INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in "sectioning" the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again – beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from "photographs" if essential to the understanding of the dissertation. Silver prints of "photographs" may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

Xerox University Microfilms
300 North Zeeb Road
Ann Arbor, Michigan 48106
MEYERS, Hazeldean, 1932-
A STUDY OF SEX DIFFERENCE IN RISK-TAKING AMONG INNER CITY AND SUBURBAN CHILDREN.

The Ohio State University, Ph.D., 1975
Education, psychology

Xerox University Microfilms, Ann Arbor, Michigan 48106

(©) Copyright by
Hazeldean Meyers
1975

THIS DISSERTATION HAS BEEN MICROFILMED EXACTLY AS RECEIVED.
A STUDY OF SEX DIFFERENCE IN RISK-TAKING
AMONG INNER CITY AND SUBURBAN CHILDREN

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
Hazeldean Meyers, B.S.Ed., M.A.

* * * * *

The Ohio State University
1975

Reading Committee:
Alexander Frazier
George G. Thompson
Loren R. Tomlinson
John J. Kennedy

Approved by

[Signature]
Adviser
Department of Early and
Middle Childhood Education
Every study of this kind has had the assistance of many individu-
als. I would like to acknowledge my grateful appreciation to my advis-
er, Dr. Alexander Frazier, for his continued encouragement through my
years of graduate work, as well as through this dissertation study. To
other members of my doctoral committee, Dr. John J. Kennedy, Dr. George
G. Thompson, and Dr. Loren R. Tomlinson, I am deeply appreciative of
their work and encouragement to me.

Recognition also goes to Dr. A. Maxine Smith of Columbus Public
Schools who gave me a boost by encouraging me to conduct my first pilot
study in her school. Other cooperative principals were Mr. John Stuck
and Mrs. Maxine Staiger of Columbus Public Schools, as well as Marcia
Kepley of the Upper Arlington Schools. To the teachers who cooperated
with my efforts, I give my thanks.

Special recognition goes to those friends who have cared the most
about my endeavors. Among those friends are Luther and Thelma Dillard,
without whom a college education could not have been achieved. To
Annie L. Carlson, a faithful friend of many years, a special apprecia-
tion is noted of her patience and understanding through good times and
bad. Her typing of this manuscript is a monument of love. To these
enduring friends I am ever grateful.
March 4, 1932. . . . . Born - West Portsmouth, Ohio

1956 . . . . . . . . B.S.Ed., Ohio University, Athens, Ohio

1956-1958. . . . . Teacher, Deer Creek School, London, Ohio

1958-1960. . . . . Teacher, Columbus Public Schools, Columbus, Ohio

1960-1962. . . . . Teacher-Administrator, Pemba Girls School, Pemba, Zambia
                 David Livingstone Teacher Training College, Livingstone, Zambia

1963-1967. . . . . Teacher, Columbus Public Schools, Columbus, Ohio

1966 . . . . . . . . M.A., The Ohio State University, Columbus, Ohio

1967-1972. . . . . Administrator, Columbus Public Schools, Columbus, Ohio

1972-1973. . . . . Teaching Assistant, The Ohio State University, Columbus, Ohio

1973-1975. . . . . Administrator, Columbus Public Schools, Columbus, Ohio

1975------. . . . . Assistant Professor, Murray State University, Murray, Kentucky

FIELDS OF STUDY

Major Fields: Elementary Education
              Child Development
# Table of Contents

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acknowledgements</strong></td>
</tr>
<tr>
<td><strong>Vita</strong></td>
</tr>
<tr>
<td><strong>List of Tables</strong></td>
</tr>
<tr>
<td><strong>List of Figures</strong></td>
</tr>
</tbody>
</table>

## Chapter 1. Introduction

- **Focus of the Problem** | 3
- **Purpose of the Study** | 5
- **Hypotheses** | 8
- **Definition of Terms** | 10

## Chapter 2. Survey of Related Literature

- **Background of Risk-taking Studies** | 11
- **Theories and Models of Risk-taking** | 12
- **The Achievement Motive and Risk-taking** | 20
- **Individual Risk-taking** | 23
- **Group Risk-taking and the Risky Shift** | 26
  - **Situational or Social Context and Risk-taking** | 27
  - **Ethical Risk-taking and Locus of Control** | 29
  - **Familiarization** | 30
  - **Group Norms** | 31
  - **Risk as Value Hypothesis** | 32
- **Cognitive Development and Risk-taking** | 34
- **Skill and Chance Risk-taking** | 37
- **Demographic Factors in Risk-taking** | 41
  - **Risk-taking and Age** | 42
  - **Risk-taking and Sex** | 45
  - **Risk-taking and Culture** | 51
    - **a. American Subculture Studies** | 51
    - **b. Cross-cultural Studies** | 54
    - **c. Subculture Studies in Other Cultures** | 55
- **Summary of Review of Literature** | 56
LIST OF TABLES

Table                                                                                         Page

I  Means and Standard Deviations for Risk-taking Behavior
    Scores by Sex, School Location, and Type of Risk. . . . 72

II Analysis of Variance of Risk-taking Behavior by Sex,
    School Location, and Type of Risk . . . . . . . . . . . . . 73

III Mean Cell Differences for Skill and Chance Risk-taking
    Behavior Scores . . . . . . . . . . . . . . . . . . . . . . . . 80

IV Mean Cell Differences for Chance Risk-taking Behavior
    Scores. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 85

V Totals for Tokens Won by Sex and School Location . . . . 86

VI Level Means for Sex by Type of Risk. . . . . . . . . . . . 92

VII Level means for School Location by Type of Risk. . . . 94

LIST OF FIGURES

Figure                                                                                         Page

1  Interactions of Sex (A) by Type of Risk (C) Displayed
    Over Levels of School Location (B). . . . . . . . . . . 75

2  Interactions of Sex (A) by Type of Risk (C) Displayed
    Over Levels of School Location (B). . . . . . . . . . . 76
CHAPTER I
INTRODUCTION

The paucity of women in jobs or tasks which require high levels of risk-taking is an historical fact. In order to find accounts of such women, the reader has to search far and wide. Historians have limited their writings to such women as Carrie Nation of the Prohibition era and Clara Barton, the founder of the American Red Cross. It has taken the efforts of the Women's Liberation Movement in recent years to develop an awareness of women and their jobs. They now collect and disseminate biographies of women of the past and women presently engaged in positions of importance. The book The Feminine Mystique authored by Freidan (1964) has brought into sharp focus the true role that women play in American society and has instigated a series of studies involving the roles that women play (Garskopf, 1971), and how women and girls are stereotyped in school textbooks and children's stories (Publishers Weekly, 1971).

It can be proven historically that women can and have been as daring and risk-taking as men. Historians have simply avoided the issue by failing to point out the roles that women have played alongside their men in stressful and risky tasks, such as protecting the home in times of danger, carrying the share of farm and industrial work along with regular household duties.
The question has been raised as to whether women are as great risk-takers as men and are, therefore, as capable as men in solving difficult tasks requiring risky decision-making. Recent historians and members of the Women's Liberation Movement would state that women have always been and still are capable of performing at levels of risk comparable to that of men.

Typically, women have been considered to be so-called "safe" risk-takers as illustrated by Wallach and Kogan's interpretations of their study in 1959 in which they accounted for the sex differences they found by using such terms as "hard-headed" and "sure thing" to describe the decision-making of women. They used the historical and sociological stereotyped woman as the basis for their interpretations of their data. The widespread use of such stereotypes may have distorted other interpretations of sex differences and certainly has precluded a search for fuller understanding.

That the socializing process of American children is clearly different for each sex is well documented (Hartup, 1964; Minuchin, 1965; Lewis, 1971). Horner (1971) has suggested that socialization may account for what she terms the "motivation to avoid success" found by her to exist in women but not in men. Further evidence suggests that parents value achievement more for boys than for girls (Katkovsky, Preston, and Crandall, 1964). Crandall (1963) states that "In the United States, boys receive more achievement training while girls are given more obedience and responsibility training." (Chapman & Hill, 1971, p. 72).
If the process of socialization affects boys and girls differently in achievement motivation, specific characteristics related to striving may in turn be affected. Thus researchers have been much interested over the years in the study of attitudes, goal setting, task performance, anxiety, and risk-taking, to mention only a few. Of these, knowledge about risk-taking has been the least developed. Comprehensive summaries by Kogan and Wallach (1964, 1967) bring together much of the relevant work on risk-taking. In their second report, they state that so little research has been conducted with regard to sex difference in risk-taking behavior that it is difficult to arrive at any generalizations. The impact of differences among American subcultures in risk-taking is also unknown.

Focus of the Problem

A brief review of the literature revealed the paucity of studies in children's skill and chance risk-taking behavior in which differences in sex and possibly subculture had been involved. There are, however, a few that are outstanding.

Studies dealing with chance risk-taking situations are considered first. Four such studies were located, in two of which there were no apparent sex differences. Cratch (1964) studied urban children in grades 1, 3, and 5 in dependency risk-taking. In general, he found that sex was unrelated to his other variables, which were degree of adult approval and age. Jamieson (1969) who studied birth order, family size, and sex among ten- and twelve-year-old children in New Zealand found that sex did not make a difference in risk-taking behavior but
that family size did.

The other two studies indicated that sex does make a difference in risk-taking behavior. Kass (1964) studied age, sex, and probability preference among children ages 6, 8, and 10 and found boys to prefer probability which involved greater risk as compared to girls. Slovic (1966) studied age and sex differences among children who volunteered at a fair to participate in a game where they could win candy until pulling a "disaster" switch. He found boys more daring and girls more cautious, with greater cautiousness resulting in better payoffs for the girls.

In studies where skill risk-taking behaviors had been observed, a similar diversity was reported. In relating creative ability and risk-taking behavior, Pankove and Kogan (1968) found that competitive contests aroused more response in boys than in girls and that in self-confidence, girls exhibited more conservatism. Slakter (1967) did not find risk-taking on objective examinations (RTOOE) to be related to sex differences. However, in a later study (Slakter, 1971) he found that males took greater risks although the relationship between sex and risk remained unclear. In a study using both skill and chance risk-taking behaviors as variables, Krzesni (1973) found no sex differences in chance situations but in skill situations found boys to take more risks and have fewer winnings than girls.

Studies with regard to cultural, geographic, or socioeconomic differences in risk-taking are also few in number and inconclusive. Carlson (1969) in studying probability judgment in second- and fifth-grade children found some differences between socioeconomic groups on certain
items of his test. Witryol et al. (1965) found a few differences across social classes in incentive values, for example; the incentive value of the penny was shown to be significant for lower socioeconomic first-grade boys as opposed to bubble gum, charms, or verbal reinforcement.

More direct evidence was suggested in Cohen's (1960) study of chance, skill, and luck in which he assumed that social class would make a difference and offered proof through the difference found in upper and lower "streams" of children in British schools. Slakter (1971) noted in his RTOOE study that the differences found between schools in Michigan and New York may be "school or geographic differences in RTOOE..."

In a cross-cultural study of Canadian and East Indian males (age 19) Carment (1974) found that the East Indians were more conservative in chance situations and that in successive episodes of skill risk-taking tended to withdraw from higher commitments. The East Indians seemed to be dominated by the motive to avoid failure, which suggested to Carment that authoritarian East Indian family life may be responsible.

**Purpose of the Study**

The major purpose of this study was to determine whether sex differences and subcultural or school location differences in risk-taking behavior existed. A secondary purpose was to determine whether differences existed within subjects on skill and chance risk-taking behavior.
Children were selected from school locations representing the three subcultures of inner city black (ICB), inner city white (ICW), and suburban white (SW). Each child was presented individually with a skill and chance risk-taking situation. From these situations it was anticipated that answers to the following questions might be found:

1. Are there differences between boys and girls on risk-taking behavior?
2. Does the school location and its concomitant subculture implications make a difference in risk-taking behavior?
3. Will this study further verify the known psychological difference within subjects with respect to skill and chance situations?

Hypotheses

The foregoing questions generated the following hypotheses:

I. For risk-taking (RT) behavior relating to possible sex differences, the following null hypotheses were offered:

I-A Inner city black (ICB) boys will not differ from ICB girls in skill risk-taking behavior.

I-B ICB boys will not differ from ICB girls in chance risk-taking behavior.

I-C Inner city white (ICW) boys will not differ from ICW girls in skill risk-taking behavior.

I-D ICW boys will not differ from ICW girls in chance risk-taking behavior.

I-E Suburban white (SW) boys will not differ from SW girls in skill risk-taking behavior.
I-F SW boys will not differ from SW girls in chance risk-taking behavior.

II. For risk-taking (RT) behavior relating to possible differences in school location (B) based upon different American subcultures, the following null hypotheses were offered:

II-A ICB boys, ICW boys, and SW boys will not differ in skill risk-taking behavior.

II-B ICB boys, ICW boys, and SW boys will not differ in chance risk-taking behavior.

II-C ICB girls, ICW girls, and SW girls will not differ in skill risk-taking behavior.

II-D ICB girls, ICW girls, and SW girls will not differ in chance risk-taking behavior.

II-E The combined ICB boys and girls and combined ICW boys and girls and combined SW boys and girls will not differ in skill risk-taking behavior.

II-F The combined ICB boys and girls and combined ICW boys and girls and combined SW boys and girls will not differ in chance risk-taking behavior.

III. For possible differences in skill and chance risk-taking behavior (C) within subjects, the following null hypotheses were offered:

III-A Skill and chance risk-taking behavior will not differ within ICB boys.

III-B Skill and chance risk-taking behavior will not differ within ICB girls.

III-C Skill and chance risk-taking behavior will not differ within ICW boys.

III-D Skill and chance risk-taking behavior will not differ within ICW girls.

III-E Skill and chance risk-taking behavior will not differ within SW boys.

III-F Skill and chance risk-taking behavior will not differ within SW girls.
IV. For possible interaction between sex (A), school location based upon different American subcultures (B), and risk-taking behavior (C), the following null hypotheses were offered:

**First-order interactions**

IV-A Interaction between sex (A) and school (B) will not be significant.

IV-B Interaction between sex (A) and type of risk (C) will not be significant.

IV-C Interaction between school location (B) and type of risk (C) will not be significant.

**Second-order interactions**

V. Interaction among the variables of sex (A), school location (B), and type of risk (C) will not be significant.

**Definition of Terms**

To discuss risk-taking or to study it, a workable definition had to be attained. The setting of risk-taking frequently determines the type of definition. However, for the purpose of this study, the definition offered by Kogan and Wallach (1967) served very well.

...risk-taking...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 post-decisional stage might find himself worse off than he was before he made the decision. (p. 115).

A closely related variable to risk-taking is the probability concept. It is the development of this concept which determines how people will react in various risk-taking situations. This concept is
sometimes referred to as the subjective probability, or psychological probability, as opposed to the mathematical probability. Cohen and Hansel (1959) speak of the "world of private uncertainty," but never really define subjective probability. The closest definition could be found on page three of their book Risk and Gambling—"the expectation attached to a person's future behavior" or "the unconscious weighing of uncertain considerations." This expectation of behavior has been shown to change with age and experience in structuring of uncertain situations (Cohen, Dearncley, & Hansel, 1957). It also may vary from person to person and from culture to culture (Cohen & Hansel, 1959).

The variations of probability and risk-taking are affected by internal variance preferences. Coombs and Pruitt (1960) describe the variance preference as the dispersion of possible outcomes of situations and the range within which an individual may prefer certain amounts of variance over others. This variable affects risk-taking behavior.

