

A STUDY OF FACTORS RELATED TO DECISION -
MAKING IN SECOND GRADE CHILDREN

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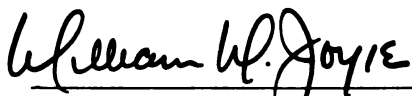
MAKING IN SECOND GRADE CHILDREN

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ABSTRACT

A STUDY OF FACTORS RELATED TO DECISION- MAKING IN SECOND GRADE CHILDREN

By

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The purpose of this study was to explore the relationship to measurable factors of second grade elementary school children's use of intention cues in decision-making behavior. Specific attention was addressed to the relationship of (1) academic achievement, (2) gender, and (3) size of school enrollment to decision-making behavior.

The population for this investigation consisted of children in second grade classrooms in four public schools of a standard metropolitan area of the United States of America. Out of an enrollment of approximately 400 children, 208 were sampled.

The instrumentation consisted of a basic standardized skill inventory administered to the subjects by their own classroom teachers. The second part of the instrument was administered by the researcher using prepared tapes. It consisted of accidental and intentional concrete incidents requiring decisions of the subjects. Intention cues provided the basis for decisions.

A $2 \times 2 \times 3$ randomized block design was used. It was hypothesized that there would be no statistically significant differences among the variables of achievement, gender, and size of school enrollment in the performance of young children in decision-making behavior in relation to intention cues.

Analyses of variance used for the statistical analysis of these data revealed no statistically significant differences at alpha .05 level of significance. The conclusions which resulted from these findings were as follows:

1. The decision-making behavior of individual second grade children of this sample when considered according to level of academic achievement cannot be differentiated in a statistically significant manner.

2. The second grade children of this sample evidence no statistically significant differences in their decision-making behavior according to gender.

3. The variable of size of school enrollment offers no statistically significant evidence of effect upon the decision-making behavior of the second grade children of this sample.

A STUDY OF FACTORS RELATED TO DECISION-
MAKING IN SECOND GRADE CHILDREN

By

Iantha Crutchfield Beckett

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Dedicated
to
My Family

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CHAPTER I

THE PROBLEM

Introduction

The qualitative differences in decision-making behaviors of young elementary school children are of special significance to the educator. The reasons center upon two important elements on the agendas of human concern; namely, a plethora of political-cultural challenges which demand the skilled decision-making behaviors of an informed citizenry, and secondly, the dilemma of personal choice. These needs of humankind invite research which will facilitate positive linkages between the abstract, conceptual universe of ideas, and the concrete, experiential universe of actions based on decisions. This study has been addressed to that concern.

Background

The phenomenon of decision-making is fundamental to human experience, and the use of inferential skills is basic to it. A significant element of inferential skill is perspective, described as a capacity to distinguish among the proportions or relations of given

phenomena.¹ In perceptual perspective, inferences are drawn in regard to an individual's visual, auditory, or tactile experience. In conceptual perspective the inference concerns internal experience--an individual's thought, desire, intention. The inference, of course, is the conclusion reached by reasoning from both the known and the assumed.

Chisholm² traced the term intentionality from the Scholastics up to Jeremy Bentham in the eighteenth century. He found the concept reintroduced in certain documents set forth in Brentano's³ writings of 1874, as well as several other contexts. Particularly was this true of the writings of the philosopher Husserl, who became one of the leading figures in modern Phenomenology.⁴

¹Roderick M. Chisholm, "Intentionality," in Encyclopedia of Philosophy, vols. 3-4, ed.-in-chief Paul Edwards (New York: The Macmillan Co., 1972), pp. 201-204; John H. Flavell et al., The Development of Role Taking and Communication Skills in Children (New York: John H. Wiley and Sons, 1968), pp. 201-203; Robert S. Marvin et al., "The Early Development of Conceptual Perspective Taking: Distinguishing Among Multiple Perspectives," Child Development 47 (1976): 511-514; Jean Piaget, The Mechanisms of Perception, trans. G. N. Seagrim (London: Routledge and Kegan Paul, 1969).

²Chisholm, p. 201.

³Franz Brentano, "The Distinction Between Mental and Physical Phenomena," trans. D. B. Terrell, in Encyclopedia of Philosophy, vols. 3-4, ed.-in-chief Paul Edwards (New York: The Macmillan Co., 1972), p. 202.

⁴Roderick M. Chisholm, "Notes on the Logic of Believing," Philosophy and Phenomenological Research 24 (1963): 196.

Husserl asserted that all data of experience are the proper subject matter of inquiry. With the passage of time, a lack of explicit agreement as to meaning gradually attached itself to the concept of intentionality. From the standpoint of modern philosophy, Aune⁵ arrived at a working definition of intention as a matter of conceiving action while in a state of readiness to perform that which will directly bring about its realization. Intentional acts have four aspects: subject, action, intentional object, and means asserted. The noun intentionality refers to a readiness to perform actions toward a desired end.

Further background considerations involve the influence of scholarly work by Earl Barnes⁶ and his colleagues at Leland Stanford Junior University in 1894. About forty years before Piaget's theorizations in the same area, Barnes reported in a journal edited by Granville Stanley Hall the account of a research project ambitiously involving four thousand American children. By 1898 he had traveled to England to conduct comparison

⁵Bruce Aune, "Intention," in Encyclopedia of Philosophy, vols. 3-4, ed.-in-chief Paul Edwards (New York: The Macmillan Co., 1972), pp. 198-201.

⁶Earl Barnes, "Punishment As Seen by Children," in Pedagogical Seminary, vol. 3, ed. Granville Stanley Hall (Worcester, Mass., 1894), pp. 235-245.

studies. The project was designed to study the attitudes of children toward punishment and their sense of justice. His research question was: "Does a child in the process of his development from infancy to manhood pass through clearly marked stages in his attitude toward punishment?"⁷

Barnes pioneered the story-dilemma procedure, in which a child might receive a punishment even though his intentions were good. Children eight to sixteen years of age were asked to write how they felt when this happened. In 1897 he published an adaptation used by one of his students in a replication effort. The story read:

One day when I was seven years old I went to a neighbor's to play and my Mom told me to be back by six o'clock. I was enjoying myself so much that I did not know how fast the time was passing until I noticed it was getting dark. Then, I ran home as fast as I could, but it was 6:30 when I got there and the family had been to supper. My Mother scolded me for being late.⁸

Chronologically, in a sense, Barnes' stories appear to be forerunners of the intentionality stories now widely associated with Piaget.

⁷Earl Barnes, ed., Studies in Education: A Series of Ten Numbers Devoted to Child Study and the History of Education, vol. I (Palo Alto, Calif.: Leland Stanford Jr. University, 1896-1897), p. 28.

⁸Ibid., p. 344.

In the late 1920s, Piaget⁹ related situations common to the everyday experience of his children and asked for their decisions regarding the punishment the child-actors should receive. He reported that as the children grew older they began to consider the intention of the doer in decisions about his punishment. Piaget asserted that the more immature decision-making was made on the basis of constraint, while more reasoned and mature decision-making was based upon cooperation, a taking into account of the intent of the doer. He stated:

For it is not nearly so natural as one would think for primitive thought to take intentions into account. The child is far more interested in the result than in the motivation of his actions. It is cooperation which leads to the primacy of intentionality . . . when mutual respect is strong enough to make the individual feel from within the desire to treat others as he himself would wish to be treated.¹⁰

Purpose of the Study

The purpose of this study was to explore the extent to which second grade elementary school children gave evidence of using intention cues in decision-making behavior. It was assumed that the usage of intention cues is a significant indicator of growth in mature

⁹Jean Piaget, The Moral Judgment of the Child, trans. by Marjorie Gabain, (Glencoe, Ill.: The Free Press, 1948), pp. 116-128.

¹⁰Ibid., pp. 187, 194.

decision-making behavior. Such growth, nurtured by the educator, is of pedagogical significance.

Importance and Need of the Study

The importance of this study derived from education's special concern for nurturing skilled decision-making behavior in learners. The concern is substantiated by society's acceptance of the educational system as the primary agency by which children are socialized into democracy. Inherent within the nature of the socialization is an understanding of the responsibility for decision-making which citizenship requires, as well as the need for competence in personal decision-making. Changing life-styles with resultant changes in self-conceptions demand decisions affecting humankind in both the present and the future. Humankind's decisions already transcend the boundaries of time and space; transnational and transgenerational consequences are already in evidence. Efforts to improve the decision-making competencies of future citizens might reasonably be expected to result in (1) more successful adaptation in the present to the results of past forces over which citizens have had no control, and (2) deeper insight into some of the far-reaching possibilities of contemporary decisions.

Further, the consequences of this research reasonably may be expected to shed light on efforts to explain the natural phenomenon of decision-making. The examination of some relations among variables with which decision-making skills interact may facilitate this aim. Kerlinger describes the behavioral sciences of this decade as being in the midst of a conceptual and technical revolution. The availability of the modern computer makes possible theory and research which may be more precise in reflecting the nature of human behavioral reality. He predicts:

Within the decade we will probably see the virtual demise of one-variable thinking. Instead, multivariate methods will be accepted tools in the behavioral scientist's and in the educator's armamentarium.¹¹

Finally, it was the belief of the researcher that a study which would shed light on human behavioral variables and their interrelationships would facilitate encouragement of young children into the experiences of decision-making. Such nurturing processes would generate what Bruner referred to as "far-transfer" as each child's circle of social interaction expanded. In this context Smith observed:

¹¹Fred N. Kerlinger and Elazar J. Pedhazur, Multiple Regression in Behavioral Research (New York: Holt, Rinehart, and Winston, Inc., 1973), pp. v, vi.

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. . . the world will continue to be one of fascinating and dangerous alternatives and the individual growing up in it will either become more skillful in choosing among these alternatives or will by default have his choices made for him.¹²

Statement of the Problem

The study addressed the following questions:

- (1) Is the student's level of academic achievement in an early primary grade likely to foster beginning competence in decision-making in relation to intention cues?
- (2) Are boys or girls of the same primary grade level more likely to display decision-making behavior with regard to intention cues?
- (3) Does the numerical size of school enrollment make a difference?

To answer these questions, hypotheses were formulated, a population for the research was identified, and a design was created and implemented.

Assumptions of the Study

This study was based upon the assumption that beginning skills inherent within decision-making are important, and that such skills could be taught and learned in the elementary school. Further, the researcher assumed the personalized experience of actual decision-making to be meaningful to the individual child,

¹²Frederick R. Smith and P. Benjamin Cox, New Strategies and Curriculum in Social Studies (Chicago: Rand, McNally and Co., 1969), p. 65.

in both the present and the future. This meaningfulness reflects the ultimate benefit to the vitality of our democratic society, as well as to the quality of the individual's personal life. Finally, the study also assumed that the measuring devices available would discriminate among the sample.

Definition of Terms

Terms of specialized use in this study are defined as follows:

Achievers, high: Those children reaching a level of performance in the uppermost third of their peer sample on standardized measures administered in their own elementary schools.

Achievers, middle: Those children reaching a level of performance in the middle third of their peer sample on standardized measures administered in their own elementary schools.

Achievers, low: Those children reaching a level of performance in the lower third of their peer sample on standardized measures administered in their own elementary schools.

Decision-making: As Good defines it, reaching a practical judgment with respect to what is to be

done in a particular situation. It is the act of forming a conclusion with deliberation implied.¹³

Incident, accidental: An event, especially a minor one, which happens by chance.

Incident, intentional: An event, especially a minor one, purposely contrived.

Intentionality: The state of readiness to do or try to do actions which will realize the desired object or goal.¹⁴

Perspective-taking, conceptual: One individual's inference regarding the less tangible aspects of another's internal experience, such as thoughts, desires, intentions.¹⁵

Standard metropolitan area: A central city with at least fifty thousand people according to the United States Census Bureau, and with economically integrated suburban areas. These are usually the rest of the county where the city is located and possibly the contiguous territories.¹⁶

¹³Carter V. Good and Winifred R. Merkel, Dictionary of Education, 3rd ed. (New York: McGraw Hill Book Co., 1973), p. 167.

