rules which make it possible to classify one course of action as more risky than another.
Choice A will be considered to be more risky if:
- both choices have the same prize and the same probabilities of winning the prize and of losing the stake, but choice A has a higher stake than choice B.
- both choices have the same stakes and probabilities of winning and losing, but choice A has a smaller prize.
Similarly, with other parameters constant, A is more risky than B: if the chance of winning the prize in A is less, or - other things constant - the chance of losing the stake in A is greater.

In the dilemma-of-choice questionnaire, of course, riskiness is controlled by varying the probabilities of winning the prizes. However, Stoner's use of the terms "probability of winning the prize" and "probability of losing the stake" is both confusing and confused because it implies that these terms refer to two independent parameters. Yet such is not the case where the risky alternative can have only two outcomes: win or lose. In the dilemma-of-choice questionnaire, the so-called risky alternative has two outcome possibilities in six of the twelve items (in items 4, 6, 7, 10, 11, and 12) and more than two outcome possibilities in the other six items (items 1, 2, 3, 5, 8, and 9).

It is a basic and accepted principle that the probabilities for different outcomes of a given course of action must add up to 1.0.

If a given course can have only two outcomes, win or lose, then the probability of winning is complementary to the probability of losing. So if the probability of winning happens to be 0.3, then the probability of losing must be 0.7. Furthermore, if the probability of winning would change by a given fraction of 1.0, e.g.: 0.2, then the probability of losing would correspondingly have to change by exactly the same fraction of 1.0. This means that rather than being two independent parameters, the probabilities of winning the prize and of losing the stake are interdependent aspects of the same parameter in any course of action where the outcome possibilities are win or lose.

On the other hand, if a given course can have more than two possible outcomes - such as win, lose, and stay even, for example - then the probability of winning the prize would not be complementary to the probability of losing the stake, and the two probabilities truly would be two independent parameters.

It must also be pointed out that some of the situations described in the items of the dilemma-of-choice questionnaire have more than two alternatives. If both of the alternatives given are courses of action, then there is always a third course, namely, that of inaction. Such a third course exists in items 2, 3, 4, 5, 6, 7, 8, 11, and 12, and it may or may not be a cautious course.

In the dilemma-of-choice questionnaire, items 2, 7, 8, 9, and 12 are treated like the remaining seven items with regard to varying the

probability of success with the so-called "risky" alternative. However, since these five items really do not have a cautious and a risky, but only two risky alternatives, probabilities of success should be listed for both alternatives in these five items. If this is not done, then the decision-making situation is misrepresented.

To sum up, Stoner's analysis of risk taking is based on the structure of gambling-type risk taking and on the assumption that it is this type of risk taking which is represented in the dilemma-of-choice questionnaire. The items of the questionnaire, however, are not all of this simple type: Some of the items do not have a risky and a cautious alternative, but only have risky alternatives; some items have more than two alternatives; objective probabilities can only be established with some of the items; and the risky alternatives in a number of the items have more than two outcome possibilities. This inconsistency in the nature of the items reflects the lack of understanding of complex decision making and shows how this inadequate knowledge has contributed to the existing state of confusion in risk-taking research.

2. Brown's Definition of Risk Taking

A view of risk taking which is very similar to that of Stoner is taken by Brown (1965, p. 691): "A decision under risk involves choosing between a more certain, less attractive alternative (the 'stake')

and a less certain, more attractive alternative (the 'prize')." Unfortunately, Brown's explanation could lead to confusion: The term "more certain" could mean that the stake is certain - which it is with the cautious course of action - or it could mean that the stake is not certain but is nevertheless more certain than the prize - which could be the case where there are two risky alternatives. In the latter case, however, problems develop with regard to the definitions for "stake" and "prize": Is a "more certain yet not certain" stake a stake or a less desirable prize? It would seem that terms such as "stake" and "prize" become progressively more difficult to work with as the complexity of decision-making situations increases; eventually, the point is reached where these terms become next to useless and only lead to confusion.

Yet one should not be overly dismayed that such difficulties with terminology arise. After all, much of the language used in dealing with complex decision making has been taken over from research which dealt with simple gambling-type risk taking. Such language, however, simply is no longer adequate if applied to complex decision making. As shall be demonstrated in chapter V, complex decision making cannot be properly defined or dealt with unless a more complex language is used.

Brown makes another statement with regard to risk taking which not only is dubious, but appears to be outright wrong (1965, p. 658): "To take a risk is voluntarily to endanger (the) stake." Risk taking

certainly will frequently be of the kind where the stake is voluntarily exposed to loss, but one surely cannot restrict risk taking to such voluntary action. In any decision-making situation where there are only risky and no cautious alternatives, exposing the stake to loss is anything but voluntary. In many such cases the continued possession of the stake is threatened to a high degree, and restoring the security of possession becomes the prize. Brown's statement, however, is another excellent example of the existing confusion with regard to the concept of risk taking.

With specific reference to item 1 of the dilemma-of-choice questionnaire, Brown makes still another controversial statement which should be examined (1965, p. 658):

> If the individual is to have a problem of decision making the prize must exceed the value of the stake. If the prize and stake were equally valuable and yet the probability of attaining the prize varied, as it does in problem 1 .., then Mr. A would not consider risking his stake. Would he give up his present job in order to take a new job exactly like the one he has in a company that might fail? Probably not.

Let us make clear first that Mr. A, were he to make the move to the new company under the circumstances described by Brown, would indeed take a risky course of action. Now, Brown states that Mr. A, under these circumstances, would probably not make the move. Why not? Mr. A could have any number of reasons for making the risky move under these circumstances. He might want to spite his old boss; he might want to tell others that he moved to a better job although in reality the new job is not better and less secure on top of this; he might

just simply be fed up with his old surroundings and desire a change in scenery; he might have convinced himself that the new job, in the long run, offers better possibilities for advancement although his hope might really be without any foundation in fact; he might have a very attractive secretary in the new job; etc., etc. At any rate, this author does not think that it is always necessary that the prize must be of greater value than the stake, although it probably is more often than not. Furthermore, as we shall see in section 4 of this chapter, the problem of "value" is a difficult one indeed.

It should also be kept in mind that some people will endanger the stake for the sheer kick of placing it into jeopardy. The "prize", in such cases, appears to be the thrill of risking the stake. Examples for this kind of risk taking can be found in the games of "Russian Roulette" and "Chicken". Of course, in these games, admiration from an audience may constitute an additional prize.

3. Kogan and Wallach's Definition of Risk Taking

We shall now turn to a definition of risk taking that has been advanced by Kogan and Wallach in the introduction to their most recent analysis of the subject matter (1967a, p. 115):

> To talk about risk taking, then, is to refer to behavior in situations where there is a desirable goal and a lack of certainty that it can be attained. The situations may take the form of requiring a choice between more or less desirable goals, with the former having a lower probability of attainment than the

> latter. A further possible, but not necessary, characteristic of such situations is the threat of negative consequences for failure so that the individual at the postdecisional stage may find himself worse off than he was before he made his decision.

There are a number of questionable points in the above statement. Firstly, there is the assertion that a choice might be required "between more or less desirable goals, with the former having a lower probability of attainment than the latter." This statement is of a nature very similar to one made by Brown which was quoted by the present author on pages 67 and 68 of this thesis. In that statement, Brown asserted that "a decision under risk involves choosing between a more certain, less attractive alternative (the 'stake') and a less certain, more attractive alternative (the 'prize')." The present author has argued that this statement by Brown leads to questions about whether a possibly uncertain stake is a stake or a less desirable prize. Kogan and Wallach's terminology creates the same kind of difficulty: Is the "less desirable goal" a stake or a less valuable prize? It can only be restated that the use of terms such as "stake", "prize", and "more or less desirable goals", is fraught with danger and contributes to the existing confusion over definitions of risk taking.

The second questionable point in Kogan and Wallach's statement is their assertion that it must be uncertain whether the desired goal can be attained. It shall be shown in section 4 of chapter V that uncertainty with regard to goal attainment is not a necessary requirement for risk taking in cases where goal attainment, although assured,

may nevertheless also lead to additional consequences which have an important bearing on the question of risk taking.

The third controversial aspect in the authors' statement is the peculiar way in which they tie together the term "negative consequences for failure" with a state of being worse off in the postdecisional stage than one was in the predecisional stage. As shall be demonstrated in section 4 of chapter V, it is not advisable to restrict the term "negative consequences for failure" in the fashion Kogan and Wallach have done. Furthermore, it shall be shown in section 3 of chapter V that to simply speak of "negative consequences" is not sufficient if one wants to gain a better understanding of risk taking.

It was outlined in sections 1, 2, and 3 of the present chapter that previous definitions of risk taking are inadequate and do not allow for a proper appraisal and analysis of complex risk taking. However, before we can turn to a more comprehensive definition of risk taking, it is necessary to first deal with the problem of value and the problem of probability. Furthermore, we must also take a brief look at the question of static versus dynamic decision making.

4. The Problem of Value

In order to facilitate discussion in this and the following sections of this chapter, the author will already state the first basic

principle of his definition of risk-taking situations: In order to be in a decision-making situation involving risk, there must be a problem situation, and the solution of the problem must seem both desirable and possible to the decision maker.

Although the terms "problem situation" and "solution of the problem" are analogous to the terms "goal" and "goal attainment", the author nevertheless has come to the conclusion that using the new terms allowe for greater flexibility in the analysis of decision-making situations involving risk than would be possible with the use of the old terms.

In any decision-making situation involving risk, three basic factors have to be considered: (1) The positive value that is attached to a successful solution of the problem; (2) the negative value that is attached to various possible negative consequences which may result from the decision making; and (3) the probabilities which are attached to the successful solution of the problem and to the negative consequences which might occur should the problem not be solved. The author has decided to use the same terminology which has been employed by Wallach and Kogan in, for example, their 1961 study, as far as factor (1) is concerned; for factor (2), the author will use a modification of a term taken from Wallach and Kogan's 1961 study. The positive value that is attached to a successful solution of the problem, or the desirability of the gains resulting from goal attainment, will be called the utility of succes, whereas the negative value that is attached to various possible

negative consequences, or the undesirability of the costs resulting from non-attainment of the goal, will be called the disutility of negative consequences.

In complex real-life decision making it is quite probable that the desirability of success and the undesirability of negative consequences are largely of a subjective rather than of an objective nature because the impact of specific gains and costs will be assessed differently by different people. It would, therefore, appear to be difficult, if not impossible, to operate without the concepts of "utility" and "disutility" which by now have become an accepted part of the language of decision making (e.g.: Edwards, Lindman, and Phillips, 1965) and which denote the subjectivity of that which is valued or feared.

Since the whole problem of values is far too complex to be dealt with in detail in the frame of this thesis, the author must restrict himself to touching upon a few basic questions which he believes to be of considerable importance in the realm of decision-making involving risk.