One of the closest related variables to risk-taking is the achievement motivation. Several definitions have been given to this variable (Atkinson, 1957; Klinger & McNelly, 1969). The one chosen by this writer is given by Heckhausen (1967). It is defined as the "striving to increase or keep as high as possible one's capability in all activities in which a standard of excellence applies, and where the execution of such activities can, therefore, either succeed or fail" (Chapman & Hill, 1971, p. 5).

Skill risk-taking includes the use of motor skills in goal-seeking activities with the element of uncertainty about the outcome. In this
study the skill was the throwing of indoor horseshoes in which the subjects attempted to make a ringer around a stake set at three and six feet distances from which to choose.

Chance risk-taking involves the elements of a goal-seeking activity with the uncertainty about the outcome. It is a situation in which the participant cannot control in any way the random selection of events. In this study the chance factor was a set of cards containing the letters "A" and "F" which were preselected by a random number system and over which the subjects had no control.

Summary

Studies in risk-taking in children have been few and inconclusive. This study has been conducted to add to the body of knowledge with regard to the two main variables of sex and cultural differences, as well as to the psychological differences involved in skill and chance risk-taking within subjects.

The following chapter presents a review of the literature associated with risk-taking. The review is an attempt to give an overall view of the studies relating to risk-taking behavior and to relate this study to that body of knowledge. Chapter three details the methods and procedures utilized in this study, and chapter four is an analysis of the data gathered with an examination of the hypotheses generated by this study. The final chapter is a summary of the study, with discussion, conclusions, and recommendations for further research.
CHAPTER II

SURVEY OF RELATED LITERATURE

Background of Risk-taking Studies

The intent of this review of the literature is to acquaint the reader with the broad scope of the study of risk-taking and the variables which impinge upon it. It begins with a review of the theories and models of risk-taking and narrows to demographic factors which relate to this study—sex differences and cultural factors—and to the psychological differences in skill and chance orientations.

Historically, the study of risk-taking originated in the field of economics. It is only in the past twenty-five to thirty years that the psychological aspects have been explored. The early explorations of risk-taking behavior sought a means for measuring the personality trait that has been variously named "the tendency to gamble" (Swinford, 1941), "choice behavior" (Jones & Liverant, 1960), "decision-making" (Edwards, 1954), and "decision under uncertainty" (Feather, 1966). In concluding an assessment of the literature concerning risk-taking behavior, Slovic (1964) stated that it is multidimensional in nature. This multidimensionality has made it difficult to measure and has, therefore, led to many contradictory results.

The multifaceted aspects are well illustrated in some of the studies which evolved from the investigation of achievement motivation
in the economic arena. As early as 1957 Atkinson had developed a model for risk-taking behavior. This model included such variables as motive to succeed ($M_s$), motive to avoid failure ($M_{af}$), incentive value of success ($I_s$), incentive value of failure ($I_f$), probability of success ($P_s$), probability of failure ($P_f$), hope of success ($HS$), fear of failure ($FF$). Variables developed by other writers included subjective probability, probability preference, variance preference, subjective expected utility, aspiration level, attainment attractiveness, wishful choice, choice potential, success probability, situational context, among many others. Each of these factors was seen to play a role either directly or indirectly, strongly or weakly, in risk-taking behavior.

A great portion of the early studies dealt with individual differences. Only in recent years has group risk-taking gained prominence. A large literature now exists for group risk-taking. The latest trend is the study of cultural differences in risk-taking.

For the purposes of this chapter, it has seemed best to review the literature on risk-taking from several different aspects: theories and models of risk-taking, the achievement motive and risk-taking, individual risk-taking, group risk-taking, and the risky-shift, cognitive development and risk-taking, skill and chance risk-taking, and demographic factors and risk-taking. A discussion of these topics follows.

Theories and Models of Risk-taking

Since the study of risk-taking originated in the field of economics, it would be expected that the very early studies by psychologists would draw their knowledge from the economic arena. It was not
surprising, therefore, that a major comprehensive review of risk-taking appearing in the *Psychological Bulletin* (Edwards, 1954) included a study of those theories relating to the economics field. The approach to the study of risk-taking in the early days was clouded with the uncertainty of what to call it. Thus, Edwards (1954) used the term "decision-making." Essentially, however, he devoted his article to factors relating both to risk-taking and to decision-making, using economic terms and phrases, such as maximizing utility, maximum expected utility, utility of the object, value of the object, and theory of games. He discussed the theory of riskless choices, the application of the theory of riskless choices to welfare economics, the theory or risky choices, transitivity in decision-making, and the theory of games, and of statistical decision functions. The article is an expansive consideration of what economists have learned about decision-making and risk-taking. He encouraged those in the field of psychology to use this economical theoretical structure and to perform experiments based on this knowledge.

A year later Edwards (1955) presented four theoretical models of gambling behavior:

- **Expected Value (EV)** - Both the probabilities and the monetary amounts are taken at their objective face value.
- **Subjectively Expected Money (SEM)** - This model substitutes the objective probabilities of the EV model with subjective probabilities.
- **Expected Utility (EU)** - This model replaces objective monetary values with subjective value, that is, what the person
believes to be the *real* value involved.

**Subjectively Expected Utility (SEU)**—In this model both the probabilities and the monetary value take the subjective form.

Even before the time of the appearance of Edwards' articles, there began to emerge a flow of studies and articles based on psychological concepts of decision-making and risk-taking. Ziller (1957) utilized such "stochastic models of human decision-making behavior" as the basis for developing his own theory with regards to individual vocational choice-making. His theory proposed that "vocational choice is a decision-making situation in which risk plays a major role, and therefore, individual risk-taking tendencies determine, in part, occupational choice." (p. 61) The results of his study supported his theory.

The most widely known and used risk-taking model in the field of psychology was developed by Atkinson (1958) in relation to his work with achievement motivation. Again, this model was an offshoot from the work of McClelland (1956), who studied "the role of achievement entrepreneurship and economic development." Atkinson's objective was to correlate the motivational bases of risk-taking behavior. He summarizes his model thusly:

...the major implications of the theory are (a) performance level should be greatest when there is greatest uncertainty about the outcome, i.e., when subjective probability of success is .50, whether the motive to achieve or the motive to avoid failure is stronger within an individual; but (b) persons in whom the achievement motive is stronger should prefer intermediate risk while persons in whom the motive to avoid failure is stronger should avoid intermediate risk and prefer instead very easy and safe undertakings or extremely difficult and speculative undertakings.... (p. 338-339).
This model will be discussed more thoroughly in the next section. It has been used by many others studying achievement motivation and risk-taking. Essentially, the results of Atkinson's own studies using this model indicated the need for further research on probability preferences in gambling.

Another model tested was related to a learning model which R. C. Atkinson, Sommer, and Sterman (1960) adapted for decision-making for children. Basically, the model proposed "that response probability on a given trial is a linear function of the probability on the preceding trial." (p. 1) The results indicated that verbal reinforcement and the concomitant learning parameters associated with reinforcement were very unstable. However, further analysis of the data indicated that there were difficulties with this model.

Other researchers have attempted also to relate learning models to decision-making models. Such a model was developed by Siegel (1959), whose model was concerned with "the prediction that the behavior of subjects in the two-choice situation is a function not only of the event probabilities but also of the amount of reinforcement present in the situation." (p. 337) Siegel and Andrews (1962) put this model to the test and concluded that their study supported the model. Furthermore, the age range of children (3- to 5-year-olds) used in this experiment gave indication that the "concept of probability" was more advanced in children of this age than had previously been inferred from Piaget's studies.

Perceiving that one of the definitions for risk-taking involved positive and negative incentives, Slakter (1967) developed a model of
risk-taking utilizing the built-in risks in objective examinations which included penalties for incorrect responses. This model is referred to as RTOOE (risk-taking on objective examinations) and was defined as "guessing when the examinee is aware that there is a penalty for incorrect responses" (p. 33).

Realizing by this time that other factors were at work in risk-taking besides those outlined by Edwards (1955), Pruitt (1962) developed a model that included variance preferences. He treated the gambling phenomena on an individual basis so that the model speaks to individual behavior rather than to the general population:

Pattern and Level of Risk (PLR)-This model includes the pattern of risk (the amount that can be won relative to the amount invested), level of risk "which is a function of the size of the gambler's stake weighted by the probability of its loss," and the concepts of "ideal level of risk"—the level most preferred by an individual for a given pattern and "maximum acceptable level of risk."

Another aspect of risk is "how much or to what degree one person will trust another." A theory was developed by Lundstedt (1966) called Interpersonal Risk Theory in which the main idea was that voluntarily an individual may choose to give away power and influence to others with whom he is in contact. This theory was tested by Lillibridge and Lundstedt (1967) who found that "an interpersonal risk behavior correlated significantly and positively with measures of trust and risk-taking" (p. 127).
Kogan and Wallach (1967) reviewed Edwards' (1955) four models of gambling behavior plus the theory by Pruitt (1962), pointing out that motivational, situational, and social factors enter into the decision-making process. They further stated that these simplistic models for decision-making demonstrated that constructs for risk-taking were needed. Other variables they said needed to be considered include organizational determinants, social or group factors, contexts of the situation. Demographic, personality, and cognitive factors must be included to account for the various behaviors involved in risk-taking.

Slovic and Lichenstein (1968) proposed a new model in which "decisions may be determined by a person's beliefs about the relative importance of probabilities and payoffs and by limitations on his ability to act on the bases of these beliefs when processing the information that describes a gamble (p. 1)." Andriessen (1971) tested this model and concluded that it is more successful in a skill rather than a chance context. He also concluded that situational factors are important variables and that there seems to be some generality in the average risk level.

Mackenzie (1970) tested a general hypothesis concerning risk where groups were concerned. This was called "Risk as a Value Hypothesis" (Brown, 1965) and is related to the "risky-shift" phenomena discussed later. Essentially, the value of taking a risk is true "if the value of taking a risk is positive and if the level of risk at maximum expected value shifts towards greater risk for groups compared with individuals" (p. 125). Mackenzie found that his data did not support the value of risk hypothesis.
Until 1970 no generally accepted definition for risk had been offered. Therefore, Pollatsek and Tversky (1970) formulated a theory of risk in "terms of the ordering of options, characterized as probability distributions." Drawing upon mathematics and logic, Pollatsek and Tversky developed several theorems to prove that "risk is expressible as a linear combination of expectation and variance" (p. 547). The objective of their work was to "provide a testable psychological model for the measurement of risk" by use of "a quantitative concept of risk as a substitute for the more familiar, but vaguer, notion of degree of risk" (p. 551-2).

In that same year, Coombs and Huang (1970) proposed and tested a new theory of individual risky decision-making involving two-outcome gambles played one or more times. The theory proposed that there is a preferred level of risk at each level of expected value and that an individual will maximize expected value in a choice between games which deviate in risk the same amount from their respective ideal risk levels. Their experiments supported their theory.

A year later Coombs collaborated with Bowen (1971b) and tested the theories of risk that stated that risk is a function of variance and expectation. Their study concluded that by "varying the odds without changing the variance or expectation still causes substantial changes in perceived risk. As a consequence any theory that requires risk to be a function solely of variance and expectation is violated" (p. 27).

In 1972 Johnson and Davis proposed an equiprobability model of risk-taking which involved group risk-taking decisions. The model describes a trial by trial distribution of decisions as the group shifts
to a riskier position. The model is independent of considerations such as physical probabilities and payoffs of events.

Hamilton (1973) developed a measure to test a "person's subjective probability of success in a task of skill and effort." He concluded that "within the domain of achievement motivation, risk-taking behavior is indeed related to the subjective probability of success" (p. 3917-B).

To summarize the theories and models about risk or risk-taking is a difficult task due to the multidimensionality of the subject. As this writer perceives these theories, it appears that they fall into four major and three minor categories. (1) In the earliest days of the study of risk-taking, the tendency was to look at risk-taking in an objective manner. Thus Edwards (1954) talked in terms of "expected utility" and "expected value," terms implying a real utility, real probability, and a real value. (2) However, it was soon discovered that subjective or internal factors had an effect on risk-taking. Thus, terms such as subjective probability, variance preference, importance of probabilities and payoffs were used to discuss the individual's psychological approach to risk-taking. (3) The third major area of study revolved around the study of achievement motivation and its relationship to risk-taking. (4) Finally, a few researchers have attempted to describe risk-taking in mathematical and logical terms, such as linear functions of probability, probability distributions, and linear combinations of expectations and variance.

(5) A few writers have explored the role of learning in the risk-taking process and discussed risk-taking in terms of reinforcement and positive and negative incentives. (6) One writer explored risk in
terms of interpersonal relationships (7) while writers like Kogan and Wallach (1967) tried to draw attention to situational and demographic factors.

The complexity of the problem may well have been expressed by Andriessen (1971) who said, "Probably there is no stability at all in individual preferences in different situations" (p. 186). While he was speaking specifically to the situation in his study, it might also be said that humanity's behavior expectations are as infinite as the infinite number of situations. Glimpses of this infinity are to be noted throughout this review of literature.

The Achievement Motive and Risk-taking

It is difficult to speak of risk-taking without also discussing achievement motivation. When Atkinson first hypothesised in 1957 the existence of this relationship, very little was known about the psychological aspects of risk-taking. Atkinson (1958, 1964) found a curvilinear relationship between these two variables. People who were highly motivated—those with a motive to succeed ($M_s$)—tended to choose tasks within the intermediate range. People motivated to avoid failure ($M_{AF}$) tended to choose extremely low risk tasks or to choose extremely difficult tasks, using as an excuse for their failure the fact that the task was too difficult to perform anyway.

McClelland (1961) related the two variables by emphasizing three major points concerning $n_{Ach}$ (need for achievement): (1) individual responsibility for the outcome (success or failure), (2) explicit knowledge of the results, and (3) some degree of risk concerning the
possibility of success. Studying this topic with children (1958), he established the same curvilinear relationship, concluding that among children "individuals with high n Achievement preferred significantly more often very safe or very speculative enterprises" (p. 321).

Using high school sophomore males, Hancock and Teevan (1969) tested Atkinson's model by using real bets rather than theoretical ones. They based their results on their subjects' behavior in which those subjects with fear of failure (FF) chose the most difficult odds on the initial trial while the subjects with hope of success (HS) chose the easy odds. Also, the FF subjects made significantly more "irrational" moves in odds after success or failure than did the HS subjects.

Hope of success and fear of failure were tested in a risk-taking behavior task by deCharms and Dave (1965). Using Atkinson's model, no relationship was found between their measures of hope of success and fear of failure and risk-taking. However, they also utilized the Jordan-deCharms method (1959) of assessing achievement motivation. Their results tended to indicate that "when alone and when the level of probability of success is empirically assessed and impressed upon the subjects as they enter the risk-taking situation, there is no effect of overall n Ach and/or anxiety upon the risk-taking behavior of the subject" (p. 567).

Prior to 1964 tests used by psychologists to test n Ach were projective ones, using primarily the thematic apperception techniques. Myers (1965) developed an objective test to attempt to measure the n Ach and risk-taking. Using high school students he established that an objective test could be utilized to find the traditional curvilinear
relationship between achievement motivation and risk-taking.

In 1966 Litwin, using college males, clearly confirmed that "achievement-oriented subjects would select tasks of intermediate difficulty more often than the failure-oriented subjects..." (p. 113). His study provided positive evidence for Atkinson's model of risk-taking.