¹⁴Bruce Aune, "Intention," in Encyclopedia of Philosophy, vol. 3, ed.-in-chief Paul Edwards (New York: The Macmillan Co., 1972), p. 199.

¹⁵Marvin et al., p. 511.

¹⁶M. J. Slakter, Statistical Inference for Educational Researchers (Reading, Mass.: Addison-Wesley, 1972), p. 520.

The Population and the Sample

The population to which results are applicable includes boys and girls in second grade classrooms in integrated public elementary schools in a standard metropolitan area. Cluster sampling techniques were employed to produce a representative sub-group. Post hoc stratification techniques were then used to generate levels of achievers, and to identify male and female subjects according to their performances on the standardized achievement measure in use in their school system. Two hundred eight subjects were sampled of which 201 yielded data for investigation.

General Hypotheses of Interest

The hypotheses of interest were:

1. There is a difference according to level of academic achievement in a child's decision-making behavior in relation to intention cues.
2. There is a difference according to gender in a child's decision-making behavior in relation to intention cues.
3. There is a difference according to size of school enrollment in a child's decision-making behavior in relation to intention cues.

Limiting Factors of the Study

There were several factors which limited the scope of this study. These factors are cited below:

1. This study is limited to the second grade children in the standard metropolitan area in which it was conducted.

2. Such factors as socioeconomic status, country of origin, race or ethnic background, and attitude of parents were neither measured, evaluated, nor controlled in this study.

3. The amount of time available for data collection in any public school setting is a normal limiting factor.

4. The study is limited by the degree of sensitivity of the measuring instruments available for use.

5. The use of an electronic device, the tape recorder, to communicate the items of Part II of the instrument had the advantage of uniformity of presentation for all subjects, accompanied by the normal limitations of the auditory medium. These limitations include the individual child's competence in the integration of auditory perceptions and his competence in acquiring meaning from oral statements.

6. The fact that the researcher was a stranger to the pupils and staff may be considered a limiting factor.

Overview

The following is a brief, descriptive overview of the entire study with the content of each chapter delineated:

In Chapter I the introduction to the study has been presented, followed by discussion of its background, purpose, and importance. The specific problem addressed by the study has been defined. Are children who achieve on different academic levels according to standardized measures in use in their own school systems likely to exhibit differences in decision-making behavior in relation to intention cues? Are boys or girls of the same primary grade level more likely to display decision-making behavior in relation to intention cues? Does the size of school enrollment have an effect on individual decision-making?

The sample and definition of terms have been presented. Hypotheses of interest have been specified, and the limiting factors of the study have been discussed. In Chapter II the literature and related research on decision-making behavior in young elementary school children is reviewed. The sample characteristics, methodology, instrumentation, and research design are described in Chapter III. In Chapter IV the statistical analysis and interpretation of data are presented. Finally, in

Chapter V, the summary of the entire study is presented followed by conclusions drawn from the findings and recommendations for further research.

CHAPTER II

A REVIEW OF RELATED LITERATURE AND RESEARCH

Introduction

The importance of research as a tool for the educator has been established. We live in an innovative, investigative era which demands professional adaptation to the continuum of change. Not least important of the characteristics of our time is the phenomenon of global neighborliness facilitated by jet travel and almost instantaneous satellite communication. The cross-communication of ideas, whether by traditional or technologically sophisticated means, serves as a dynamic force which impels educators to subject traditional theorizations and practices to critical research and analysis. It is the intent of the following review to contribute to this ongoing process.

Related Antecedent Research

The scope of the antecedent research involves selected investigations from the final decade of the nineteenth century to contemporary studies. In addition, selected theorizations of some of education's scholars have been discussed.

Earlier mention has been made of the scholarly work in the 1890s of Earl Barnes¹ at Leland Stanford Junior University. Barnes' reports first appeared in Pedagogical Seminary, a journal edited by Granville Stanley Hall starting in 1891. Later in the decade, in his own journal, Studies in Education, Barnes presented an elegant statement, in part still applicable, concerning the status of research with children:

Our knowledge of children is too fragmentary as yet to warrant an attempt to analyze a child's social consciousness into its constituent factors, or to justify us in tracing the development of these factors across the years of infancy and childhood. At the same time, any fair-minded student may reasonably undertake to sketch the way in which social judgments are formed in connection with some concrete instance, and he may hope that the multiplication of such studies will in time give us a body of facts on which we can safely rest larger generalizations.²

Barnes' study, "Punishment as Seen by Children," was based on written reports from 4,000 children, seven to sixteen years of age, on their ideas of just and unjust punishment. His research question bears repeating because of its solid impact on educational theorization over time. The question was: "Does a child in the process of his development from infancy to manhood pass

¹Barnes, "Punishment as Seen by Children," vol. 3, pp. 235-245.

²Earl Barnes, ed., "Growth of Social Judgment," in Studies in Education: A Series of Ten Numbers Devoted to Child Study, vol. II (Philadelphia: Huebsch Publisher, 1902), pp. 203-217.

through clearly marked stages in his attitude toward punishment?"³

Barnes did not totally resolve his question of stages. He concluded that children tended to consider punishment just simply because it was administered by adults, and children tended to believe offenses could be paid for with pain. Their adherence to these points of view tended to decrease with age.

Schallenger⁴ also reported in 1894 on research involving written responses of children, 6 to 16, to a story of a child who painted all of the parlor chairs because she wanted them to look nice for her mother. Younger children tended to decide that the child should be harshly punished, while older children tended to give consideration to the intention.

In 1898, while Barnes was in England replicating his research, he obtained results similar to Schallenger's. In addition, Barnes described a correlation between the responses which favored explanation and consideration of the intention over harsh punishment with the higher intelligence levels. Also, he found English children to be more mature than American children in

³Barnes, Studies in Education, vol. I, p. 28.

⁴Margaret E. Schallenger, "Children's Rights as Seen by Themselves," vol. 3, in Pedagogical Seminary, ed. Granville Stanley Hall (Worcester, Mass., 1894), pp. 87-96.

their earlier rejection of punitive punishment. The intentionality story which he presented 1,047 English children read as follows:

Once a Mother gave her child for a birthday present a beautiful box of paints. The child was just six years old. In the afternoon while the Mother was busy in another room the child painted all the chairs in the dining room to make them look pretty, and then she called out: "Oh, Mama, come and see how pretty I have made the dining room look." The paint could not be washed off, and so the chairs were spoiled. What would you have done if you had been the child's Mother? Why?⁵

Barnes, Schallenger and some of their contemporaries appear to have pioneered a direction later extended by Piaget and other researchers to study the development of a child's social or moral decisions with regard to intention.

Related Piagetian Research: The Contribution and the Dilemma

Background

Over the past fifty years the research and theorizations of Jean Piaget have been subjected to wide dissemination, numerous replications, and varied critical analyses. In voluminous writings, scholars have speculated that Piaget's contribution will continue to influence theory formation and research direction in education and other disciplines related to human development. The reason is that Piaget addressed a philosophical-scientific

⁵Barnes, Studies in Education, vol. II, p. 203.

question which has long engaged the reflections of thinkers: namely, by what means and mechanisms are humankind's conceptions of the world formed? The question remained debatable to Piaget himself, and since then scholars and scientists have tended to read into his theories that which is consistent with their own beliefs regarding nature and nurture, heredity and environment, as related to the value or futility of formal educational intervention in the lives of the young of humankind. To any research in psychology, sociology, education, or pediatric medicine, the naturalistic foundations of Piaget's theorizing demand consideration in the synthesis of professional/operational philosophy.

Piaget's Naturalistic Suppositions

Gibbs states:

At the heart of Piaget's Theory is a naturalistic theme Building upon [it] are the assumptions of holism, constructivism, and interactionism. The empirical criteria specific to naturalism indicate that sequential stage development is (a) . . . gradual, (b) common to the species, and (c) achieved through processes which are spontaneous and essentially unconscious.⁶

Naturalism is the most basic of the four fundamental features of Piaget's genetic theory. It may be

⁶John C. Gibbs, "Kohlberg's Stages of Moral Judgment: A Constructive Critique," Harvard Educational Review 47, No. 1 (February 1977): 53.

defined as a philosophic doctrine emanating from early Greek philosophers who searched for the cause or principle most explanatory of continuity and change. They had an unclear notion of the difference between qualities and things qualified, and traditionally adopted quantitative terms to explain the universe.⁷ On the other hand, Piagetian theory emphasizes a continuity between the human species and other biological forms of life. For Piaget, normative human behavior has a deep biological significance. This is in marked contrast to Rousseau⁸ and other Romantics who used naturalism as a theory of the good, locating the intrinsic goodness of man in the pre-socialized heart and experience of the young child.

Holism's view is that the living organism has a reality distinct from and greater than its constituent parts.⁹ The term holism was coined in 1926 by Jan Smuts and gradually came to be associated with (1) vitalism in biology, (2) gestaltism in psychology, and (3) super-organism in popular philosophy. Piagetian theory interprets holism as the existence of organized structures at

⁷Milton C. Nahm, Selections from Early Greek Philosophy, 4th ed. (New York: Appleton-Century-Crofts, 1964), p. 24.

⁸J. J. Rousseau, Emile (New York: Dutton, 1932).

⁹Gibbs, p. 5.

cellular, epigenetic, neurophysiological and behavioral levels.¹⁰

Further reflective of Piaget's philosophical perspective is constructivism, which assumes that mental behavior consists of new structures and new lines of conduct elaborating the course of continuous constructive development. The further assumption is that life shows a continual tendency to extend itself. Piaget theorizes of intelligence that it extends, but does not reduce to, organic regulatory processes and structures.¹¹

With regard to interactionism, Piaget theorizes that the organism interacts with the environment by "equilibration," the accommodations and assimilations which the organism and the environment exchange. He feels that social and physical conditions can affect only the rate of cognitive development, a point with which Campbell¹² and other recognized theorists strongly disagree. For them, knowledge is transmitted through the environmental encounters of teaching, learning, and schooling. They interpret the interaction as means of actualizing

¹⁰Ibid., p. 51.

¹¹Ibid., p. 52.

¹²Donald T. Campbell, "On the Conflicts Between Biological and Social Evolution and Between Psychology and Moral Tradition," The American Psychologist 30 (1975): 1103-1126.

this while Piaget posits the interaction itself as the generative origin of the acquisition of knowledge.

Basically, the work of Piaget has been that of a genetic psychologist and philosopher. His suppositions, studies, and findings are enormously generative of excitement and replicate research among those interested in human behavior. Inevitably, some have sought to superimpose findings based upon his method on inappropriate areas. In the belief that an understanding of the assumptions basic to Piaget's theory of cognitive development is essential, a summarized discussion of them follows:

Approach to theory formation.--Piaget's approach emanates from the biological sciences and philosophy. Validity is measured by the degree of inner consistency of findings with theoretical propositions, empirical research being a tool to substantiate or refute facts previously established by application of logic. Maier¹³ contends that for Piaget the logical consistency of all findings is the most decisive criterion of their potential usefulness.

Assumptions on the order of the cosmos.--Piaget believes in universal order and that four spontaneous

¹³Henry W. Maier, Three Theories of Child Development (New York: Harper & Row Publishers, 1965), p. 83.

actions are always present: (a) the action of the whole upon itself--the law of preservation and survival; (b) the action of the parts upon themselves--the law of preservation and survival; (c) the action of all the parts--the law of alteration and preservation; and (d) the action of the parts on the whole--the law of alteration and preservation.

Piaget recognizes three possible forms of equilibrium. These are (a) the predominance of the whole with alteration of parts, (b) the predominance of the parts with alteration of the whole, and (c) reciprocal balance of the parts and the whole.

On the etiology of human behavior.--Piaget has defined himself as a biologically oriented, genetic epistemologist. He is a researcher of human development who prefers to leave questions regarding behavioral etiology to others. He feels that the attributes of personality depend primarily on the evolving intellectual capacity of the individual to organize his experience. His famous stance on adaptation is that it is the cognitive striving of the thinking person or cognitive organism to find an equilibrium between himself and his environment through processes of assimilation and accommodation.