In an analysis of studies on betting behavior under both imaginary and real payoff conditions, Kogan and Wallach come to the following conclusion (1967a, p. 143):

> If forced to piece together a tentative conclusion, the authors would have to say that real as opposed to imaginary payoff conditions seem to yield greater conservatism in decision making. This conservatism increases as the magnitude of the positive and negative incentives becomes larger. Further, the rate of increase in conservatism as potential losses increase seems to

> exceed the rate of increase in risk taking as potential gains increase.

From this one could draw the tentative conclusion that a very high disutility of negative consequences may be a more important factor in decision making than a very high utility of success. That is to say, if the disutility of negative consequences is considered to be intolerable, a person may well decide not to take a risk no matter how high the utility of success might be. Furthermore, Kogan and Wallach appear to be quite right in stating that ".. decision situations will vary in the degree to which the cost incurred by failure will detract subjects from the pursuit of valued goals" (1967a, p. 136).

Kogan and Wallach, in that part of their paper which deals with hypothetical decision making, make two more statements with regard to the utility of success and the disutility of negative consequences: "As the value or utility of the desired outcome increases, the costs incurred by failure will have less of a deterrent effect" (1967a, p. 136), and

> .. potential gains and costs will be placed in some sort of balance. As the values associated with gains achieve dominance over those linked to costs, risk-taking levels should go up. Correspondingly, conservatism should be enhanced as the values tied to costs exceed in importance those that will be fostered in pursuit of potential gain (1967a, p. 138).

Although Kogan and Wallach made the foregoing statements in connection with an analysis of results obtained in hypothetical decision-making situations where the dilemma-of-choice questionnaire had been used, it must be recognized that just because the dilemma-of-choice

questionnaire has not yet been demonstrated to be a valid instrument for the investigation of real-life risk taking, this still does not mean that it can serve no useful purpose whatsoever.

It would seem, then, that the decision maker's assessment of the utility of success and of the disutility of negative consequences constitutes a very important factor in risk-taking behavior. Furthermore, it appears to be advisable that some future studies be directed at answering the following questions:

(a) If both the utility of success and the disutility of negative consequences are of a high magnitude, will the decision maker experience considerable value conflicts which will make it difficult for him to arrive at a decision?

(b) Will the decision maker tend to downgrade the utility of success if:

- the gains from a successful solution may be threatened in the future by a factor which is likely to become operant at some future date?
- the value of that which is gained from a successful solution is likely to decline at some future date?
- the decision maker has reason to assume that the utility of success will be less valued by him at some future date?
- the decision maker believes that that which would be gained by a successful solution now, could be gained at some future date when the disutility of negative consequences might be of a lesser magnitude than it is at present?

(c) Will the decision maker tend to downgrade the disutility of negative consequences if:

- that which would be lost as a result of an unsuccessful attempt to solve the problem may be threatened in the future by a factor which is likely to become operant at some future date?
- the value of that which could be lost as a result of an unsuccessful attempt to solve the problem is likely to decline at some future date?
- the decision maker has reason to assume that, at some future date, he will attach a lesser value to that which could be lost as a result of an unsuccessful attempt to solve the problem now?
- the decision maker believes that that which would be lost as a result of an unsuccessful attempt to solve the problem now, could be recovered at some later time?

Whatever the answers to the foregoing questions may turn out to be, it can be assumed that the utility of success and the disutility of negative consequences are more difficult to assess in decision-making situations where there are only risky alternatives and that attempts to measure degrees of risk taking will become more difficult as the role which is played by subjective values increases in a given decision-making situation.

There are a number of additional factors which are bound to influence the assessment of the utility of success and the disutility of negative consequences, and - again - it would be difficult, with-

out conducting further research - to guess just what the nature of such influences would be:

- Postdecisional effects, whatever they may be, may not become known until quite some time after the decision has been made. Iklé (1967), while discussing the making of predictions, points out that postdecisional (or post-prediction) effects may follow immediately if one alternative is chosen, but may be delayed with the other alternative. In such a case, how will the decision maker decide? Which alternative would be more attractive to him? No answer is possible to these questions at the present time.
- After the decision has been made, postdecisional action may be initiated by the decision maker himself or by others who are advised or ordered to act.
- Postdecisional effects may be directed at the decision maker himself, at someone else, or at both the decision maker and someone else.
- Finally, the utility of success and the disutility of negative consequences may frequently have a strong bearing on the decision maker's relationships with meaningful others. It would complicate the decision-making process considerably if the decision maker finds himself in a situation where he considers the utility of success to be high and the disutility of negative consequences to be low, but where meaningful others view the situation in the opposite fashion.

At any rate, it must be stated emphatically that the problem of value constitutes a substantial barrier to the assessment and measur-

ing of risk-taking behavior and that a considerable amount of additional research efforts would be necessary in order to lower or remove this barrier. These problems, unfortunately, become even more formidable when we turn to the probabilities which govern success and failure in decision-making situations.

5. The Problem of Probability

Luce and Raiffa (1957) suggest that a decision is made under risk if concrete objective probabilities exist and are known to the decision maker, and that a decision is made under uncertainty if such concrete objective probabilities do not exist or are not known to the decision maker. On the other hand, the words "risky" and "uncertain" are frequently used as if they were interchangeable: It is often said that an outcome is highly uncertain if the probability of that outcome occurring is well below 0.5, and that action based on the hope that that outcome will occur is highly risky. It can be seen, then, that - unless the rationale which underlies the use of these terms is clearly defined - the use of the words "risky" and "uncertain" may lead to confusion.

Both riskiness and uncertainty are functions of the level of probability which governs the occurrence of a specific outcome. Riskiness has an inverse relation to that probability level, that is, riskiness increases as the probability level decreases, so that the degree of

risk taking is low if the level of probability is high and, vice versa, that the degree of risk taking is high if the level of probability is low. On the other hand, uncertainty with regard to the occurrence of a specific outcome has an inverse relation to the probability level as long as that level decreases from 1.0 towards 0.5, and a direct relation to the probability level as that level further decreases from 0.5 towards 0.0. That is to say that uncertainty is low at both high and low levels of probability and high around the medium (0.5) level of probability: If the level of probability is high, the decision maker can be highly certain that the specific outcome is likely to occur, that is, his level of uncertainty is low. Similarly, if the level of probability is low, the decision maker can be highly certain that the specific outcome is likely not to occur, that is, his level of uncertainty again is low. However, in cases where the level of probability is around 0.5, the decision maker cannot at all be certain whether or not the specific outcome will occur, and he will, therefore, experience the highest degree of uncertainty. Figure 1 on page 81 shows how the degree of riskiness and the level of uncertainty relate to the level of probability.

It can be assumed that in most complex real-life decision-making situations, outcome probabilities more often than not will be unknown, which means that they should be viewed as if they were at the 0.5 level, and that, as a result of this, the decision maker starts from a basis of maximum uncertainty. However, it is a well-known fact that people

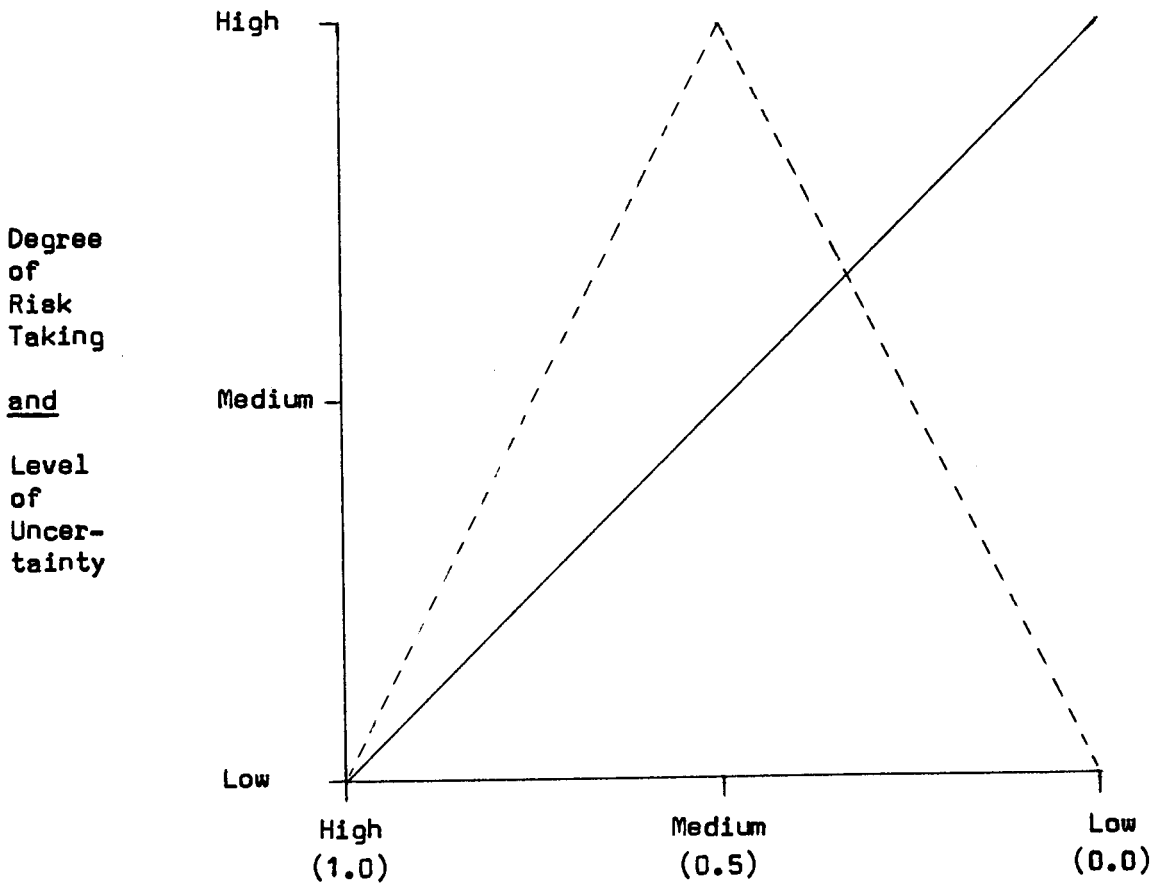

FIGURE 1

RELATIONSHIPS OF DEGREE OF RISK TAKING AND LEVEL OF UNCERTAINTY TO LEVEL OF PROBABILITY

generally feel very uncomfortable if they are in a state of high or maximum uncertainty. For this reason it would appear reasonable to operate under the assumption that the decision maker, whenever he is in a decision-making situation of maximum uncertainty, will tend to exhibit a tendency to move towards greater certainty; that is, he will tend to create subjective probabilities which, depending on the circumstances that prevail in the decision-making situation, may either be fairly high or fairly low. Of course, the tendency to create subjective probabilities is also present in cases where objective probabilities exist, be they high or low.

The problem of subjective probabilities and their influence on risk-taking behavior raises a number of questions toward which future research efforts should be directed:

(a) If the utility of success is high and the disutility of negative consequences is low, will the decision maker tend to create a high subjective probability of success?

(c) If both the utility of success and the disutility of negative consequences are high, will the decision maker assign a higher subjective probability to success or to negative consequences, or will he assign a 0.5 level to both?