Hamilton (1973) pointed out the need for a "trustworthy measure of person's subjective probability of success in a task of skill and effort" (p. 3917-B). He developed such a measure and tested it with male high school seniors. His findings supported the curvilinear relationship and he concluded that "within the domain of achievement motivation, risk-taking behavior is indeed related to the subjective probability of success" (p. 3917-B).

As a corollary to \( n \) Ach studies, McClelland and Watson (1973) applied the Atkinson model to the need for power (\( n \) Power). They once again confirmed the curvilinear relationship between \( n \) Ach and risk-taking. However, their findings were not so significant for \( n \) Power. They concluded that "those with high \( n \) Power take extreme risks...because doing so satisfies the incentive they seek—to stand out in some way" (p. 134). The placing of large bets came from the desire to be seen rather than the amount of money to be won. In conclusion McClelland and Watson believed that the Atkinson model was adequate, indicating that their work as applied to other needs such as \( n \) Power or \( n \) Affiliation (need for affiliation) clarifies the situation better. Those high in \( n \) Power feel a need to stand out publicly. Those high in \( n \) Affiliation try to avoid publicity by taking low bets. The application of their work would be more useful in predicting behavior when
a person has present also a high \( n \) Power, especially in a gambling situation.

In studying sex differences regarding \( n \) Ach, Horner (1971) hypothesized that women have another element—motive to avoid success—not discussed in Atkinson's original model.

In essence, it is difficult to discuss risk-taking without involving certain aspects of achievement motivation. Factors such as expectancy of success, hope of success, fear of success, fear of failure, subjective probability, social approval and self-image are closely interwoven throughout both. Nevertheless, while establishing the relationship between them it is still possible to measure each separately. This has been achieved in many ways. The next section will contain studies concerning risk-taking behavior in several facets.

**Individual Risk-taking**

A large body of knowledge is growing around the two variables of individual and group risk-taking. A few of these studies have been chosen to illustrate their scope. Individual risk-taking will be discussed first, followed by a discussion of group risk-taking and the risky-shift.

One of the earlier reviews of studies on individual risk-taking was written by Kogan and Wallach (1967). In brief they stated that the issue to grapple with is why individuals do not all respond in the same way in the different decision-making settings. They believed that it could be shown that individuals are either consistently conservative or consistently risk-taking on a particular decision-making task. Very
little research has been conducted, however, in a variety of risk-taking settings to see if an individual is consistently conservative or risk-taking over various decision-making contexts. Their own studies revealed two personality types--those with high test anxiety and defensiveness and those low in these two variables. The low anxious persons exhibited a flexibility which adapted itself to given situations. The high anxious persons were unresponsive to situational considerations, and responded with an "overgeneralized set toward risk-taking or conservatism" (p. 222).

These findings tend to concur with those in achievement motivation. People with feelings of hope of success showed a tendency for moderate risks whereas those with feelings of fear of failure (or high anxiety and high defensiveness) went to the extremes of high or low risk. Therefore, it seems that a pattern exists for individuals on internal factors as they relate to external situational set-up (natural or experimental).

Later studies have undertaken to answer many of the questions raised by Kogan and Wallach (1967). In 1968 Blank studied the effects of conditions on choice behavior. With respect to individuals he found that the choice behavior of those who were transferred from group decision-making to individual decision-making situations tended to be more like the individuals who were placed originally in the individual decision-making situation--more conservative. The reverse of this was true in that when an individual was placed in a group situation his behavior was more like the group norm, i.e., a less conservative posture.
When individuals are placed in situations where they must make decisions for themselves or others, Kogan and Zaleska (1969) found that subjects tend to make more conservative choices for others than for themselves. Since there is evidence that people tend to believe that others' decisions are more conservative than their own (Brown, 1965), Kogan and Zaleska interpreted their findings to conclude that it was "a simple effort to achieve the best possible match to the others' self-choice rather than a desire to enhance the other's likelihood of a monetary reward" (p. 424).

Pruitt's study (1969) suggested that individuals may tend to be like one of Thurber's heroes "whose life was actually cautious but who pretended that he was engaged in highly risky situations" (p. 425). Like Walter Mitty, Pruitt's subjects on a test of cautious-shift items performed cautiously but told others that their behavior was risky.

In 1971 Zaleska and Kogan performed another study regarding risky decision-making for self and for others. In conditions where the individual made a decision for himself and then for others the shift was to conservatism. In conditions where individuals made decisions for themselves followed by group discussion, a risky shift resulted. In conditions where individuals made decisions for others followed by group discussions, there was a shift in the direction of more risk but less than in the prior condition mentioned. In conditions where individuals made decisions for themselves on two different occasions, there were no changes of significant value.

Cecil (1972) pointed out that very little attention had been given to factors that may influence individual risk-taking attitudes. He
found that such things as college class standing, major subject studied in college, "family income, and rural home environment produced significant differences in individual risk-taking attitudes" (p. 225). There were no differences for sex, occupation of head of household, and birth order.

In a study where individuals were asked to make risky decisions on two separate occasions with a manipulated information of norms between the two sessions (Schwartz, Loomis, Hebert, 1975), the results clearly indicated that knowledge of others' choices was a sufficient condition for a risky or cautious shift to occur.

The why and wherefore of individual response to risk-taking is influenced by many factors. Internal and external locus of control, type and amount of feedback, the situation, whether the person is deciding for himself or for others all enter into the total scheme. Predicting individual risk-taking can perhaps best be explained in terms of Atkinson's model where conservative people tend to take intermediate ranges of risk whereas others will choose very easy or very difficult risk-taking situations. Again, it still is not possible to predict with any amount of accuracy how individuals will react from situation to situation.

**Group Risk-taking and the Risky Shift**

Brown (1965) acquainted the psychological world with Stoner's (1961) work with groups and the risky shift. The risky shift is that phenomena which occurs when individuals' risk-taking scores shift to riskier positions after group discussions. Brown hypothesized that
"risk is a value." Since that time, a number of studies have been developed which tried to measure these concepts as they related to groups and to individuals, several of which will be discussed in the following sections. The issues raised by Stoner and Brown started a deluge of studies which attempted to sort out the various aspects of group risk-taking and the risky shift. The major areas found were situational, group dynamics or pressure, ethical risk-taking and locus of control, familiarization, group norms, and risk as a value.

Situational or Social Context and Risk-taking. Rim (1964) studied the relationship between social attitudes and risk-taking behavior in individual and group contexts. He concluded:

...individuals holding extreme views, either conservative or radical, tend to be more cautious, in their initial decisions, than those holding intermediate views...On the other hand, conservatives and radicals differ in their risk-taking behavior after the group discussion: whereas conservatives become more cautious, radicals shift in the risky decisions (p. 264).

He further found that "tender-minded subjects seem to be more influential in the group process than tough-minded subjects" (p. 264).

In an overall review of the literature up to 1967, Kogan and Wallach presented three possible relationships between individual and group decisions:

...a group decision may represent the average of the degrees of risk-taking recommended by the various members when deciding as individuals; the group decision may be more conservative than this average; or the group decision may be more risky than this average...(p. 228).

They then presented studies which argued favorably for each of these positions. They conducted some studies of their own which supported the latter posture of groups being "more risky than" the average of
individuals of the group.

In studying the "homogeneity or heterogeneity in sociability of group members," Guttentag and Freed (1971) found that "both consistently risky and consistently cautious shifts depend on the sex of the protagonist in the task content, the sex of the group, and its homogeneity" (p. 306). Females tended to shift to conservatism in homogeneous groups.

Testing the hypothesis that "risky and cautious shifts appear only under optimal conditions," Goodale and Flanders (1971) studied a group of 120 college women students who responded to items which included four risky, four cautious, and four controversial dilemmas. They concluded that the cautious shift is situationally specific and that "altering the content of choice dilemmas to be more controversial than usual completely suppressed shifting" (p. 254).

Malamuth and Feshbach (1972) tested as one of their hypotheses that the risky shift will occur even if contrary to a rational decision. Their results provided clear evidence for their hypothesis. They suggested that the element of uncertainty in risky situations facilitated the "adoption of risky alternatives which may result in extreme aggressive consequences..." (p. 47).

Unequal balance in groups was thought by Gordon, Flanders, and Cranny (1973) to be instrumental in group decisions. They, therefore, set up groups in which there were more cautious persons or more risky persons. The results indicated that the persons with the minority view were ultimately won over by the majority view.
A similar study by Fischer and Burdeny (1973) indicated that low risk-takers appeared to be more resistant to change. They only shifted their decisions toward greater risk when they constituted a minority against a group containing at least one high risk-taker and even then only when high risk-takers also agreed to change.

Risk taken by bystanders in a situational context involving high risk was studied by Howard and Crano (1974). They found that the sex of the victim (especially females) and prior conversation with the victim made the subjects more willing to intervene. More intervention occurred in the student lounge than in the library or the grill.

**Ethical Risk-taking and Locus of Control.** Three studies were found by this writer in which ethical risk-taking was researched. The first of these was by Horne (1972), who concluded that no relationship exists between general risk-taking and ethical risk-taking. The correlations between the two tests used for judging each of these variables were not significant.

Chapko (1972) tested subjects posing hypothetical situations such as stealing money, stealing a life-saving drug, and selling stolen stocks. He found that the ethical situations did not necessarily account for the increase in risk-taking from individual to group decisions.

Testing the presumption that people whose "locus of control is internal should perform differently on an ethical risk-taking test than those whose locus of control is external," (p. 142) Kraus and Blanchard (1970) found that neither sex, locus of control, nor ethical risk components affected the risky shift.
Schulman (1973) attempted to explore the concept of locus of control as a structural variable, using two kinds of structural variations: representative control and direct group control. A significant effect was found only for locus of control. The mean difference on the risk scores changed significantly when control was transferred to new groups rather than when kept by the original groups. He concluded that the structural variables that have been found to affect risk decision-making should also affect decision-making in a variety of other contexts.

Familiarization. In 1966 Bateson introduced the idea of the familiarization (prior knowledge and thought) interpretation to the risky shift. This interpretation implies that the risky shift is a pseudo-group effect—explainable in terms of individual processes and not necessarily dependent upon group discussion. Presumably the individual's thought processes after acquaintance with the topic internalizes and reduces the feelings of uncertainty and cautiousness. This then frees the individual to make riskier decisions.

Similarly, Flanders and Thistlewaite (1967) presumed that internal "private study" produced a greater comprehension resulting in a more serious reconsideration of the risk-related problems. The familiarization process produced the risky shift both for Bateson (1966) and Flanders and Thistlewaite (1967).

Taking up the familiarization theme in 1970, Miller and Dion attempted to replicate these studies which they were unable to do. Familiarization for Miller and Dion did not add to the level of risk-taking produced by prior group discussion. However, "group discussion
produced significant risky shifts whether preceding or following fa-
miliarization" (p. 338).

Knowles (1972) sought the answer to the question of whether indi-
vidual study of risk problems (familiarization) leads to greater risk-
taking. He concluded that individuals working alone show as large a
risk shift as groups.

Group Norms. One of the first studies dealing with the normative
approach, i.e., the study of norms relevant to a group, was conducted
by Rabow et al. (1966). They found that "group decisions on problems
involving risk can be riskier, more conservative, or may not differ at
all when compared" to prior individual decisions (p. 24). Also, by
manipulating the norms they were able to "counteract the forces account-
ing for increased risk-taking in groups." This suggested to the au-
thors that norms play a role in group decisions.

Chandler and Rabow (1969) did a similar study in manipulating
norms, using family groups. They found that group decisions need not
be any different from individual decisions. Family groups will be more
conservative on items that had previously produced a risky shift.

The most recent study was conducted by Schwartz, Loomis, and He-
bert (1975). They had their subjects make decisions about outcomes in
a first session. They then manipulated the norms into three areas--
more risky, more cautious, and no feedback at all. The groups shifted
according to the feedback except the no feedback group which fell be-
tween the risky and cautious group. Schwartz et al. concluded that in-
formation about others' choice "is sufficient for risky shift to occur"
(p. 407).
Risk as a Value Hypothesis. The idea that risk is a value was first introduced by Brown (1965) in discussing Stoner's (1961) work. He raises the question: "Do Americans Value Risk?" He thought so:

Our theory holds that riskiness is indeed a cultural value but that cultural values cannot be realized in concrete situations until they are "specified"...The function of the group discussion...is chiefly informative. It teaches individuals how to be risky in the present concrete task; it gives specificity to the value. The content of the discussion, the arguments pro and con, are of no importance by this theory. It is the information about other people's answers that makes individuals move toward greater risk after group discussion (p. 702).

Thus, only after group discussion in which the person was able to see himself in relation to others and realize that his peers were not more cautious than he, did he shift to a riskier position.

This same theme was taken up by Willems (1969). His data supported the "assumption that persons tend to view themselves as moderately risky vis-a-vis their peers" (p. 81). He further found evidence that not only is risk a value but that group discussion enhances its value.

Testing the hypothesis of risk being a value, Levinger and Schneider's data (1969) supported a value interpretation of the risky-shift phenomena. Subjects in their sample believed others to be more conservative than themselves while admiring a choice more risky than the one they had chosen.

On the opposite side, Mackenzie's study (1970) tended to refute the "risk is a value" hypothesis. While his data supported the assumption that there is a positive value to risk, they did not support the maximum expected value risk shifts toward greater risk for groups as
compared with individuals.

Another counteracting study was one performed by St. Jean (1970), whose findings did not support Brown's position. His data did, however, lend support to the relevant argument hypothesis. The subjects discussed the topics without revealing their risk preference. No differences were found between this group and another group which discussed the topics in general terms. He also found that shifts occur in non-interactional situations when appropriate information is known.

In 1972 Clark and Willems found evidence again to support Brown's hypothesis. Their data provided a clear basis for stating that the value placed on risk by an individual is at least as risky as the average of a reference group.

The phenomenon of the risky shift has been studied by many others. Among the topics discussed were pessimism and optimism (Lamm, Trommsdorff, & Kogan, 1970), variance of length of time and group size (Bennet & Lindskold, 1971), task, response pattern, and grouping (Davis, Hoppe, & Hornseth, 1968), self-image (Lamm, Trommsdorff & Rostschaude, 1972), persuasiveness and leadership (Wallach, Kogan, & Burt, 1967), risks and rewards (Des Jarlais, 1970), negotiation constraints (Kogan, Lamm, & Trommsdorff, 1972), information about others' level (Mabli, 1972), perceived ability (Jellison, Riskind & Broll, 1972), cohesiveness of group (Dion, Miller & Magnan, 1970), risky shift in children (Maurer, 1973), rational group decision (Miller, 1970), judged consequences of failure (Clark & Willems, 1969), and other topics (Blank, 1968; Flanders, 1970; Zaleska & Kogan, 1971; Zajonc, Wolosin, Wolosin, & Sherman, 1968).
From the days of Stoner (1961) and Brown (1965) group risk-taking and the risky shift phenomena have been studied from a multitude of aspects. Group discussion tends to change the risk-taking to a riskier position. Some researchers have stated that this is because people assume others are not as risky as themselves and when, therefore, the group discussion reveals the opposite, a shift to a riskier position occurs. Variables such as ethics, group norms, internal-external locus of control, and familiarity with the subject, all tend to impinge upon the decision-making process. A voluminous amount of literature now exists regarding group risk-taking and the risky shift.

The next sections deal with risk-taking in relationship to cognitive development, skill and chance situations, and demographic factors.