Assumptions on the core of human functioning.--Piaget speaks of primary processes as the development of

early mental processes and the totality of early human behavior. For him, the story of intellectual development is the story of personality formation. Piaget assumes a permanent striving toward equilibrium and believes in an invariant sequence of developmental phases or stages.

Piaget's conception of development.--Piaget views development as an inherent, unalterable, evolutionary process.¹⁴ He locates distinct developmental stages within the process, these stages to be thought of as homogeneous patterning of an individual's life-style for the duration of that period. Maier offers a six-point summary of the developmental conception as follows:

- (a) . . . there is an absolute continuity in all developmental processes,
- (b) development proceeds through a continuous process of generalization and differentiation,
- (c) this continuity is achieved by a continuous unfolding,
- (d) each phase entails repetition of processes of the previous level in a different form of organization,
- (e) the differences in organizational pattern create a hierarchy of experience and actions,
- (f) individuals achieve different levels within the hierarchy.¹⁵

Assumptions on the progression through stages.--Piaget believes in the gradual progression from one stage to the next and that the actual time of occurrence of a given stage may vary with the individual and the

¹⁴Ibid., p. 91.

¹⁵Ibid., p. 92.

particular society. Four main factors contribute to growth from one stage to the next. These factors are:

(a) Maturation--the biological growth of the nervous system. He believes this rate varies among individuals and is controlled by heredity.

(b) Experience--acting upon objects and drawing some knowledge about the objects by abstraction. Logical-mathematical experience is that of the actions of the subject, and not an experience of the objects themselves.

(c) Social transmission--the means by which a child learns information through language transmission from adults, other children, and media. The child, however, must have the structures which allow him to assimilate his new knowledge.

(d) Equilibration--mental activity as initiated by the child. The child is attempting to assimilate and accommodate information from the first three factors into his existing structure of knowledge. The two functional invariants are organization and adaptation. Organization is the internal aspect, or the accord of thought with itself, while adaptation is the external aspect, the accord of thought with things. Adaptation is broken down into two further aspects of assimilation and accommodation. Accommodations are experiences, actions, and reactions to things in the environment. Assimilation is input from and output to these experiences. For Piaget,

the importance of the role of educative experiences is qualified by his emphasis on equilibration processes.

The Dilemma

Elkind¹⁶ writes that Piaget views himself as a biologically oriented, genetic epistemologist first, a psychologist second, and an educator not at all. His profound interest in children is not that of the educator, but rather it is the interest of the geneticist, the logician, the philosopher. It then becomes a dilemma of educators themselves to confront the critical question raised by his work: Does education's formal intervention alter the cognitive development of the young of human-kind?

Gaudia¹⁷ sees this dilemma as residing in (1) the degree of scientific doubt surrounding the applicability of Piaget's theory to all of education, and (2) the zeal, impetus, and influence of Piaget's "coterie" in applying his writings to educational problems of questionable applicability.

¹⁶David Elkind and John Flavell, eds. Studies in Cognitive Development: Essays in Honor of Jean Piaget (New York: Oxford University Press, 1969).

¹⁷Gil Gaudia, "The Piagetian Dilemma: What Does Piaget Really Have to Say to Teachers?" The Elementary School Journal 74, No. 8 (May 1974): 480-492; Gil Gaudia, "Piaget's Theory and Psychometric Intelligence," The Elementary School Journal 73 (October 1972): 37-43.

In his assessment of Piaget's work, Berlyne¹⁸ observes the following: inadequate data sampling with regard to the sensori-motor period; and with regard to perceptual research, few measures of variance, no precise statement of assumptions, and no operational definitions of concepts. Further, as a psychologist, Piaget has refused to be identified as espousing one school of psychological thought, instead preferring to remain randomly eclectic. Notwithstanding these criticisms, Berlyne further comments that Piaget's ideas retain their generative capacity. They continue to move science forward because, linked to the observation of behavior, they remain productive of replication and extension studies by highly motivated researchers in education, psychology, and sociology.

In general, it may be stated that theorists have divided themselves into three positions with regard to Piagetian interpretations. Position One interprets the Piagetian meaning to support genetic innateness as the prime factor in intellectual performance, pointing out the strong biological significance of organization

¹⁸D. E. Berlyne, "Recent Developments in Piaget's Work," in Current Research in Elementary Social Studies, ed. Wayne L. Herman, Jr. (Toronto: Collier Macmillan Canada, Ltd., 1969), pp. 105-117.

and adaptation. Inhelder,¹⁹ Elkind,²⁰ Flavell,²¹ and Evans²² hold this position.

Position Two interprets Piaget as supportive of environmentalist viewpoints as explained by Furth.²³

Position Three, a conciliatory view, sees Piagetian Theory as supportive of both hereditary and environmental interaction. This viewpoint has been discussed by Gaudia²⁴ in an effort to emphasize the possibility of distortion of Piaget's views vis-à-vis temptation to cite them authoritatively in regard to unrelated aspects of human behavior or curricular innovation.

¹⁹Barbel Inhelder, "Some Aspects of Piaget's Genetic Approach to Cognition," in Thought in the Young Child, eds. W. Kessen and C. Kuhlmen (Washington, D.C.: Society for Research in Child Development), vol. 27, no. 2, serial 83, pp. 19-34.

²⁰Elkind and Flavell, Studies in Cognitive Development.

²¹John H. Flavell, The Developmental Psychology of Jean Piaget (Princeton, N.J.: Van Nostrand Co., 1963), p. 472.

²²Richard I. Evans, Jean Piaget: The Man and His Ideas, trans. Eleanor Duckworth (New York: E. P. Dutton and Co., Inc., 1973), pp. xi, 101.

²³Hans G. Furth, Piaget for Teachers (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970).

²⁴Gaudia, "The Piagetian Dilemma," pp. 480-492.

Benjamin Bloom,²⁵ however, declares that although the geneticist or the psychologist may wish to speculate about improvement of the "gene pool," the educator of necessity is an environmentalist. Bloom emphasizes that it is only through the environment that the educator may intervene in the life of the young of his own species. Learning takes place within the young human, but the means of influencing this learning is external--the skill of environmental manipulation, termed instruction. Bloom believes the three significant variables in the learning situation to be (1) cognitive entry behaviors, (2) affective entry behaviors, and (3) quality of instruction. He further declares that what one person in the world may learn, other persons may learn if provided with appropriate prior and current conditions of learning.²⁶

Decision-Making in Young Children

Celia Scapelhorn²⁷ states in an exploration of the Piagetian consideration of children's moral decisions, that from a theoretical and methodological viewpoint the

²⁵ Benjamin Bloom, "Letter to the Editor," Harvard Educational Review 39 (Winter 1969): 421.

²⁶ Benjamin S. Bloom, Human Characteristics and School Learning (New York: McGraw-Hill Book Co., 1976), p. 7.

²⁷ Celia Scapelhorn, "Piaget's Cognitive Development Approach to Morality," in Piagetian Research, ed. Sohan Modgil (Windsor, Berks.: NFER Publishing Co., Ltd., 1974), pp. 275-368.

investigations of children's moral development and decisions are polarized. One pole represents behavioral systems and its opposite represents cognitive systems which incorporate (1) psychoanalytic, (2) learning theory, or (3) cognitive-developmental approaches. This diversity can be traced to three historic philosophical doctrines:

1. The doctrine of original sin, which emphasizes the importance of adult intervention and is represented in modified form by Freudian theory, leading to emphasis and research on the phenomenon of guilt.

2. The doctrine of tabula rasa, in which the child is assumed neither corrupt nor pure. In this doctrine adult intervention is defined as greatly important. The doctrine undergirds the learning theory approach which regards morality as based in rewards and punishments with little accompanying rationale.

3. The doctrine of innate purity, in which the corrupting influence of society is stressed. This doctrine is associated with Piaget's insight into the development of morality; building upon it, he stresses the importance of social interaction among peers and adults along with the development of cognitive processes.

It had been approximately forty years after the Barnes and Schallenger reports that Piaget²⁸ began

²⁸Piaget, Moral Judgment, pp. 117-118, 184.

to report his investigations of the mental processes and thought structures underlying the judgment of children in a variety of problematic situations presented in the form of stories and informal interviews. Eventually, Piaget's distinction between constraint and cooperation in the thinking of the child became the foundation of his theoretical base for the decisions children make regarding moral dilemmas. He reached this position by first investigating the attitudes of children toward rules and their origin, legitimacy, and alterability. He attributed the establishment of cooperation and the development of the idea of justice to intellectual growth and the experiences of role-taking in the peer group. Finally, mutual agreement and reciprocity were considered to represent the advanced stages in moral reasoning.

Continuing, Piaget presented children with hypothetical situations in the form of proverbs or stories to reveal their ideas of punishment, responsibility, equality, authority, moral realism and three forms of justice--immanent (inherent), retributive, and distributive. Scapellhorn and other critical scholars maintain that Piaget succumbed to the temptations which so easily beset researchers. They point to the tendency to generalize beyond documentation and to interpret in the light of his own philosophical and genetic interests.

Exemplary may be Piaget's use of intentionality stories involving clumsiness in an effort to reveal children's ideas and decisions about punishment. The stories were in two categories: one with considerable material damage to objects--but the damage was the result of a well-intended act--and in the second category there was negligible material damage but an ill-intended act. He set up similar investigations regarding lying and stealing with the aim of trying to discover whether the child ascribed greater importance to the intention or to the material results. Piaget reported in his findings that younger children tend to give less importance to the intentions in question, while older children give evidence of considering the intentions.

Replicative Investigations

The educator's dilemma in regard to certain aspects of Piagetian theory has been explored, with the point remaining that the thrust of Piagetian theorization since its initial reporting has addressed a philosophical-scientific question long provocative to Western thought: By what means and mechanisms are humankind's conceptions of the world formed? The generative power of this idea continues to draw the attention of researchers from numerous disciplines. The following examination of replicative studies with regard to just one aspect of the

theorization, children's decision and intention cues, sheds interesting light on the thinking of numerous scholars.

Harrower,²⁹ in 1934, after a study of upper-class and working-class children in England, refuted the Piagetian notion of stages in moral development. Instead, she considered parental influence to be the dominant influence in maturing responses of children. Then, in 1937, Lerner³⁰ reported upon the relationship of social status, parental authority and moral realism in American children from six to twelve years of age. He concluded that children of middle-class families pass through stages of moral development earlier than the children of lower-class families, attaching the social variable to the concept of moral development.

A conceptual problem connected with children's decisions on punishment and intentionality on the part of the doer is the childhood idea of immanent justice--meaning a belief that punishment automatically emanates from things themselves. Piaget hypothesized that children

²⁹M. R. Harrower, "Social Status and the Moral Development of the Child," British Journal of Educational Psychology 4 (1934): 75-95, as recorded in Sohan Modgil, ed., Piagetian Research (Windsor, Bers.: NFER Publishing Co., Ltd., 1974), p. 282.

³⁰Eugene Lerner, "The Problem of Perspective in Moral Reasoning," American Journal of Sociology 43 (1937): 249-269.

abandon this belief as they mature. Provoked by this hypothesis, a number of researchers have replicated Piaget's studies. Ching-Ho Liu³¹ reported in an unpublished doctoral dissertation in 1950 that children six to twelve years of age decreased each year in their belief in immanent punishment. Liu also found a higher level of belief in non-Chinese children, concluding that cultural factors, rather than age alone, are contributory.

At the University of Chicago in 1955, Havighurst and his associates³² investigated more than 900 Indian children ages 6 to 18 from six Indian tribes. He reported either an increase or no change in the children's belief in immanent justice. He concluded that children in primitive societies tend to become more rigid in their moral development due to the constraints placed upon them. He also felt that environmental factors within each cultural group must be investigated in depth.

³¹Ching-Ho Liu, "The Influence of Cultural Background on the Moral Judgment of Children" (Ph.D. dissertation, Columbia University Press, 1950), as reported in Sohan Modgil, ed., Piagetian Research: A Handbook of Recent Studies (Windsor, Bers.: NFER Publishing Co., Ltd., 1974), p. 283.