(d) Whenever the decision maker will show a tendency to downgrade the disutility of negative consequences, will he tend to create a high subjective probability of success?

(e) Whenever the decision maker will show a tendency to downgrade

the utility of success, will he tend to create a low subjective probability of success?

At any rate, attempts to measure degrees of risk taking will become more difficult the greater the decision maker's tendency is to create subjective probabilities in a given decision-making situation.

It should be pointed out in this connection that the imposition of different levels of "objective" probabilities on the subjects who do the dilemma-of-choice questionnaire would, for many of the items, appear to be rather unrealistic for still another reason: An "objective" probability of, let us say, 0.7 in any of the items may well have quite different subjective meanings for different subjects. In other words, a person choosing 0.7 conceivably could act subjectively "riskier" than a person who chooses 0.5 in the same item.

In complex real-life decision making there are probably numerous cases where the decision maker either is not aware of the fact that he might suffer negative consequences as a result of his decision making, or where he has assigned such a high subjective probability to success that he feels he can safely forget about the possible negative consequences. In such cases it would be an open question whether the decision maker can be considered to be in a subjective state of risk taking, and, if asked, the decision maker may well insist that he is not taking any risk in attempting to solve his problem.

Closely tying in with the problem of probability is the problem

of skill versus chance. Kogan and Wallach, in their discussion of this question and with reference to one of their own studies (1964), state that ".. a skill context appeared to stimulate a moderate level of risk taking, whereas a chance context seemed to induce an avoidance of intermediate in favor of extremely risky or conservative strategies" (1967a, p. 128). However, other studies (e.g.: Littig, 1962) indicate that relying on skill increases the degree of risk taking compared to situations where the outcome depends on chance rather than on skill.

The problem, of course, is that "higher risk taking" is assumed to take place whenever subjective probabilities are increased as a result of a person's conviction that his skill will increase his chances of solving his problem. Yet the assumption that an increase in subjective probability as a result of relying on one's skill constitutes higher risk taking may not be entirely justified.

Let us take, for example, the case of a person who prefers to drive in his own car across the continent instead of taking an airplane. This person may well be aware that the probability of having an accident and maybe getting killed is much higher if he drives a car than it would be were he to take a commercial flight. By the same token, that person also might be quite aware of the fact that his driving skill increases his chances of getting across the continent without an accident, whereas - if he takes the plane - he has no chances whatsoever of preventing a possible plane crash. This author is inclined to say that a person who makes such calculations

may not be entirely wrong. After all, there are a fair number of drivers who, in twenty or more years of driving, never had a car accident and whose accident-free driving record is largely a result of their exceedingly high driving skills. However, the fact that a person prefers driving to flying may, in many instances, be a function of his fear of flying rather than resulting from his conviction that he is a much better than average driver.

It would appear to be fairly easy to cite more examples for the author's contention that an increase in subjective probability as a result of a person's reliance on his own skills does not necessarily mean an increase in subjective riskiness. However, the author is quite willing to admit that the problem of skill versus chance and its influence on subjective probabilities in decision-making involving risk is far from being settled. Just about all one can say with reasonable certainty is that a person's assessment of his own level of skill pertinent to the decision-making situation is bound to influence his subjective probability estimations somehow.

A final factor that probably influences the direction of subjective probabilities is the amount and kind of information which is available to the decision maker in a given decision-making situation. If there is available very little information initially, the assumption can probably be made that the decision maker will be in a state of considerable uncertainty from which he cannot move until he acquires more information. However, in which direction his subjective probabilities

will develop cannot be ascertained until one knows how the decision maker will assess the additional information which he eventually will acquire.

Kogan and Wallach have stipulated that the following factors govern the accumulation of additional information (1967a, pp. 128-129): (1) The gravity of the decision that has to be made; (2) the cost of obtaining information; and (3) the consistency of the information which is acquired, where the amount of additional information acquired is the less the greater the consistency of the already acquired information is. Kogan and Wallach also feel that rather than seeking to acquire "all possible relevant information .. a moderate level of information seeking may well prove to be optimal" (1967a, pp. 131-132), and they further state that they ".. strongly suspect that the psychological forces at work in an information-seeking context militate against maximal information seeking" (p. 132).

The present author feels that there exist at least four more factors which influence the gathering of additional information: (4) The amount of predecision time available for information seeking; (5) the validity of the information acquired; (6) the decision maker's skill in assessing the information which he has acquired; and, finally, (7) some decision makers' tendency to use intuitive short-cuts in assessing both their information needs and the quality of the information which has been acquired.

To sum up, the problem of probabilities is extremely complex and

is - in any given case - bound to be influenced by a variety of factors which frequently will include such variables as estimation of one's own skill and the search for additional information. Furthermore, the likelihood that most real-life decision making leads to the creation of subjective probabilities makes it very difficult to draw comparisons with regard to degrees of risk taking both between different decision-making situations and between different decision makers. Forcing "objective" probabilities on the subjects who do the dilemma-of-choice questionnaire would seem to increase the aura of artificiality which already surrounds that questionnaire.

5. Static versus Dynamic Decision Making

A final question which deserves brief consideration is that of static versus dynamic decision making.

Edwards, Lindman, and Phillips (1965) point to the fact that complex real-life decision making is dynamic rather than static. The authors state that static decision making is of the kind where the decision maker has a clear and well-defined problem and also has the information which he needs in order to make his decision. Once his decision is made and acted upon, the decision-making situation has come to an end.

In dynamic decision making, on the other hand, the decision maker faces a sequence of decisions that may or may not relate to one another

and that may or may not all seek the same goal. The decision maker's initial decision, once acted upon, may not immediately lead to the solution of the problem but may only constitute a first step towards that solution. However, as a result of the action that follows that first decision, the problem situation will begin to change and new factors will begin to emerge. Furthermore, the decision maker will have received some feedback with regard to the success of his first decision and will now have a greater pool of information available. He now also may or may not be closer to the final solution of his problem. This process will be repeated with each successive decision until the problem is either solved or its solution is abandoned.

Now, in many - if not most - such dynamic decision-making situations, the decision maker is probably quite aware of the aforementioned circumstances before he makes his first decision. Yet the extent to which the decision maker is aware of this complexity is bound to influence his first decision. Depending on how much he believes himself to be in control of his future actions with regard to the solution of his problem, his degree of confidence concerning his <u>first</u> decision may differ considerably from situation to situation. Of course, in any analysis of <u>theoretical</u> complex decision-making situations, the analyst can only concern himself with the <u>first</u> decision because his analysis does <u>not</u> include any feedback with regard to the consequences which would have followed that first decision had it been made in a <u>real</u> decision-making situation rather than in a theoretical one. This limitation simply constitutes <u>another</u> barrier which lies in the path

toward a better understanding of risk taking, and it could only be overcome by conducting field studies of real-life complex risk taking.

We shall now, finally, turn to the attempt of finding a better understanding of complex risk taking.

Chapter V

TOWARD A BETTER UNDERSTANDING OF RISK TAKING

It now becomes possible to attempt to arrive at a better understanding of complex real-life risk taking. In this chapter, the author will suggest a new and more comprehensive definition of risk taking. Based on that new definition, the concept of "negative consequences" as well as the concept of "alternatives" will be thoroughly examined. Following this, a new tool for the investigation of complex decision-making situations will be offered. The author then will review the question of whether the subjects who do the dilemma-of-choice questionnaire do or do not engage in decision-making <u>involving risk</u>. After that has been done, the question of measuring and comparing degrees of risk taking will be dealt with. The chapter will conclude with a brief look at the problem of studying real-life decision-making groups.

1. Some Preliminary Considerations

The author, at the end of chapter III, had stated that before one can attempt to simulate something, one must first be quite clear about the nature of that which one wants to simulate. He furthermore expressed his opinion that, in the past, researchers who used the dilemma-of-choice questionnaire as their major tool of investigation, had apparently not been clear about the nature of that which they wanted to simulate in the laboratory, namely, complex real-life decision-making under conditions of risk. We have furthermore seen in chapter IV that previous definitions of risk taking appear to have been based on simple gambling-type risk taking rather than on complex real-life risk taking.

Kogan and Wallach, at the end of their analysis of group decisions involving risk, made the following statement (1967a, p. 266):

> For the most part, then, the present essay must leave the research traditions concerned with the taking of risks by individuals and by groups in a state of unnatural separation. While attempts to unite these two frames of reference are beginning to be made, most of this task remains as unfinished business for the future.

There indeed exists a "state of unnatural separation" between research on individual and group risk taking, and it is not overly difficult to see why this should be so: (1) Research in individual risk taking has concentrated on the investigation of gambling-type risk taking which is a relatively simple form of risk taking and lends itself to the development of mathematical models of risk taking. (2) On the other hand, research comparing individual to group

risk taking has been directed towards complex risk taking, but has largely - by using the dilemma-of-choice questionnaire - relied on inadequate simulation techniques. (3) The dilemma-of-choice questionnaire not only is inconsistent with regard to the kind of risk-taking situations represented in its items, but furthermore is based on a concept of risk taking which is simple-minded and too insufficient to take up the enormously wide range of real-life risk-taking phenomena.

With a situation such as this, the very first step towards improvement would seem to be to find a better definition of risk taking and to develop some tools which can be of help in analyzing various risk-taking situations.

2. A Better Definition of Risk Taking

It should be made clear that trying to define "risk taking" is somewhat like trying to define "mental illness": Many manifestations of mental illness are so obvious and clear-cut that different doctors all will agree that the patient is mentally ill. On the other hand, in any of the borderline cases such agreement frequently does not exist. The same situation prevails with regard to risk taking: Little, if any, disagreement will be found if we look at clear-cut cases of risk taking, but considerable disagreement is bound to occur with regard to borderline cases.

Because the problem of risk taking is far too complex to allow for an inclusive definition, the author must restrict himself to stating the minimum requirements which must be present in order to be able to say that a decision-making situation is one that involves risk:

(1) There must be a problem situation, and the solution of the problem must seem both desirable and possible to the decision maker.

(2) There must be a possibility that the decision maker may experience negative consequences as a result of his decision making.*

(3) There must be available at least two alternatives which are relevant to the decision-making situation, although having available only two relevant alternatives may not always be a sufficient condition for risk taking. Furthermore, there must not be available an alternative which, while assuring the solution of the problem, would rule out the occurrence of any type of negative consequences.

(4) It is not necessary that there be uncertainty with regard to the problem solution if there is uncertainty with regard to the occurrence or the impact of certain negative consequences.

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*) It should be kept in mind that the basic meaning of the word "risk" is ".. the chance of injury, damage, or loss; dangerous chance; hazard .." (Webster's New World Dictionary, 1966, p. 1257).

(5) A distinction must be made between objective and subjective decision-making involving risk: If the decision maker as well as outside observers perceive the decision-making situation as being one that involves risk according to the criteria outlined under points (1) to (4), then the decision maker is in a decision-making situation involving risk both objectively and subjectively. If, however, the decision maker does not perceive the decision-making situation as one involving risk although it is perceived as such by outside observers, then the decision maker cannot be considered to be in a state of subjective risk taking although he is in a state of objective risk taking. By the same token, if only the decision maker perceives the decision-making situation as one involving risk, but if outside observers do not share his perception, then the decision maker must still be considered to be in a subjective state of risk taking although he is not in an objective state of risk taking.