Cognitive Development and Risk-taking

Is risk-taking developmental? This question has drawn attention from several researchers. As early as 1958 McClelland recognized that children as young as five-years-old had a predisposition toward taking moderate risks and that there existed individual differences in \( n_{\text{Ach}} \) and in risk-taking in the same age group.

Using nursery school and elementary school children, Jones and Liverant (1960) predicted that the nursery school children in a two-choice situation would use "pure strategy" whereas the elementary school children would "respond with a probability value equal to the actual occurrence of reinforcement" (p. 680). Their evidence supported their predictions, thus contributing to the concept of cognitive development.
Cohen (1960) studied children between the ages of ten and sixteen years in relationship to understanding the idea of a statistical distribution. He found four developmental stages. He states:

...with increasing age and experience, the structure which the child imposes on an uncertain situation...is increas­ingly in accord with the objectivity of mathematical ex­pectation. The recognition of these developmental stages may prove of great value as a guide in the very important task of training the young in the comprehension of sta­tistical ideas (p. 34).

The parallel of these stages with Piaget's stages is very striking!

However, it was interesting to note the review of Piaget's work (1950) by Yost, Siegel, and Andrews (1962). Piaget did not recognize at the time of his writing (1950) that children were able to make probability judgments based on cognitive development. Yost et al. con­cluded from their study that four-year-olds have some understanding of probability and this understanding could be developed with reinforce­ment.

Picking up part of their previous work with Yost, Siegel and Andrews (1962) continued studying the aspects of magnitude of rein­forcement. They concluded that four-year-olds have a more advanced stage of the concept of probability than that obtained by Piaget.

Gratch (1964) studying dependence upon adult approval and age in risk-taking among children found that there were age trends with re­spect to event comprehension but no dependence trends.

Citing the work of Piaget and Inhelder, (1951) in which they "con­cluded that young children do not understand the idea of chance and cannot deal with probability effectively before the age of seven," (p. 157) Goldberg (1966) studied preschoolers for these variables. Her
conclusions were that children of this age could deal with chance and probability concepts in the right settings.

The purpose of Carlson's work (1969) was to "trace the development of the child's conception of probability by administering several Piagetian-type tasks of varying difficulty" (p. 193) to several groups of children. He found that his study supported Piaget's position in that the development of probability is not completed until the stage of formal operations. He said, "...older children's probability judgments are more sophisticated than those of younger children" (p. 200). This study does, in fact, support the concept of developmental stages for understanding probability.

Anifant (1972) found differences in children's responses on the Choice Dilemma Procedure. There was a significant difference between sixth, seventh, and eighth graders, which would lend support to cognitive-judgmental risk-taking.

While studying kindergarten children's achievement motivation, Koep (1973) concluded that motivational sequences can be taught to young children. Considering the close relationship between achievement motivation and risk-taking, there may be implications for teaching risk-taking as well.

Finally, Osicki (1974) in studying fourth and sixth grade students found no differences on cognitive development on the two variables of risk-taking and need for achievement when compared by SES or grade levels. Perhaps the children in this study had reached or nearly reached the formal operations stage and the differences were too slight to appear in the study.
Is risk-taking developmental? Piaget and Inhelder (1951) were not aware that very young children could understand probability. However, by four years of age children are showing signs of understanding this concept. Of the few studies found in this review, the majority seem to indicate a developmental stage for the factors which impinge upon risk-taking. It could be possible, therefore, to conclude that risk-taking is also developmental.

**Skill and Chance Risk-taking**

The daily and even momental decisions of life are risk-taking ventures. Individuals are constantly making decisions, using the senses of the body to reflect the maximum utility and ever seeking the equilibrium for life. Cohen (1960) said, "At birth we are cast adrift on a sea of uncertainty from which we never consciously disembark" (p. 190). Never being able to have all the facts at hand, individuals have developed subjective probability states from which they operate, and as Cohen (1960) said, individuals have developed an "antidote" to cope with these daily uncertainties—"a vigorous belief in luck" (p. 189).

Chance, skill, and luck are the themes of Cohen's book (1960). The author of this classic attempted to (1) present the systematic tendencies of individuals in guessing or gambling activities, (2) trace the development of the psychological probability phenomena both in individuals and institutions, and (3) investigate man's trust in luck around which a large cultural heritage has been built, including the personification of luck itself by calling her "Lady Luck."
Others have also attempted to study the development of probability in mankind. Rose and Levy (1956) conducted a series of experiments to describe the hypotheses that individuals use in prediction and problem-solving situations. Several major findings were (1) tenth-grade students had a well-developed feeling of being able to predict chance although fourth, fifth, and sixth graders had not, (2) subjects tended to believe that predicting chance was a solvable problem, and (3) as people grow older their belief in being able to predict chance situations grew stronger.

Gratch (1964) studied children to find out what they knew about random events and how they react to them in relation to dependence upon adult approval. He determined that as children grow older, they guess with more understanding about random events, wagering on relatively safe events and less on more dangerous events. Also, he found that there was no difference between dependent and independent children in what they knew about the events, but they differed in that the dependent children were less willing to wager on them.

Achievement-related motives were studied in relationship to risk-taking in games of skill and chance by Raynor and Smith (1966). For college males the achievement-related motives are related to preference for intermediate risk in games of skill but not in games of chance, thus supporting Atkinson's model for risk-taking with skill. Raynor and Smith suggested that games of skill are incentive laden for achievement while chance games are not. This, they said, may account for the psychological differences found in individuals for chance and skill.
Van der Meer (1967) studied the need for achievement and probability preference under chance and skill orientations. His results conflicted with the Atkinson model since some subjects with a low \( \text{p_Ach} \) have high levels of aspiration. The subjects experienced a reversal of probabilities. Those preferring high and intermediate probabilities in chance situations preferred low probabilities in skill. Those preferring low probabilities in chance orientations preferred higher probabilities under skill situations. Under chance orientations, bets with the highest expected value are preferred independently of the probability preference while skill orientations in expected value do not influence the results.

The difference between chance and skill orientations also came under Kogan and Wallach's (1967) scrutiny. Their sample of college students did not show a tendency for greater risk-taking under skill situations. Their subjects chose the intermediate strategies for skill. Whereas the skill context included a moderate level of risk-taking, the chance context worked in favor of extremely risky or conservative strategies.

Gruen and Ottinger (1969) in studying socioeconomic groups found that differences in chance and skill orientations existed for groups of children. Middle-class children were more skill-oriented to some degree, though not strongly.

Disadvantaged and nondisadvantaged children were studied by Walls and Cox (1971) with respect to skill and chance outcomes. They found sex differences between chance and skill orientations but none related to SES.
In testing a new risk-taking model Andriessen (1971) found large differences in strategy between chance and skill settings and also between different chance settings.

Jellison et al. (1972) believed that people perceive others as more capable if the "others" chose high levels of risk. This hypothesis was verified along with the unexpected finding that in chance situations "others" were rated higher in ability in chance conditions than in the skill conditions.

The study by Anifant (1972) indicated that there were differences in chance and skill risk-taking. This information was established in studying children in open-space and traditional school settings with learning differences found between the two types of school settings.

Testing Atkinson's model in a cross-cultural study, Wycoff (1974) found that Americans preferred higher risk in both chance and skill tasks in comparison with Ugandan schooled and unschooled children.

Another cross-cultural study was conducted by Carment (1974). He found differences between Canadians and East Indians, especially in the area of skill risk-taking. The East Indians changed their estimates of performance to lower values following a prior success whereas the Canadians maintained or increased their estimates.

This review of the literature seems to indicate a rather clear difference between skill and chance risk-taking responses. The psychological difference was not explored by the researchers, but it would seem that the universal belief in the ability to control "luck" affects most chance risk-taking scores. On the other hand, differences in the self-concept of personal ability and differences in cultural upbringing
seen to affect the skill risk-taking scores. The next section will deal with demographic factors of age, sex, and culture.

**Demographic Factors in Risk-taking**

In reviewing risk-taking studies through 1967, Kogan and Wallach found a few studies dealing with the demographic correlates of age, sex, and social class. The studies to that point in time did not clearly indicate how these correlates worked although some directions seemed to be forming. There were evidences of developmental stages for young children but not enough work had been completed to account for differences across age spans into older life. They suggested that there was some evidence that girls were more conservative than boys although "the evidence is hardly conclusive" (p. 172). With regard to social class they concluded:

...there was a clear relation between higher status and participation in gambling activities...it seems that social and educational status are conducive to participation in gambling activities, but may lend a conservative stamp to such activities. Correspondingly, lower status reduces the likelihood of participation in gambling, but may well enhance the risky character of the gambler taken by those who do in fact engage in such behavior...(p. 173).

Little was known in 1967 of the extent of cross-cultural similarities and differences.

The review that follows will be an attempt to draw together those studies dealing with age, sex, and cultural factors. The multidimensionality of risk-taking provides a wide range in which to study these variables, including studies in probability, incentive values, effects of prior gains or losses, self-esteem, impulsivity, modeling, and levels of aspiration, as well as the achievement motive in children.
Despite the multiplicity of topics the reviewer has attempted to group the studies to develop an ordered understanding of the broadness of the subject.

**Risk-taking and age.** Uncertainty and subjective probability are a part of risk-taking. Cohen et al. (1957) attempted to measure these variables by asking children ranging in age from nine to fourteen years to estimate the number of times they would succeed in throwing a ball to hit a target when the number of attempts were set at values of 1, 5, 10, 100, or 1000. Children responded with values which varied with the age of the child. Most importantly, subjective probability tended to decline as the number of hypothetical attempts at the task became larger. This effect is less marked, however, among the older children.

Jones and Liverant (1960) found differences between nursery school children and elementary school children on responses in choice behavior situations. They state that age makes a significant contribution to the mode of response.

The risk involved in decision-making has been a topic of interest to several people. Using preschool and elementary school children as subjects, Kass (1964) placed his subjects before three identical, simulated slot machines differing in probability payoff. He found no significant difference associated with chronological age.

An exploratory study by Gratch (1964) revealed age trends with respect to event comprehension in risk-taking. Studying independent-dependent children, she found dependents more cautious than independents at each age level, with the nature of this cautiousness changing with age.
Davies (1965) also studied the development of probability concept in children, testing Piaget's theory. Her conclusions were based on the discovery of a developmental trend of this variable not only operationally but also verbally with kindergarten and elementary school children.

Incentive value is one of the variables which impinges upon risk-taking. Witryol et al. (1965) found that as with risk-taking, there is a developmental trend for incentive values in children. The results of this study are not surprising in view of the overwhelming evidence for the developmental trend in risk-taking, decision-making, and other related variables.

Using three-, four-, and five-year-olds, Goldberg (1966) studied probability judgment based on Piaget's ideas. She found that age did not affect the total scores. This nonsignificance could be due to the very small sample that was used, plus the narrow age range which was chosen.

The age at which children are able to handle probability judgments has been the attention of several researchers. Piaget (1950) is quoted as believing that probabilistic estimations come at the formal operations level. Carlson (1969) traced the development of children's conception of probability in second- through fifth-grade children and found a trend indicating that children's understanding of this variable increased with age, with the exception of the low SES group on one item of the test. He also concluded that the development of probabilistic thinking is not highly related to I.Q.
Three age levels of children were studied by Rosenfeld et al. (1969) to assess the effect of contingent gains and losses on children's risk-taking behavior. Their results did not show age effects. The similarity of the pattern of responses seemed to indicate that children at all age levels learned from the experience over the number of trials.

In comparing boys and adults, Chaubey and Sinha (1972) found that age was significantly related to risk-taking in their sample of Indian villagers, ages 10-15, 20-30, and over 45. The young adult groups of the sample were more willing to take risks and preferred a high level of aspiration. Unfortunately, the writers did not make clear the results with the 10-15 age bracket.

First- and fifth-grade children were used by Montgomery (1972) to study risk-taking through modeling. He hypothesized that children will imitate the model. The analysis of his data revealed that children's behavior was influenced by the risk behavior of the model and that there were no sex or age differences in either imitative behavior or risk performance.

Krzesni (1973) studied third- and fifth-grade children on two risk-taking tasks. On Task 1, where the children were to separate real words from nonsense syllables, he found that risk-taking decreased with age, whereas in the second task of a game with chance, risk-taking increased. This difference may be explained in terms of development and increased knowledge on the first task whereas on the second, the children had no reference point and no knowledge from which to work with the chance-oriented task.
In his study Layne (1974) examined the role of age in risk-taking in children. He found partial support for his hypothesis that as "age increases there is more conservatism shown in choice behavior in children." There was no specific preference for risk or conservatism for his six- or nine-year-olds but significant conservative preference among twelve-year-olds.

Sinclair (1974) used the Atkinson model of risk-taking with college students. He found that for different ages of this group no significant differences existed on resultant motivation as defined by the Atkinson model. The lack of age difference may be accounted for in terms of the developmental stages since junior college students are well into the formal operations stage.

The issue of whether age affects risk-taking is closely related to cognitive development. As reviewed above, there is growing evidence that age and risk-taking are related. What remains yet unanswered is what impact age may have on risk-taking after the formal operations stage is completed in children. Aging itself must have an effect, and there are a few studies to suggest this. However, only a few researchers have dealt with this long-range problem.

Risk-taking and sex. One of the earliest studies on risk-taking behavior was conducted by Swineford (1941). Terming this trait the "tendency to gamble," she reported that "boys have a significantly greater tendency to gamble on their test scores than do girls, particularly on an unfamiliar type of test" (p. 443).

The longitudinal studies in guidance research conducted at Berkeley, California, (Tuddenham, 1952) revealed some sex differences in
children's rating of their peers. Even first-grade children made clear stereotyped distinctions of their classmates, attributing "taking chances" as a boy trait while attributing "not taking chances" to girls.

As early as 1958 Pettigrew found that males chose broader category estimates than females. While the sex distributions did not deviate from normalcy, the male choice of a broader category width indicated to Pettigrew that males are more risk-taking prone.

Another early study in category width conducted by Wallach and Caron (1959) revealed that girls were more conservative. Females also were less tolerant of deviation than males. The sex differences were not related to I.Q. or achievement in mathematics.

Also in 1959 Wallach and Kogan studied sex differences and judgment processes. They found women more conservative than men when unsure of their decision. At the same time women were more extreme when very sure of their decision. They also found women to be more conservative than men regarding risks of income, loss, death, and football defeat. Women, however, were bolder in the areas of marriage and art.

In a study using elderly and younger women, Wallach and Kogan (1961) found that the older female was more extreme than the younger female. Also, women tended to be more extreme in high confidence situations than men.

In 1964 Tajfel, Richardson, and Everstine found no sex differences between males and females either on measures of breadth or category or on the independent measure of risk. Their subjects were college students.
Kass (1964) found sex differences in his investigation of decision-making behavior in children. The differences were in probability preferences where boys chose the low and intermediate probabilities of payoff significantly more often than girls. The areas of probability involved riskier decisions than the others.

In a comprehensive study of the development of incentive values in children, Witryol et al. (1965) found very few sex differences. The most important part of their findings was that boys tended to accumulate money as reinforcers while girls received and accepted verbal reinforcement over trials in discrimination learning.

Slovic (1966) found while studying age and sex differences in risk-taking behavior in children that boys were bolder than girls. His subjects were volunteers at an experiment set up at a county fair, the children ranging in age from 6-16.

In studying preschoolers in development of probability judgment, Goldberg (1966) found no sex differences in her sample.