³²Robert J. Havighurst and B. L. Neugarten, American Indian and White Children: A Sociopsychological Investigation (Chicago: University of Chicago Press, 1955).

Gustav Jahoda³³ replicated the work of Havighurst with West African children and confirmed the belief of the children in immanent justice, questioning, however, the validity of some of the interview items.

In a series of replication studies beginning in 1959, Durkin³⁴ sought to determine if Piaget's generalizations in this area of moral decisions had been "too sweeping." Not in total agreement, she concluded that although the role of intelligence in moral decisions and judgment was undefined, there is a relationship between age and concepts of justice, and that older children give evidence of being more aware of the complexities of a situation.

Medinnus,³⁵ in a series spanning 1959 through 1966, also sought to replicate some of Piaget's findings.

³³Gustav Jahoda, "Immanent Justice Among West African Children," Journal of Social Psychology 47 (1958): 241-248.

³⁴Dolores Durkin, "Children's Concepts of Justice: A Comparison with the Piaget Data," Child Development 30 (1959): 59-67; Dolores Durkin, "Sex Differences in Children's Concepts of Justice," Child Development 31 (1960): 361-368; Dolores Durkin, "The Specificity of Children's Moral Judgments," Journal of Genetic Psychology 98 (1961): 3-13.

³⁵Gene Roland Medinnus, "Immanent Justice in Children: A Review of the Literature and Additional Data," Journal of Genetic Psychology 94 (1959): 253-262; Gene Roland Medinnus, "The Relation Between Several Parent Measures and the Child's Early Adjustment to School," Journal of Educational Psychology 52 (1961): 153-156; Gene Roland Medinnus, "Objective Responsibility in Children: A Comparison with Piaget's Data," Journal of Genetic Psychology 101 (1962): 127-133.

Two hundred forty children of lower socioeconomic status were given 18 Piagetian-type intentionality stories with questions somewhat different from the Piagetian model. The results were used as evidence to indicate a child's shift from subjective to objective responsibility. Younger children tended to think an action or lie was wrong only because of the resultant punishment. Older children realized the conflict with mutual trust and affection.

Armsby³⁶ investigated Piaget's story pairs in which accidental and intentional actions were presented. He concluded that the Piagetian stories did not clearly differentiate between accidental and intentional behavior, and after using revised versions of the intentionality stories, he found that children made decisions based on intention cues at an earlier age. He reported an age progression, but no clear age level at which decisions based upon constraint ceased to occur.

Johnson³⁷ investigated the antecedent adult constraint, age, sex, I.Q., and parent occupation relative to moral judgment and decisions with 807 children in grades 5 through 11. He used intentionality stories

³⁶Richard E. Armsby, "A Reexamination of the Development of Moral Judgments in Children," Child Development 42 (1971): 1241-1248.

³⁷Ronald C. Johnson, "A Study of Children's Moral Judgments," Child Development 33 (1962): 327-354.

based upon the Barnes-Piagetian model with new questions. He reported that out of 760 correlations, 294 were positive and 79 were negative and at the alpha 0.05 level of significance. Abstractness, concreteness, and parent attitude were found to be less significant than I.Q. and parent occupation.

Literature and Research Related to the
Role of the Elementary School Experi-
ence in Nurturing Children's Skills
in Decision-Making Behavior

In the schools the young learn whether and how to debate the future.³⁸

Writing in his volume, Alternative Models of Elementary Education, Joyce emphasized the critical role of the elementary school experience on the child's early decision-making. Early and casual observation may seem to indicate that decisions are made almost instinctively; that is, the child inferring from the sum of his present experience at any given point in time. He then makes the most personally advantageous decision of which he can conceive. As this paper has already discussed, Piaget asserted that the more immature decision-making behavior is based on constraint, while maturity introduces cooperation and consideration of additional situational

³⁸ Bruce R. Joyce, Alternative Models of Elementary Education (Waltham, Mass.: Blaisdell Publishing Co., 1969), p. 3.

forces such as intention cues. Joyce³⁹ declares the decisions we make to be limited or extended by what the tools of our time enable us to do. Any consideration of the "tools of our time" involves our system of elementary education. It is this system, in its early years of impact upon children, which initiates and fosters skill development. For example:

1. skill in recognizing factual information;
2. skill in recalling and applying factual information;
3. skill in translating concepts from one kind of language (verbal or symbolic) to another;
4. skill in comprehending concepts;
5. skill in recognizing and comprehending interrelationships among concepts;
6. skill in performing fundamental operations;
7. skill in inferring or extending interpretations beyond stated information; and
8. skill in reaching a decision.

Such skills are vital to successful living in our society, which has in large measure delegated to the schools the enhancement of these skills in children. As a matter of response, educators increasingly are alert to contemporary research, imaginative ideas, and

³⁹Joyce, p. 42.

exploratory theorizing related to learning. Tracing this trend, Joyce explains:

The historical antecedents of this quest for excellence can be traced to the writings of those who sought to undertake the first "scientific" studies of education in this country. By the turn of the nineteenth century G. Stanley Hall, William James, E. L. Thorndike, Charles Judd, Lewis Terman, and John Dewey had begun to regard the child as a legitimate subject for observation and experimentation.⁴⁰

Engle,⁴¹ in a powerful presentation, declares decision-making to be the "heart" or "special forte" of the social studies curriculum. In its inherent thrust toward preparing future citizens for national and global perspectives, the social studies must convey the understanding that the quality of decisions about public and private matters of social concern is one of the marks of good citizenship.

Engle further admonishes that schools must begin early if they are to have impact upon the students' increasing skill in intelligent decision-making. The decision-making process should provide the structure around which the social studies curriculum is organized.

⁴⁰ William W. Joyce et al., eds., Elementary Education in the Seventies: Implications for Theory and Practice (New York: Holt, Rinehart, and Winston, Inc., 1970), p. iv.

⁴¹ Shirley H. Engle, "Decision-Making: The Heart of the Social Studies Curriculum," in Crucial Issues in the Teaching of Social Studies, eds. Byron G. Massialas et al. (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1964), pp. 28-35.

Students will gradually attain competencies in decision-making as they receive guided and critically oriented instruction and experience in the process. To very young children, very simple anecdotes or story dilemmas may be presented for classroom consideration and discussion. Over time there will be advancement to the more complex situations of individual behavior, social problems, and public political policy.

Parallel to the long-term quest for excellence by educators, parents increasingly have communicated their reaction to the events of schools. A nervous public watches as schools respond to varied social, political, and economic pressures. The quality, nature, and direction of both responses is of concern to educators. Gershenkron pleads for perspective, declaring: "Nothing is so good that it cannot benefit from criticism. No criticism is so justified that its weaknesses can be ignored."⁴²

Generally, it becomes the responsibility of the professional educators to integrate the collective insights of direct experience and related research into interaction with children. Such interaction will have its base in the recognition that children learn in a

⁴²Alexander Gershenkron, "Getting Off the Bullock Cart: Thoughts on Educational Reform," The American Scholar 45, No. 2 (Spring 1976): 407.

great variety of ways--and that they learn more effectively when they are guided into making decisions about what and how they learn.

But as Joyce⁴³ points out, an insidious counterforce impacts upon educators. It may be described as a pull toward conformity, a resistance toward change, the rejection of procedures which appear to be innovative, or the mistaken assumption that status quo is the most advantageous survival syndrome. Accordingly, many educators assess the social-political-cultural climate of their working communities and try to reduce all negative reactions by avoiding controversial issues. Conceding to such a modus operandi creates classrooms which become bland, dull places where bold thinking, exploration of hypotheses, free-ranging inquiry, and student decision-making are unknown, and where professionals abdicate their educative responsibility. It is their assessment of the political-cultural milieu which determines the quality of each child's education. As a result, children are deprived of the relevance, vitality, and vigor of educational adventure.

Conversely, the true role of the elementary school in nurturing children's decision-making behavior reveals a higher calling to what Joyce terms the

⁴³Bruce Joyce, p. 53.

"mission" of the school. He delineates three realms of decision-making crucial to elementary schools in America. Decisions in the first realm answer the question of what will be the mission of the school. Decisions in the second realm answer the question of what social, technological and curricular systems will be developed in order to intervene effectively in the life of the student. Decisions in the third realm address the question of how the system will evaluate growth and communicate it to those concerned.

The scope of these questions combined with the importance of the decisions invites reliance on a structure. Such structure permits identification of central unifying objectives that serve to focus the combined efforts of school personnel and students, thus effectuating the mission of a societal institution. Joyce explains:

The mission of the school can be defined in terms of the domains (or realms) through which it enters into the life of the student. For education is an attempt to enter our life and change it. The product of education is always seen in terms of a developed capacity to respond to reality in new ways.⁴⁴

Obviously, decision-making on the part of children will be inherent in the response.

⁴⁴Ibid., p. 8.

Continuing, Joyce suggests three functional domains which define the mission of the school, serve as points of intervention in the life of the child, and implement the accomplishment of school as nurturer. These domains are (1) the academic domain, (2) the personal domain, and (3) the social domain. Within each are alternate emphases which may be combined in varied ways, and within each children should experience decision-making skills, guided by the intervention of competent, caring educators.

An examination of the academic domain indicates that educators may choose to intervene in the life of the child by emphasizing five major aspects. These are:

1. symbolic technical proficiency,
2. information from selected disciplines,
3. major organizing concepts or structures of the selected disciplines, in the manner of Bruner⁴⁵ and Ausubel,⁴⁶
4. modes of inquiry of the disciplines,
5. broad philosophical problems such as ethics, aesthetics, and humanitarian issues.

It is evident that intervention through the academic domain can provide the child with a basis for

⁴⁵Jerome S. Bruner, The Process of Education (New York: Vintage Books, Random House, 1961), p. 6.

⁴⁶David P. Ausubel, The Psychology of Meaningful Verbal Learning (New York: Grune and Stratton, Inc., 1963), pp. 39-49.

dealing with complexity, for internalization of symbolic systems, for synthesis of the strategies of the scholar, and for exercise of decision-making skills. Thelen⁴⁷ and Miel⁴⁸ emphasized that the child learns the disciplines through practicing them. They encourage teachers to facilitate engagement in the activities of the scholar by practicing his problem-solving, decision-making inquiry method in the classroom.

Within the personal domain, educators may choose to intervene in the life of the child through a combination of the following emphases:

1. self-organization as described by Rogers⁴⁹ and a host of other scholars;
2. development of productive thinking capacity and creativity as described in the writings of Torrance;⁵⁰
3. development of personal meaning whereby the child discovers himself and finds meaning in a social

⁴⁷Herbert A. Thelen, Education and the Human Quest (New York: Harper and Row Publishing Co., 1961), Chapter Two.

⁴⁸Alice Miel and Peggy Brogan, More Than Social Studies: A View of Social Learning in the Elementary School (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1957).

⁴⁹Carl R. Rogers, On Becoming a Person (Boston: Houghton-Mifflin Co., 1961).

⁵⁰Ellis Paul Torrance, Gifted Children in the Classroom (New York: The Macmillan Publishing Co., 1965).

world as broadly described in Fromm's⁵¹ and Bandura's⁵² writings;

4. increasing the student's capacity for bold thinking, decision-making, and problem-solving as emphasized in the heritage from Dewey;⁵³

5. developing the aesthetic capacity of the student by trying to change his response to beauty in his life, in his physical and social environment, as emphasized by Dewey.

Summary

This review of related literature and research has traced the educational interest in children's decision-making from the last decade of the nineteenth century to contemporary times.

Of particular interest was the work of Earl Barnes as published by Granville Stanley Hall starting in 1891. Seeking to study the ideas and written notions of children as to their decisions on just and unjust punishment, he reported extensive research with children in the United States and in England.

⁵¹Erich Fromm, The Art of Loving (New York: Harper Row Publishing Co., 1956).

⁵²Albert Bandura and Richard J. Walters, Social Learning and Personality Development (New York: Holt, Rinehart and Winston, 1963).