In the next two sections of this chapter, the concepts of "negative consequences" and "alternatives" shall be examined in detail, and it shall be shown how a greater sophistication in the definition of these concepts will help in the creation of a valuable tool which can be used for the analysis of decision-making situations.

3. The Concept of Negative Consequences

As had been shown in section 3 of the previous chapter - on page 72 - Kogan and Wallach restrict the concept of negative consequences to ".. negative consequences for failure, so that the individual at the postdecisional stage might find himself worse off than he was before he made the decision" (1967a, p. 115). The authors appear to link the concept of "negative consequences" to the concept of "losing the stake". In this they do not seem to be alone: Both Stoner (1961) and Brown (1965) appear to take a similar view. It can safely be assumed that all of these workers view "negative consequences" as meaning that one loses the stake as a result of having failed to win the prize. This restriction of the concept of negative consequences is, however, one of the main reasons why the terminology used at present in dealing with complex risk taking is so inadequate and creates such difficulties with regard to a better understanding of the phenomenon.

The present author has stated that the first basic principle in any definition of risk taking is that there must be a problem situation and that the solution of the problem must seem both desirable and possible to the decision maker. Now, one result of failing to achieve a solution to the problem may be that the decision maker finds himself worse off in the postdecisional stage than he was in the predecisional stage because he has, following his decision making, lost something which he previously had possessed. Such a state of being worse off in the postdecisional stage shall from now on be called

primary negative consequences, or PNC.

However, not having been able to solve one's problem - whether that non-solution results from having failed in one's attempts to solve the problem or from one's decision to abandon the attempts to solve that problem - constitutes in itself a negative consequence because a solution had initially been desired, and that which had been desired was not achieved. This type of negative consequences shall henceforth be known as secondary negative consequences, or SNC. From this it follows that in any given decision-making situation involving risk the failure to achieve problem solution will always lead to secondary negative consequences, but may or may not lead to primary negative consequences.

There is yet another kind of possible negative consequences. Some decision-making situations may be of the kind where either the attempt to solve the problem or the abandoning of this attempt may create, in the postdecisional stage, a new problem resulting from the decision-making per se. The reader is asked to refer to page 15 of this thesis where the third of three examples of complex decision making is described. In that situation, country X has to decide whether to fight a pre-emptive war against country Y, and it was stated that fighting such a pre-emptive war "would very likely lead to all sorts of international repercussions the implications of which could turn out to be extremely unpleasant for country X." Kogan and Wallach describe these international repercussions as follows (1967a, p. 226):

> World opinion .. would severely condemn country X for invading a neighboring nation without direct provocation, especially in view of the fact that Y's new leader obtained the reins of government by due process of law. The subsequent repercussions in terms of trade sanctions against nation X might be severe. Furthermore, other nations might send military support to Y, so that the outcome of X's military intervention might actually be a defeat for X.

Let us, to facilitate analysis, forget about the possibility of military intervention by the international community on behalf of country Y, and let us focus on the possibility of severe trade sanctions against country X. These trade sanctions would constitute a perfect example of the creation of a new problem as a result of the decision-making process per se. This new problem could be avoided, of course, if country X decides against fighting the pre-emptive war.

Now let us complicate this problem situation even more. Let us assume that country X does not have a strong democratic tradition and that past governments in that country have, at several occasions, been overthrown as a result of an internal plot. The present government of country X basically has a "dovish" attitude, but "hawks" are known to be eager to form a new government. These hawks are now putting pressure on their government to invade nation Y, and the government of nation X is afraid that failure to give in to the hawks' pressure might mean being overthrown by them. The decision makers of nation X now face the possibility of inviting severe international trade sanctions were they to order the invasion of country Y, and they face the possibility of an internal upheaval were they not to order that invasion. In other words, the decision makers of country X face the possibility

of creating a new problem whether or not they decide to solve their original problem.

Such creation of a new problem as the result of the decision-making per se, shall from now on be known as tertiary negative consequences, or TNC. This type of negative consequences would, in some cases, be somewhat akin to what Rettig and Rawson (1963) have called "censure" in their study of unethical behavior.

If, in any given decision-making situation, there exist no possibilities that the decision maker may suffer at least one of the three types of negative consequences, then the decision-making situation cannot be one involving risk. Generally, the most clear-cut decision-making involving risk will be found in cases where one alternative rules out the occurrence of primary negative consequences whereas the other alternative makes possible that occurrence. In such cases, it is truly possible to speak of a cautious and a risky alternative and to say that a person, by choosing the risky alternative, acts riskier than if he had chosen the cautious alternative. However, even in such cases we must qualify the statement that a person "acts riskier by choosing the risky alternative" because we have to consider the problem of the subjectivity of utility of success versus disutility of negative consequences, and because we have to consider the problem of subjective probabilities.

Let us now sum up the principles of the three types of negative

consequences:

PRIMARY negative consequences refer to a state of being worse off in the postdecisional stage than one was in the predecisional stage as a result of not having solved one's problem. Whenever primary negative consequences occur, secondary negative consequences must also occur.

SECONDARY negative consequences result from the non-solution of the problem per se and occur whenever the problem has not been solved, be this as a result of having failed in one's attempts to solve the problem or as a result of having abandoned one's attempts to solve the problem. Secondary negative consequences may or may not occur together with primary negative consequences.

TERTIARY negative consequences result from the creation of a new problem following the decision-making process per se. Tertiary negative consequences may or may not occur together with primary and secondary negative consequences.

We shall now turn to the concept of "alternatives" and to the problem of outcome uncertainty.

4. The Concept of Alternatives and the Problem of Outcome Uncertainty

Previous attempts to deal with complex risk taking have, as was shown in chapter IV, operated with only two course alternatives: The

cautious and the risky alternative. Such a restriction, however, is just as dangerous as the restriction to only one type of negative consequences. If we want to achieve a better understanding of complex risk taking, we must expand the concept of "alternatives".

Kogan and Wallach, in their definition of risk taking which had been quoted on pages 70 and 71, had stated that "to talk about risk taking, then, is to refer to behavior in situations where there is a desirable goal and a lack of certainty that it can be attained" (1967a, p. 115). The present author, in commenting on this statement on pages 71 and 72, has expressed the opinion that uncertainty with regard to goal attainment (or problem solution) is not a necessary requirement for risk taking in cases where goal attainment, although assured, may nevertheless also lead to additional consequences which have an important bearing on the question of risk taking. It should be pointed out that we are, of course, referring to subjective rather than objective uncertainty.

In the present section, the concept of alternatives and the question of uncertainty with regard to goal attainment shall be dealt with together.

As was stated above, operating with only two alternatives is not sufficient for dealing with complex risk taking. The author feels that we must expand the range of alternatives to include at least the following seven kinds of alternatives which are characterized either by specific certainties or possibilities with regard to primary and secondary

negative consequences and with regard to achievement of problem solution (goal attainment), or APS:

(1) The SURE-FIRE alternative. This alternative assures that the problem will be solved and, therefore, rules out the occurrence of primary or secondary negative consequences.

(2) The CAUTIOUS alternative. This alternative rules out that the problem will be solved. The cautious alternative can only exist in situations where the non-solution of the problem cannot lead to primary negative consequences. This alternative, therefore, rules out the occurrence of primary negative consequences, but assures the occurrence of secondary negative consequences.

(3) The SEMI SURE-FIRE alternative. This alternative may or may not lead to the solution of the problem. The semi sure-fire alternative, just like the cautious alternative, can only exist in situations where the non-solution of the problem cannot lead to primary negative consequences. This alternative, then, rules out the occurrence of primary negative consequences. However, since the problem may or may not be solved, secondary negative consequences may or may not occur with this alternative.

(4) The REDUCED RISK alternative. This alternative may or may not lead to the solution of the problem. Furthermore, primary negative consequences may or may not occur if the problem is not solved. Secondary negative consequences, on the other hand, are assured to occur if the problem is not solved.

(5) The STANDARD RISK alternative. This alternative may or may not

lead to the solution of the problem. However, if the problem is not solved, the occurrence of both primary and secondary negative consequences is assured.

(6) The ENHANCED RISK alternative. This alternative rules out that the problem can be solved and assures the occurrence of secondary negative consequences. Primary negative consequences may or may not occur with this alternative.

(7) The DOOMSDAY alternative. This alternative rules out that the problem can be solved and assures the occurrence of both primary and secondary negative consequences.

The characteristics of these seven alternatives with regard to their relationships to primary negative consequences (PNC), secondary negative consequences (SNC), and achievement of problem solution (APS), then are as follows:

				PNC	SNC	APS
1.	Sure-fire alternative	-		o	o	x
2.	Cautious alternative	-		o	x	o
3.	Semi sure-fire alternative	-	either:	o	o	x
		-	or:	o	x	o
4.	Reduced risk alternative	-	either:	o	o	x
		-	or:	o	x	o
		-	or:	x	x	o
5.	Standard risk alternative	-	either:	o	o	x
		-	or:	x	x	o
6.	Enhanced risk alternative	-	either:	o	x	o
		-	or:	x	x	o
7.	Doomsday alternative	-		x	x	o

As can be seen, four of the seven alternatives have outcome certainty with regard to achievement of problem solution (APS): The sure-fire alternative assures that the problem can be solved, and the cautious, enhanced risk, and doomsday alternatives rule out the solution of the problem. The other three alternatives - the semi sure-fire, reduced risk, and standard risk alternatives - do not have outcome certainty with regard to achievement of problem solution (APS).

If, in any given decision-making situation, the available alternatives were all of the kind which has outcome certainty with regard to achievement of problem solution, that situation - according to Kogan and Wallach's definition of risk taking - could not be one involving risk. However, we now must take into consideration the possibility that in any decision-making situation there may or may not exist the possibility of experiencing tertiary negative consequences as a result of the decision-making per se. Furthermore, such tertiary negative consequences conceivably could occur with any of the seven alternatives. If we, then, have a decision-making situation in which all available alternatives have outcome certainty with regard to achievement of problem solution, but one or more of these available alternatives also carry the possibility of experiencing tertiary negative consequences, we then have a risk factor entering into such a situation. This risk factor, of course, is the very possibility of experiencing tertiary negative consequences. Furthermore, the risk factor is of a dual nature: On one hand is the fact that these tertiary negative consequences may or may not occur, and on the other hand is the problem of pro-

perly assessing the impact of these tertiary negative consequences should they occur.