Risk-taking on objective examinations (RTOOE) has been studied by Slakter (1967, 1969). While noting school location differences, he found that sex differences were negligible. A later study by Slakter et al. (1971) revealed that boys took greater risks than girls on the objective examinations. This was true by school location but was only significant in one school system.

An interesting study was conducted by Horner (1968) in relationship to achievement motivation. Her study indicated that not only are there sex differences in motivation but also that women have a "motive to avoid success." This motive is a psychological barrier for women in
the achievement arena according to Horner.

Pankove and Kogan (1968) studied creative ability and risk-taking behavior. They verified that risk-taking is not associated with I.Q. but is associated with creative ability. This was more evident for boys than for girls. In highly competitive contests, boys responded more intensely than did the girls. Pankove and Kogan further suggested that self-confidence appeared to be a possible mediating link between creativity and risk-taking.

In New Zealand Jamieson (1969) studied birth order, family size, and sex differences in risk-taking behavior. He found that male and female subjects did not differ significantly in the amount of risk they accepted.

There were no sex differences in performance between boys and girls in handling probability judgments (Carlson, 1969) at any grade level on any of his items. This was in conjunction with the study of probability judgments as related to age, intelligence, SES level, and sex.

Junior high school students were the subjects of a study by Martuza (1970) in which risk-taking behavior was studied in relationship to strategy availability and bankroll. He found that the female subgroups' results were very much like the whole sample findings in that the "subject's level of strategy sophistication significantly affects the kind of decision he makes under uncertainty" (p. 159).

Steiner, Jarvis, and Parrish (1970) hypothesized that "situations of risk which involved uncertainty and the chance of an undesirable outcome are likely to give rise to high arousal levels..." (p. 337).
They found a number of their female subjects expressing anxiety and embar­
raiment about winning and taking money from the experimenters,
which suggests to this writer further evidence of women's motive to a­
void success found by Horner (1968).

The relationship of creativity and academic risk-taking among
fifth graders was studied by Strum (1971). She determined that boys
were greater risk-takers than girls.

In a cross-cultural study of risk-taking preferences, Touhey (1971)
found minimal sex differences within both American and Canadian samples.
The subjects used were college students.

In comparing backgrounds of members of a women's liberation group
and their nonmember peers, Joesting (1971) found a significant differ­
ence in favor of members of the liberation group. These women were
found higher in risk-taking, creativity, and originality.

Heilizer and Cutter (1971) studied the generality and correlates
of risk-taking among college students in gambling situations. A major
finding was that male subjects were willing to risk more extremely than
female subjects.

Lunneborg and Rosenwood (1972) replicated an earlier study which
showed that women were strictly interpersonal and affiliative. Their
study, however, gave indication that there is a declining sex differ­
ence, at least in college populations. Men are showing more concern
with interpersonal relationships while women are striving for perform­
ance in school and work.

Cecil (1972) studied facts affecting individual risk-taking atti­
tudes. He summarized that there were no significant differences in
risk-taking between male and female subjects.

In studying the learning experiences between open-space schools and the traditional school setting, Anifant (1972) found there were no sex differences on three risk-taking tasks. He concluded, however, that the open-space school was more conducive to risk-taking behavior than is a traditional school.

Brook et al. (1974) studied aspiration levels of children and found strong sex differences at the fifth-grade level.

The risk involved in bystander intervention was observed by Howard and Crano (1974). They confirmed that female "victims" are twice as likely to receive help, but there were no sex differences found on the part of the bystanders. That is, both males and females responded equally to the risk situation in helping another person in distress.

The effects of prior wins and losses on risk-taking were studied by Layne (1974). He found no sex differences at any age or across ages in his study.

A recent study by Roberts (1974) indicates that women are still more cautious in their risk preferences than men. Roberts felt that this research supported the cultural stereotype of female conservatism. The subjects performed a sexually neutral motor task testing the hypothesis that men exhibit greater risk-taking than women. The subjects were college students majoring in physical education.

Contradictions may be the key word for studies relating to risk-taking and sex. There seem to be as many indicating sex differences as there are indicating no sex differences. A review of the literature indicates that the cultural stereotype still is being used as a means
of interpretation of the results. More research needs to be done in this area.

Risk-taking and Culture. To what extent does one's cultural background affect risk-taking? This question has been applied to American subcultures as well as to cross-cultural situations. The following pages are a review of this growing body of knowledge.

a. American subculture studies. Studying risk-taking behavior in Negro and white adults, Lefcourt (1965) established that Negroes were more cautious than whites. His conclusions inferred "that Negroes as compared to whites believe that achievement in self-evaluative, skill-demanding tasks is less instrumental to success than in extremely controlled situations where determinants of success are largely luck or fate" (p. 769).

Silberstein (1969) compared three ethnic groups on risk-taking behavior. The subjects were assigned to stratified treatment groups with varying rewards. The analysis of data showed no significant difference between ethnic groups, sexes, treatments, or for effects of failure and success. As predicted, however, Mexican Americans took significantly fewer chances with the candy reward, while Negro and Anglo-Americans took fewer chances with beads and praise rewards.

Skill and chance orientations as determiners of problem-solving behavior in different social class children was studied by Gruen and Ottinger (1969). They found no main effects of social class but some support was received for the idea that middle-class children would be more skill-oriented than lower-class children. An interaction was found for social class and orientation, with middle-class skill-oriented
subjects having a larger portion of their responses accounted for by pattern responses than did middle-class chance oriented students.

Carlson's study (1969) of children's development of probability judgment showed that "high SES children performed, for the most part, at a higher level than their low SES counterparts" (p. 202).

Investigating differences in age as related to risk-taking among managers, Vroom and Pahl (1971) compared the younger with the older managers. It was established that the younger managers were greater risk-takers than the older. In explaining this phenomenon, the authors cite cultural differences. The younger men had not experienced a major war or a depression whereas the older men had and were, therefore, more cautious. Vroom and Pahl felt that risk-taking is learned early in life with the "sociocultural conditions prevalent at that time being instrumental in its determination" (p. 404).

Disadvantaged and advantaged children were the subjects of Walls and Cox study (1971). They reviewed children's expectancies in chance and skill outcomes. Examination of the results revealed that disadvantaged girls had a general external control expectancy while the advantaged boys displayed the same effect. Also, internal locus of control was more prevalent in disadvantaged boys while the girls were more externally oriented.

In studying attitudes toward risk-taking, Cecil (1972) used seven variables that could influence individual risk-taking. Class standing, major subject, family income, and rural home environment produced significant differences.
Alker and Wohl (1972) studied personality and achievement in suburban and inner city school settings. They concluded that none of the personality variables of locus of control, rational risk-taking, independence, or conformity had achieved level of significance. While there were no significant means on the simple effects of personality, there was, however, a modest significant interaction of personality and setting. This situational difference emerged from the parts of the test which measure achievement via conformity and the additive achievement composite variables. "These concepts deal with a person's capacities for successful role enactment," state Alker and Wohl (p. 109). They consider "achievement motivation as an aspect of role enactment which, in turn, varies as a function of socioeconomic class" (p. 109).

In analyzing his data obtained from Blacks and Puerto Ricans, Stukalin (1973) did not find significant differences in risk-taking. All of his subjects excelled in the skill condition, maximizing success and high risks. Boys, however, were greater risk-takers than girls.

Fleming (1973) studied social position and decision-making involving risk. A group of unemployed persons and a group of welfare recipients were compared with college students. The differences in what they believed about themselves and others with respect to risk appeared to be biased by social position. College students thought of themselves as being more willing to take risks than their peers, whereas welfare recipients tended to believe that they are less willing to take a new high paying but less secure job than their fellow unemployed. Their peers tended, however, to think of themselves as being more cautious.
In a study of aspiration levels of children and of their parents for them, Brook et al. (1974) found high SES children had higher aspirations than low SES for vocations. Social class differences were stronger among the younger children.

The purpose of Sinclair's study (1974) was to compare two age and socioeconomic groups of junior college students using the Atkinson risk-taking model. This comparison revealed significant differences between the middle and low socioeconomic college students on resultant motivation. A larger proportion of young-middle socioeconomic students was identified as extreme risk-takers than was found among old-low socioeconomic students.

In a study by Osicki (1974), no significant differences were found between middle and low SES groups on n Ach or risk preference. Osicki further stated that cognitive development does not vary with n Ach or risk level.

b. Cross-cultural studies. Slakter (1969) has been interested in risk-taking on objective examinations. In a study using American and Canadian students, he observed significant difference in risk-taking performance related to school location.

Sherman (1970) measured individual preferences in games with high social risk. Across the two cultures, American and British, he found differences. This indicated to him that "competitive strategic choices can vary from one culture to another as well as risk attitudes among individuals within a culture" (p. 230).

The hypothesis that the "risky shift" is a function of a cultural value favoring risk was tested by Carlson and Davis (1970). The
results of their study confirmed the hypothesis, with Ugandan students being more conservative and, therefore, less favorably disposed to risk-taking than Americans.

Touhey (1971) explored the differences between Canadians and Americans on risk preferences. The results of his work indicate a significant difference, with Canadians being more conservative than the American sample.

Comparing East Indians and Canadians, Carment (1974) established that East Indians were more conservative than the Canadians. The Indians set their estimates of future performance at lower values than their prior performance, especially in skill risk-taking. In chance situations the Indians shifted to positions of more probable bet after success.

Another cross-cultural study involving Ugandans and Americans was conducted by Wycoff (1974). He hypothesized that Americans would prefer generally higher risks. This was confirmed for both skill and chance tasks. Americans preferred a probability of success higher than both schooled and unschooled Ugandans. This was true also for chance tasks.

c. Subculture studies in other cultures. Cohen (1960) considered children from "upper and lower streams" at varying age levels on risk-taking behavior. The results revealed a significant difference between the two groups on gambles. The upper stream children preferred the small gamble as opposed to a large gamble preferred by the lower stream. Cohen presumed that some of this difference lay within social class difference.
Two types of village groups were studied by Chaubey and Sinha (1972). One set of villages included communities that had shown economic growth while the other set had not. Boys and adults were studied for risk-taking. The investigators concluded that economic development among villages was highly related to risk-taking. This was true for both adults and children. In their attitude toward risk-taking, those from developed villages were less conservative.

This review indicates that cultural differences exist. Alker and Wohl (1972) felt that the role a person plays in life is a reflection of his culture, thereby reflecting differences based on SES. An interesting variable was introduced by Vroom and Pahl (1971) in which they view cultural differences in an historical setting. They felt that the prevailing environmental climate of a child's early life will affect his long range risk-taking behavior. These two views obviously need further researching.

**Summary of Review of Literature**

There are many factors which impinge upon risk-taking behavior. It is difficult to discuss risk-taking without mentioning the variables of probability concept, incentive value of rewards, or personality make-up. This review has been organized around these and other variables to give the reader a view of the broad range of concern in the study of risk-taking.

The model of risk-taking by Atkinson (1958) is the most widely used. Other models based upon learning theory have been developed (Atkinson, Sommer & Sterman, 1960; Siegel, 1959). Risk is thought by
some (Brown, 1965) to be a cultural value. Others (Johnson & Davis, 1972) have attempted to reduce risk-taking models to mathematical equations.

The most difficult factor to separate from risk-taking is the achievement motive. Atkinson (1958, 1964) and McClelland (1961) have both contributed heavily to the understanding of the relationship between the two factors. Atkinson (1958) and others (Myers, 1965; Hamilton, 1971) have found a curvilinear relationship between achievement motivation and risk-taking. Those subjects with high motivation chose intermediate risk-taking tasks whereas those low in motivation selected extremely risky or extremely safe situations.

Individuals respond differently to risk-taking situations. Kogan and Wallach (1964) attempted in a major work to resolve the question as to why individuals do not all respond in the same way in various situations. The answer is still unresolved.

The risky shift and group risk-taking have drawn the attention of a number of researchers (Rim, 1964; Malamuth & Feshbach, 1972). It appears that individuals shift to riskier positions from the individual's standpoint once there is a group discussion, which usually reveals that others are riskier than the individual. Schwartz, Loomis, and Hebert (1974) have shown, however, that by manipulating the group norms, shifts can be made to occur in the desired direction--more risky or less risky. The implications of this finding are astounding in view of the impact of advertising and the news media via television upon their audiences.
There seems to be little doubt that risk-taking is developmental. The high relationship between risk-taking and the probability concept prompted most of the researchers to deal with the latter (Jones & Liverant, 1960; Goldberg, 1966; Carlson, 1969). A few researchers have dealt with risk-taking in a developmental perspective (Anifant, 1972; Koep, 1973; Osicki, 1974). More research needs to be conducted specifically relating to cognitive development and risk-taking.

Individuals vary in risk-taking according to skill and chance orientations (Gruen & Ottinger, 1969). An apparent psychological difference between skill and chance exist within individuals. This concept has been explored by several researchers (Krzesni, 1973; Haynor & Smith, 1966). According to Cohen (1960), the feeling of being able to control luck affects chance risk-taking scores.

The demographic factors of age, sex, and culture in relationship to risk-taking are drawing increased attention. Age and aging affect risk-taking behavior scores. Some doubt remains about true sex differences occurring, with the cultural stereotyping still affecting interpretations. Cultural studies are revealing differences both in American subcultures and in cross-cultural studies. Further explorations in these areas are needed before any firm conclusions can be drawn.

The major purpose of this present study was to contribute to the understanding of sex role enactment for risk-taking, as well as to cultural implications based on American subcultures. A secondary purpose was to explore the differences between skill and chance orientations. The following chapter describes the methods and procedures used to
conduct this study.
CHAPTER III

METHODS AND PROCEDURES

This chapter describes the methodology utilized by the investigator in completing the present study. Specifics concerning the selection of instruments, selection of the samples, the pilot study, design of the main study, and treatment of the data are outlined.

Selection of Instruments

Selection of the instruments was based upon the literature, which describes a wide variety of risk-taking situations both in skill and in chance that have been used to collect data. Krzesni (1973) used as a part of his study two sets of cards to facilitate his study of children's chance risk-taking behavior. The first set of ten cards had written on them the letter "C." The second set of ten cards had written on five cards the letter "A" and five cards with the letter "F." These letters represented grades which children receive in school in their studies. Krzesni's method was chosen for the chance risk-taking situation because it was understandable to the children, easy for the investigator to control, and provided some means of comparison with another study.

Chance Risk-taking Task. The specific chance risk-taking situation was set up using the procedure explained herein. Each subject
was seated at a table. The experimenter sat on the opposite side of the table. Two stacks of ten cards were placed face down between the subject and the experimenter. Three other cards were placed face up beside these two stacks of cards. These cards had the letter "A," "C," and "F" written on them. They were placed so that the child read them as below:

```
A   F
C
```

The order of the cards in the stack of "A's" and "F's" were randomly selected as follows: A, F, A, A, F, A, F, A, F. This order remained the same throughout the procedure for each child.