⁵³John Dewey, The Child and the Curriculum (Chicago: University of Chicago Press, 1960).

Forty years later Piaget began to publish accounts of his research in the same area. An in-depth exploration of the naturalistic suppositions of the Piagetian theorization and its implications for education pro and con, from the writings of leading educational scholars, has been presented. The marked generative quality of the theorizations of Piaget is attributed by many writers to the fact that he addressed a question which has long claimed the attention of Western thinkers. The question is, By what means and mechanisms are humankind's conceptions of the world formed?

The final section of the review dealt with the contribution of the elementary school experience toward nurturing decision-making skills in young learners.

CHAPTER III

DESIGN OF THE STUDY

Introduction

This chapter contains a description of the population and sample, the methodology, the instrumentation, the design of the study, a restatement of the hypotheses tested, and a discussion of the statistical analyses used.

The Population and the Sample

The target population to which results are generalizable includes boys and girls in second grade in four public elementary schools in a standard metropolitan area of the United States. These four schools had a second grade enrollment of approximately 400 pupils, of whom 208 returned permission slips allowing them to participate in the study.

From the population, cluster sampling techniques were employed to produce a representative sub-group. Post hoc stratification techniques were then applied to the sample to obtain higher, middle, and lower achievers, male and female subjects--all according to their performances on the standardized achievement measure

presently in use in their school system. Two hundred eight children were sampled, of which 201 contributed data used in this study.

The sample was obtained from four schools assigned by the standard metropolitan area. There are no data available regarding ethnic, racial, nor religious makeup of the sample. Gross observation indicated racially integrated faculty and pupil personnel.

Methodology

The data collection method consisted of two parts. In part one the classroom teachers of the elementary division administered a standard basic skill assessment battery to the children. This battery had been formally adopted by the administrative officials of the school system of the standard metropolitan area in 1975. Its characteristics will be discussed in the section on instrumentation.

Part two consisted of a 14-minute taped reading by the researcher of short situations or incidents related to the general school and playtime experiences of second graders with each other or with adults. The children checked written responses to the incidents. By so doing, they indicated beginning decision-making competencies in relation to intention cues.

Instrumentation

The two-part instrument consisted of a basic skill assessment battery followed by incidents on which to base a decision.

The basic skill assessment battery was the Comprehensive Tests of Basic Skills, Expanded Edition, published by McGraw-Hill in 1973. It was formally adopted in 1975 by the standard metropolitan area. The purpose of the battery is not to measure achievement in specific course content as reflected in textbooks for various grade levels throughout the United States. Rather, the battery systematically measures those skills prerequisite to studying and learning in the subject matter courses, namely, the basic skills. The underlying assumption is that all curricula are formulated to increase, through the grades, a student's competence in intellectually manipulating content of planned increasing difficulty. Using Handbook I: The Cognitive Domain of the Taxonomy of Educational Objectives,¹ the battery objectives can be classified under the following five broad intellectual processes.

1. Recognition: the ability to recognize or recall information. Bloom indicates that for measurement

¹Benjamin S. Bloom, ed., Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook I: Cognitive Domain (New York: David McKay Co., Inc., 1956).

purposes, the recall situation involves little more than bringing to mind the appropriate material. He elaborates, however, that the process of relating is also involved in that a knowledge test situation requires the organization and reorganization of a given problem, such that it will furnish the appropriate signals and cues for the information the individual possesses.

2. Translation: the ability to translate concepts from one kind of language, verbal or symbolic, to the other. The evidence of comprehension lies in the accuracy with which a communication is paraphrased from one form of language to another.

3. Interpretation: the ability to comprehend concepts and their interrelationships. Interpretation involves a reordering or a new view of the given material.

4. Application: the ability to apply techniques including performing fundamental operations. Bloom² states that it involves the use of abstractions in particular and concrete situations. These abstractions may be in the form of general ideas, rules, technical principles, or theories.

5. Analysis: the breakdown of a communication into its constituent elements so that the relationship

²Ibid., p. 205.

between ideas is clear. It is the ability to extend interpretation beyond stated information.

For several years prior to publication in 1973, the McGraw-Hill Corporation had been conducting research in an effort to identify and make gains in eliminating racial and ethnic bias in its batteries. This instrument represents the first application of that research from item tryout to the final product. The reported steps in this procedure were (1) elimination of biased items, (2) review by educators and psychologists who are minority group members, and (3) research on students from different ethnic groups during the process of standardization. In a statement regarding this procedure Spencer³ observes:

. . . choice of the Comprehensive tests of Basic Skills to stratify subjects on the ability criterion is to be commended. Through the research literature and personal communication and visits with Dr. Donald Ross Green, research psychologist at CTB/McGraw Hill, I am familiar with the procedures used in the development of this test battery. I consider it to be an appropriate instrument for the purpose of your study because of the close attention given in the standardization phase to the composition of the sample, and to the item tryout and selection procedures followed in development of the battery.

The battery in reading and in mathematics was administered to the subjects of this study by their own

³Thelma L. Spencer, personal letter, April 19, 1977, commending Comprehensive Tests of Basic Skills Procedures. She is the Executive Associate for School and College Relations, Educational Testing Service, Princeton, New Jersey.

classroom teachers. The raw score results were transformed into expanded standard scores, percentiles, and stanines. The eight variables were:

- a. Variable 1--Letter Sound
- b. Variable 2--Word Recognition I
- c. Variable 3--Reading Comprehension
- d. Variable 4--Word Recognition II
- e. Variable 5--Total Reading
- f. Variable 6--Mathematics Concept Application
- g. Variable 7--Mathematics Computation
- H. Variable 8--Total mathematics

Part two of the instrument was administered by means of an electronic device, the tape recorder. It consisted of an approximately 14-minute reading by the researcher of researcher-created short incidents. The ideas for these short incidents or situations in the lives of young children were patterned from the models first recorded in 1894 by Barnes⁴ and Schallenger⁵, then later elaborated upon and enlarged by Piaget⁶ starting in 1929. The children indicated their decisions as to the outcome of the incidents by circling responses on

⁴Barnes, "Punishment as Seen by Children," vol. 3, pp. 235-245.

⁵Schallenger, pp. 87-96.

⁶Piaget, Moral Judgment, pp. 117-118.

a pre-printed answer sheet. There were 26 incidents, 13 classified as accidental and 13 classified as intentional (see Table 3.1). As a further refinement, four of the accidental incidents involved harm or discomfort to a person, with the nine remaining involving harm to an inanimate object. Within the intentional classification, eight incidents involved harm or discomfort to a person and the remaining five involved harm to an object. The decision scores of the children yielded dependent variable data.

TABLE 3.1.--Numerical Relation of 26 Instrument Items to Decision Concepts.

| Concept | Type | No. | Randomized Order of Item Appearance in Test | | | | | Total |
|-------------|--------|-----|--|----|----|----|----|-------|
| Accidental | Person | 4 | 5 | 10 | 18 | 26 | | 13 |
| | ----- | | 2 | 4 | 7 | 12 | 14 | |
| | Object | 9 | 16 | 20 | 22 | 24 | | |
| Intentional | Person | 8 | 3 | 6 | 8 | 9 | | 13 |
| | ----- | | 15 | 17 | 21 | 25 | | |
| | Object | 5 | 1 | 11 | 13 | 19 | 23 | |

The following are examples of incidents used in part two of the instrument.

1. Two second grade classes in your school are playing a game to see which class can kick the ball the greatest distance. Everyone has had a turn except Ross.

So far the classes are even. But if Ross can kick the ball real far his class will win. Ross takes careful aim and kicks the ball with all his might. The ball goes sailing clear across the playground, smashes into a window and breaks it. Do you think Ross should be punished? (Accidental Incident)

2. One day at school Sam's friend made fun of him. Later that day Sam saw his friend coming home from school. Sam hid behind a fence, and as his friend passed by Sam squirted him on the leg with a water pistol? Do you think Sam should be punished? (Intentional Incident)

Design

A $2 \times 2 \times 3$ randomized block design was used to test the hypotheses comparing groups of the sample. Table 3.2 illustrates the design of the study.

TABLE 3.2.--Design of the Study.

| Column 1 | Column 2 | Column 3 | Column 4 |
|-------------|----------|----------------|----------------|
| Achievement | Gender | School Density | Decision |
| High | Male | Large census | $S_{s1} \dots$ |
| Middle | | | |
| Low | | Small census | |
| High | Female | Large census | S_{sn} |
| Middle | | | |
| Low | | Small census | |

Testable Hypotheses

The purpose of this study was to explore and analyze the extent to which the second grade elementary school child gave evidence of using intention cues in his decision-making behavior.

The following null hypotheses were formulated and tested:

1. There is no statistically significant difference according to level of academic achievement in an early primary grade in children's decision-making behavior in relation to intention cues.
2. There is no statistically significant difference according to gender in children's decision-making behavior in relation to intention cues.
3. There is no statistically significant difference according to size of school enrollment in children's decision-making behavior in relation to intention cues.

Discussion of Analytical Procedures Used

The first procedure was to compute the means, standard deviations, and variances in order to determine the basic character of distribution of the sample over each of the variables; information on the central tendency and the amount of dispersion around the mean was deemed fundamental. The third and fourth moments are calculated in order to secure as precise a picture as possible of the shape of the distribution over each variable. The Statistical Package for the Social Sciences--

(SPSS) Condescriptive Program⁷ was used to compute the statistics. A computer input program, it is capable of providing the user with descriptive statistics for a set of raw data. Also, frequency tables were constructed to provide information regarding the exact numbers of the 201 subjects represented in the breakdown of levels for a given variable.

The Third Moment is a statistic needed to determine the degree to which a distribution approximates the normal curve. This moment equals zero when the distribution is completely symmetrical and bell-shaped. A positive finding indicates a cluster to the left of the mean with most of the extreme values in the right. The negative finding indicates a cluster to the right of the mean with most of the extreme values to the left. The formula:

$$\sum_{i=1}^N \frac{\left[X_i - \frac{\bar{X}}{S} \right]^3}{N}$$

The Fourth Moment (kurtosis) gives an indication of the relative peakedness or flatness of the curve defined by the distribution of cases. A positive statistic indicates a narrow, peaking distribution--more so

⁷Norman H. Nie et al., Statistical Package for the Social Sciences, 2nd ed. (New York: McGraw-Hill Book Co., 1975), pp. 181-193.

than would be true of the normal distribution. The negative statistic indicates a flatter, wider distribution than would be considered normal.

The Fourth Moment formula is:

$$\sum_{i=1}^N \frac{\left[\frac{(X_i - \bar{X})}{S} \right]^4}{N} - 3$$

Correlation

It is highly unusual in social or behavioral research to find a regression line which perfectly fits the collected data. Statisticians have hypothesized various reasons such as (1) the true relationship not fitting the curve drawn, (2) the degree of human error (avoidable and unavoidable) in data collection, and (3) imprecise applications of data to analysis. Accordingly, the Pearson Product Moment Correlation Coefficients among the variables were calculated in order to gain information regarding the strength of the relationship. The Statistical Package for the Social Sciences program Pearson Corr was used.

The MANOVA program⁸ of the Statistical Package for the Social Sciences was used to analyze statistical

⁸Eli Cohen and Phil Burns, SPSS-MANOVA, Preliminary Edition (Evanston, Ill.: Northwestern University Press, 1976), p. 3.

relationships among the 14 variables. This computer program relies upon the general linear hypothesis approach to analysis of variance. The fixed effect linear hypothesis model was used. Statistical Package for the Social Sciences MANOVA is a generalized program which performs univariate and multivariate linear estimation on tests of hypotheses for a fixed or random effects model, with or without covariates.