To refer once more back to the hypothetical case of country X fighting a pre-emptive war against country Y: That situation may be such that fighting the pre-emptive war assures victory and, thereby, solves the original problem. If, however, the possibility of severe trade sanctions - imposed by the international community - exists, then fighting that pre-emptive war would be risky indeed. And, as we had seen earlier, not fighting that war would also be risky, but for two reasons: (a) Country Y might attack country X, and (b) the hawks in country X might overthrow their own government because it did not fight the pre-emptive war against country Y. It would seem, then, that risk taking does not require uncertainty with regard to achievement of problem solution if - although there exists a sure-fire alternative - there also exists the possibility that tertiary negative consequences might occur if this sure-fire alternative is used.

The author's definition of risk taking, which was given on pages 93 and 94, stated in paragraph 3 that "there must be available at least two alternatives which are relevant to the decision-making situation, although having available only two alternatives may not always be a sufficient condition for risk taking." This statement shall now be explained: If a man is on a sinking ship which has no lifeboats, he has two alternatives - he can either do nothing and go down with the

ship, which would be the doomsday alternative, or he can jump into the water and start swimming, which would be the standard risk alternative. So unless this man were willing to commit suicide, he had better start swimming. It would not seem justifiable to say that he is taking a risk by choosing the standard risk alternative; he really has no other choice if he wants to save his life.

The author's definition of risk taking, also in paragraph 3 of that definition, furthermore stipulated that "there must not be available an alternative which, while assuring the solution of the problem, would rule out the occurrence of any type of negative consequences." The reference here, of course, is to a sure-fire alternative in any case where the occurrence of tertiary negative consequences is ruled out just as much as primary and secondary negative consequences are always ruled out with the sure-fire alternative. It is quite evident that any such situation could not possibly be one that involves risk. However, this stipulation leads us directly to a consideration which, to the author's knowledge, has been absent in previous risk-taking research.

There may be a decision-making situation in which there exists a sure-fire alternative while tertiary as well as primary and secondary negative consequences are ruled out. However, there may nevertheless exist a reduced risk or standard risk alternative in that situation. Now, although the decision-making situation as such would not be one involving risk, the decision maker still might choose, for various reasons, to employ either the standard risk or the reduced

risk alternative. One example of this kind of action might run as follows: A young person wants to get across a river at a point where the river is spanned by a bridge. In order to solve his "problem", the youngster merely would have to walk across that bridge, and doing this would be to choose the sure-fire alternative. However, the youngster chooses to accomplish the solution to his "problem" by walking on top of the bridge railing. This alternative would be a standard risk alternative because it may or may not lead to achievement of problem solution and will, if the solution to the problem is not achieved, lead to primary negative consequences, namely, injury or even death. That young person, then, made a risky decision although he was not at first in a decision-making situation involving risk. Such forms of risk taking would probably have to be called "needless" or "reckless" risk taking, but risk taking they are.

As was pointed out in section 1 of the previous chapter, a number of items in the dilemma-of-choice questionnaire depict situations in which there are no cautious but only risky alternatives. Because a person, in such situations, can only choose between risky alternatives, it might be possible to apply the term "forced risk taking" to such situations in order to distinguish them from voluntary risk taking which takes place when a risky alternative rather than an existing cautious alternative is chosen. However, that distinction would have to be treated with great care because of the possibility of borderline cases in which tertiary negative consequences are possible. If the

situation is such that there is a cautious and a risky alternative, but the cautious alternative entails the possibility of experiencing tertiary negative consequences, then we might also have a case of forced rather than voluntary risk taking. Furthermore, in any case of forced risk taking it might be quite difficult to decide whether course A is riskier, less risky, or just as risky as course B.

Still another problem with regard to determining the riskiness of a given course arises where there is a possibility of sequential alternative runs. In item 6 of the dilemma-of-choice questionnaire, the central character has to choose between taking his Ph.D. at a high-prestige university where the chances of success are small, or taking his degree work at a low-prestige university where virtually every candidate gets the degree. Now, a decision to enter the high-prestige university would appear to be a risky decision. However, the candidate may, if he realizes after one or two semesters that he cannot make it, then go to the low-prestige university without really having lost anything because the course work done at the high-prestige university certainly would count at the other university. And even if he should have failed his course work at the high-prestige university, he still could try the low-prestige university and would, at the worst, have lost one semester's time. In the light of this, then, the decision to enter the high-prestige university may not really be very risky, if it is risky at all.

It should be pointed out that "sequential alternative runs" must not be confused with "dynamic decision making": Sequential alterna-

tive runs refer to alternatives which exist before the first decision is made, whereas dynamic decision making refers to situations where new alternatives emerge after the first decision has been made and feedback has been received following that first decision.

Based on the findings in chapters IV and V, it now becomes possible to develop a new tool for the investigation of decision-making situations.

5. A New Tool for the Investigation of Complex Decision-Making Situations.

It is evident by now that complex real-life decision-making situations involving risk can, in their nature, differ considerably from each other. It should furthermore be evident that this diversity must be taken into consideration in any attempts to investigate complex decision making. The author is of the opinion that a necessary step in the direction of a better understanding of the phenomenon under investigation would be the development of a systematic approach to the problem of analyzing decision-making situations. Such a systematic approach might best be achieved by asking a number of specific questions with regard to the nature of any given decision-making situation which is to be investigated, and the author suggests that the following twenty-five questions might profitably be asked:

(1) What is the decision-maker's problem situation? This question should take the form of asking whether the decision maker should or should not do a certain thing, or whether the decision maker should do (a) or (b) or, conceivably, any of a greater number of things. The proper identification of the decision-maker's problem is a very important step, and care should be taken with this identification.

(2) Is the solution of the problem both desirable and possible? Yes; no; cannot be determined.

(3) Is there a possibility that the decision maker might experience negative consequences as a result of his decision making? Yes; no; cannot be determined. This is an important question because, if the answer to it is "no", the decision-making situation would not be one involving risk.

(4) If there is a possibility of experiencing primary negative consequences, what would be their nature? The answer to this question can, to some extent, indicate the magnitude of possible risk taking in that situation.

(5) Is the nature of the primary negative consequences the loss of life or something of similar severity? Yes; no; cannot be determined.

(6) Is there a possibility that the decision maker might experience tertiary negative consequences as a result of his decision making? Yes; no; cannot be determined.

(7) What would be the nature of the tertiary negative consequences?

(8) Is the nature of the tertiary negative consequences the loss of life or something of similar severity? Yes; no; cannot be determined.

(9) Are there available at least two alternatives? Yes; no; cannot be determined.

(10) Are there available more than two alternatives? Yes; no; cannot be determined.

(11) How many and what kinds of alternatives are available? It is important that the type of available alternatives be clearly determined.

(12) Is there available a sure-fire alternative which rules out all three types of negative consequences? Yes; no; cannot be determined. If there is, the decision-making situation cannot be one involving risk.

(13) Is there available a cautious alternative? Yes; no; cannot be determined. If there is, and if this alternative does not entail the possibility of tertiary negative consequences, then we have a case of voluntary risk taking which may, depending on the circumstances, make it relatively easy to determine what the degree of such possible risk taking might be.

(14) Is it a decision-making situation involving risk? Yes; no; cannot be determined. Although the author feels that at this point it should always be possible to answer this question with either "yes" or "no", he has nevertheless included the answer-category "cannot be determined". This has strictly been done in order to be on the safe side.

(15) Do any of the available alternatives involve the exercise of skill on the part of the decision maker? Yes; no; cannot be determined.

(16) Is there a possibility for sequential alternative runs? Yes; no; cannot be determined.

(17) How many outcome possibilities exist for each of the available al-

ternatives? One; two; more than two. Risky alternatives with more than two outcome possibilities may by some people be perceived as less risky than risky alternatives which have only two outcome possibilities (win or lose).

(18) Can objective probabilities be assigned to any of the available alternatives? Yes; no; cannot be determined. If there are no objective probabilities, the problem of subjective probabilities will make it very difficult - if not impossible - to determine degrees of risk taking.

(19) How much time does the decision maker have before he must make his decision? Five minutes or less; between five minutes and one hour; between one hour and six hours; between six hours and twelve hours; between twelve hours and twenty-four hours; more than twenty-four hours but not more than a week; more than a week; cannot be determined. This question is important because the amount of time available to the decision maker before he has to make his decision not only is an important determinant of the general psychological field within which the decision making takes place, but furthermore is of crucial significance with regard to the amount of information which the decision maker will be able to gather before he must decide what to do. The choices which the author offers for answering this question are somewhat arbitrary, but fixing definite time spans rules out the problem of having to make subjective judgements which would be required if the answer-categories would be such as "very little time", "a moderate amount of time", etc.

(20) When will the postdecisional effects become known for each of the available alternatives? For each alternative: Within five minutes or less; within between five minutes and one hour; within between one hour and six hours; within between six hours and twelve hours; within between twelve hours and twenty-four hours; within between twenty-four hours and one week; after more than one week; cannot be determined. For reason for fixed answer-categories, see explanation under (19).

(21) Who initiates the postdecisional action? The decision maker himself; the decision maker together with others; others only; cannot be determined.

(22) Who is affected by the postdecisional action? The decision maker himself; the decision maker together with others; others only; cannot be determined.

(23) Could the problem be solved at some later time under more favorable circumstances? Yes; no; cannot be determined.

(24) Could that which would be lost as the result of the occurrence of primary negative consequences be regained at some future date? Yes; no; cannot be determined. This same question could also be asked with regard to <u>tertiary</u> negative consequences.

(25) Is there a conflict with meaningful others with regard to the decision which the decision maker would be inclined to make? Yes; no; cannot be determined.

Although it would probably be possible to ask any number of <u>ad-</u>

ditional questions, the author feels that not very much could be gained by this at the present time. If the aforementioned twenty-five questions would be asked in any given real-life decision-making situation, our understanding of complex decision-making involving risk would be considerably improved compared to what it is with the present state of affairs: We would obtain knowledge with regard to a number of important variables which have been ignored in past research. It should be pointed out that the items of the dilemma-of-choice questionnaire are not very suitable for this kind of thorough analysis because they do not contain enough relevant information.

6. Risk Taking and the Subjects Who Do the Dilemma-of-Choice Questionnaire

This thesis has one central aim: To show the range and magnitude of the obstacles which block the attempts of inquiring into the question of risk taking in complex individual and group decision making. It has been demonstrated that complex decision-making under conditions of risk is little understood at present, and the author has, in chapters IV and V, shown a variety of important factors that must be considered in the study of complex risk taking. It has been suggested that twenty-five questions might profitably be asked in any given complex decision-making situation so that it becomes possible

to gain a better understanding with regard to the presence of various factors which are involved in such situations. Furthermore, the author has repeatedly stated throughout this thesis that the dilemma-of-choice questionnaire does not appear to be a valid tool for the study of complex risk taking, and it is to this problem that we must now return.

It was stated in paragraph (2) of the author's definition of risk taking that "there must be a possibility that the decision maker may experience negative consequences as a result of his decision making." By using this simple criterion it must be said that the question of whether the subjects who do the dilemma-of-choice questionnaire are engaging in decision-making involving risk appears to be answered: They are not! The subjects who do the questionnaire can experience neither primary nor secondary nor tertiary negative consequences. Therefore, whatever else the subjects may be doing, they most certainly are not taking any risks in their decision making.