The instructions for the chance risk-taking game were as follows:

We are going to play two games today. The first game has two stacks of cards. All of these cards have the letter "C" written on them. (Point to the stack.) In this stack the cards are marked "A" or "F." (Point to this stack.) These letters represent grades that children make in school. The "A" is for excellent, "C" is for average work, and "F" means that you have failed. I would like for you to pretend that these are your grades in school this year for ten subjects. You may choose which grades you want. If you choose the "C" grade, I will give you one token. However, you may want to choose from the stack which contains "A" and "F" cards. For each "A" (excellent) you get, I will give you two tokens and for each "F"
(failure), I will take back two tokens. In the event that you do not have any tokens if you should get an "F," you will not owe me anything. If on each try you want to take the "C" that is in this stack and the token, you may do so, or you may choose to take a card from this other stack of cards and possibly earn two tokens or lose two tokens. All the tokens that you have won at the end you may keep to add to the tokens you may win in the other game. You may choose a prize from these three boxes (point to the boxes) based on the total number of tokens you have then. Of course, the more tokens you have, the better the prize will be. For the first subject, would you like to keep the "C" or try for an "A"? (Pause for child's decision and give token or take away as needed.) For your second subject, would you like to keep the "C" or try for an "A"? (Pause...etc.) For your third subject...etc.

The preceding question was asked ten times. All tokens for the task were placed in sight of the child and the wins and losses were added or removed as indicated. A risk-taking score was determined by the number of times the child decided to try for an "A" instead of accepting the "C." The choice of a "C" counted as a zero score while the choice of "A" or "F" counted as a plus one score. The highest possible chance risk-taking score was ten and the maximum winnings were fifteen tokens. Only the risk-taking score was used for purposes of this study.
Skill Risk-taking Task. The skill risk-taking game was suggested by the literature in which various games of skill were used. Since skill per se was not a dependent variable of this study, the relatively easy game of horseshoes was chosen. The pilot study had indicated that the ring toss games used in other studies required more skill than was necessary and were biasing the risk-taking behavior. Therefore, in order to test the risk-taking rather than the skill, the ring toss game was eliminated and the horseshoe game chosen.

Each child was shown the horseshoes and the stake with the varying distances of three feet and six feet marked on a roll of contact paper which was taped to the floor as shown below:

```
   side view

6 feet       3 feet
```

An indoor horseshoe game was used. The instructions for this game were as follows:

We are going to play the horseshoe game and you will be given a choice between throwing the horseshoes at that stake (Point to the stake) from this distance (Show "safe" distance of three feet) or from this distance (Show "risky" distance of six feet). If you choose to throw from the shorter distance and you succeed in "making a ringer," you will be given one token. If you do not succeed in "making a ringer," you will not lose or gain anything. If you choose to throw from the longer distance and you succeed in
"making a ringer," you will receive two tokens. If you fail to do so, you will lose two tokens. In the event that you have no tokens, you will not owe me anything. All the tokens that you have won at the end you may trade in for a prize. Obviously the more tokens you have the better the prize will be. You may change your mind at any time during the game and choose to throw from the other distance. You may throw the horseshoes ten times.

A risk-taking score was determined by the number of times the child decided to try for the "risky" distance instead of the "safe" distance. The "safe" distance was counted as a zero score while the "risky" distance was counted as a plus one score. The highest possible risk-taking skill score was ten. The maximum winnings were twenty. Only the skill risk-taking score was used in this study.

The experimenter determined at the beginning of the horseshoe game whether each child was familiar with the game and knew how to play it. Instructions were given to each child regardless of familiarity with the game. No practice was allowed for any of the children.

A scale of zero to ten was established for both games. The games were alternated equally between the subjects, boys and girls, to eliminate biasing on any one game being first or last. It was possible to obtain both skill and chance scores for all the subjects.

Token System and Prizes. As indicated above, tokens were given as rewards for the earnings. The tokens were kept in sight of each child during both games. During the horseshoe game when the children were not at the table (although the table was close by), the experimenter
helped the children keep track of the tokens by orally reinforcing them with the number of tokens that had been won or lost. Oral reinforcement was also used during the chance game even though the tokens were in plain sight of the children.

The prizes were contained in three boxes marked: Prizes--1-10 Tokens, Prizes--11-19 Tokens, Prizes--20-35 Tokens. These ranges were chosen arbitrarily with slight adjustments following the pilot study results. The prizes in the first box ranged in price from about five cents to fifteen cents. The second box contained prizes ranging from sixteen cents to fifty cents. The last box contained prizes ranging from fifty-one cents to eighty-eight cents. The prizes were toys and games judged to be satisfactory for school-age children. The lids were kept on the boxes so that the children could not see what the prizes were before they played the games.

No attempt was made by the experimenter to keep children who had completed the games from sharing knowledge about the prizes with their classmates. The experimenter did note, however, that none of the children seemed to have shared any information. It was discovered later that the teachers whose children were being tested had encouraged their children not to share any of their knowledge about the experiment until all children had been tested. They then engaged in discussions about the purpose of the games and how they felt after participating in them.

Selection of Sample

Two schools from the Columbus (Ohio) Public Schools were selected, one with predominantly inner city black children and one with predominantly inner city white children. The third school representing the
predominantly suburban white population was selected from the Upper Ar­lington (Ohio) Public Schools. Fifth-grade students were chosen and were randomly selected within school settings for this study.

The inner city black (ICB) school had a fifth-grade population of thirty-three boys and thirty-four girls. The median income of this community in 1974 was $7797. The incidence of ADC (Aid for Dependent Children) families was 37% with 27% of homes with one parent present.

The inner city white (ICW) school had a fifth-grade population of thirty-six boys and twenty-three girls. The median income of this community in 1974 was $6331. The incidence of ADC families was 36% with 24% of homes with one parent present.

The suburban white (SW) school had a fifth-grade population of thirty-two boys and twenty-nine girls. The median income of this community in 1974 was approximately $20,000. The incidence of ADC families was 0% with 4% of homes with one parent present.

These schools provided a population of 101 boys and 86 girls with a total of 187 students. From each of the three school settings a sample of twenty boys and twenty girls was randomly selected, providing a total of sixty boys and sixty girls, with a grand total of 120 students for this study.

**Pilot Study**

In order to determine the feasibility of the two games, the scoring procedure, and the time element involved for individual testing situations, a pilot study was conducted in three Columbus (Ohio) Public Schools representing predominantly inner city black children,
inner city white children, and suburban white children. These schools were different from the ones used in the basic study.

The chance game as outlined by Krzesni (1973) was found to be satisfactory. It was simple and easy to operate. It provided a normal range of scores, and the children comprehended the game quickly.

The skill game used was a ring toss game with distances of five and ten feet. The pilot study indicated that the ring toss game required a degree of skill not commensurate with this study. This may have been due to the instrument itself rather than a lack of skill on the part of the subjects. The game was a commercially purchased ring toss game. The investigator found that the rings were not equally weighted and were, therefore, difficult to throw, thus making it impossible to control their direction and distance.

The distances of five and ten feet also seemed too far for most of the subjects. After studying the results of the first two schools, the distances of three feet and six feet were chosen as more reasonable expectations for the skill levels of the subjects involved. The greater distances and the awkwardness of the rings tended to bias the skill risk-taking scores in favor of a non-risk score. Since measurement of skill was not the main objective of this study, the ring toss game was abandoned and the distances were shortened. At the third school the new game of horseshoes was introduced along with the distances of three and six feet with the result that the skill risk-taking scores began to form a more normal curve.

As a result of the pilot study, it was determined that the investigator could test forty children on an individual basis in one school
day. In this way, external factors could be more easily controlled on a school-to-school basis.

This pilot study was conducted in October, 1974. The main study was conducted in November, 1974, within a seven-day span.

Design of the Study

The intent of this study was to investigate the independent variables of sex (A), school location based upon different American subcultures (B), and the dependent variable of type of risk-taking (C) involving both skill and chance situations. The study fit the pattern of an analysis of variance utilizing a two between-one within-subjects design. It was possible to maintain equal numbers in each cell of the matrix.

Treatment of the Data

Scores were available for all subjects on both skill and chance risk-taking behavior. With the maintenance of equal numbers within cells it was possible to analyze the data by a $2 \times 3 \times 2$ analysis of variance matrix using the two between-one within-subjects design. This analysis permitted the assessment of the twenty hypotheses of the study including the interactions.

The Dunn's Test for level of significance was chosen to analyze the data between skill and chance cell means due to the few number of means to be compared. The same test was used for the second-order interaction where few cell means were compared. The Dunn's Test was selected because it provides a more conservative level of significance for mean difference.
Summary

The present chapter has outlined in detail the methods and procedures used in this study. The following chapter will present the data gathered and the analysis made of that data.
CHAPTER IV

ANALYSIS OF THE DATA

Introduction

This study was conducted to test the questions of possible differences in risk-taking behavior for the variables of sex and school location based on an American subculture. A secondary purpose was to explore the differences in skill and chance risk-taking. Previous studies have indicated that there is a psychological difference.

One hundred twenty fifth-grade children participated in the two games involving skill and chance risk-taking. Each child was tested individually. Complete data for the two games were available for each of the subjects who participated. The subjects included twenty boys and twenty girls from each of three school settings based upon American subcultures. These school settings included inner city black, inner city white, and suburban white populations.

The analysis for this investigative study was the two between-one within-subjects repeated measures design utilizing equal numbers (Kennedy, in press). The three variables of sex, school location, and type of risk were considered fixed factors, while the additional variable of subjects was considered as a random factor.
**Results of the Testing**

The means and standard deviations of the skill and chance scores for the three groups in this study are presented in Table I. From a visual study of the means in Table I, it appeared that there might have been some differences between the groups. The analysis of variance, however, did not provide evidence for this assumption, although evidence was found for significant differences within the subjects on skill and chance risk-taking.

A study of Table I reveals a strong similarity of means in all groups within skill and chance risk-taking. Wide variances of means are observed between skill and chance risk-taking with the exception of inner city white boys whose difference between means on skill and chance is only 0.35. This is the smallest difference on the within-subjects variable. All other within-subjects mean differences range from 1.40 to 1.80. All means and standard deviations tend to fall within normal ranges.

The most apparent mean differences occur within subjects between skill and chance. An analysis of variance of two between-one within-subjects was conducted on the risk-taking scores and the results are reported in Table II.

The $F$ value of each of the variables is reported in Table II, as well as the $F$ values for the interactions. The $F$ value for the sex variable (A) was $F(1,114)=0.59$. For school locations based on American subcultures (B), the value of $F(2,114)=2.75$. Type of risk (C) reached the value of $F(1,114)=41.96$, $p<.001$. The first-order interactions are
<table>
<thead>
<tr>
<th></th>
<th>Skill</th>
<th>Chance</th>
<th>Level Means &amp; Standard Deviations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td><strong>Inner City Black</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>3.75</td>
<td>2.45</td>
<td>5.15</td>
</tr>
<tr>
<td>Girls</td>
<td>3.30</td>
<td>2.59</td>
<td>5.10</td>
</tr>
<tr>
<td><strong>Inner City White</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>3.90</td>
<td>2.88</td>
<td>4.25</td>
</tr>
<tr>
<td>Girls</td>
<td>4.15</td>
<td>2.57</td>
<td>5.65</td>
</tr>
<tr>
<td><strong>Suburban White</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>2.75</td>
<td>2.36</td>
<td>4.45</td>
</tr>
<tr>
<td>Girls</td>
<td>2.85</td>
<td>1.65</td>
<td>4.60</td>
</tr>
</tbody>
</table>

**Level Means and Standard Deviations**

<table>
<thead>
<tr>
<th>Level Means and Standard Deviations</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.45</td>
<td>2.50</td>
<td>4.87</td>
</tr>
</tbody>
</table>

**Grand Mean and Standard Deviation**

<table>
<thead>
<tr>
<th>Grand Mean and Standard Deviation</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.16</td>
<td>2.20</td>
<td></td>
</tr>
</tbody>
</table>
as follows: sex by school location (AXB), $F(2,114)$ = 1.07; sex by type of risk (AXC), $F(1,114)$ = 1.48; school location by type of risk (BXC), $F(2,114)$ = 1.29. The second order interaction for sex by school location by type of risk (AXBXC) reached a value of $F(2,114)$ = 4.66, $p < .05$.

### Table II

**Analysis of Variance of Risk-taking Behavior Scores**  
by Sex, School Location, and Type of Risk

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Subjects:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (A)</td>
<td>1</td>
<td>3.2633</td>
<td>3.2633</td>
<td>0.59</td>
</tr>
<tr>
<td>School Location (B)</td>
<td>2</td>
<td>30.5584</td>
<td>15.2792</td>
<td>2.75</td>
</tr>
<tr>
<td>AXB</td>
<td>2</td>
<td>11.9117</td>
<td>5.9559</td>
<td>1.07</td>
</tr>
<tr>
<td>S/AB</td>
<td>114</td>
<td>634.2500</td>
<td>5.5636</td>
<td></td>
</tr>
<tr>
<td><strong>Within Subjects:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Risk (C)</td>
<td>1</td>
<td>120.4333</td>
<td>120.4333</td>
<td>41.96**</td>
</tr>
<tr>
<td>AXC</td>
<td>1</td>
<td>4.2534</td>
<td>4.2534</td>
<td>1.48</td>
</tr>
<tr>
<td>BXC</td>
<td>2</td>
<td>7.3917</td>
<td>3.6959</td>
<td>1.29</td>
</tr>
<tr>
<td>AXBXC</td>
<td>2</td>
<td>26.7284</td>
<td>13.3642</td>
<td>4.66*</td>
</tr>
<tr>
<td>SB/AC</td>
<td>114</td>
<td>327.1932</td>
<td>2.8701</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>239</td>
<td>1165.9834</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$  
** $p < .001$  

Geiser-Greenhouse Conservative F value = 4.10
A Geiser-Greenhouse conservative $F$ value was used to assess the significance of within-subject effects. The value of $F=4.10$ at the p < .05 level was the point established for significance. Only two of the $F$ values exceeded the $F=4.10$ level of significance.

The within-subjects variable of type of risk (C) reached $F(2,114)=41.96$, p < .001. The second-order interaction (AXBXC) reached the $F(2,114)=4.66$, which was significant at the p < .05 level.

In summary, a significant difference was found between risk-taking on skill and chance games within subjects, but no significances were found for the two variables of sex and school location. A small significance was noted on the second-order interaction of the three variables combined.

In view of the significant $F$ level for the type of risk variable, further analysis was needed to determine which cell means in Table I were significant with respect to the differences within subjects. It was hypothesized that there would be no difference between skill and chance scores. Accordingly only six comparisons were made. Since the number of comparisons were few, the Dunn's test (Kennedy, in press) was used.

The second-order interaction was analyzed by the use of diagrams (See Figures 1 and 2). Less than half of the possible comparisons were made; thus, the Dunn's test could be utilized again on the chance scores.
Boys

Figure 1. Interactions of Sax (A) by Type of Risk (C) displayed over levels of School Location (B).
Figure 2. Interactions of Sex (A) by Type of Risk (C) displayed over levels of School Location (B).
Analysis of Sex Differences

The first major hypotheses of this study were related to possible sex differences and were stated in Hypotheses I-A through I-F as follows:

I-A Inner city black (ICB) boys will not differ from ICB girls in skill risk-taking behavior.

I-B ICB boys will not differ from ICB girls in chance risk-taking behavior.

I-C Inner city white (ICW) boys will not differ from ICW girls in skill risk-taking behavior.

I-D ICW boys will not differ from ICW girls in chance risk-taking behavior.

I-E Suburban white (SW) boys will not differ from SW girls in skill risk-taking behavior.

I-F SW boys will not differ from SW girls in chance risk-taking behavior.

The Geiser-Greenhouse conservative value of $F=4.10$ was established as the level of significance for this study. The $F$ value of the variable sex ($A$) in Table II is $F(1,114)=0.59$. This value does not reach the level of significance required and, therefore, Hypotheses I-A, I-B, I-C, I-D, I-E, and I-F are not rejected.