Conceptual Contrast of Multiple
Regression Analysis With
Analysis of Variance

Most behavioral research problems are of the ex post facto type which do not lend themselves to exact experimental manipulation and control as they do in the natural sciences. Rather, in the behavioral sciences, the intact, already-existing groups must be used. Kerlinger⁹ makes the point that subjects arrive or come to the research studies with variables which cannot be manipulated. They are then assigned to groups for study on the basis of their possession of these variables, such as membership in a socioeconomic class, or level of academic achievement. Attribute variable is the term given to such a measured variable. Active variables are manipulated variables--as with the reward variable given or not given to different groups of children in a control

⁹Kerlinger, pp. 6-9, 419-422.

group study. It has been a common practice among researchers to partition variables routinely, but with multiple regression analysis dichotomous variables may be entered as independent variables, assigning them zero or one depending upon whether they do or do not possess the characteristic in question. Continuous variables that normally would be partitioned in straight analysis of variance are included as independent variables in multiple regression analysis. Multiple regression has the capacity to handle different kinds of variables with equal facility.

In contrast to multiple regression, three underlying assumptions of analysis of variance are (1) normality, (2) independence, and (3) equality of variances.

Underlying Assumptions of Multiple Regression Analysis

First and foremost in multiple regression analysis it is assumed that the Y scores (dependent) are normally distributed at each value of X (independent). The validity of the F ratio depends upon the assumption that the dependent variable scores are normally distributed in the population.

Secondly, it is assumed that the Y scores have equal variances at each X point. The general regression equation of k number of variables, $Y = a + b_1X_1 + \dots + b_kX_k + e$, assumes the error to be random and normally

distributed with equal variances at each X point.

Restated by Kerlinger, "the distribution of the deviations from regression (residuals) are the same at all X points."¹⁰ It is well also to remember the "F" and "t" tests are robust statistics which resist the violation of assumptions. The statistical significance of R^2 (and thus the regression) is reflected by the "F" ratio.

Underlying Concepts of Multiple Regression Analysis

Underlying concepts which are basic to this system include acceptance of the regression model as a formal means of expressing the following two essential ingredients of a statistical relation: (1) the tendency of the dependent variable (designated Y) to vary with the independent variables in a systematic fashion, and (2) a scattering of observations around the curve of this statistical relationship. These two essential characteristics are embodied in the regression model by postulating that (1) ". . . in the population of observations associated with the sampled process there is a probability distribution of the dependent variable for each level of the independent variable,"¹¹ and (2) the

¹⁰ Kerlinger and Pedhazur, pp. 47-48, 63.

¹¹ John Netter and William Wasserman, Applied Linear Statistical Models: Regression, Analysis of Variance and Experimental Designs (Homewood, Ill.: Richard D. Irwin, Inc., 1974), pp. 25-26.

means of these probability distributions vary in systematic fashion with the independent variables. This systematic function is called the regression function of the dependent on the independent variables, and its graph is called the regression line.

Conceptually, the construction of models does serve to reduce the innate complexity of human phenomena to manageable proportions. Learning, achievement, decision-making are all considered phenomena having several sources of variation in education as well as in the other behavioral disciplines; the substantive and analytic importance of variation cannot be too strongly emphasized. Conceptually, this complexity of human nature mandates starting the analysis at a selected given point in order to gain direction toward clearer insight. Progress uncovers a series of marginal truths which are significant to research in three aspects: (1) statistical, (2) pedagogical, or (3) directional--pointing toward future research. In this particular study, analysis of these data (as processed by mathematical techniques performed in mini-seconds by that inestimable tool, the computer) reduced somewhat the perceived complexity of human behavior and indicated direction for future research. At the same time it gave renewed importance to the realization that all aspects of human behavioral phenomena are not yet fully apprehended.

Conceptually, there is a multi-faceted interaction of independent variables as they impinge on dependent variables. The task of multiple regression analysis is to help explain the variance of a dependent variable by estimating the contributions to this variance of two or more independent variables. The principle of "least squares" applies in all regression problems since all predictions regarding variables are subject to error, all scientific data are subject to fallibility. The principle of least squares serves to minimize the squared deviations from the means. The Gauss-Markov Theorem¹² states that in a basic regression model with one independent variable and a linear regression function, the least squares estimators are unbiased and have minimum variance among all unbiased linear estimators. Neither estimator tends to overestimate or underestimate systematically.

The coefficient of multiple correlation and its square are both basic to multiple regression. "R" is the product moment correlation of the predicted dependent variables. Finally, the "F" ratio is calculated and its level of significance is stated.

¹²Netter and Wasserman, p. 38.

Summary

It was the purpose of this study to explore the extent to which second grade elementary children gave evidence of using intention cues in their decision-making behavior. In this chapter the sampling techniques have been defined and the two-part data collection method has been explained. The instrumentation has been discussed along with its method of presentation to the 201 young children. The randomized block design for statistical analysis of the data has been presented and diagrammed. The testable hypotheses were presented followed by a detailed discussion of analytical procedures used.

In Chapter IV the analysis and discussion of the statistical comparisons are presented.

CHAPTER IV

ANALYSIS OF THE DATA

Introduction

The purpose of this chapter is to present and discuss the findings as related to the hypotheses stated in Chapter I. The specific aim of the hypotheses was to ascertain the nature of the relationship of (1) level of academic achievement, (2) gender, and (3) size of school enrollment to decision-making behavior in young children. The findings resulting from the statistical procedures used are charted and discussed in this chapter.

Background

In order to establish the normality of the distribution, comprehensive statistical procedures were performed. (These data are charted and located in the Appendices; they include the frequency tables, Third and Fourth Moments, and total performance means, standard deviations, and standard error tables.) The normality of the distribution was strongly established. The ANOVA model was then selected, its three underlying assumptions of normality, independence, and equality of variances having been met.

Analysis of the Results

In order to proceed with analysis of the data, the research hypotheses presented in Chapter I were restated in null or statistical form. These hypotheses are numbered and follow the sequence of their presentation in Chapter I.

Null Hypothesis 1

This hypothesis was formulated to gain evidence for the comparison of subjects according to their achievement. The null hypothesis tested for this comparison was:

1. There is no statistically significant difference according to level of achievement in early primary-grade children's decision-making behavior in relation to intention cues.

The summarized performance of the sample over eight independent variables provided the basis for the selection of high, middle, and lower achievers. The ANOVA for these three cell groups was analyzed comprehensively according to total decision performance with total reading achievement performance as charted in Table 4.1. The F was not significant at the alpha 0.05 level of significance.

Cell means and standard deviations for the sample reveal that the three achievement groups closely approach similarity (Table 4.2).

TABLE 4.1.--ANOVA for Total Decision Performance with Total Reading Achievement.

| Source | df | Mean Squares | F | P < |
|----------------|-----|--------------|------|------|
| Between groups | 2 | 3.919 | .469 | .627 |
| Within | 198 | 8.363 | | |

α .05 (NS).

TABLE 4.2.--Cell Data for Total Decision Performance (N = 201).

| Group | Mean | Standard Deviation | Standard Error |
|------------------|--------|--------------------|----------------|
| Group 1 (N = 67) | 12.850 | 3.22 | 0.39 |
| Group 2 (N = 68) | 13.044 | 2.62 | 0.31 |
| Group 3 (N = 66) | 13.333 | 2.79 | 0.34. |

The rationale for the two additional ANOVAs was to gain a precise analysis while approaching from differentiated perspectives. Accordingly, in Table 4.3 the results of the ANOVA for Total Decision Performance and combined reading and mathematics achievement are presented.

Cell means and standard deviations for the sample are charted in Table 4.4 and reveal that the three achievement groups closely approximate similarity on the dependent variable of Total Decision.

TABLE 4.3.--ANOVA for Total Decision Performance with Combined Reading and Mathematics Achievement.

| Source | df | Mean Squares | F | P < |
|----------------|------------|--------------|-------|------|
| Between groups | 2 | 10.75 | 1.215 | .299 |
| Within | <u>171</u> | 8.85 | | |
| Total | 173 | | | |

α .05 (NS).

TABLE 4.4.--Cell Data for Total Decision Performance on the Basis of Combined Reading and Mathematics Achievement.

| Group | Mean* | Standard Deviation | Standard Error |
|---------|----------------|--------------------|----------------|
| Group 1 | 13.1563 | 3.262 | 0.407 |
| Group 2 | 12.5366 | 2.335 | 0.364 |
| Group 3 | <u>13.4493</u> | 3.013 | 0.365 |
| Total | 13.1264 | | |

*All within 95% C.I.

In the ANOVA for a subset of the dependent decision variable with combined reading and mathematics achievement, the F test was not significant at alpha .05 level. This subset involved only those decision-item incidents which were accidental in nature. The results are charted in Table 4.5.

TABLE 4.5.--ANOVA for Decision Subset (Accidental Incidents) and Achievement.

| Source | df | Mean Squares | F | P < |
|----------------|------------|--------------|------|------|
| Between groups | 2 | 22.066 | .061 | .941 |
| Within | <u>171</u> | 362.685 | | |
| Total | 173 | | | |

An examination of the cell means and standard deviations as presented in Table 4.6 reveals their similarity.

TABLE 4.6.--Cell Data for Decision Performance Subset on the Basis of Combined Reading and Mathematics Achievement.

| Group | Mean* | Standard Deviation | Standard Error |
|---------|-------|--------------------|----------------|
| Group 1 | 8.412 | 2.64 | 0.33 |
| Group 2 | 8.57 | 2.32 | 0.36 |
| Group 3 | 8.55 | 2.14 | 0.25 |

*All within 95% C.I.

TABLE 4.7.--Summary of Performance of Sample Over Independent and Dependent Variables. (Number of subjects = 201.)

| Performance Variable | Mean | Standard Deviation | Standard Error |
|------------------------------|----------|--------------------|----------------|
| <u>Independent Variables</u> | | | |
| Letter Sound | 243.2836 | 134.7581 | -9.505 |
| Word Recognition I | 247.1592 | 134.3118 | 9.474 |
| Reading Comprehension | 241.2289 | 123.1098 | 8.683 |
| Word Recognition II | 245.4129 | 123.1208 | 8.684 |
| Total Reading | 277.0398 | 144.9487 | 10.224 |
| Math. Concept Appl. | 241.8060 | 135.3060 | 9.544 |
| Math. Computation | 302.0896 | 200.8994 | 14.170 |
| Math. Total | 262.4776 | 135.1262 | 9.531 |
| <u>Dependent Variables</u> | | | |
| <u>Decision Total</u> | 13.0746 | 2.8843 | .203 |
| <u>Subset</u> | | | |
| Accidental score | 3.0626 | 3.1792 | |
| Intentional score | 9.9900 | 2.6814 | |

Null Hypothesis 2

This hypothesis was formulated to gain evidence for the comparison of subjects according to their gender.

The null hypothesis tested for this comparison was:

2. There is no statistically significant difference according to gender in children's decision-making behavior in relation to intention cues.

Table 4.8 and Table 4.9 give the summary of the means, standard deviations, and standard errors of the sample over all independent and dependent variables according to gender. Gross examination indicates these

TABLE 4.8.--Summary of Performance of Sample According to Gender Over Independent and Dependent Variables for Male Subjects (N = 107).

| Performance Variables | Mean | Standard Deviation | Standard Error |
|------------------------------|---------|--------------------|----------------|
| <u>Independent Variables</u> | | | |
| Letter Sound | 255.449 | 168.126 | 16.253 |
| Word Recognition I | 261.037 | 167.465 | 16.189 |
| Reading Comprehension | 253.243 | 152.609 | 14.753 |
| Word Recognition II | 254.907 | 150.400 | 14.540 |
| Total Reading | 296.131 | 191.480 | 18.511 |
| Math. Concept Appl. | 255.439 | 169.332 | 16.370 |
| Math. Computation | 323.206 | 231.461 | 22.376 |
| Math. Total | 271.280 | 167.827 | 16.224 |
| <u>Dependent Variable</u> | | | |
| Decision | 12.570 | 3.099 | 0.300 |

TABLE 4.9.--Summary of Performance of Sample According to Gender Over Independent and Dependent Variables for Female Subjects (N = 94).

| Performance Variables | Mean | Standard Deviation | Standard Error |
|------------------------------|---------|--------------------|----------------|
| <u>Independent Variables</u> | | | |
| Letter Sound | 231.681 | 83.216 | 8.583 |
| Word Recognition I | 233.862 | 83.652 | 8.628 |
| Reading Comprehension | 231.138 | 82.833 | 8.544 |
| Word Recognition II | 236.638 | 83.333 | 8.595 |
| Total Reading | 263.021 | 90.514 | 9.336 |
| Math. Concept Appl. | 229.255 | 84.126 | 8.677 |
| Math. Computation | 286.085 | 172.647 | 17.087 |
| Math. Total | 250.021 | 87.219 | 8.996 |
| <u>Dependent Variable</u> | | | |
| Decision | 13.532 | 2.869 | 0.296 |

statistics to be differentiable according to gender. The ANOVA was then performed in the two tables which follow, Tables 4.10 and 4.11.