However, the question remains to what extent and how reliably the subjects might be projecting themselves into these decision-making situations. If such projection would be very extensive and reliable, it would be possible to say that the subjects act as if they really were in these situations. The author must admit that he cannot offer a completely satisfactory answer to this question and that he must restrict himself to listing a number of reasons for his contention that the subjects very likely cannot project themselves into

these situations to such an extent that they would decide in the same manner as they would if they really were to find themselves in these situations.

(1) The subjects are forced to make all kinds of assumptions with regard to important circumstances of the situations described in the items. A perfect example for this can be found in Kogan and Wallach (1967a, pp. 234-239). The authors there give a transcript of a group discussion that took place among several subjects with regard to item 5 of the dilemma-of-choice questionnaire. In that item, the president of an American corporation has to decide whether or not to build a branch factory in a politically unstable foreign country. The transcript of the discussion clearly shows that the subjects are making assumptions with regard to the following factors of the situation: The financial strength of the company; the amount of investment capital that is available to that company; the capital costs for the investment in both the U.S. and the foreign country; the magnitude of the investment return for both the U.S. and the foreign country; the length of the payoff time for domestic versus foreign investment; the length of the period of political stability which might be expected in the foreign country; the situation as it might exist with regard to other alternatives for capital investment; and, finally, assumptions are made with regard to the possible reactions of the company's shareholders to any risky investment ventures.

Now, it is quite obvious that the subjects have to make a similar range of assumptions with regard to the other eleven items of the ques-

tionnaire as well. However, having to make all these assumptions, and having to do this in a completely arbitrary fashion, lends an air of unreality to the decision-making situation. Furthermore, different subjects and different groups are bound to make different assumptions and will, as a result of these different assumptions, arrive at different decisions.

(2) The subjects are not asked whether or not they would make the risky decision, but rather are asked at what level of probability they would make the risky decision. This is a very dubious procedure because even under the best of circumstances it would be difficult to justify objective probabilities in more than five of the situations (items 2, 6, 8, 9, and 10), and even in these situations the decision maker, in real life, might replace the objective probabilities by subjective probabilities as a result of wishful thinking. Furthermore, items 2, 7, 8, 9, and 12 do not have a cautious course of action, and this fact is not pointed out in the questionnaire. However, as has been stated before, it is quite difficult to decide which of two risky courses is the riskier one.

(3) Even in the group discussions, the time available for decision is considerably less than one hour per item (as a matter of fact, in most studies it has not been much more than five minutes per item). Yet in real-life situations of the kinds described in items 1, 2, 3, 5, 6, 8, 9, 10, 11, and 12, the decision maker would certainly expect to have considerably more time available before he would want to make a decision.

(4) Whatever the decisions may be that the subject will arrive at, these decisions will be influenced by the subject's experiences with the kind of situations that are described in the items. If a subject had no experiences with a given situation, he will be far less able to project himself satisfactorily into that situation than he could if he had experienced a similar situation befors. It is a matter of common knowledge that people frequently are totally wrong in their estimations of how they would react in a given novel situation.

(5) The subjects are fully aware that they are only playing a game. However, this "game" lacks one of the most important aspects of game playing, namely, the kind of feedback where the subjects are told what would have been the "right" decision or how things might have worked out for the central characters in the items had they been real people who followed the subjects' advice. The subjects never experience the reality of the relationship between counselor and counselee with all its involvement, feedback, and constant interaction.

(6) Because the subjects are playing a game, and because this "game" can neither be won nor lost, the problems of utility of success versus disutility of negative consequences can enter only marginally into the subjects' decision making. However, were the subjects really in these situations, these problems would become dominant factors in the decision-making process.

(7) The question of skill versus chance very likely becomes activated only to a minimal extent for the subjects, if it becomes activated at all. However, in real-life decision making, the subjects' skill

could become an important factor.

(8) Finally, even if a subject projects himself unusually extensively and strongly into one or the other of the situations described in the twelve items of the questionnaire, he still would not operate in the same psychological field that would exist if the decision-making situation were real.

To sum up, the author is reasonably sure that the subjects' reactions to the items of the dilemma-of-choice questionnaire do not allow for any valid conclusions to be drawn with regard to the subjects' willingness to take risks in real-life decision making.

7. Measuring and Comparing Degrees of Risk Taking

In order to extend the present analysis of decision-making involving risk, it would be interesting to consider the question of what would be involved in measuring and comparing the degrees of risk taking if the situations depicted in the dilemma-of-choice questionnaire were actual rather than fictional. Let us assume that we are now dealing with the central characters in the items of the questionnaire rather than with the subjects who do that questionnaire, and let us explore what the decisions of these central characters could tell us with regard to their willingness to take risks.

First of all, the author must again state that it would be ex-

tremely difficult to measure degrees of risk taking in any situation where there are only risky alternatives such as the reduced risk, standard risk, and enhanced risk alternatives, if neither of these alternatives would permit establishing objective probabilities. In such situations, the problem of subjective probabilities combined with the problems of utility of success versus disutility of negative consequences would appear to rule out, or make at least highly dubious, any attempts to measure degrees of risk taking unless one would be willing to accept the decision maker's assessment of the respective probabilities as he perceives them.

The same kind of problem would seem to exist in cases where alternatives are present which have certainty with regard to the achievement of problem solution - such as the sure-fire, cautious, and doomsday alternatives - or where a semi sure-fire alternative is available, if any of these alternatives happen to entail the possibility of experiencing tertiary negative consequences. Any such situations would become somewhat like those in which there exist only risky alternatives.

This would seem to leave us with only one type of decision-making situation involving risk in which it is possible to establish with a reasonable degree of accuracy, at least in a fair number of such cases, whether a person has acted risky or not; and that kind of decision-making situation is where there exist a cautious and one or more risky alternatives, and where the cautious alternative cannot lead to tertiary negative consequences. However, even then we have to be aware of the fact that choosing the risky alternative might not necessarily consti-

tute risk taking on the part of the decision maker in any case where one or more of the following factors are present: (a) The disutility of negative consequences is viewed by the decision maker as having little deterrent power either because of its nature or because of its judged low probability of occurrence. (b) The effect of the decision will not become apparent for a long time to come, such as years later. (c) The decision maker himself will not be affected by his decision. (d) The decision maker grossly underestimates the disutility of negative consequences. (e) The decision maker is correct in his assumption that his unique skills will help him to achieve problem solution in a situation where other people would have a low probability of success. In our present discussion, however, let us assume - for simplicity's sake - that none of these five factors are present, so that it truly would be possible to say that taking the risky alternative instead of the cautious course constitutes risky decision-making.

If we now look at the situations described in the dilemma-of-choice questionnaire in order to find out in which of these it would be possible to speak of cautious versus risky decision-making, we find that this can only be done in the situations described in items 1, 3, 4, 5, 6, 10, and 11. Only in these seven situations are both a cautious and a risky alternative available. In the other five situations - described in items 2, 7, 8, 9, and 12 - only risky alternatives are present.

In item 2, not having the heart operation and restricting one's

activities instead, is an enhanced risk alternative because it does not rule out the possibility of suffering primary negative consequences such as further deterioration of health or even death due to heart failure.

In item 7, not using the risky strategy in the chess game but biding one's time instead, is a reduced risk alternative because it also may lead to defeat just as could happen with the risky strategy, which would be a standard risk alternative. Of course, the reduced risk alternative may also lead to victory or to a stalemate.

In item 8, not entering the conservatory but going to medical school instead, is an enhanced risk alternative because the achievement of the goal - becoming a concert pianist - is ruled out, and the occurrence of primary negative consequences is possible: Mr. H may not succeed in becoming a doctor.

In item 9, deciding not to escape appears to be an enhanced risk alternative because staying in the prisoner-of-war camp, where the conditions are alleged to be "quite bad", may lead to primary negative consequences such as deterioration of health or even death because of malnutrition or maltreatment.

Finally, in item 12, breaking off with the girl is an enhanced risk alternative because Mr. M might find out that he is extremely unhappy without the girl. He might well come to forever regret that he had decided to break off his relations with the girl.

From this we must conclude that, as far as measuring and comparing degrees of risk taking is concerned, only the situations described

in items 1, 3, 4, 5, 6, 10, and 11 can be used, provided that none of the five qualifications described on page 120 are present.

So far we have only been concerned with comparing risk taking between different individuals who might find themselves in these situations. An additional problem, however, arises if we want to find out whether there would be any differences in the degrees of risk taking between individuals and groups who might find themselves in these situations. In order to examine that question, we must ask which of these situations would be of such a nature that a group of people might find themselves in that identical situation so that all of the group members would be affected by their decision, whatever that decision might be. However, this means that we now would have to eliminate items 1, 3, 4, 6, 10, and 11 as well, and that we only could keep item 5. This item, describing a situation of corporate decision making, is the only item where group risk taking could be examined. The other items are of such a nature that only an individual could find himself in these situations.

It would, of course, be possible to study group risk taking in situations where groups tender advice to outsiders, but where the members of the group are not directly involved as far as the outcome is concerned. Yet doing that would only be a shade better than using the dilemma-of-choice questionnaire. The greater degree of realism in real-life advisory group decision making as compared to imaginary advisory group decision making as it occures with the dilemma-of-

choice questionnaire would probably be offset by the fact that an adviser frequently, if not always, will tend to give the kind of advice which he thinks is best for the client rather than advising the client to do what he, the adviser, would be inclined to do if he were in that situation. This factor, by the way, may also be present with some of the subjects who do the dilemma-of-choice questionnaire.

It would, then, appear that real-life complex group risk taking could only be studied by observing real-life groups who are engaged in decision-making involving the threat of negative consequences to themselves. However, as we shall see in the next section, to undertake such studies will pose considerable difficulties.

8. The Study of Real-Life Decision-Making Groups

If we would decide to study real-life decision-making groups that are engaged in complex decision-making involving risk, we would encounter a number of significant difficulties. Nagel (1961, p. 457) states that "field experimentation has some clear advantages over experimentation in the laboratory, but it is equally clear that in field experiments the difficulty of keeping relevant variables constant is in general greater." What, then, would be some of these "relevant variables" as far as group decision-making under conditions of risk in complex real-life situations is concerned?

One variable would be the manner in which different groups, or the same group at different times, might interact prior to their final decision making. This manner may differ greatly with regard to any of the following factors: (a) Degrees of freedom in exchange of ideas between the group members. (b) Degrees to which certain ideas might be ridiculed or even suppressed. (c) Degrees to which group members who are in positions of authority might exert pressures on the other members of the group; the "authority figure" might be in that role because of position in the organization, general knowledge, or specific prior experiences with the problem on which a decision has to be made. (d) The manner in which given groups customarily arrive at their decisions. This may be accomplished by a majority vote which may either be open or by secret ballot, or the goal might be to achieve a unanimous decision which might be accomplished with *none*, little, or considerable pressure on dissenting members. If the emphasis is on achieving a unanimous decision, and if - in the course of achieving this goal - considerable pressure is exerted on dissenting group members, some group members would be forced to change their decision. In such a case, the question of the effects of such pressure, no doubt, would play a significant role with regard to the nature of the final group decision. However, groups that operate on the principle of unanimous decision making may well represent a very particular type of group decision making which may not at all be typical. The author would be inclined to think that unanimous group decision making is an unnatural state of affairs that violates the

individual group members' personal inclinations. (e) The manner in which given groups customarily collect and evaluate relevant information. Such information-gathering might be distributed to the members with each of them being responsible for a particular segment, but where the group accepts whatever information its members contribute without subjecting this information to any intensive scrutinizing by the group in order to establish the validity of the information. On the other hand, the group might collectively gather and examine all the information and subject it to considerable scrutiny by the group.