In summation, this means that sex as a variable did not account for any of the difference noted in the mean differences. The $F$ value of 0.59 would seem to indicate a near zero effect for sex in this sample of fifth-grade boys and girls. This would also indicate that sex was not an influencing factor on risk-taking behavior in skill or chance situations or in over-all risk-taking behavior.
Analysis of School Locations Based on American Subcultures

Another major purpose of this study was to determine whether American subcultures as identified in particular school locations affected the scores on risk-taking behavior. The hypotheses relating to this variable were stated as follows:

II-A Inner city black (ICB) boys, inner city white (ICW) boys and suburban white (SW) boys will not differ in skill risk-taking behavior.

II-B ICB boys, ICW boys and SW boys will not differ in chance risk-taking behavior.

II-C ICB girls, ICW girls and SW girls will not differ in skill risk-taking behavior.

II-D ICB girls, ICW girls and SW girls will not differ in chance risk-taking behavior.

II-E The combined ICB boys and girls and combined ICW boys and girls and combined SW boys and girls will not differ in skill risk-taking behavior.

II-F The combined ICB boys and girls and combined ICW boys and girls and combined SW boys and girls will not differ in chance risk-taking behavior.

No level of significance was reached for differences between cell means for school location (B) where the value of F(2,114)=2.75 is indicated for school locations. This value does not achieve the Geiser-Greenhouse conservative value of $F=4.10$ required at the $p=.05$ level. Therefore, Hypotheses II-A, II-B, II-C, II-D, II-E, and II-F were not rejected.

In summary then, it can be adjudged that school location based upon American subculture had no significant effect upon the risk-taking behavior scores of the fifth-grade boys and girls utilized in this study. It is interesting to note, however, that the $F(2,114)=2.75$
for school location tended to be closer to the level of significance, whereas the $F(1,114)=0.59$ for the sex variable did not. The conclusion drawn, however, was that school location as a variable was not a significant factor and that null hypotheses relating to this factor were not rejected.

**Analysis of Type of Risk: Skill and Chance**

The secondary purpose of this research was to determine if there were risk-taking behavior differences within subjects relating to skill and chance orientations. The literature had indicated that such a difference did exist. It was anticipated, therefore, that the repeated measures portion of this study would reach or exceed the $p<.05$ level of significance.

The figures reported in Table II indicate that such a significance did occur. For type of risk, the $F(1,114)=41.96$ was significant at the $p<.001$ level. Because of the small number of pairwise comparisons, the Dunn’s test (Kennedy, in press) was utilized to determine which of the mean differences were significant.

The skill and chance mean differences were compared on the basis of a series of hypotheses, of which this is the first:

**III-A Skill and chance risk-taking behavior will not differ within inner city black (ICB) boys.**

The Dunn’s test of $t=0.41$ at the $p<.05$ level and $t=0.49$ at the $p<.01$ level was established to test for the level of significance for mean differences. The means shown in Table I for ICB boys are skill, 3.75 and chance, 5.15. The mean difference on skill and chance risk-taking behavior for ICB boys was 1.25 (See Table III). This mean
### TABLE III

Mean Cell Difference for Skill and Chance Risk-taking Behavior Scores

<table>
<thead>
<tr>
<th>Subjects</th>
<th>ICW Boys</th>
<th>SW Boys</th>
<th>SW Girls</th>
<th>ICB Girls</th>
<th>ICB Boys</th>
<th>ICB Girls</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means</td>
<td>4.25</td>
<td>4.45</td>
<td>4.60</td>
<td>5.10</td>
<td>5.15</td>
<td>5.65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.50</td>
<td>1.70*</td>
<td>1.85</td>
<td>2.35</td>
<td>2.40</td>
<td>2.90</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td>1.40</td>
<td>1.60</td>
<td>1.75*</td>
<td>2.25</td>
<td>2.30</td>
<td>2.30</td>
<td>2.85</td>
</tr>
<tr>
<td></td>
<td>0.95</td>
<td>1.15</td>
<td>1.30</td>
<td>1.80*</td>
<td>1.85</td>
<td>2.35</td>
<td>3.30</td>
</tr>
<tr>
<td></td>
<td>0.50</td>
<td>0.70</td>
<td>0.85</td>
<td>1.35</td>
<td>1.40*</td>
<td>1.90</td>
<td>3.75</td>
</tr>
<tr>
<td></td>
<td>0.35**</td>
<td>0.55</td>
<td>0.70</td>
<td>1.20</td>
<td>1.25</td>
<td>1.75</td>
<td>3.90</td>
</tr>
<tr>
<td></td>
<td>0.10</td>
<td>0.30</td>
<td>0.45</td>
<td>0.95</td>
<td>1.00</td>
<td>1.50*</td>
<td>4.15</td>
</tr>
</tbody>
</table>

\[ n = 240 \]

* \( p < .01 \) within subjects

** non-significant within subjects
difference is significant at the $p < .01$ level. Inner city black boys do perform differently on skill and chance risk-taking behavior. Hypothesis III-A is not confirmed.

**III-B** Skill and chance risk-taking behavior will not differ within inner city black (ICB) girls.

The means reported in Table I for ICB girls are: skill, 3.75 and chance, 5.10. The mean difference for skill and chance risk-taking scores for ICB girls is 1.80 (See Table II). This difference is significant at the $p < .01$ level. It can be concluded that ICB girls perform differently on skill and chance risk-taking behavior. Hypothesis III-B is, therefore, not confirmed.

**III-C** Skill and chance risk-taking behavior will not differ within inner city white (ICW) boys.

The mean reported in Table I for ICW boys on skill is 3.90 while the chance mean is 4.25. The mean difference for skill and chance risk-taking behavior scores is 0.35 (See Table III). This mean difference does not achieve the $p < .05$ level of significance of $F=0.41$ as established in the Dunn's technique. Therefore, Hypothesis III-C is not rejected.

**III-D** Skill and chance risk-taking behavior will not differ within ICW girls.

The means for skill and chance scores as shown in Table I for ICW girls are 4.15 and 5.65 respectively. The mean difference is 1.50 (See Table III), which is significant at the $p < .01$ level. Consequently Hypothesis III-D is not confirmed.

**III-E** Skill and chance risk-taking behavior will not differ within suburban white (SW) boys.
Skill and chance means for SW boys are respectively 2.75 and 4.45. This is a mean difference of 1.70 (See Table III), which is significant at the $p < .01$ level. Thus Hypothesis III-E is not confirmed.

III-F Skill and chance risk-taking behavior will not differ within SW girls.

The mean for SW girls on skill is 2.85 while the chance mean is 4.60. This is a mean difference of 1.75 (See Table III). Again this mean difference exceeds the $p < .01$ level of significance. Hypothesis III-F is, therefore, not confirmed.

In summation, all hypotheses except one relating to skill and chance difference within subjects are not confirmed. Only inner city white (ICW) boys did not have a significant mean difference on the two types of risk-taking behavior. The hypothesis relating to this difference was not rejected.

**Analysis of First-order Interactions**

Three hypotheses relating to first-order interactions were formulated. They are as follows:

IV-A Interaction between sex (A) and school location (B) will not be significant.

IV-B Interaction between sex (A) and type of risk (C) will not be significant.

IV-C Interaction between school location (B) and type of risk (C) will not be significant.

For Hypothesis IV-A the $F(2,119)=1.07$ was achieved. This value is below the Geiser-Greenhouse conservative value of $F=4.10$. Hypothesis IV-A is not rejected.
Hypothesis IV-B stating the null for sex (A) and type of risk (C) reached an $F(1,120)=1.48$. This is once again below the $F=4.10$, $p<.05$ level of significance established for this study. Hypothesis IV-B is not rejected.

The last first-order interaction hypothesis which is IV-C reached an $F(2,120)=1.29$ value as shown in Table II. This is an insufficient $F$ value to reach significance at the $p<.05$ level. Hypothesis IV-C is not rejected.

In summary, there were no first-order interactions in this study. This leads to the conclusion that sex by type of risk, sex by school location, and school location by type of risk were not important factors in this study. An analysis of the second-order interaction which was significant follows.

**Analysis of the Second-order Interaction**

The second-order interaction hypothesis was stated thusly:

V Interaction among the variables of sex (A), school location (B), and type of risk (C), will not be significant.

In Table II it can be seen that the value for this second-order interaction was $F(2,120)=4.66$. Using the conservative $F$ value of the Geiser-Greenhouse formula, the value for the second-order interaction was significant at the $p<.05$ level. Hypothesis V is, therefore not confirmed.

By rejecting Hypothesis V it was then necessary to analyze the data in terms of the significant variability which existed among the A*B*C cell means. Kennedy (in press) states that a "significant
second-order interaction occurs when there is a significant change in the pattern of the simple first-order interaction as a function of levels of the third variable" (page 7.34).

Plottings of the first-order interactions of sex (A) by type of risk (C) over the third variable of school location (B) are shown in Figures 1 and 2. In Figure 1 inner city white (ICW) boys' skill and chance risk-taking behavior scores are shown to be not as divergent as those for the inner city black (ICB) boys and the suburban white (SW) boys. Mean differences on skill and chance risk-taking behavior scores for ICW boys are 0.35, whereas the difference for ICB boys is 1.25 and for SW boys, 1.70 (See Table II).

That ICW children perform on chance risk-taking behavior scores differently from ICB children and SW children is shown in Figure 2. The cell mean difference for ICW boys and girls on chance risk-taking behavior is 1.40 (See Table IV). For ICB boys and girls the cell mean difference on chance risk-taking behavior is 0.05 (Table IV). For SW boys and girls the cell mean difference on chance risk-taking behavior is 0.15 (Table IV).

Utilizing the Dunn's test as a test of significance between means, \( t = 0.59 \) was established for the \( p < .05 \) level and \( t = 0.70 \) was established for the \( p < .01 \) level. Six cell mean differences were found to be significant at the \( p < .01 \) level, while one cell mean difference was significant at the \( p < .05 \) level.

Those chance cell mean differences which are significant are shown in Table IV. ICW boys and ICW girls chance cell mean difference is 1.40. The chance cell means for ICW boys and ICB boys is 0.90. The
<table>
<thead>
<tr>
<th>Subjects:</th>
<th>ICW Boys</th>
<th>SW Boys</th>
<th>SW Girls</th>
<th>ICB Girls</th>
<th>ICB Boys</th>
<th>ICB Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means:</td>
<td>4.25</td>
<td>4.45</td>
<td>4.60</td>
<td>5.10</td>
<td>5.15</td>
<td>5.65</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>0.20</td>
<td>0.35</td>
<td>0.85**</td>
<td>0.90**</td>
<td>1.40**</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>0.15</td>
<td>0.65*</td>
<td>0.70**</td>
<td>1.20**</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.50</td>
<td>0.55</td>
<td>1.05**</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.05</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.50</td>
<td>5.15</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>n = 120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05
** p < .01
chance cell means for ICW boys and ICB girls is 0.85. At the next levels, SW boys and ICW girls mean cell difference is 1.20; for SW boys and ICB boys 0.70; for SW boys and ICB girls 0.65. For SW girls and ICW girls the chance cell mean difference is 1.05. These seven chance cell mean differences are the only significant ones. Implications and discussions of these differences will be presented in Chapter V.

Results of the Token System

Although the number of tokens won was not a portion of this study, the author thought it interesting to add these results to the report of the study. The total number of tokens possible to win on the skill game per student was twenty, while the total number on the chance game was fifteen. As shown in Table V, the tokens won by the boys (845) exceed the number of tokens won by the girls (738). The ICB boys won 252 tokens while the ICB girls won 240. The ICW boys won 300 tokens and the ICW girls won 206. The SW children won the least number of tokens with the boys winning 293 and the girls 292.

Table V

Totals for Tokens Won by Sex and School Location

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICB</td>
<td>252</td>
<td>240</td>
</tr>
<tr>
<td>ICW</td>
<td>300</td>
<td>206</td>
</tr>
<tr>
<td>SW</td>
<td>293</td>
<td>292</td>
</tr>
<tr>
<td>Totals</td>
<td>845</td>
<td>738</td>
</tr>
</tbody>
</table>
It is interesting to note that the results of the winnings in this study contrast with that of Krzesni (1973) who found that girls won more tokens than boys. Slovic (1966) also found that the conservative posture of girls helped them to have more winnings than boys.

**Summary**

Chapter IV is a discussion of the analysis of data gathered for this research. A two between-one within-subjects analysis of variance design was utilized. The results of this analysis revealed no sex differences, and no differences were found for school location based upon American subcultures. On the within-subjects variable, a significant difference was found for skill and chance risk-taking behavior scores. The Dunn’s test procedure was utilized to test the significant differences of the skill and chance cell means. All means were significant except for ICW boys. No first-order interactions were noted. A significant F value was found for the second-order interaction. It was established that ICW children responded differently in skill and chance situations. The ICW boys' skill and chance scores were highly related, whereas the ICW girls were prone to be more risky in chance situations. Their mean differences were found to be significant in relation to ICW boys and SW boys and girls. While not significantly different from ICB children, the chance risk-taking behavior mean for ICW girls exceeded the means for these two groups. Even so, these differences tended to be in the direction of significance, failing to achieve it at the p < .05 level by a narrow margin.
Chapter V which follows is a discussion of the results and conclusions reached as an outcome of this research. It will include some limitations of this study and some recommendations for further research.
CHAPTER V

DISCUSSIONS AND CONCLUSIONS

Purpose

The major purpose of this study was to determine whether differences in risk-taking behavior existed for the variables of sex and sub-cultural or school location. The secondary purpose was to study the differences known to exist within-subjects on skill and chance risk-taking behavior. These concerns were stated in question form as follows:

1. Are there differences between boys and girls on risk-taking behavior?

2. Does the school location based on an American sub-culture make a difference in risk-taking behavior?

3. Will this study further verify the within-subjects difference with respect to skill and chance situations?

Twenty hypotheses were generated from these three questions.

Procedure

One hundred twenty fifth-grade students were chosen from the Franklin County, Ohio, area. Three school locations were identified as being substantially different from each other in a subcultural sense. One school was predominantly black with low income families and located in the inner city. One school was predominantly white Appalachian with
low income families and also located in the inner city. The third school was predominantly white with high income families and located in a suburban area.

Each child was individually tested at one sitting on both skill and chance games. The games were alternated with each student so that half of the students played the skill game first and half played the chance game first. Risk-taking behavior scores were obtained for all subjects.

Summary and Discussion

Results of the analysis of variance of the three variables of sex, school location, and type of risk with concurrent interactions indicated some significant differences. There were no significant differences on the between-subjects variables of sex and school location. None of the hypotheses relating to these two variables were rejected.

For the within-subjects variable of type of risk involving skill and chance orientations, there was a significant difference at the $p < .001$ level. The Dunn's procedure was used to test the significance of the cell mean differences. There were significant differences for all within-subjects cell means on skill and chance, except for the inner city white (ICW) boys. Hypotheses III-A, III-B, III-D, III-E, and III-F were not rejected. Hypothesis III-C relating to the ICW boys was not confirmed.

The analysis of the interactions indicated that there were no first-order interactions. However, a second-order interaction did occur. The Dunn procedure was used to test the cell mean difference on
the chance variable since a study of the second-order interaction indicated that the ICW children performed differently in chance risk-taking behavior.