The ANOVA for gender with Decision Performance indicates the F is not significant at the alpha .05 level.

TABLE 4.10.--ANOVA for Gender with Decision Performance.

| Source | df | Mean Squares | F | P < |
|----------------|-----|--------------|------|------|
| Between groups | 1 | 3.679 | .360 | .549 |
| Within | 197 | 10.212 | | |

α .05 (NS).

The ANOVA for gender with Decision Performance subset in Table 4.11 indicates that the F is not significant at the alpha .05 level.

TABLE 4.11.--ANOVA for Gender with Decision-Subset Performance.

| Source | df | Mean Squares | F | P < |
|----------------|-----|--------------|-------|------|
| Between groups | 1 | 18.021 | 2.454 | .119 |
| Within | 197 | 7.341 | | |

α .05 (NS).

Null Hypothesis 3

This hypothesis was formulated in order to gain evidence for the comparison of subjects according to the magnitude of school census. The null hypothesis tested for this comparison was:

3. There is no statistically significant difference according to size of school enrollment in children's decision-making behavior with regard to intention cues.

In Tables 4.12 and 4.13 the means and standard deviations of the sample on the dependent variable (Decision and subset) reveal similarity according to size of school enrollment.

TABLE 4.12.--Cell Data Schools-Decision Variable Subset.

| Group | Mean | Standard Deviation |
|---------------|-------|--------------------|
| Large schools | 5.747 | 2.979 |
| Small schools | 6.451 | 3.350 |

TABLE 4.13.--Cell Data for School Decision Subset.

| Group | Mean | Standard Deviation |
|---------------|-------|--------------------|
| Large schools | 6.765 | 2.594 |
| Small schools | 6.587 | 2.748 |

The ANOVA of size of school enrollment with the dependent variable of Decision and Decision subset is presented in Tables 4.14 and 4.15. The F is not significant at the alpha .05 level.

TABLE 4.14.--ANOVA for Schools with Decision.

| Source | df | Mean Squares | F | P < |
|----------------|-----|--------------|------|------|
| Between groups | 1 | 3.628 | .355 | .552 |
| Within | 197 | 10.212 | | |

α .05 (NS).

TABLE 4.15.--ANOVA for Schools with Decision Subset.

| Source | df | Mean Squares | F | P < |
|----------------|-----|--------------|------|------|
| Between groups | 1 | 3.502 | .477 | .490 |
| Within | 197 | 7.340 | | |

α .05 (NS).

Summary of Results

| <u>Null Hypotheses</u> | <u>Statement of Rejection or Non-rejection</u> |
|--|--|
| 1. There is no statistically significant difference according to level of academic achievement in early primary-grade children's decision-making behavior in relation to intention cues. | Non-rejection |
| 2. There is no statistically significant difference according to gender in children's decision-making behavior in relation to intention cues. | Non-rejection |
| 3. There is no statistically significant difference according to size of school enrollment in children's decision-making behavior in relation to intention cues. | Non-rejection |

CHAPTER V

SUMMARY, CONCLUSIONS, AND
RECOMMENDATIONS

This chapter includes a brief summary of the study followed by the conclusions, discussion of findings, and the recommendations.

Summary of the Study

It was the purpose of this study to explore the extent to which second grade children made use of intention cues in decision-making behavior. The differences among the children were explored with regard to levels of academic achievement on standardized measures adopted by their school systems, and according to gender and numerical enrollment of the school.

The population for this investigation included the children in four second grade classrooms in the public elementary school system of a standard metropolitan area of the United States. From the population, by means of cluster sampling techniques, a representative subgroup was formed from those children who returned signed permission slips. Post hoc stratification techniques were then applied to the sample to identify the higher,

middle, and lower achievers according to their performance levels on the standardized measures formally adopted for use in the school system. Additional groups were generated according to gender and size of school enrollment. Two hundred eight children were sampled of which 201 yielded data for investigation.

Straightforward statistical techniques were used to analyze the relationship of performance on the dependent variable to that on the eight independent variables. "Dummy" variables were not employed.

The two-part instrumentation included standardized achievement tests of basic skills in areas of reading and mathematics and a series of concrete incidents involving children's activities on which to base a decision. These incidents were presented to the children by means of an electronic tape recorder, having the advantage of uniform presentation to all subjects along with the normal limiting factors of the auditory medium. One-half of the incidents were accidental in nature and one-half were intentional. Children were scored zero or one for each item according to their assessment of the intentionality of the doer. Intention cues provided the basis for decision. Higher scores on the dependent variable were indicative of greater frequency of usage of intention cues.

The hypotheses tested for exploration of the data concerned (1) the relationship of achievement to decision-making behavior in relation to intention cues, (2) the relationship of gender to decision-making in relation to intention cues, (3) the relationship of size of school enrollment to decision-making in relation to intention cues.

The three one-way analyses of variance applied to the data revealed no statistically significant differences predicated by factors of achievement, gender, or size of school enrollment in the decision-making behavior in relation to intention cues.

Conclusions

Within the limiting factors of this investigation, the following conclusions appear to be reasonable:

1. The decision-making behavior among the second grade children of this sample in a statistically significant manner cannot be differentiated according to level of academic achievement as indicated by reading and mathematics performance.

The objective analysis of the performance of the sample when divided across achievement variables indicated their similarity. Multiple perspectives as employed supported this conclusion. Additionally, the more than ample size of the sample gave credence to the findings upon which this conclusion is based.

2. The gender of second grade children evinced no statistically significant differences within this sample, on their decision-making behavior in relation to intention cues.

On gross examination the descriptive and summary statistics evidenced differentiation according to gender. However, the "F" test did not support the gross indication.

3. The variable of size of school enrollment offers no statistically significant evidence of effect upon the decision-making behavior of the second grade children of this sample.

The large school census exceeded 1,100 children. The small school census parameters were 300 to 400 children. Statistical analysis did not reveal school enrollment to be a significant factor.

Discussion of the Findings

In the preceding sections of this study the statistical findings were presented in a straightforward, objective manner without bias or discussion. In this section, a discussion of the statistical findings related to the hypotheses is presented in the same order as their earlier placement in the study.

Null Hypothesis 1

Null Hypothesis 1 stated that there is no statistically significant difference according to level of achievement within an early primary grade in a child's decision-making behavior in relation to intention cues.

The statistical findings called for non-rejection at the alpha 0.05 level of significance. Reasons for this occurrence may center upon the selection of the total reading performance first, then a combination of total reading and performance in mathematical computation as independent variables for the analysis of variance procedures with the dependent variable of decision-making. Finally, a subset of the dependent variable of decision-making, namely, the performance of the sample only on the accidental incidents of the decision variable, was subjected to analysis of variance procedures. Again, there was no statistically significant difference.

The reason appears to center in the fact that the total reading independent variable is composed of four subsets. These are (1) Letter Sound, (2) Word Recognition I, (3) Reading Comprehension, and (4) Word Recognition II. The composite performance, as represented by the total reading score, tends to obscure precise strength in any one element of the set of reading achievement variables. Precise strength apparent in one

of the elements may be more closely related to the dependent variable at a significant level.

In regard to mathematical computation, the fact that its performance score was also combined with that of total reading had the tendency to obscure its precise strength in relation to the dependent variable of decision-making.

Null Hypothesis 2

Null Hypothesis 2 stated that there is no statistically significant difference according to gender in children's decision-making behavior in relation to intention cues.

The statistical findings called for non-rejection of this hypothesis at the alpha 0.05 level of significance. The reasons for this lack of significant differences when the sample was divided for analysis on the basis of sex may reside in the fact that children of this early primary-grade placement do not exhibit sexual differences in the human phenomenon of decision-making. Of interest, however, are the slight differences in summary or descriptive statistics of the total performance of the sample when divided according to sex. Especially with regard to mathematical computation was the difference most pronounced. This observation was a factor in the early deliberations of the study and resulted in the

decision to apply analysis of variance procedures on the basis of sex. The findings are similar to the report of Fennema and Sherman¹ in their recent study, "Sex-Related Differences in Mathematics Achievement, Spatial Visualization, and Affective Factors." They found no significant evidence of innate, sex-related cognitive differences in a sample of more than 1,000 children. They did find attitudinal sexual differences and concluded that social-cultural factors play a role.

Null Hypothesis 3

Null Hypothesis 3 stated that there is no statistically significant difference according to school enrollment in children's decision-making behavior in relation to intention cues. The statistical findings called for non-rejection of this hypothesis at the alpha 0.05 level of significance.

Observations during the data-gathering phases of the study revealed that the school enrollment in one of the schools was markedly larger than that of the other three schools. The large school had an enrollment in excess of 1,000 children, the three smaller schools an enrollment of 300 to 400 pupils.

¹Elizabeth Fennema and Julia Sherman, "Sex-Related Differences in Mathematics Achievement, Spatial Visualization, and Affective Factors," American Educational Research Journal 14, No. 1 (Winter 1977): 51-72.

Based upon the statistical findings, it is the supposition of the researcher that the interaction ratio of pupils to teachers may be the more decisive factor. This class-size ratio appeared to be approximately the same in the four locations of the study.

Correlation Coefficients

Pearson Product Moment Correlation Coefficients were calculated in order to measure the strength of the relationship between each independent variable of the achievement battery and the dependent variable of decision-making. Each coefficient indicated "goodness of fit" of the linear regression line to the data, as well as (when squared) the proportion of variance in one variable explained by the other.

Mathematically, the Pearson Product Moment Correlation Coefficient is defined as the ratio of covariance to square root of the product of the variation in the independent variable and the variation in the dependent variable, with X and Y symbolizing the two variables. The formula is as follows:

$$r = \frac{\sum_{i=1}^N (X_i - \bar{X}) (Y_i - \bar{Y})}{\left[\left[\sum_{i=1}^N (X_i - \bar{X})^2 \right] \left[\sum_{i=1}^N (Y_i - \bar{Y})^2 \right] \right]^{1/2}}$$

where

X_i = the i^{th} observation of variable X,

Y_i = the i^{th} observation of variable Y,

N = the number of observations,

\bar{X} = the mean of variable X, and

\bar{Y} = the mean of variable Y.

The reported significance tests for each coefficient were derived from the use of student's t with $N - 2$ degrees of freedom.

$$r \left[\frac{N - 2}{1 - r^2} \right]^{1/2}$$

It has been noted that it is highly unusual in behavioral research to find a regression line which perfectly fits collected data. The Pearson Product Moment Correlation Coefficients among all variables were calculated in order to gain information regarding the strength of the relationship. Table 5.1 gives extracted findings.

A statistically significant relationship exists with regard to Word Recognition I, Mathematics Computation and Decision-making variable.

It bears repeating that it is highly unusual in behavioral research to find a regression line which perfectly matches collected data. However, Table 5.1 indicates a statistically significant relationship with

TABLE 5.1.--Pearson Product Moment Correlation Coefficients for Independent Variables and Dependent Decision Total Variable.

| Variable | PPM Coefficient | N |
|------------------------------|-----------------|-----|
| <u>Independent Variables</u> | | |
| 1. Letter Sound | .1024*** | 195 |
| 2. Word Recognition I | .1317* | 195 |
| 3. Reading Comprehension | .0457 | 196 |
| 4. Word Recognition II | .0812 | 196 |
| 5. Total Reading | .1097** | 194 |
| 6. Math. Concept Application | -.0080 | 195 |
| 7. Math. Computation | .1337* | 186 |
| 8. Total Mathematics | .0269 | 195 |

*Significant at 0.05 or better.