Another relevant variable which might turn out to be difficult to control would be the reaction of the group members to being observed. This would mean that a given group might act and decide differently when being observed than it does when not being observed, a phenomenon which is assumed to occur in televised congressional or parliamentary debates and voting. It can probably furthermore be assumed that many occasions of complex decision making would simply be inaccessible to any outside observers because of the unwillingness of the group to be observed in certain kinds of decision making. Therefore, any given decision-making group may only be observable at certain times and not at others. This, however, would make it quite difficult to establish that group's record of "riskiness", particularly if it would happen to be inconsistent in those instances where it had been observed.

Finally, probably the most important relevant variable would be

the nature of the decision-making problem itself. Since it can be expected that complex real-life decision-making problems will vary enormously from one situation to another, it would appear to be necessary to systematically collect information from a great number of different decision-making groups, and it would further seem to be necessary to observe each of these groups in a considerable number of different decision-making situations. If this were not done, reliable conclusions as to the degrees of risk taking in groups could hardly be drawn. Whether or not such Herculean efforts would be worthwhile shall be discussed in the next and final chapter.

Chapter VI

CONCLUSIONS

Past attempts to compare complex risk taking in individual and group decision making have been incredibly naive with regard to the methodology used in these efforts. It would furthermore appear that the dilemma-of-choice questionnaire, which has been used in the vast majority of relevant past research, should be ruled out as a valid instrument for the investigation of the phenomenon of complex real-life risk taking. Since no systematic field studies of complex real-life risk taking by individuals and decision-making groups have been undertaken in the past either, it must be stated that we know next to nothing about complex risk taking under real-life conditions.

The author is of the opinion that it would be, at least at present, almost impossible to develop experimental methods by which complex real-life risk taking by individuals and groups could be adequately simulated in laboratory studies. And even if such simulation techniques could be developed, they would have to be so elaborate that they could not be kept secret for any length of time. That is to say, it would become progressively more difficult to find enough "naive" subjects in order to be able to continue such studies.

It would, therefore, appear that there is only one way of finding out something about the phenomenon of complex real-life decision-making involving risk as it is exercised by individuals and decision-making groups: And that is to study such real-life decision making! However, it must be realized that, very likely, risk taking can only be properly assessed in situations where there exist both a cautious and one or more risky alternatives and that even then the assessment may be unreliable because of the enormous complexity of the phenomenon.

Yet despite all the difficulties which lie in the path of field research into real-life complex risk taking, a beginning could be made by using the twenty-five questions which the author has suggested for the study of risk taking. Using this approach, we would at least have a chance to collect a body of specific information which, at some future time, might be analyzed with some profit. Yet the task of inquiry would be so monumental that neither an individual worker nor a small group of researchers would have much of a chance to accomplish this goal within a reasonable length of time. For this reason, the author sees only one way of attacking the problem: Different workers in the field of decision-making involving risk must get together and discuss the full range of the problem. They eventually would have to work out an agreed-upon systematic approach to the study of real-life risk taking, and the chosen research method would have to do credit to the complexity of the problem to be investigated. The twenty-five

questions suggested by the author are only a small beginning. Taking it from there, it might be possible to develop much more sophisticated tools, and if such tools would be used by the majority of pertinent researchers - in conjunction with computer evaluation - we might eventually come closer to finding an answer to our original question of whether there exist any differences in the degrees of risk taking between individual and group decisions made under complex real-life conditions.

However, the author must confess that he is still very pessimistic with regard to the worthwhileness of such efforts, particularly with regard to studying group decision making. At times, it is very difficult not to be influenced by one's intuitions, and the author intuitively suspects that the following factors strongly suggest that further research into the question of possible differences with regard to degrees of risk taking as exhibited by individuals and groups who are engaged in complex real-life decision making, may be nothing but a monumental waste of time:

(a) Many complex risk-taking situations are of the kind where there exists no cautious alternative and where it would, therefore, seem to be almost impossible to objectively establish degrees of risk taking.

(b) Whatever the group risk-taking situation may be, it would appear to be impossible to establish the differences in degrees of risk taking for the individual members of the group as compared to the final group decision because by the time the group decision can be made, the individual members of the group are in a position with regard to their

decision making which they could not possibly have achieved had they not been members of that group! That is to say, they have interacted to such an extent as members of their group that whatever decision they would make as individuals at that point, could no longer be considered to constitute a truly individual decision. On the other hand, individual decision making before the group interaction begins would, in many cases, be impossible because most complex group decision making is likely to be concerned with problems of such complexity that the solution of these problems simply is beyond the powers of any single individual.

(c) Finally, even if it were possible to establish that differences exist with regard to degrees of risk taking in individual and group decisions, it would be highly unlikely that such differences would turn out to be of a consistent nature. Furthermore, it would seem to make absolutely no difference whether or not such differentials in the degrees of risk taking might exist. The increasing complexity of modern technological society forces us into an ever increasing reliance on group decision making so that, even if we were to come to regard group decision making as being inferior to individual decision making, we still would have no choice but to continue using group decision making!

The author must then come to the final conclusion that research concerned with comparisons of complex individual and group decisions involving risk may, for now and the near future, barely be worth the

effort. The only way out of this predicament appears to be to concentrate on the study of complex real-life risk taking by individuals. The results gained from such studies might conceivably enable us to develop, at some future time, methods for studying group risk taking so that it then might become possible to compare individual to group risk taking.

* * *

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APPENDIX

In this appendix, Wallach and Kogan's (1959, 1961) dilemma-of-choice questionnaire will be reproduced as it has been used by Stoner (1961, appendix A-1). Stoner changed the format of the questionnaire only with regard to the cover sheet: The second part of the instructions on the questionnaire's cover sheet, namely, the part that says "Please do not discuss the material in this session with any of your fellow students, even if they have already taken part in the experiment", had not been contained on the cover sheet of the questionnaire as it had been used by Wallach and Kogan in their 1959 and 1961 studies.

Also in this appendix, some modified and new dilemma-of-choice items will be reproduced in the same abbreviated form in which they have been published in two recent studies by Rabow, Fowler, Bradford, Hofeller, and Shibuya (1966) and by Stoner (1967). These items will be numbered consecutively to the items of the original dilemma-of-choice questionnaire, that is, the modified and new items will begin with # 13. They will also, in brackets behind their consecutive numbers, contain the numbers they had in the two studies in which they had been used as part of the total number of dilemma-of-choice items which had been employed in these studies. Furthermore, the modified

and new items will be listed in two sections, one each for the two studies from which these items have been taken.

1. The Original Dilemma-of-Choice Questionnaire

WALLACH-KOGAN QUESTIONNAIRE

Name _____

INSTRUCTIONS

On the following pages you will find a series of situations that are likely to occure in everyday life. The central person in each situation is faced with a choice between two courses of action. We want your opinion as to how desirable it is for the person to follow one of the two courses of action. Read each situation carefully before giving your opinion.

Please do not discuss the material in this session with any of your fellow students, even if they have already taken part in the experiment.

1. Mr. A, 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. A is offered a job with a small, newly founded company with 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.

Imagine that you are advising Mr. A. Listed below are several probabilities or odds of the new company's proving financially sound. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE TO MAKE IT WORTHWHILE FOR MR. A TO TAKE THE NEW JOB.

____ The chances are 1 in 10 that the company will prove financially sound.

____ The chances are 3 in 10 that the company will prove financially sound.

____ The chances are 5 in 10 that the company will prove financially sound.

____ The chances are 7 in 10 that the company will prove financially sound.

____ The chances are 9 in 10 that the company will prove financially sound.

____ Place a check here if you think Mr. A should not take the new job, no matter what the probabilities.

2. Mr. B, a 45-year-old accountant, has recently been informed by his physician that he has developed a severe heart ailment. The desease would be sufficiently serious to force Mr. B to change many of his strongest life habits - reducing his work load, drastically changing his diet, giving up favorite leisure time pursuits. The physician suggests that a delicate medical operation could be attempted which, if successful, would completely relieve the heart condition. But its success could not be assured, and in fact, the operation might prove fatal.

Imagine that you are advising Mr. B. Listed below are several probabilities or odds that the operation will prove successful. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR THE OPERATION TO BE PERFORMED.

____ Place a check here if you think Mr. B should not have the operation, no matter what the probabilities.

____ The chances are 9 in 10 that the operation will be a success.

____ The chances are 7 in 10 that the operation will be a success.

____ The chances are 5 in 10 that the operation will be a success.

____ The chances are 3 in 10 that the operation will be a success.

____ The chances are 1 in 10 that the operation will be a success.

3. Mr. C, a married man with two children, has a steady job that pays him about $6000 per year. He can easily afford the necessities of life, but few of the luxuries. Mr. C's father, who died recently, carried a $4000 life insurance policy. Mr. C would like to invest this money in stocks. He is well aware of the secure "blue-chip" stocks and bonds that would pay approximately 6% on his investment. On the other hand, Mr. C has heard that the stocks of a relatively unknown Company X might double their present value if a new product currently in production is favorably received by the buying public. On the other hand, if the product is unfavorably received, the stocks would decline in value.

Imagine that you are advising Mr. C. Listed below are several probabilities or odds that the Company X stocks will double their value. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR MR. C TO INVEST IN COMPANY X STOCKS.

____ The chances are 1 in 10 that the stocks will double their value.

____ The chances are 3 in 10 that the stocks will double their value.

____ The chances are 5 in 10 that the stocks will double their value.

____ The chances are 7 in 10 that the stocks will double their value.

____ The chances are 9 in 10 that the stocks will double their value.

____ Place a check here if you think Mr. C should not invest in Company X stocks, no matter what the probabilities.

4. Mr. D is the captain of College X's football team. College X is playing its traditional rival, College Y, in the final game of the season. The game is in its final seconds, and Mr. D's team, College X, is behind in the score. College X has time to run one more play. Mr. D, the captain, must decide whether it would be best to settle for a tie score with a play which would be almost certain to work; or, on the other hand, should he try a more complicated and risky play which could bring victory if it succeeded, but defeat if not.

Imagine that you are advising Mr. D. Listed below are several probabilities or odds that the risky play will work. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR THE PLAY TO BE ATTEMPTED.