This study clearly indicates that for this group of fifth-grade children there are no sex differences in risk-taking behavior as measured by the skill and chance games. This finding is contrary to those of Slovic (1966), Kass (1964), and Brook et al. (1974) but agrees with Gratch (1964), Jamieson (1969) and Martuza (1970).

The girls in this study showed no indication of conservatism in any of the cultural settings. The inner city white girls exceeded all other groups of boys and girls on chance risk-taking. It will be noted in Table 1 that the inner city white girls and the suburban white girls had means in both skill and chance risk-taking which exceeded the means for the boys of their respective groups. This certainly casts doubt on the idea that females are more conservative than males.

The results of this study coincide more with the results of Lunneborg and Rosenwood (1972) who found a declining sex difference in risk-taking within a college population. For this group of elementary school children, the expected sex differences are absent as indicated by the very low F value of 0.59.

The socializing process for risk-taking for this sample of elementary school children evidently has not been so very different for boys and girls. The conservatism for females found in past studies (Crandall, 1965; Guttentag & Freed, 1971), does not appear in this research.
In Table VI the similarity of the means is clearly shown. The skill variable has a negligible difference. The chance variable is slightly more but not significantly so. The totals reflect the minute difference between the boys and the girls, with the girls being slightly greater risk-takers.

**TABLE VI**

Level Means for Sex by Type of Risk

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill</td>
<td>3.47</td>
<td>3.43</td>
</tr>
<tr>
<td>Chance</td>
<td>4.62</td>
<td>5.12</td>
</tr>
<tr>
<td>Totals</td>
<td>4.05</td>
<td>4.28</td>
</tr>
</tbody>
</table>

This study does not clearly define cultural differences among subjects. The F value of 2.75 was climbing toward a significant level but did not achieve it. It is interesting, however, to note that the trend was toward significance with this variable whereas it was not with the sex variable.

Children from varying backgrounds reflect those backgrounds in various ways. This is true of this group of elementary school children. A study of the means in Table I indicates that both groups of inner city children exhibited more risk-taking on both types of risk as opposed to a more conservative approach to risk-taking in the suburban group. Perhaps the difference reflects home and community backgrounds.
The children in the two inner city groups probably live in less secure home settings, have a higher incidence of one parent families, and suffer the results of limited incomes. They are well-versed in the street language and street culture. The necessity of fighting sometimes for survival of life confronts inner city children. They certainly are more practiced in the art of risk-taking. These children experience crossing the street alone at an early age and are left to care for themselves more frequently. The influence of peer groups develops sooner and the exertion of developing the "self" as a "being" is experienced at an earlier age. They frequently have more daringness, more openness, and more freedom to explore their environment away from home. Their individuality is strengthened by these earlier experiences.

These things cannot be said about suburban children who usually live in secure home settings. There are fewer broken homes, and fewer financial worries are made known to them. They are escorted by their parents in automobiles to clubs and gatherings. There is more adult supervision of suburban children. The lack of risk-taking ventures may well be reflected in the means of the suburban children who consistently performed at lower risk levels than their counterparts in the inner city.

Even though the F value did not reach significance, the tendency toward significance may indeed be important and may reflect subtle subcultural differences. A study of Table VII reveals quite clearly the similarity of the two inner city group performances on skill and chance risk-taking and the difference of the suburban children on the same types of risk.
TABLE VII
Level Means for School Location by Type of Risk

<table>
<thead>
<tr>
<th></th>
<th>ICB</th>
<th>LCW</th>
<th>SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill</td>
<td>3.53</td>
<td>4.03</td>
<td>2.80</td>
</tr>
<tr>
<td>Chance</td>
<td>5.13</td>
<td>4.95</td>
<td>4.53</td>
</tr>
<tr>
<td>Totals</td>
<td>4.33</td>
<td>4.49</td>
<td>3.67</td>
</tr>
</tbody>
</table>

The effect of cultural or environmental factors upon human behavior has been studied by many writers (Henry, 1963; Hunt, 1961; Jencks, 1972; Skinner, 1971). Kozielecki (1974) in a Polish study concluded that environment more than personality influenced the decision-making process. Alker and Wohl (1972) in dealing with the problem of personality and achievement in a suburban and an inner city school concluded that differences that occur in the inner city schools may depend on the nature of the role demands which may differ for students in that setting. Katz (1969), after reviewing the literature dealing with personality approaches to achievement, proposed that psychologists had contributed little to the understanding of the motivational problems of disadvantaged students. He recommended that research should be concerned with the motivational processes, such as self-evaluation, expectancy levels, and incentive values. Differences found in inner city children may be more related to these processes than to inadequacy of early socialization or to a personality deficit. Klinger and McNelly (1969) analyzed the relationship between fantasy need achievement and performance with
social class standing. They found that social class is clearly associated with n Ach scores and that social class status affects achievement values and performance.

The literature above would lend support to the likelihood of differences among groups of children or adults from varying cultural backgrounds. What these differences may be in relationship to risk-taking is not presently clear. The meaning of these differences may need to be explored using better instruments for measuring risk-taking, as well as different types of instruments for measuring the variables which impinge upon the risk-taking behavior.

The highly significant F value for the within-subjects variable of skill and chance orientations has support in the literature. Alker and Wohl (1972) hypothesized that the culture for black children has not clearly defined the relationship between achievement and skill or luck. These children, therefore, are in doubt as to the real role of the determining factors of grades and respond frequently in an irrational manner to achievement situations. This may be reflected in the difference found in the inner city black children in this study with relation to skill and chance orientations.

Other groups may also be similarly affected. Cohen (1960) studied groups of children ranging in age from nine to fifteen years. He found that the vast majority of these children preferred to gamble rather than not to gamble, with the tendency to gamble declining with age. He grouped the children into upper and lower streams in school. Those children in the upper stream preferred the safer gamble while those in the lower stream preferred the riskier gamble. This same difference
may be reflected somewhat in this study where the inner city children consistently made riskier choices than did the suburban children. Krzesni found that for his risk-taking task involving the use of knowledge or skill, the male subjects took more risks; but on the chance risk-taking task there were no differences between males and females. Unfortunately, he does not deal directly with the differences between the two orientations and the reader is left wondering why the sex difference for skill and not for chance. This is a reversal of the situation for the inner city white children in this study.

Some hint of this lack of difference on the chance task is given by Ross and Levy (1958) who found that their subjects all seemed to believe that chance events are controllable and solvable by skill tactics. Cohen (1960) found similar results. The Atkinson model (1957) suggests that games of skill may be laden with achievement incentive whereas games of chance are not.

The subjects of the present study took more risks on the chance game than on the skill game, which may lead to two different conclusions. The first is that these children were influenced by the luck element in the chance situation, responding with the hope of higher wins. The second conclusion may be that the grades of "A," "C," and "F" were influential in providing the wide variation between the chance and skill risk-taking scores. A hint of this latter course may be reflected by the inner city white boys' lack of significant difference on these two variables. These boys may merely be showing their contempt for school grades by not responding as the girls did to the chance situation. They responded differently, also, from the other two groups of
boys. Girls have long been known to be more grade-conscious than boys. The cultural value of school grades may also be different for inner city black children and suburban white children, whereas inner city white children, especially boys, may have adopted an attitude reflecting belief in their lack of control of fate. Certainly in the present day, black children are being made more aware of the need to control their own fate. Suburban white families presumably already have more control over their fate. It is obvious to this writer that for the inner city white (Appalachian) groups of the Franklin County, Ohio, area, there are few organizations working toward improving their lives or developing strong self-concepts within the children. If the lack of control of fate has affected the minority groups, such as the blacks, then this factor must also be at work among the poorer whites. The same debilitating effects should be present in inner city white subcultures.

The differences found in this study between skill and chance risk-taking reaffirms the psychological differences noted by other researchers. The quite large significant difference is suspected as being influenced by the desire to achieve high grades, as well as the desire to be able to have "luck" at a game of chance. In the latter case, Cohen (1960) may be right when he stated that man's antidote for dealing or coping with life's uncertainties is a vigorous belief in luck. Luck may not only be a safety device for man but reliance on it may have come to shape our beliefs and our judgments.

The second-order interaction found in this study is considered to be of minimal significance. Since only the inner city boys reacted differently on the chance orientation, it is highly likely that this is
a mere reflection of their contempt for school grades and nothing more.

In summation, the lack of sex differences in this study casts doubt on the continued presence of the conservative posture once attributed to females. Also, although no significant differences were found for the three school locations, there was a tendency for the F value to climb toward significance. There may, therefore, be subtle subculture differences in risk-taking which may require the use of more sophisticated instruments to detect. Significant differences were found for skill and chance orientations.

The next sections will deal with the limitations of this study. Recommendations for further research will be offered.

Limitations

This study was limited to three American subcultural groups. Other subcultural groups, such as Mexican Americans, suburban blacks, Chinese Americans, and rural samples were not included in this study.

Personality variables, such as achievement motivation, were not examined to consider the influence they might have upon risk-taking behavior.

The effect of prior gains and losses were not studied for this population even though the possibility of this effect exists in the raw data.

This study did not reflect possible differences in types of homes (conservative or liberal) nor does it reflect any religious training differences.
Parents' ambitions and desires for their children were not con­sidered. Such parental expectations may reflect differences in risk-taking scores.

**Recommendations**

In 1967 Wallach and Kogan illustrated that much work needed to be done in studying the psychological aspects of risk-taking. This is still true today since few studies of risk-taking have been conducted, especially with children.

Further studies should be conducted to explore possible sex differences in other types of settings. Sex differences regarding achievement motivation in varying situational contexts with regard to risk-taking need further exploration with children.

In view of the continued possibility of subcultural effects, it is recommended that further studies be conducted to include other groups of Americans.

The effect of probability awareness and its effect upon children's decision-making in risk-taking situations needs further study. More research also needs to be conducted to test the cognitive development of risk-taking in children. So little has been done in this area that no real generalizations can be made about the topic at the present time.

The aspect of cognitive development in risk-taking should be studied in subcultural settings similar to the study conducted for this research.

One element in the present study, if it is replicated or extended, needs to be changed. The chance risk-taking game should be developed in an area which is not tied to school grades. The same card system
might be used employing symbols rather than grades. Symbols, such as
the circle, diamond or square, might suffice. Another method might be
to create nonsense symbols, thus removing even further any emotional or
learned behaviors with respect to the letters used in this study.

Summary

One hundred twenty fifth-grade children from inner city and sub-
urban groups were randomly selected from three school locations and
tested for risk-taking in skill and chance games. The primary purpose
of this study was to determine whether differences in risk-taking be-
havior existed for the variables of sex and school locations. The sec-
ondary purpose was to study differences between skill and chance orien-
tations. No differences were found for sex nor for school location,
although the latter had a tendency toward levels of significance. A
large significance was found for skill and chance orientations. There
were no first-order interactions. A second-order interaction occurred
with inner city white boys not responding to chance situations in the
same manner as the other groups.
APPENDIX A

Specific Instructions Used in Risk-taking Testing Period
GENERAL INSTRUCTIONS:

1. Make the child acquainted with the experimenter's name.

2. Converse with child in a manner to get him/her to relax or to dispel any fear about the game situation.

3. State:

   Today we are going to play two games. These games are just for fun. As you win playing these games, I will give you some tokens. If you lose, I will take some tokens away if you still have some. At the end of the game you will owe me nothing. You will, however, be permitted to choose a prize from one of the three boxes you see here. The box you choose from will be determined by the number of tokens you have won. Of course, the more tokens you have, the better the prize will be. Do you understand about the tokens and the prizes?

   (Make sure child understands the purpose of the tokens and that he/she will get a prize of some kind regardless of the number of tokens he/she may have in hand at the end of the two games.)

   You may save your tokens and collect your prize after the two games are played. You will exchange the tokens for the prize...trade them in...for instance. The tokens you win in one game will not be taken away if you lose in the next game.

INSTRUCTIONS FOR GAME OF CHANCE:

We are going to play this (first/second) game with two stacks of cards. All of these cards in this stack have the letter "C" written on them. (Point to the stack and show the card to the side with the letter on it.) In this other stack are cards marked with the letter "A" or the letter "F" on them. (Point to this stack. Point to the cards
with "A" and "F" to the side.) These letters represent grades that children make in school. I would like for you to pretend that these are your grades in school this year for ten subjects. You may choose which grades you want. If you choose the "C" grade, I will give you one token. However, you may want to choose from the stack which contains the "A" or "F" cards. For each "A" (excellent) you get, I will give you two tokens and for each "F" (failure), I will take back two tokens. In the event that you do not have any tokens if you should get an "F," you will not owe me anything. If on each try you want to take the "C" that is in this stack and take the one token you may do so. You may, however, choose to take a card from this other stack and possibly earn two tokens or lose two tokens for an "A" or an "F." (Pause for child's decision and give token or take away as needed.) For your second subject, would you like to keep the "C" or try for an "A"? (Pause...etc.) For your third subject...etc.

NOTE: Tokens won in playing the previous game are not to be "lost" in this game.

INSTRUCTIONS FOR GAME OF SKILL:

We are going to play this (first/second) game by throwing the horseshoes at that stake which you see at the end of this area which is marked off for you. You will be given ten attempts to get the horseshoes around the stake. (Show the child the horseshoes and the stake.) You may choose to throw the horseshoes from the two different distances which are marked on the floor. (Show the "safe" distance of three feet and the "risky" distance of six feet.) If you choose to throw from the shorter distance and you succeed in getting the horseshoe around the
stake, you will be given one token. If you do not succeed in throwing the horseshoe over the stake, you will not lose any tokens. If you choose to throw from the longer distance and you succeed in getting the horseshoe around the stake, I will give you two tokens. If you fail to do so, I will take back two tokens. In the event that you have no tokens, you will not have to pay me back. You may change your mind at any time during the game and choose the other distance. Are you ready to play?

NOTE: Tokens won in the previous game are not to be "lost" playing this game.
APPENDIX B

Sample of Scoring Sheet
<table>
<thead>
<tr>
<th>Risk (10)</th>
<th>Tokens (20)</th>
<th>Risk (10)</th>
<th>Tokens (15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>2. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>3. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>4. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>5. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>6. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>7. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>8. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>9. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>10. 0 1</td>
<td></td>
<td>0 1</td>
<td></td>
</tr>
</tbody>
</table>

Total
BIBLIOGRAPHY


Carlson, J. S. Children's probability judgments as related to age, intelligence, socioeconomic level and sex. Human Development, 1969, 12, 192-203.


Fischer, D. G., & Burdeny, T. C. Individual shifts and the group-shift phenomenon. Proceedings of the 81st Annual Convention of the


Katz, L. Monetary incentive and range of payoffs as determiners of risk taking. *Journal of Experimental Psychology*, 1962, 64, 541-544.

Kennedy, J. J. An intuitive approach to the design and analysis of educational experiments. Worthington, Ohio: Charles A. Jones, in press.


Powell, L. Achievement motivation and emotional stability: Some omissions resulting in fallacies in the Jencks report. Journal of


Swineford, F. Analysis of a personality trait. Journal of Educational Psychology, 1941, 32, 438-444.


Wallach, M. A., Kogan, N., & Bem, D. J. Diffusion of responsibility and level of risk taking in groups. Journal of Abnormal Social


Willems, E. P. Risk is a value. Psychological Reports, 1969, 24, 81-82.


Zaleska, M., & Kogan, N. Level of risk selected by individuals and groups when deciding for self and for others. Sociometry, 1971 34, 198-213.