**Significant at 0.064.

***Significant at 0.07.

regard to the dependent variable of decision-making and both Word Recognition I and Mathematical Computation.

These statistical findings strongly invite further research. The competencies indicated by skills in word recognition and mathematical computation may be related to the competencies inherent within the phenomenon of decision-making. Further research is recommended. The present indication of a statistically significant relationship at the alpha 0.05 level invites further statistical analysis.

Summary

In this section the findings related to null hypotheses have been discussed in the same order as they first appeared in the study. Statistical analyses of data did not reveal statistically significant differences at the alpha 0.05 level according to achievement, gender, or school enrollment.

Pearson Product Moment Correlation procedures did produce coefficients which were significant at the alpha 0.05 level in Word Recognition I and Mathematical Computation with the dependent variable of decision-making.

Recommendations for Further Research

This study sought to shed light on the natural phenomenon of decision-making, thereby reducing its innate complexity to a manageable conceptualization. An exploration of the variance with other factors hypothesized to be related was conducted. During the course of the fascinating exploration, new insights were gained which generated recommendations for further research. These recommendations are as follows:

First, an in-depth multivariate analysis model should be selected and applied to the analysis of variables hypothesized to be related to the phenomenon of decision-making. The use of canonical correlation

analysis² should be considered as its basic strategy is to derive a linear combination from each of two sets of variables in such a way that the correlation between the two is maximized. The result could be an accounting for the maximum amount of relationship between two sets of variables. Further, techniques of scalogram analysis should be applied to variables related to decision-making in order to ascertain the nature of the relationship with affective and attitudinal components hypothesized to exist within the phenomenon. The usage of Likert, Guttman and other scales with subjects, their peers, parents, and teachers, may be expected to shed further light on the decision-making process.

Second, continued research in the area of conceptual perspective taking as engaged in by humankind is recommended. The inferences made regarding the less tangible aspects of another's internal experience, such as his intentions, are hypothesized to be related to decision-making. Broader, yet more precise, research in this illusive area is recommended. Marvin³ and

²Paul Vincent Warwick, "Canonical Correlation Analysis," in Statistical Package for the Social Sciences, 2nd ed., Norman H. Nie et al., eds. (New York: McGraw-Hill Book Co., 1975), pp. 515-527.

³Robert S. Marvin et al., "The Early Development of Conceptual Perspective-Taking: Distinguishing Among Multiple Perspectives," Child Development 47 (1976): 511.

Flavell⁴ have indicated a direction in their writings on role-taking and perspective-taking in young children.

Third, communication receptivity and its relation to decision-making is an area fertile for research. It may be approached from the viewpoint of psycholinguistic theory. The question of the means and mechanisms by which a child learns to receive, synthesize, and respond to varied communications systems bears further research.

Fourth, the areas of interpersonal antecedents and correlates to the phenomenon of decision-making demand investigation. The child's experiences with his parents, peers, and teachers merit further exploration. Are there certain kinds of human environments which enhance decision-making in the young child? This question is worthy of in-depth exploration.

Fifth, the vital contribution of teacher behavior toward the enhancement of the child's potential is a recognized given and continues to be investigated. Certainly, the emphasis is not misplaced. The influence of the individual educator as the professional communicator of society's mores to its young is unquestioned. The overt and covert operational atmosphere of the classroom and its relation to enhancing decision-making behavior in young children bears ongoing, longitudinal investigation.

⁴Flavell et al., Development of Role-Taking.

Sixth, the post hoc examination of the Pearson Product Moment Correlation Coefficients indicated a significant relationship between the dependent variable of decision-making and two elements within the set of achievement variables; namely, the competencies in Word Recognition I and in Mathematical Computation. These findings strongly invite further research. Clearer insight into the nature of this relationship reasonably might be hypothesized to suggest points of emphasis for effective instruction aimed toward increasing decision-making competencies in young children.

In a natural progression the next step would be a spectrum of planned, controlled pilot programs involving parents, pupils and teachers. Selected methods used on a controlled time arrangement (such as 20 minutes, three times weekly in school) might be implemented. After one school year post-testing might reveal new findings. Innovative parent-participation sequences are possible, such as (1) small-group simulation games conducted by parent volunteers on a controlled time basis, and (2) selected small-group tutoring by parent volunteers in word recognition skills or mathematics computation skills.

The final recommendation is aimed toward the approach of future researchers with children. The aim is to avoid ambivalent or imprecise results in any

research endeavor in order to maintain the thrust of the research toward (a) introducing positive educational interventions, (b) diminishing inequities which exist, and (c) improving the condition of humankind.

In this regard, the researcher has a responsibility to search out and disseminate truth. The equally important balance to this responsibility is the nature of the resultant consequence. One such consequence has tended to be the almost reflex-like attribution of blame to the intended beneficiaries of the research model if it has not been proven overwhelmingly successful. The professional literature abounds with explanations indicating that a particular educational intervention as conceived by the researcher failed only because of the resistance of teachers or because the target population was innately incapable of improving. The professional and humanitarian issues attendant upon research in the behavioral sciences demand replication studies followed by discerning, considered, judicious application of findings and the conclusions.

It is hoped that the explorations of this study will generate further questions and stimulate ongoing replicatory research in the area of decision-making in young children.

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APPENDICES

APPENDIX A

FREQUENCY DISTRIBUTION OF TOTAL READING
EXPANDED STANDARD SCORES INCLUDING
MEAN AND STANDARD DEVIATION

APPENDIX A

FREQUENCY DISTRIBUTION OF TOTAL READING EXPANDED STANDARD SCORES INCLUDING MEAN AND STANDARD DEVIATION

(201 Subjects)

| Interval | Boundaries | Midpoint | Frequency | Cumulative Frequency |
|----------|-------------|----------|-----------|-------------------------|
| 344-363 | 343.5-363.5 | 353.5 | 4 | 4 |
| 324-343 | 323.5-343.5 | 333.5 | 10 | 14 |
| 304-323 | 303.5-323.5 | 313.5 | 7 | 21 |
| 284-303 | 283.5-303.5 | 293.5 | 30 | 51 |
| 264-283 | 263.5-283.5 | 273.5 | 28 | 79 |
| 244-263 | 243.5-263.5 | 253.5 | 31 | 110 |
| 224-243 | 223.5-243.5 | 233.5 | 28 | 138 |
| 204-223 | 203.5-223.5 | 213.5 | 23 | 161 |
| 184-203 | 183.5-203.5 | 193.5 | 15 | 176 |
| 164-183 | 163.5-183.5 | 173.5 | 10 | 186 |
| 144-163 | 143.5-163.5 | 153.5 | 8 | 194 |
| 124-143 | 123.5-143.5 | 133.5 | 7 | 201 |

$\bar{X} = 277.0398$

S.D. = 144.9487

APPENDIX B

FREQUENCY DISTRIBUTION OF TOTAL MATHE-
MATICS EXPANDED STANDARD SCORES
INCLUDING MEAN AND STANDARD
DEVIATION

APPENDIX B

FREQUENCY DISTRIBUTION OF TOTAL MATHEMATICS EXPANDED STANDARD SCORES INCLUDING MEAN AND STANDARD DEVIATION

(201 Subjects)

| Class Interval | Class Boundaries | Class Midpoint | Frequency | Cumulative Frequency |
|----------------|------------------|----------------|-----------|----------------------|
| 321-340 | 320.5-340.5 | 330.5 | 4 | 4 |
| 301-320 | 300.5-320.5 | 310.5 | 3 | 7 |
| 281-300 | 280.5-300.5 | 290.5 | 17 | 24 |
| 261-280 | 260.5-280.5 | 270.5 | 38 | 62 |
| 241-260 | 240.5-260.5 | 250.5 | 43 | 105 |
| 221-240 | 220.5-240.5 | 230.5 | 30 | 135 |
| 201-220 | 200.5-220.5 | 210.5 | 22 | 157 |
| 181-200 | 180.5-200.5 | 190.5 | 21 | 178 |
| 161-180 | 160.5-180.5 | 170.5 | 13 | 191 |
| 141-160 | 140.5-160.5 | 150.5 | 3 | 194 |
| 140 and below | Below 140.5 | Below 130.5 | 7 | 201 |

$\bar{X} = 262.4776$

S.D. = 135.1262

APPENDIX C

FREQUENCY DISTRIBUTION OF TOTAL DECISION
SCORES INCLUDING MEAN AND
STANDARD DEVIATION

APPENDIX C

FREQUENCY DISTRIBUTION OF TOTAL DECISION SCORES INCLUDING MEAN AND STANDARD DEVIATION

(201 Subjects)

| Class Interval | Boundaries | Class Midpoint | Frequency | Cumulative Frequency |
|----------------------------|---------------|----------------|-----------|----------------------|
| 0.884-1.000 | 0.8845-1.0000 | 0.942 | 3 | 3 |
| 0.769-0.883 | 0.7685-0.8845 | 0.827 | 4 | 7 |
| 0.653-0.768 | 0.6525-0.7685 | 0.711 | 15 | 22 |
| 0.538-0.652 | 0.5375-0.6525 | 0.591 | 44 | 66 |
| 0.423-0.537 | 0.4225-0.5375 | 0.481 | 106 | 172 |
| 0.307-0.422 | 0.3065-0.4225 | 0.365 | 27 | 199 |
| 0.192-0.306 | 0.1915-0.3065 | 0.250 | 2 | 201 |
| 0.076-0.191 | 0.0755-0.1915 | 0.134 | 0 | 201 |
| Total: $\bar{X} = 13.0746$ | | S.D. = 2.8843 | | |

APPENDIX D

THIRD AND FOURTH MOMENT STATISTICS

FOR MALE SUBJECTS

APPENDIX D

THIRD AND FOURTH MOMENT STATISTICS FOR MALE SUBJECTS

(107 Subjects)

| Variable | Mean | Third Moment | Fourth Moment |
|-----------------------|--------|-----------------|------------------|
| Letter Sound | 255.44 | 4.08 | 15.23 |
| Word Recognition I | 261.03 | 4.05 | 14.99 |
| Reading Comprehension | 253.24 | 4.47 | 18.88 |
| Word Recognition II | 254.90 | 4.57 | 19.84 |
| Total Reading | 296.13 | 3.20 | 9.01 |
| Math. Concept Appl. | 255.43 | 4.01 | 14.76 |
| Math. Computation | 323.20 | 2.52 | 4.55 |
| Mathematics Total | 271.28 | 3.78 | 13.91 |
| Decision Performance | 12.57 | .41 | 3.91 |

APPENDIX E

THIRD AND FOURTH MOMENT STATISTICS

FOR FEMALE SUBJECTS

APPENDIX E

THIRD AND FOURTH MOMENT STATISTICS FOR FEMALE SUBJECTS

(94 Subjects)

| Variable | Mean | Third Moment | Fourth Moment |
|-----------------------|--------|-----------------|------------------|
| Letter Sound | 231.68 | 8.43 | 75.59 |
| Word Recognition I | 233.86 | 8.23 | 73.09 |
| Reading Comprehension | 231.13 | 8.58 | 77.27 |
| Word Recognition II | 236.68 | 8.23 | 73.15 |
| Total Reading | 263.02 | 5.70 | 44.72 |
| Math. Concept Appl. | 229.25 | 8.24 | 73.21 |
| Math. Computation | 286.08 | 3.77 | 12.81 |
| Total Mathematics | 250.02 | 6.77 | 56.24 |
| Decision Performance | 13.53 | .83 | 1.37 |

APPENDIX F

PERMISSION LETTER

APPENDIX F

PERMISSION LETTER

October 8, 1976

PUBLIC SCHOOLS

This is my consent to allow the doctoral candidate named below access to the school test record (CTBS) of my child, _____

(name of child)

and to allow my child to participate in an approved study on the decision-making skills of second grade boys and girls. Short stories will be read to the children. The children will then decide the outcome of each story.

SIGNED:

(Signature of Parent/Guardian)

Iantha C. Beckett
Doctoral Candidate
Michigan State University
College of Education