____ Place a check here if you think Mr. D should not attempt the risky play, no matter what the probabilities.

____ The chances are 9 in 10 that the risky play will work.

____ The chances are 7 in 10 that the risky play will work.

____ The chances are 5 in 10 that the risky play will work.

____ The chances are 3 in 10 that the risky play will work.

____ The chances are 1 in 10 that the risky play will work.

5. Mr. E is president of a light metals corporation in the United States. The corporation is quite prosperous, and has strongly considered the possibilities of business expansion by building an additional plant in a new location. The choice is between building another plant in the United States, where there would be a moderate return on the initial investment, or building a plant in a foreign country. Lower labor costs and easy access to raw materials in that country would mean a much higher return on the initial investment. On the other hand, there is a history of political instability and revolution in the foreign country under consideration. In fact, the leader of a small minority party is committed to nationalizing, that is, taking over, all foreign investments.

Imagine that you are advising Mr. E. Listed below are several probabilities or odds of continued political stability in the foreign country under consideration. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR MR. E'S CORPORATION TO BUILD A PLANT IN THAT COUNTRY.

____ The chances are 1 in 10 that the foreign country will remain politically stable.

____ The chances are 3 in 10 that the foreign country will remain politically stable.

____ The chances are 5 in 10 that the foreign country will remain politically stable.

____ The chances are 7 in 10 that the foreign country will remain politically stable.

____ The chances are 9 in 10 that the foreign country will remain politically stable.

____ Place a check here if you think Mr. E's corporation should not build a plant in the foreign country, no matter what the probabilities.

6. Mr. F 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.

Imagine that you are advising Mr. F. Listed below are several probabilities or odds that Mr. F 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. F TO ENROLL IN UNIVERSITY X RATHER THAN UNIVERSITY Y.

____ Place a check here if you think Mr. F should not enroll in University X, no matter what the probabilities.

____ The chances are 9 in 10 that Mr. F would receive a degree from University X.

____ The chances are 7 in 10 that Mr. F would receive a degree from University X.

____ The chances are 5 in 10 that Mr. F would receive a degree from University X.

____ The chances are 3 in 10 that Mr. F would receive a degree from University X.

____ The chances are 1 in 10 that Mr. F would receive a degree from University X.

7. Mr. G, a competent chess player, is participating in a national chess tournament. In an early match he draws the top-favored player in the tournament as his opponent. Mr. G has been given a relatively low ranking in view of his performance in previous tournaments. During the course of his play with the top-favored man, Mr. G notes the possibility of a deceptive though risky maneuver which might bring him a quick victory. At the same time, if the attempted maneuver should fail, Mr. G would be left in an exposed position and defeat would almost certainly follow.

Imagine that you are advising Mr. G. Listed below are several probabilities or odds that Mr. G's deceptive play would succeed. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR THE RISKY PLAY IN QUESTION TO BE ATTEMPTED.

____ The chances are 1 in 10 that the play would succeed.

____ The chances are 3 in 10 that the play would succeed.

____ The chances are 5 in 10 that the play would succeed.

____ The chances are 7 in 10 that the play would succeed.

____ The chances are 9 in 10 that the play would succeed.

____ Place a check here if you think Mr. G should not attempt the risky play, no matter what the probabilities.

8. Mr. H, a college senior, has studied the piano since childhood. He has won amateur prizes and given small recitals, suggesting that Mr. H has considerable musical talent. As graduation approaches, Mr. H has the choice of going to medical school to become a physician, a profession which would bring certain prestige and financial rewards; or entering a conservatory of music for advanced training with a well-known pianist. Mr. H realizes that even upon completion of his piano studies, which would take many more years and a lot of money, success as a concert pianist would not be assured.

Imagine that you are advising Mr. H. Listed below are several probabilities or odds that Mr. H would succeed as a concert pianist. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR MR. H TO CONTINUE WITH HIS MUSICAL TRAINING.

____ Place a check here if you think Mr. H should not pursue his musical training, no matter what the probabilities.

____ The chances are 9 in 10 that Mr. H would succeed as a concert pianist.

____ The chances are 7 in 10 that Mr. H would succeed as a concert pianist.

____ The chances are 5 in 10 that Mr. H would succeed as a concert pianist.

____ The chances are 3 in 10 that Mr. H would succeed as a concert pianist.

____ The chances are 1 in 10 that Mr. H would succeed as a concert pianist.

9. Mr. J is an American who was captured by the enemy in World War II and placed in a prisoner-of-war camp. Conditions in the camp are quite bad, with long hours of hard physical labor and a barely sufficient diet. After spending several months in this camp, Mr. J notes the possibility of escape by concealing himself in a supply truck that shuttles in and out of the camp. Of course, there is no guarantee that the escape would prove successful. Recapture by the enemy could well mean execution.

Imagine that you are advising Mr. J. Listed below are several probabilities or odds of a successful escape from the prisoner-of-war camp. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR AN ESCAPE TO BE ATTEMPTED.

____ The chances are 1 in 10 that the escape would succeed.

____ The chances are 3 in 10 that the escape would succeed.

____ The chances are 5 in 10 that the escape would succeed.

____ The chances are 7 in 10 that the escape would succeed.

____ The chances are 9 in 10 that the escape would succeed.

____ Place a check here if you think Mr. J should not try to escape, no matter what the probabilities.

10. Mr. K is a successful businessman who has participated in a number of civic activities of considerable value to the community. Mr. K has been approached by the leaders of his political party as a possible congressional candidate in the next election. Mr. K's party is a minority party in the district, though the party has won occasional elections in the past. Mr. K would like to hold political office, but to do so would involve serious financial sacrifice, since the party has insufficient campaign funds. He would also have to endure the attacks of his political opponents in a hot campaign.

Imagine that you are advising Mr. K. Listed below are several probabilities or odds of Mr. K's winning the election in his district. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE TO MAKE IT WORTHWHILE FOR MR. K TO RUN FOR POLITICAL OFFICE.

____ Place a check here if you think Mr. K should not run for political office, no matter what the probabilities.

____ The chances are 9 in 10 that Mr. K would win the election.

____ The chances are 7 in 10 that Mr. K would win the election.

____ The chances are 5 in 10 that Mr. K would win the election.

____ The chances are 3 in 10 that Mr. K would win the election.

____ The chances are 1 in 10 that Mr. K would win the election.

11. Mr. L, a married 30-year-old physicist, has been given a five-year appointment by a major university laboratory. As he contemplates the next five years, he realizes that he might work on a difficult long-term problem which, if a solution could be found, would resolve basic scientific issues in the field and bring high scientific honors. If no solution were found, however, Mr. L would have little to show for his five years in the laboratory, and this would make it hard for him to get a good job afterwards. On the other hand, he could, as most of his professional associates are doing, work on a series of short-term problems where solutions would be easier to find, but where the problems are of lesser scientific importance.

Imagine that you are advising Mr. L. Listed below are several probabilities or odds that a solution would be found to the difficult long-term problem that Mr. L has in mind. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE TO MAKE IT WORTHWHILE FOR MR. L TO WORK ON THE MORE DIFFICULT LONG-TERM PROBLEM.

____ The chances are 1 in 10 that Mr. L would solve the long-term problem.

____ The chances are 3 in 10 that Mr. L would solve the long-term problem.

____ The chances are 5 in 10 that Mr. L would solve the long-term problem.

____ The chances are 7 in 10 that Mr. L would solve the long-term problem.

____ The chances are 9 in 10 that Mr. L would solve the long-term problem.

____ Place a check here if you think Mr. L should not choose the long-term, difficult problem, no matter what the probabilities.

12. Mr. M is contemplating marriage to Miss T, a girl whom he has known for a little more than a year. Recently, however, a number of arguments have occurred between them, suggesting some sharp differences of opinion in the way each views certain matters. Indeed, they decide to seek professional advice from a marriage counselor as to whether it would be wise for them to marry. On the basis of these meetings with a marriage counselor, they realize that a happy marriage, while possible, would not be assured.

Imagine that you are advising Mr. M and Miss T. Listed below are several probabilities or odds that their marriage would prove to be a happy and successful one. PLEASE CHECK THE LOWEST PROBABILITY THAT YOU WOULD CONSIDER ACCEPTABLE FOR MR. M AND MISS T TO GET MARRIED.

____ Place a check here if you think Mr. M and Miss T should not marry, no matter what the probabilities.

____ The chances are 9 in 10 that the marriage would be happy and successful.

____ The chances are 7 in 10 that the marriage would be happy and successful.

____ The chances are 5 in 10 that the marriage would be happy and successful.

____ The chances are 3 in 10 that the marriage would be happy and successful.

____ The chances are 1 in 10 that the marriage would be happy and successful.

2. Some Modified and New Dilemma-of-Choice Items from Two Recent Studies

Section 1 (Items from the study by Rabow, Fowler, Bradford, Hofeller, and Shibuya, 1966, p. 20):

13. (3) Your brother, 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.

14. (5) Your father, who has 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.

15. (4) A successful businessman with strong feelings of civic reponsibility must decide whether or not to run for Congress on the ticket of a minority party whose campaign funds are limited. He must also consider his children, who have felt deprived of his companionship.

16. (6) A very small community has sponsored the medical education of a young doctor in order to replace the older and only doctor of the community. The young doctor must decide whether or not to follow up a research idea which may produce an important medical advance, a decision that will prevent him from returning to the small community.

Section 2 (Items from the study by Stoner, 1967; pp. 10-12):

17. (1) A dentist with a family must decide whether to undergo an operation which would remove a severe pain if successful but would prevent his continuing his dental practice if unsuccessful. (CAUTIOUS)

18. (2) A man about to embark on a vacation trip experiences severe abdominal pains and must choose between disrupting his vacation plans in order to see a doctor or boarding an airplane for a long overseas flight. (CAUTIOUS)

19. (6) A father, who has recently received a promotion, is considering spending some savings originally set aside for his son's college education on a family trip to Europe. (CAUTIOUS)

20. (8) A couple must choose between allowing a complicated pregnancy to continue, with danger to the mother's life, or having the pregnancy terminated. (CAUTIOUS)

21. (10) A person involved in an airplane accident must choose between rescuing only his child or attempting to rescue both his spouse and child with the realization that both will be lost if the attempt is unsuccessful. (RISKY)

22. (11) A recently married young man with a pregnant wife is deciding whether or not to give up his hobby of sportscar-racing. (CAUTIOUS)

23. (12) A man of moderate means is considering borrowing on his life insurance to invest in a stock which may grow substantially in value. (CAUTIOUS)

In order to facilitate references the reader might wish to make from page 38 of this thesis, here is a list of how the items 17 to 23, which have been cited above, went in Stoner's 1967 study:

Cautious items

17. (1; Nordhøy) - No significant shift.

18. (2; new) - Cautious shift.

19. (6; new) - Doubtful; probably no significant shift.

20. (8; new) - Cautious shift.

22. (11; new) - No significant shift.

23. (12; Nordhøy) - No significant shift.

Risky item

21. (10; new) - Risky shift.

The other five risky items in Stoner's study were all from the original dilemma-of-choice questionnaire with the exception of one which had been modified. All of these five items showed a risky shift.